SUMMARY

2005 Site Environmental Report

BROOKHAVEN NATIONAL LABORATORY







ABOUT THE COVER

On the front cover is a photo of a Slaty Skimmer *(Libellula incesta)*. The photo was taken by BNL staff photographer Roger Stoutenburgh. This is just one of the many dragonflies found on site. The photos of damselflies and dragonflies on the inside cover were taken by BNL's Natural Resource Manager, Tim Green or one of his many interns.

Over the past several years, BNL has been conducting surveys of the damselflies and dragonflies found on site. Damselflies and dragonflies belong to the Order Odonata. Damselflies are more delicate, have thinner abdomens, and generally fold their wings over their abdomens when at rest (top two photos). Dragonflies tend to be more stocky, are agile fliers, and hold their wings away from their bodies when at rest. Both have aquatic larva and are good indicators of aquatic health. To date, BNL has identified 56 species of damselflies and dragonflies on site.

Inside front Cover
1st Row (Left) - Lyre-tipped spreadwing *(Lestes unguiculatus)* (Right) - Familiar bluet *(Enallagma civile)*
2nd Row (Left) - Swamp Darner *(Epiaeschna heros)* (Right) - Wandering Glider *(Pantala flavescens)*
3rd Row (Left) - Twelve-spotted Skimmer *(Libellula pulchella)* (Right) - Widow Skimmer *(Libellula luctuosa)*
4th Row - Cherry-faced Meadowhawk *(Sympetrum internum)*.

The Brookhaven National Laboratory 2005 Site Environmental Report is a public document that is distributed to various U.S. Department of Energy sites, local libraries, and local regulators and stakeholders. The report is available to the general public on the internet at http://www.bnl.gov/esd/ser.asp. A summary of the report is also available and is accompanied by a compact disk containing the full report. To obtain a copy of the summary and CD, please write or call:

Brookhaven National Laboratory
Environmental and Waste Management Services Division
Attention: SER Project Coordinator
Building 120
P.O. Box 5000
Upton, NY 11973-5000
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2005 Site Environmental Report Summary

BROOKHAVEN NATIONAL LABORATORY

Although I was just named Director of Brookhaven Lab in August 2006, I've worked here for 28 years in several scientific and management positions. During that time, I've witnessed first-hand how important it is for the Laboratory to not only conduct great science, but to back it up with excellence in our operations and openness in our relationships with the many, many communities we serve.

Our environmental performance is, in many ways, key to our success. I am well aware of the tremendous progress we have made in this area in recent years, and I am fully committed to the programs we have in place to help us maintain environmental excellence here at the Laboratory.

In 2005, Brookhaven Lab celebrated a major milestone marking the successful completion of several high-priority cleanup projects that were part of an interagency agreement reached in 1992. Working closely with the Department of Energy, regulatory agencies, our local government, and our neighbors, we've cleaned up billions of gallons of groundwater, removed hundreds of tons of contaminated soil from the site, and restored the Peconic River, a crucial Long Island resource.

Through the Laboratory's Environmental Management System and our Environmental, Safety, Security, and Health Policy, our commitments to compliance, pollution prevention, cleanup, community outreach, and continual improvement remain strong. This report captures our performance for 2005, and I believe it documents our continued progress in each of these areas.

Samuel Aronson
Laboratory Director

EXPLORING EARTH'S MYSTERIES
...PROTECTING ITS FUTURE

Preface

Each year, Brookhaven National Laboratory (BNL) prepares an annual Site Environmental Report (SER) in accordance with the U.S. Department of Energy (DOE) Order 231.1A, Environment, Safety and Health Reporting. The SER is written to inform the public, regulators, Laboratory employees, and other stakeholders of BNL's environmental performance during the calendar year in review. The report summarizes BNL's environmental data; environmental management performance; compliance with applicable DOE, federal, state, and local regulations; and compliance, restoration, and surveillance monitoring 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 SER is intended to be a technical document and is available in print and as a downloadable file. This summary provides a general overview of the SER and includes the full report on CD, which can be found on the inside back cover of this booklet. The summary is intended for public distribution in support of BNL's educational and community outreach and as part of DOE's commitment to conveying environmental performance to people living near DOE facilities and to other interested stakeholders. Both the full report and the summary are available as downloadable files on the BNL web page at http://www.bnl.gov/ewms/SER.asp.

ESSH Policy

The Laboratory's Environmental, Safety, Security, and Health (ESSH) 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 ESSH Policy is posted throughout the site, on the BNL website at http://www.bnl.gov/ESQH/ESSH.asp, and is included in all training programs for new employees, guests, and contractors.

BROOKHAVEN
NATIONAL LABORATORY

Environmental, Safety, Security, and Health Policy

Brookhaven National Laboratory

This document is a statement of BNL's ESSH policy. BNL is a world leader in scientific research and strives to demonstrate excellence in protecting people, property, and the environment.

I expect every employee, contractor, and guest to take personal responsibility for adhering to the following principles:

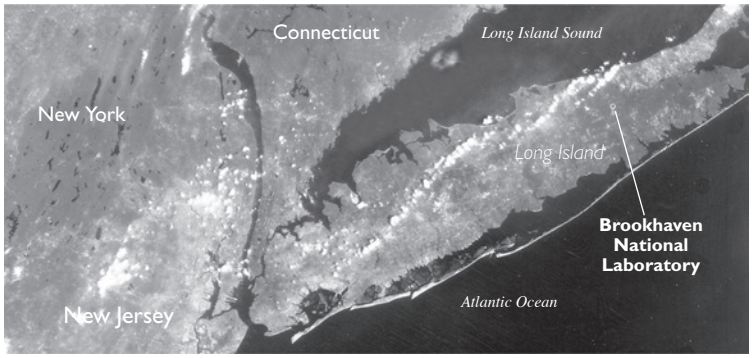
- Environment: We protect the environment, conserve resources, and prevent pollution.
- Safety: We maintain a safe workplace and we plan our work and perform it safely. We take responsibility for the safety of ourselves, coworkers, and guests.
- Security: We protect people, property, information, computing systems, and facilities.
- Health: We protect human health within our boundaries and in the surrounding community.
- Compliance: We achieve and maintain compliance with applicable ESSH requirements.
- Community: We maintain open, proactive, and constructive relationships with our employees, neighbors, regulators, DOE, and our other stakeholders.
- Continual Improvement: We continually improve ESSH performance.

In addition to my annual review of BNL's progress on ESSH goals and adherence to this policy, I invite all interested parties to provide me with input on our performance relative to this policy, and the policy itself.

Signed _____ September 6, 2006

Sam Aronson, Director

Brookhaven National Laboratory is one of ten national laboratories overseen and primarily funded by the Office of Science of the U.S. Department of Energy. The Laboratory conducts research in nuclear and high-energy physics, physics and chemistry of materials, environmental and energy research, nonproliferation, neurosciences and medical imaging, and structural biology. BNL also builds and operates major scientific facilities available to university, industry, and government researchers. Established in 1947, BNL is operated and managed by Brookhaven Science Associates (BSA). BSA, a non-profit, 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 SUNY-Stony Brook, is the legal entity responsible for leading BNL successfully through the 21st century. Stony Brook University and Battelle have been managing and operating the Laboratory under a performance-based contract with DOE since 1998. From 1947 to 1998, BNL was operated by Associated Universities Incorporated. Prior to 1947, the site operated as Camp Upton, a U.S. Army training camp, which was active from 1917 to 1920 during World War I and from 1940 to 1946 during World War II.



Satellite photo showing location of BNL. The small circle is the Relativistic Heavy Ion Collider, known as RHIC.

The Laboratory's broad mission is to produce world-class science and advanced technology in a safe and environmentally sound manner with the cooperation, support, and appropriate involvement of its scientific and local communities. BNL has a staff of approximately 3,000 scientists, engineers, technicians, and support staff and over 4,000 guest researchers annually. The fundamental elements of the Laboratory's role in support of DOE's strategic missions in energy resources, environmental quality, and national security are:

- To conceive, design, construct, and operate complex, leading-edge, user-oriented research facilities in response to the needs of DOE and the international community of users.
- To carry out basic and applied research in long-term, high-risk programs at the frontier of science.
- To develop advanced technologies that address national needs and to transfer them to other organizations and to the commercial sector.
- To disseminate technical knowledge to educate future generations of scientists and engineers, to maintain technical capabilities in the nation's workforce, and to encourage scientific awareness in the general public.

BNL is located on Long Island, 60 miles east of New York City. The Laboratory's 5,265-acre site is near Long Island's geographic center and is part of the Town of Brookhaven, the largest township (both in area and population) in Suffolk County. The Laboratory annually hosts an estimated 4,000 visiting scientists, more than 30 percent of whom are from New York State universities and businesses. The visiting scientists and their families, as well as students, reside in apartments and dormitories on site or in the surrounding communities. More than 75 percent of BNL employees live in Suffolk County.

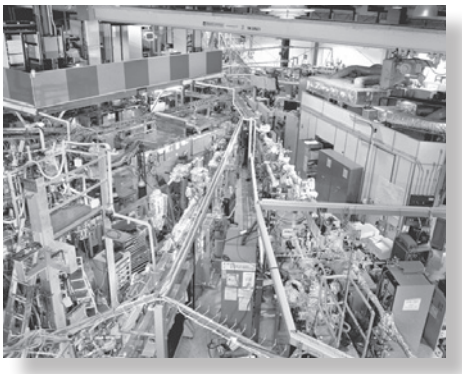
The Laboratory is one of five large, high-technology employers on Long Island. An independent Suffolk County Planning Commission concluded that BNL's spending for operations, procurement, payroll, construction, medical benefits, and technology transfer spreads throughout Long Island's economy, making BNL vital to the local economic health. Several of the Laboratory's currently planned projects, which include the Research Support Center and the Center for Functional Nanomaterials (both currently under construction) and the proposed building of a new synchrotron light source, are expected to significantly enhance BNL's economic value to Long Island and New York State.

In 2005, BNL's total procurement budget was approximately $465 million, of which $280 million was spent on employees' salaries, wages, and fringe benefits. In addition, the Laboratory purchased $26.7 million worth of supplies and services from Long Island businesses. Out of that amount, approximately $22.4 million was spent on approximately 3,000 purchases in Suffolk County and approximately $4.3 million went toward 507 purchases made in Nassau County.

Research and Discoveries at BNL

BNL is home to many world-class research facilities and scientific departments which attract resident and visiting scientists from all over the world in many fields. To date, research at the Laboratory has produced six Nobel Prizes http://www.bnl.gov/bnlweb/history/nobel/. Listed below are just some examples of current research and discoveries at BNL. Further information can be found at http://www.bnl.gov/bnlweb/research_list.asp.

a.



b.

c.

Examples of Current Research

- Investigation of new nanostructures, objects on the scale of a billionth of a meter
- High-temperature superconductors—materials that, below a certain temperature, conduct electricity with no resistance
- New states of matter being produced at the Relativistic Heavy Ion Collider
- Nanoparticles which may lead to catalytic converters that are better at cleaning up auto exhaust
- Medical imaging techniques to investigate the brain mechanisms underlying drug addiction
- New methods of understanding the earth's climate
- Research into how infections begin, which may lead to better prevention

BNL Discoveries

- L-dopa, used to treat Parkinson's disease
- Magnetically-levitated (maglev) trains
- Pioneering work using x-rays and neutrons to study biological specimens, leading to the modern science of structural biology
- The radionuclide thallium-201, used in hundreds of thousands of heart stress-tests each year
- The radionuclide technetium-99m, used to diagnose heart disease and other ailments in over 11 million Americans each year
- x-ray angiography for non-invasive heart imaging
- Pioneering solar neutrino studies seeking the answer to the mystery of the "missing" neutrinos from our solar system's sun, and neutrino bursts from supernovae
- The strong focusing principle, crucial to the function of all modern particle accelerators.

a. BNL's National Synchrotron Light Source is a major user facility, drawing close to 2,500 visiting researchers each year. Using intense beams of x-rays and ultraviolet light, researchers carry out a wide range of studies in diverse scientific fields.

b. The Positron Emission Tomography (PET) facility is used to conduct brain research, including how drugs, mental illness, nicotine, alcohol, and normal aging affect the brain.

c. A view of the superconducting magnets at BNL's Relativistic Heavy Ion Collider. As gold particles zip along the collider's 2.4 mile long tunnel at nearly the speed of light, 1,740 of these magnets guide and focus the particle beams.

Aerial photograph of the BNL site.

BNL Facilities and Operations

The Laboratory's 5,265 acres are mostly wooded and part of the native Long Island Pine Barrens ecosystem. Most of BNL's principal facilities are located near the center of the site. The developed area is approximately 1,650 acres:

- 500 acres originally developed by the U.S. Army (as part of Camp Upton) and still used for offices and other operational buildings
- 550 acres used for outlying facilities, such as the Sewage Treatment Plant, agricultural research fields, housing facilities, and fire breaks
- 400 acres of roads, parking lots, and connecting areas
- 200 acres occupied by large, specialized research facilities

Construction of the Center for Functional Nanomaterials (CFN) began in the spring of 2005, with building occupancy and technical equipment installation to begin in early 2007. One of five nanotechnology centers approved by DOE, it will provide researchers with state-of-the-art capabilities to fabricate and study nanoscale materials. Construction of BNL's Research Support Building also began in the spring of 2005. This new building will consolidate frequently visited administrative and support functions in a single location to provide more efficient administrative services to Laboratory employees and visiting scientists. The existing major scientific facilities at BNL are briefly described on the following page. The three former research reactors (the Brookhaven Graphite Research Reactor, the High Flux Beam Reactor, and the Brookhaven Medical Research Reactor) are no longer operating. Other facilities, which are briefly described below, support BNL's science and technology mission by providing basic utility and environmental services. All of the research and support facilities must undergo periodic environmental review as part of BNL's Environmental Management Program.

- *Central Chilled Water Plant.* This plant provides chilled water sitewide for air conditioning and process refrigeration via underground piping. The plant has a large refrigeration capacity and reduces the need for local refrigeration plants and air conditioning.
- *Central Steam Facility.* This facility provides high-pressure steam for facility and process heating sitewide. Either natural gas or fuel oil can be used to produce the steam, which is conveyed to other facilities through underground piping. Condensate is collected and returned to the facility for reuse, to conserve water and energy.
- *Fire Station.* The BNL Fire Rescue Group provides on-site fire suppression, emergency medical services, hazardous material response, salvage, and property protection. The fire rescue group responds within 5 minutes to any emergency in the core area of the Laboratory and within 8 minutes to emergencies in the outer areas (Relativistic Heavy Ion Collider and eastern portions of the site).
- *Major Petroleum Facility.* This facility provides reserve fuel for the Central Steam Facility during times of peak operation. With a total capacity of 2.3 million gallons, the facility stores primarily No. 6 fuel oil. The 1997 conversion of the facility's boilers to burn natural gas as well as oil has significantly reduced BNL's reliance on oil as a fuel source.
- *Sewage Treatment Plant.* This facility treats sanitary and certain process wastewater from BNL facilities prior to discharge into the Peconic River, similar to the operations of a municipal sewage treatment plant. The plant has a design capacity of 3 million gallons per day. Effluent is monitored and controlled under a permit issued by the New York State Department of Environmental Conservation.
- *Waste Concentration Facility.* This facility was previously used for the receipt, processing, and volume reduction of aqueous radioactive waste. At present, the facility houses equipment and auxiliary systems required for the storage and transfer of liquid low-level radioactive waste.
- *Waste Management Facility.* This facility is a state-of-the-art complex for managing the wastes generated from BNL's research and operations activities. It was built with advanced environmental protection systems and features, and began operation in December 1997.
- *Water Treatment Plant*. The potable water treatment facility has a capacity of 5 million gallons per day. Potable water is obtained from six on-site wells. Three wells located along the western boundary of the site are treated with a lime softening process to remove naturally occurring iron. The plant is also equipped with dual air-stripping towers to ensure that volatile organic compounds are below New York State drinking water standards. Three wells located along the eastern section of the developed site are treated with carbon to ensure that volatile organic compound levels meet drinking water standards. BNL's water met all drinking water standards in 2005.

Major Scientific Facilities at BNL

- *Relativistic Heavy Ion Collider (RHIC).* The RHIC is a world-class scientific research facility. The RHIC accelerator drives two intersecting beams of gold ions, other heavy metal ions, and protons head-on to form subatomic collisions. What physicists learn from these collisions may help us understand more about why the physical world works the way it does, from the smallest subatomic particles, to the largest stars. Current RHIC experiments include the Solenoidal Tracker at RHIC (STAR), a detector used to track particles produced by ion collisions; the PHENIX detector, used to record different particles emerging from collisions; the Broad Range Hadron Magnetic Spectrometer (BRAHMS), used to study particles as they pass through detectors; and PHOBOS, an experiment based on the premise that when new collisions occur, new physics will be readily identified.
- *Alternating Gradient Synchrotron (AGS).* The AGS is a particle accelerator used to propel protons and heavy ions to high energies for physics research. The AGS is capable of accelerating protons and heavy ions, such as gold and iron. The Linear Accelerator, part of the AGS complex, serves as a proton injector for the AGS Booster.
- *AGS Booster.* The AGS Booster is a circular accelerator used for physics research and radiobiology studies. It receives either a proton beam from the Linac or heavy ions from the Tandem Van de Graaff and accelerates these before injecting them into the AGS ring for further acceleration. The Booster also serves as the energetic heavy ion source for the NASA Space Radiation Laboratory, which is used to simulate the harsh cosmic and solar radiation environment found in space.
- *Linear Accelerator (Linac) and Brookhaven Linac Isotope Producer (BLIP).* The Linac provides beams of polarized protons for the AGS and RHIC. The excess beam capacity is used to produce radioisotopes for research and medical imaging at the BLIP. The BLIP is one of the nation's key production facilities for radioisotopes, which are crucial to clinical nuclear medicine. The BLIP also supports research on new diagnostic and therapeutic radiopharmaceuticals.
- *Heavy Ion Transfer Line (HITL).* The HITL connects the Tandem Van de Graaff and the AGS Booster. This interconnection enables the transport of ions of intermediate mass to the AGS Booster, where they are accelerated before injection into the AGS. Ions are then extracted and sent to the AGS experimental and RHIC areas for physics research.
- *Radiation Therapy Facility (RTF).* Part of the Medical Research Center, the RTF is a high energy dual x-ray mode linear accelerator used for radiation therapy for cancer patients. This accelerator delivers therapeutically useful beams of x-rays and electrons for conventional and advanced medical radiotherapy techniques.
- *Brookhaven Medical Research Reactor (BMRR).* The BMRR was the world's first nuclear reactor built exclusively for medical research and therapy. It produced neutrons in an optimal energy range for experimental treatment of a type of brain cancer known as glioblastoma multiforme. The BMRR was shut down in December 2000 due to a reduction in medical research funding.
- *Scanning Transmission Electron Microscope (STEM).* The STEM facility includes two microscopes, STEM 1 and STEM 3, used for biological research. Both devices allow scientists to see the intricate details of living things, from bacteria to human tissue.
- *National Synchrotron Light Source (NSLS).* The NSLS uses a linear accelerator and booster synchrotron as an injection system for two electron storage rings that provide intense light spanning the electromagnetic spectrum from the infrared through x-rays. The properties of this light and the 80 specially designed experimental stations, called beamlines, enable scientists to perform a large variety of experiments.
- *High Flux Beam Reactor (HFBR).* The HFBR was one of the premier neutron physics research facilities in the world. Neutron beams produced at the HFBR were used to investigate the molecular structure of materials, which aided in pharmaceutical design, materials development, and expanded the knowledge base of physics, chemistry, and biology. The HFBR was permanently shut down in November 1999.
- *Tandem Van de Graaff and Cyclotron.* These accelerators are used in medium energy physics investigations and for producing special nuclides. The Tandem Van de Graaff accelerators are used to bombard materials with ions for manufacturing and testing purposes, and supply the RHIC with heavy ions. The cyclotrons, operated by the Chemistry Department, are used for the production of radiotracers for use in Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI) studies.
- *Brookhaven Graphite Research Reactor (BGRR).* The BGRR was the first peace-time reactor to be constructed in the United States following World War II. It was used for scientific exploration in the fields of medicine, biology, chemistry, physics, and nuclear engineering. The BGRR is currently being decommissioned.

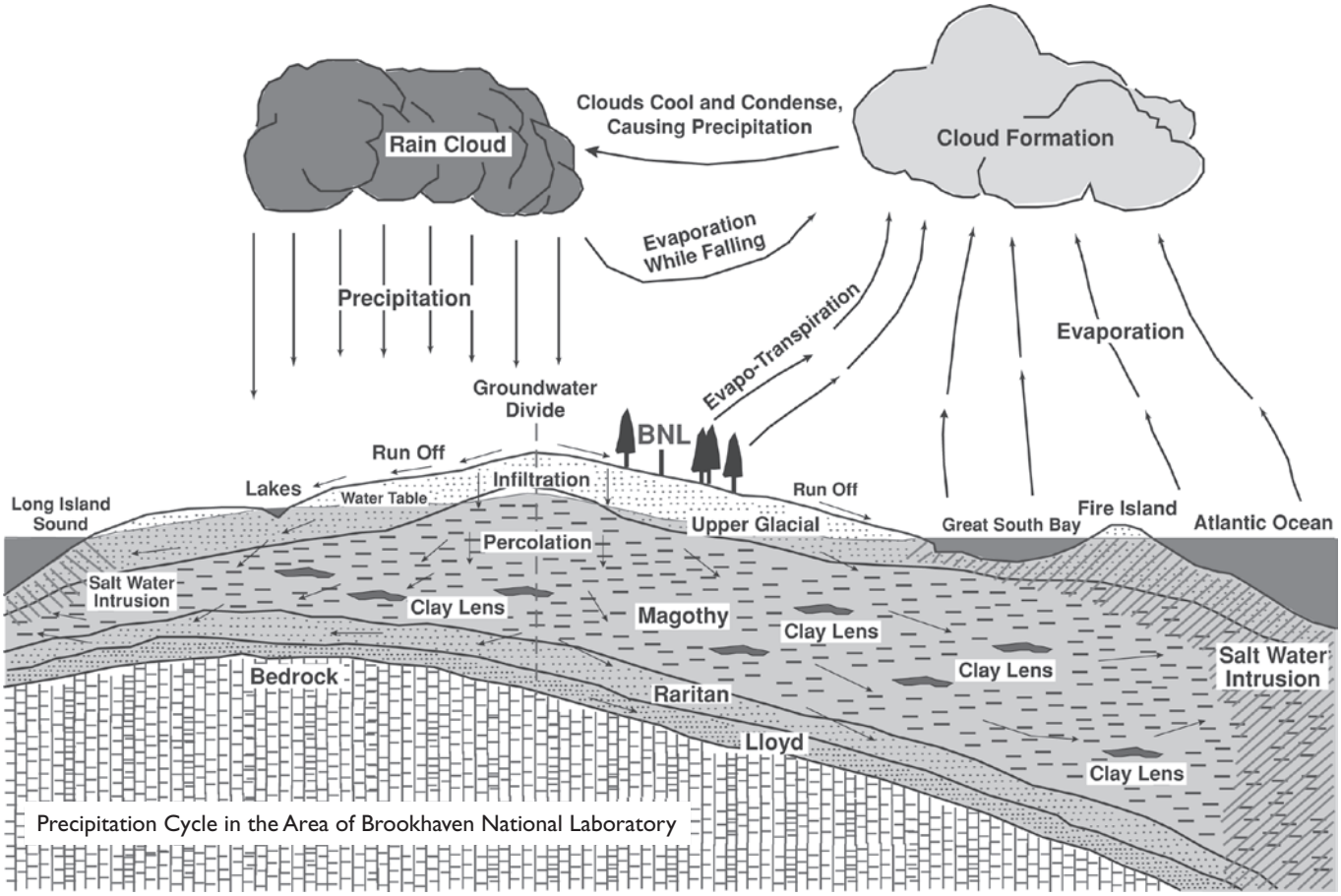
Hydrology and Geology of the BNL Site

BNL is situated on the western rim of the shallow Peconic River watershed. The marshy areas in the northern and eastern sections of the site are part of the headwaters of the Peconic River. The Peconic River both recharges to, and receives water from, the sole source aquifer system beneath Long Island. Long Island's aquifer system is one of 72 sole source aquifers in the nation recognized under the aquifer protection program authorized by the U.S. Safe Drinking Water Act.

The terrain of the BNL site is gently rolling, with elevations varying between 44 and 120 feet above mean sea level. Depth to groundwater from the land surface ranges from 5 feet near the Peconic River to about 80 feet in the higher elevations of the central and western portions of the site. The hydrology and geology of the local area are well defined. Studies in the vicinity of the Laboratory indicate that the uppermost Pleistocene deposits, composed of highly permeable glacial sands and gravel, are between 120 and 250 feet thick. Water penetrates these deposits readily and there is little direct runoff into surface streams unless precipitation is intense. These sandy deposits store large quantities of water in the Upper Glacial aquifer. On average, about half of the annual precipitation is lost to the atmosphere through evapotranspiration and the other half percolates through the soil to recharge the groundwater.

The BNL site overlaps a deep-flow recharge zone for Long Island groundwater. Precipitation and surface water that recharge within this zone have the potential to replenish the deep Magothy and Lloyd aquifer systems lying below the Upper Glacial aquifer. It is estimated that up to 40 percent of the recharge from rainfall moves into the deeper aquifers. The extent to which groundwater on site contributes to deep flow recharge has been confirmed through the use of an extensive network of shallow and deep wells installed at BNL and surrounding areas. This groundwater system is the primary source of drinking water for both on- and off-site private and public supply wells.

During 2005, BNL used approximately 1.4 million gallons of groundwater per day to meet potable water needs and heating and cooling requirements. Approximately 75 percent of the water pumped from Laboratory supply wells is returned to the aquifer through on-site recharge basins and permitted discharges to the Peconic River. Under normal hydrologic conditions, most of the water discharged to the river recharges to the Upper Glacial aquifer before leaving the site. Human consumption,

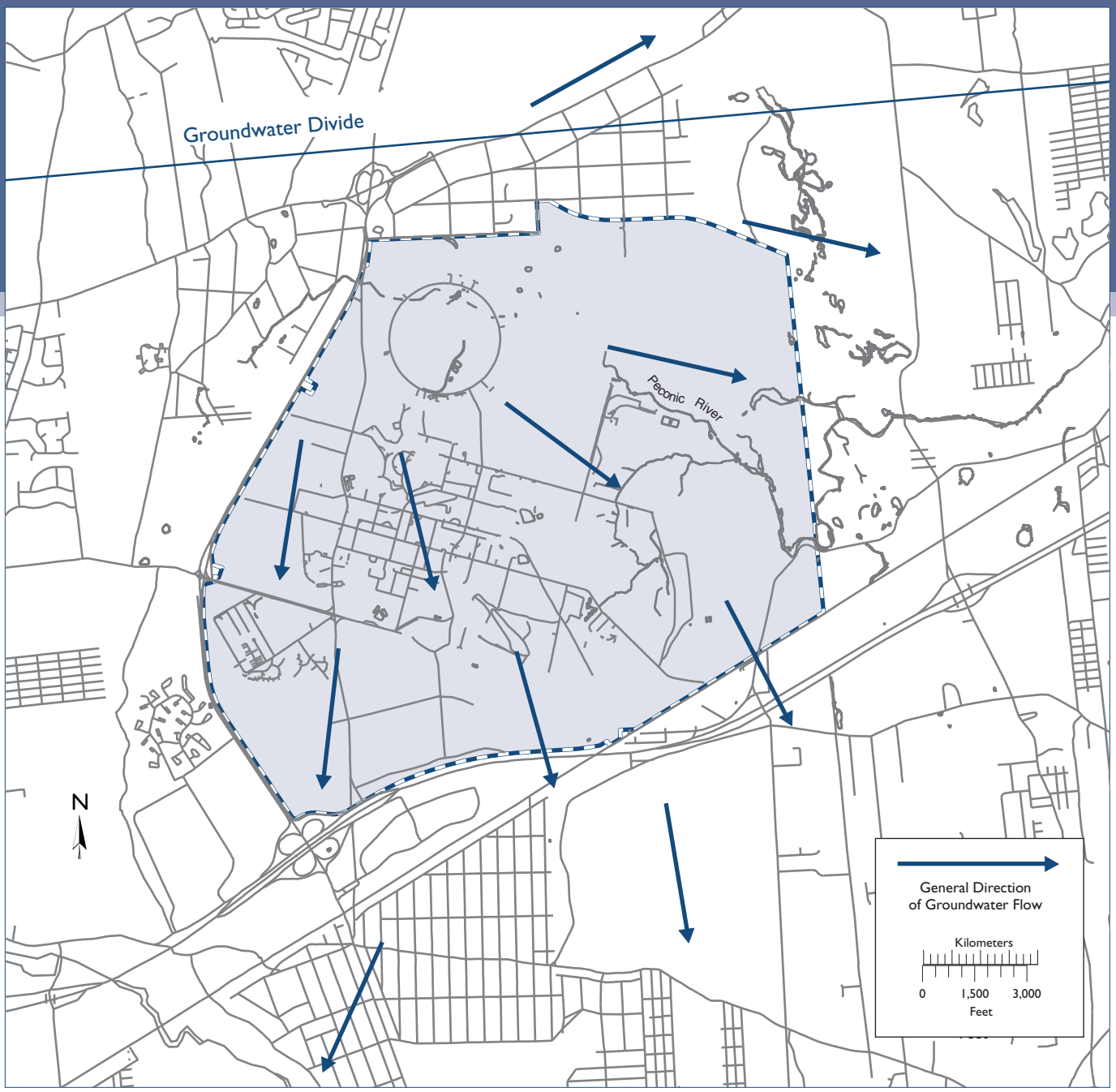


Precipitation Cycle in the Area of Brookhaven National Laboratory

evaporation (cooling tower and wind losses), and sewer line losses account for the remaining 25 percent. An additional 4.1 million gallons of groundwater are pumped each day from remediation wells for treatment and then returned to the aquifer by way of recharge basins.

Groundwater flow direction across the site is influenced by natural drainage systems that flow eastward along the Peconic River, southeast toward the Forge River, and south toward the Carmans River. Pumping from on-site supply wells affects the direction and speed of groundwater flow, especially in the central, developed areas of the site. The main groundwater divide on Long Island is aligned generally east–west and lies approximately one-half mile north of BNL. Groundwater north of the divide flows northward and discharges to the Long Island Sound. Groundwater south of the divide flows east and south, discharging to the Peconic River, Peconic Bay, south shore streams, Great South Bay, and Atlantic Ocean. In most areas at the Laboratory, the horizontal velocity of groundwater is approximately 0.75 to 1.2 feet per day. This means that groundwater travels for approximately 20 to 22 years as it moves from the central, developed area of the site to the BNL southern boundary.

BNL Groundwater Flow Map



Natural Resources at BNL

BNL's Natural Resource Management Program promotes stewardship of the natural resources found at the Laboratory by integrating natural resource management and protection with BNL's scientific mission. BNL's Natural Resource Management Plan describes the program strategy, elements, and planned activities for managing the various resources found on site. The goals of the program include protecting and monitoring the ecosystem, conducting research, and communicating with staff and the public on ecological issues. BNL focuses on protecting New York State threatened and endangered species on site, and continuing the Laboratory's leadership role within the greater Long Island Central Pine Barrens ecosystem.

A wide variety of vegetation, birds, reptiles, amphibians, and mammals inhabit the BNL site. The only New York State endangered species confirmed at the Laboratory is the eastern tiger salamander, although the Persius duskywing butterfly and the crested fringed orchid have been identified on site in the past. Five New York State threatened species identified at the Laboratory include the banded sunfish, swamp darter (a fish), stiff goldenrod plant, and northern harrier. In 2005, the Pine Barrens bluet was confirmed at one of the many coastal plain ponds located on site. The frosted elfin butterfly has been identified as possibly being at the Laboratory, based on historic documentation and the presence of its preferred habitat and host plant (wild lupine). In addition, stargrass has historically been found and is likely to persist. Several other species that are listed by New York State as rare, species of special concern, or exploitably vulnerable are known to inhabit the site, visit during migration, or have historically been identified.

The Laboratory has precautions in place to protect on-site habitats and natural resources. Activities to eliminate or minimize negative effects on sensitive or critical species are either incorporated into BNL procedures or into specific program or project plans. Environmental restoration efforts remove pollutant sources that could contaminate habitats. Human access to critical habitats is limited. In some cases, habitats are enhanced to improve survival or increase populations. Even routine activities such as road maintenance are not undertaken until they have been evaluated and determined to be unlikely to affect habitat.

BNL 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 the Laboratory in collaboration with DOE, 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.

Wild Turkey (Meleagris gallapavo).

White-tailed Deer (Odocoileus virginianus).

Twelve-spotted Skimmer (Libellula pulchella).

Eastern Hognose Snake (Heteroden platyrhinos).

Banded Sunfish (Enneacanthus obesus). This fish was released immediately after the photo was taken.

Eastern Tiger Salamander (Ambystoma t. tigrinum).

Canada Goose (Branta canadensis).

Upton Ecological and Research Reserve

In 2000, the Upton Ecological and Research Reserve was established on site by DOE and managed by the U.S. Fish and Wildlife Service (FWS) to conduct resource management programs for the conservation, enhancement, and restoration of wildlife and habitat. The 530 acre reserve is located on the eastern boundary of BNL and is home to a wide variety of flora and fauna. It contains wetlands and is largely within the core preservation area of the Long Island Central Pine Barrens. Based on a biological survey of the Laboratory, experts believe the reserve is home to more than 200 plant species and at least 162 species of mammals, birds, fish, reptiles, and amphibians.

In establishing the Upton Reserve, DOE committed to provide FWS with $1 million over a 5-year period, to manage the reserve. 2005 marked the final year of the agreement and a planned transition from FWS management to management by BNL and the Foundation for Ecological Research in the Northeast (FERN). FERN initiated its first pine barrens-wide monitoring program and a database of all known pine barrens–related research and forest health monitoring protocols for the Pine Barrens was produced. Both the database and monitoring protocols are available on the FERN website, at www.fern-li.org. These data were implemented and used by FERN to gather information concerning the health of the Long Island Central Pine Barrens. A total of 50 permanent monitoring plots were established in the summer of 2005; the project will continue in 2006 to fully assess the current health of the forests. Permanent plots will allow the periodic assessment of forest health, to determine whether management actions are having a positive or negative impact on the forests.

Educational programs have been a significant part of the Upton Reserve. In 2005, a project was conducted to determine the preferential use of artificial shelter (“cover”) by reptiles and amphibians and research on oak tree defoliators continued. FWS management activities included mapping vernal pools, conducting educational and outreach activities, coordinating researcher access and training requirements, and radio tracking hognose snakes and spotted turtles.

Student interns conducting research on the reserve.

BNL's Cultural Resource Management Program

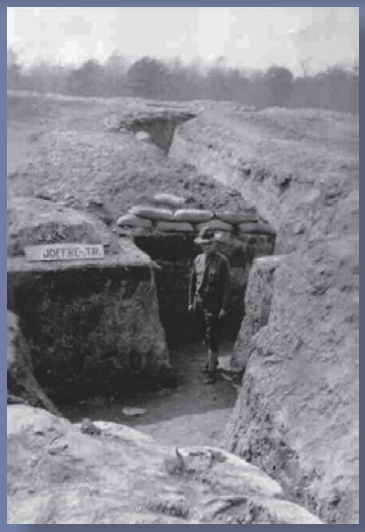
The Cultural Resource Management Program at BNL ensures that the Laboratory fully complies with numerous historic preservation requirements. A Cultural Resource Management Plan for BNL was approved by DOE in 2005, and will be used to guide the management of all of the Laboratory's historic resources. These resources include World War I trenches, the Camp Upton Historical Collection, scientific equipment, photo/audio/video archives, and institutional records.

BNL currently has three facilities that have been determined to be eligible for listing on the National Register of Historic Places: the Brookhaven Graphite Research Reactor complex, the High Flux Beam Reactor complex, and the World War I training trenches. The training trenches at BNL are examples of the few surviving WWI earthworks in the United States.

In 2005, the Cultural Resource Management Program focused on outreach activities. A drive-by tour of historic Laboratory structures was developed, along with an accompanying narrative CD and pamphlet. More than 500 visitors participated in the tours on one BNL Summer Sunday in August.

As cultural resources are identified, plans for their long-term stewardship are developed and implemented. Achieving these goals ensure that the contributions BNL and the BNL site have made to our history and culture are documented.

Exhibit A shows the result of mapping Trench 6. An overhead view was produced that provides a complete perspective of how this particular trench network was arranged. Exhibits B and C present two diagrams of trench construction methods, from British and American army field manuals. When the trench layout is compared to the two field manual methods, similarities become quite apparent. At the far right is a recent photograph depicting how the trenches appear today, approximately 85 years later.



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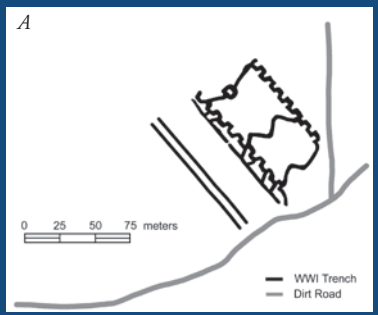

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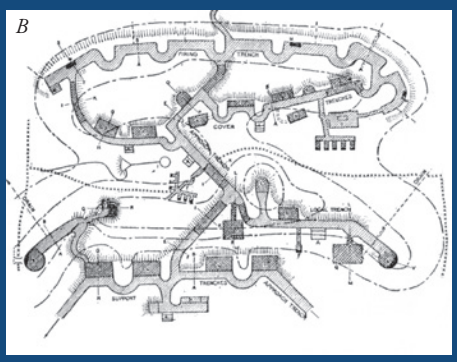

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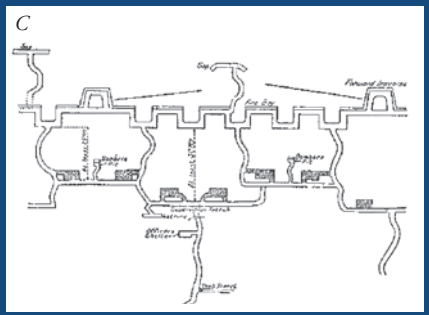

BNL management has established an Environmental Management System (EMS), that ensures that environmental issues are systematically identified, controlled, and monitored. In addition, the Laboratory's EMS provides mechanisms for responding to changing environmental conditions and requirements, reporting on environmental performance, and reinforcing continual improvement. BNL's EMS was designed to meet the rigorous requirements of the globally recognized International Organization for Standardization (ISO) 14001 Environmental Management Standard.

The ISO 14001 Standard is globally recognized and defines the structure of an organization's EMS for purposes of improving environmental performance. The process-based structure of the ISO 14001 Standard is based on the "Plan-Do-Check-Act" improvement cycle. The standard requires an organization to develop an environmental policy, create plans to implement the policy, implement the plans, check progress and take corrective actions, and review the system annually to ensure its continuing suitability, adequacy, and effectiveness.

BNL's EMS was officially registered to the ISO 14001 Standard in July 2001 and was the first DOE Office of Science Laboratory to obtain third-party registration to this globally recognized environmental standard. To achieve registration, the Laboratory underwent an independent audit of its EMS to verify that the system conformed to all ISO 14001 requirements and that it was effectively implemented. The certification also requires BNL to undergo annual audits by an accredited registrar to assure that the system is maintained.

In 2005, an EMS Surveillance Audit determined that BNL remains in conformance with the ISO 14001 Standard. In its recommendation for continued certification, NSF-International Strategic Registrations, Ltd. highlighted seven examples of BNL's continual improvement, some of which include BNL's improved methods for presenting objectives and targets. The auditors also identified three minor nonconformances and four opportunities for improvement. A corrective action plan was prepared to track the minor nonconformances to closure.

One measure of an effective EMS is recognition of good environmental performance. In 2005, BNL operations led to a DOE Noticeable Practice Award for a conference entitled, "Fleet Managers Pollution Prevention Workshop." The workshop, held at the Laboratory, allowed local organizations that manage fleet vehicles to interact and share pollution prevention ideas.

NSF-ISR

NSF International Strategic Registrations, Ltd.

NSF-ISR

A Subsidiary of NSF International
789 North Dixboro Road, Ann Arbor, Michigan 48105
(888) NSF-9000

Certificate of Registration

This certifies that the Environmental Management System of

Brookhaven National Laboratory

Building 460 Brookhaven Avenue
P.O. Box 5000
Upton L.I., NY 11973-5000 US

has been assessed by NSF-ISR and found to be in conformance to the following standard(s):

ISO 14001:2004

Scope of Registration:

Facilities, experiments, and operations managed by Brookhaven Science Associates at Brookhaven National Laboratory in accordance with the Environmental Management System.

Industrial Classification:

IAF: 34
SIC: 8733
NACE:

ANAB ACCREDITED

Certificate Number: 69525-E3
Certificate Issue Date: 08/10/2005
Company Initial Date: 07/10/2001
Registration Date: 06/25/2004
Expiration Date*: 06/24/2007

Signature on file

Christian B. Lupo, General Manager
NSF-ISR, Ltd.

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BNL's Environmental Management Program consists of several Laboratory-wide and facility-specific environmental programs, which integrate environmental stewardship into all facets of BNL's mission. This program includes monitoring the air, drinking water, surface water, groundwater, soil, sediment, and flora and fauna. The program identifies potential pathways for exposure of the public and employees, evaluates what impact BNL operations have on the environment, and ensures compliance with environmental permit requirements.

Pollution Prevention Program

The Laboratory's Pollution Prevention (P2) Program represents an ongoing effort to make pollution prevention and waste minimization integral parts of the BNL operating philosophy. Key elements of the Laboratory's P2 Program include:

- Eliminate or reduce emissions, effluents, and waste at the source where possible, and ensure that they are as low as reasonably achievable
- Procure environmentally preferable products (known as "affirmative procurement")
- Conserve natural resources and energy
- Reuse and recycle materials
- Achieve or exceed BNL/DOE waste minimization, P2, recycling, and affirmative procurement goals
- Comply with applicable requirements (e.g., New York State Hazardous Waste Reduction Goal, Executive Orders, etc.)
- Reduce waste management costs
- Identify funding mechanisms for evaluating and implementing P2 opportunities
- Implement P2 projects
- Improve employee and community awareness of P2 goals, plans, and progress

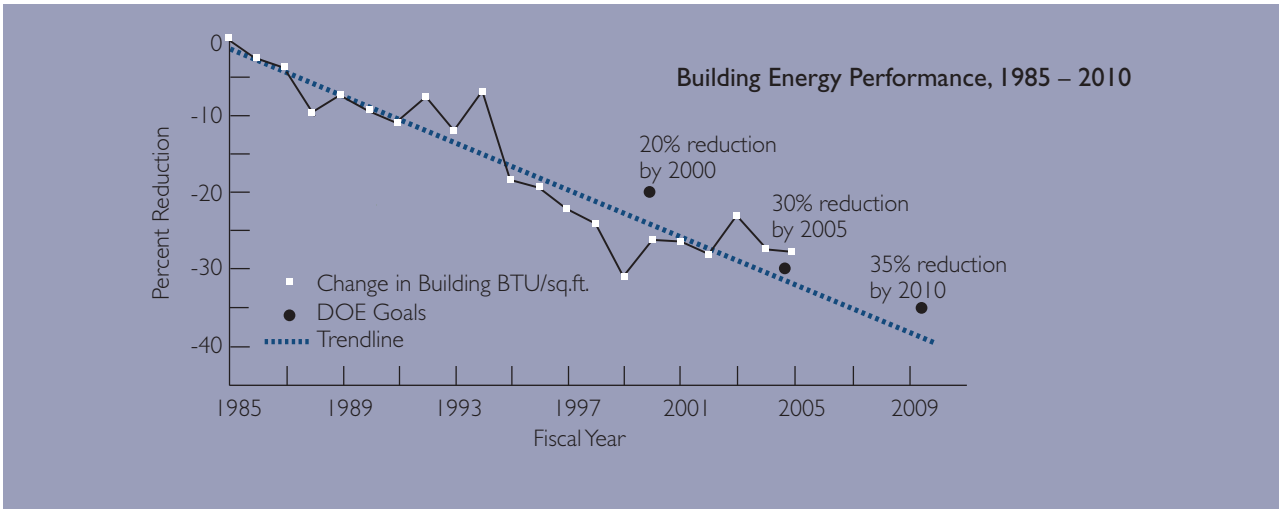
Nineteen P2 proposals were submitted by employees to the BNL P2 Council for funding in FY 2005. Nine proposals were funded, in addition to four special projects, for a combined investment of approximately $101,000. The anticipated annual savings from these projects was estimated at $102,000, for an average payback period of 1.4 years. The four special projects were jointly funded with other BNL divisions and significantly limited future environmental and worker safety risks.

The efforts of the BNL P2 and recycling programs have achieved significant reductions in waste generated by routine operations. This continues a positive trend and is further evidence that pollution prevention planning is well integrated into the Laboratory's work planning process. These positive trends are also driven by the EMS emphasis on preventing pollution and establishing objectives and targets to reduce environmental impacts.

Energy Management and Conservation Program

Since 1979, BNL's Energy Management Group has been working to reduce energy use and costs by identifying cost-effective and energy-efficient projects, monitoring energy use and utility bills, and assisting in obtaining the least expensive energy sources possible. In 2005, the Laboratory used approximately 289 million kilowatt hours of electricity, 4.4 million gallons of fuel oil, 40 thousand gallons of propane, and 40 thousand ft^3 of natural gas. Due to market conditions, fuel oil was predominately used in 2005, resulting in a cost savings of approximately $1,144,000.

BNL is a participant in the Long Island Power Authority (LIPA) Peak Load Reduction Curtailment Program. Through this program, the Laboratory has agreed to reduce electrical demand during critical days throughout the summer



when LIPA expects customer demand to meet or exceed the company's available supply. In return, BNL receives a rebate for each megawatt reduced on each critical day. In 2005, participation in this program produced a rebate of $4,000. The Laboratory's participation is significant to LIPA, representing more than 10 percent of the 95+megawatt load-curtailment program total and making the Laboratory one of the larger program contributors.

BNL also maintains a contract with the New York Power Authority (NYPA). Participation in NYPA's 2005 Load Curtailment Program produced savings of over $2 million. The National Energy Conservation Policy Act requires federal agencies to apply energy conservation measures and to improve federal building design to reduce energy use per square foot. Current goals at BNL are to reduce energy consumption per square foot, relative to 2003, by 2 percent per year from FY2006—FY2015.

BNL will continue to seek alternative energy sources to meet its future energy needs, support federally required "green" initiatives, and reduce energy costs.

Waste Management Program

Wastes are produced as a byproduct of the research BNL conducts. These wastes include materials common to many businesses and industries, such as aerosol cans, batteries, paints, and oils. However, BNL's unique scientific activities also generate waste streams that are subject to additional regulation and special handling, including radioactive, hazardous, and mixed waste.

The Laboratory's Waste Management Facility is responsible for the collection, transportation, storage, and off-site disposal of waste generated. The facility is used for the short-term storage of these wastes before they are packaged or consolidated for off-site shipment to permitted treatment and disposal facilities. In 2005, BNL generated the following types and quantities of waste from routine operations:

- Hazardous waste: 5.9 tons
- Mixed waste: 66 ft^3
- Radioactive waste: 1,402 ft^3

These quantities represent a significant reduction from previous years. BNL will continue to clean up facilities and areas containing radioactive and chemical contamination to reduce these quantities further.

Water Conservation Program

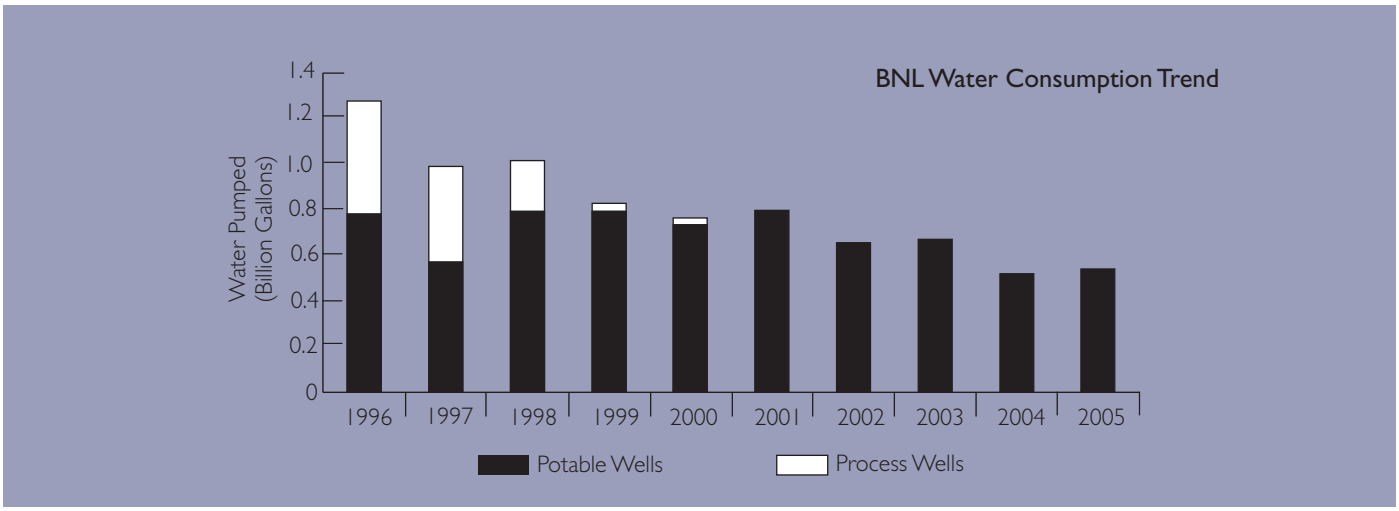
BNL has a strong Water Conservation Program in place. The Laboratory evaluates water conservation efforts when planning facility upgrades and new construction projects. These efforts include more efficient and expanded use of chilled water for cooling, ventilation, and air conditioning.

Water conservation initiatives have greatly reduced potable (drinking) water use at the Laboratory since the mid 1990s. As of 2005, BNL used less than half the water used in 1996—over 700 million gallons less.

EPA Performance Track Program

BNL was accepted into the EPA's Performance Track (PTrack) Program in 2004. The program recognizes top environmental performance among participating U.S. facilities of all types, sizes, and complexity, both public and private. It is considered the "gold standard" for facility-based environmental performance—a standard that participating members strive to attain as they "meet or exceed their performance commitment." Under this program, partners provide leadership in many areas, including preventing pollution at its source. The PTrack Program requires that sites commit to several improvement goals for a 3-year period and report on the progress of these goals annually.

Progress in 2005 included restoring 10 acres of land to native vegetation, reducing radioactive air emissions from the Brookhaven Linac Isotope Producer, reducing BNL's inventory of ozone-depleting substances by approximately 65,000 pounds, and reducing the Laboratory's inventory of mercury and mercury-containing devices by removing and recycling approximately 185 pounds.



Regulatory Compliance Program

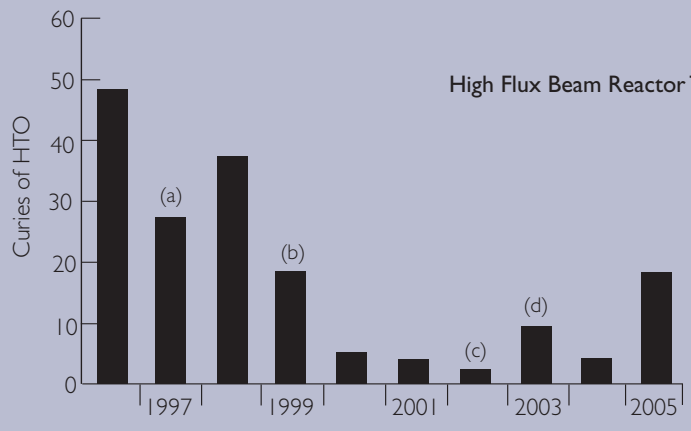
BNL's Regulatory Compliance Program ensures that the Laboratory complies with more than 100 sets of federal, state, and local environmental regulations; several site-specific permits; equivalency permits to operate groundwater remediation systems; and several other binding agreements. BNL is committed to maintaining full compliance with these requirements and agreements to help eliminate or minimize any impact Laboratory operations may have on the environment. Under this program, compliance monitoring is conducted to ensure that air emissions, wastewater effluents, and groundwater monitoring data comply with regulatory limits issued under the federal Clean Air Act, Clean Water Act, Oil Pollution Act, Safe Drinking Water Act, and associated New York State programs.

- Conventional, nonradiological air emission sources are subject to federal or state regulations. In 2005, compliance monitoring for air emissions showed that nitrogen oxides, carbon monoxide, and sulfur dioxide were all within permit limits. However, there were 107 periods where opacity from one of two boilers exceeded the 6-minute, 20 percent average allowed due to soot blowing operations. Soot blowing is needed to maintain boiler efficiency. The opacity excursions occurred in the first three quarters of 2005. Efforts to eliminate the excursions by resequencing the soot blowing cycle were successful in the fourth quarter.
- Emissions of radiological contaminants are monitored to ensure that they do not impact the environment or people residing at or near BNL. In 2005, monitoring showed that there was negligible dose to the public from BNL operations.
- Compliance monitoring of wastewater discharges is performed to ensure that the effluent complies with release limits under BNL's State Pollutant Discharge Elimination System (SPDES) permit. In 2005, wastewater discharges from the Laboratory's Sewage Treatment Plant complied with SPDES limits in greater than 99 percent of the samples taken. Eight SPDES excursions occurred: two each for total nitrogen and ammonia, and one each for iron, zinc, methylene chloride, and copper. Each of the excursions were investigated and reported to the New York State Department of Environmental Conservation (NYSDEC) and the Suffolk County Department of Health Services (SCDHS).
- Compliance monitoring of groundwater is required under the Major Petroleum Facility (MPF) License and the Resource Conservation and Recovery Act (RCRA) permit. The MPF license requires BNL to monitor groundwater in the vicinity of aboveground storage tanks for floating products and volatile and semivolatile organic compounds. In 2005, monitoring continued to demonstrate that current oil storage and transfer operations at the Major Petroleum Facility did not impact groundwater quality. Similarly, under the RCRA program, groundwater monitoring at the Waste Management Facility showed no impacts to water quality due to facility operations.
- BNL maintains six groundwater wells for on-site distribution of potable (drinking) water. As required by SCDHS, compliance monitoring is performed to ensure that the Laboratory complies with all Safe Drinking Water Act requirements and maintains a viable water supply. BNL conducts monitoring for bacteria, inorganics, organics, pesticides, and radiological contaminants. In 2005, the Laboratory's potable water supply complied with all drinking water standards.
- Any release of petroleum products to soil must be reported to both NYSDEC and SCDHS. Any release that impacts surface water must also be reported to the Environmental Protection Agency. In 2005, there were 34 spills, of which 14 were reportable to NYSDEC and SCDHS. The remaining 20 spills were small-volume releases that were contained on impermeable surfaces and cleaned up immediately upon discovery. Eight of the 14 reportable spills involved very small volumes of petroleum products to soil or water. The remaining six included: one spill of antifreeze from a piece of machinery, one 20-gallon release of No. 6 fuel oil from a delivery vehicle, two small-volume chemical releases, one outdoor release of a custodial chemical, and one finding of human excrement in buckets along a road adjacent to the BNL boundary. The Laboratory has been very successful in reducing the number and severity of spills. In 2005, the total number of spills was reduced by 55 percent, from 76 spills in 2004 to 34 in 2005.
- The storage, handling, and use of polychlorinated biphenyls (PCBs) are regulated under the Toxic Substance and Control Act. The Laboratory has made significant reductions in its PCB inventory. In 2005, the inventory was reduced by approximately 84 percent, by replacing and disposing of 250 large capacitors from the Collider–Accelerator Department. Since 2003, BNL has reduced its PCB inventory by more than 90 percent.
- The storage and application of pesticides are regulated under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Pesticides at BNL are used to control undesirable insects, mice, and rats; to control bacteria in cooling towers; and to maintain certain areas free of vegetation (e.g., around fire hydrants and inside secondary containment berms). Insecticides are also applied to agricultural research fields and in greenhouses on site. Herbicide use for spot treatment of weeds is minimized wherever possible. All pesticides are applied by BNL-employed New York State–certified applicators. The Laboratory was in full compliance with FIFRA requirements in 2005.
- A number of federal, state, and local agencies oversee Laboratory activities. In 2005, BNL underwent 11 environmental audits by external regulatory agencies, including inspections of the Central Steam Facility, BNL's potable water system, the Sewage Treatment Plant, several recharge basins and regulated outfalls, the Major Petroleum Facility, and chemical bulk storage facilities. Three conditions requiring corrective actions where found during the inspection of the Major Petroleum Facility and three conditions requiring corrective actions where found during the inspection of the chemical bulk storage facilities. Immediate corrective actions were taken to address all issues raised, and no formal violations or enforcement actions were issued.

Air Quality Program

BNL monitors both radioactive and nonradioactive emissions at several facilities on site to ensure compliance with the requirements of the Clean Air Act. In addition, the Laboratory conducts ambient air monitoring to verify local air quality and assess possible environmental impacts from Laboratory operations. Facilities that have the potential to deliver an annual radiation dose of greater than 0.1 mrem (1μSv) to a member of the public must be continuously monitored for emissions. Facilities capable of delivering radiation doses below that limit require periodic, confirmatory monitoring. Although not required, BNL has one facility that is continuously monitored, the Brookhaven Linac Isotope Producer (BLIP). Periodic monitoring is conducted at one active facility, the Target Processing Laboratory (TPL), and one inactive facility, the High Flux Beam Reactor (HFBR). In January 2005, the Environmental Protection Agency approved BNL's petition to discontinue emissions monitoring at the Brookhaven Medical Research Reactor, which was permanently shut down in August 2000. The facility was also downgraded from a nuclear facility to a radiological facility.

- Protons from the Linear Accelerator (Linac) are sent via an underground beam tunnel to the BLIP, where they strike various metal targets. The proton beam activates these metal targets to produce new radionuclides for medical diagnostics. During irradiation, the targets become hot and are cooled by a continuously recirculating water system. The cooling water also becomes activated during the process, producing secondary radionuclides. The most significant of these radionuclides are oxygen-15 (O-15, half-life: 122 seconds) and carbon-11 (C-11, half-life: 20.48 minutes). Both of these isotopes are released as gaseous, airborne emissions through the facility's 33-ft stack. In 2005, the BLIP operated over a period of 17 weeks. During this period, 816 Ci of C-11 and 2,432 Ci of O-15 were released. Tritium produced from activation of the target cooling water was also released, but in a much smaller quantity, 5.16 E-02 Ci. Combined emissions of C-11 and O-15 were roughly 20 percent higher than in 2004, primarily due to six extra weeks of operation, but the combined emissions were 15 percent lower than the 2003 total. This drop in emissions is facilitated by the installation of a lucite shroud enclosure over the continuously recirculating water system.
- Metal targets irradiated at the BLIP are transported to the TPL, where isotopes are chemically extracted for radiopharmaceutical production. Airborne radionuclides that are released during the extraction process are drawn through multistage HEPA and charcoal filters and then vented to the HFBR stack. Annual radionuclide quantities released from this facility are very small. In 2005, the total release from the TPL was 0.0771 μCi.
- Although the HFBR has been permanently shut down since 1999, residual tritium in water in the vessel and cooling loops continues to diffuse into the building's air through valve seals and other system penetrations. In 2003, there was an increase in emissions attributed to evaporative losses when tritiated water remaining in the reactor core was pumped out for approved disposal. In 2004, the downward trend in emissions resumed: the level dropped from 9.0 Ci (the 2003 value) to 3.94 Ci. In 2005, tritium emissions were 17.9 Ci. Following an investigation to determine possible sources for the rise, evaporation of residual heavy water through an open drain tank vent line appears to have been the most likely source. The air emissions from the HFBR facility have been monitored since 2002 via air sampling of the building at a frequency of one week per month.
- As part of the Environmental Monitoring Program, air monitoring stations are in place around the perimeter of the BNL site. The annual average gross alpha and beta airborne activity levels for the six monitoring stations were 0.0014 and 0.0147 pCi/m^3, respectively. The results for this location are typical for the site and the trend shows seasonal variation in activity within a range that is representative of natural background levels. As part of a statewide monitoring program, the New York State Department of Health (NYSDOH) collects air samples in Albany, New York, a



High Flux Beam Reactor Tritium Emissions, 10-Year Trend, 1996 – 2005

Notes:
(a) Shut down during evaluation process
(b) Permanent shutdown announced in November 1999
(c) Frequency of sampling reduced to one week per month in 2002
(d) Temporary increase due to decommissioning activities
(e) Increase thought to be due to evaporation of residual heavy water from a drain-tank vent line

control location with no potential to be influenced by nuclear facility emissions. In 2005, NYSDOH reported that airborne gross beta activity at that location varied between 0.0037 and 0.0187 pCi/m^3 and the average concentration was 0.0093 pCi/m^3. Sample results measured at BNL generally fell within this range, demonstrating that on-site radiological air quality was consistent with that observed at locations in New York State not located near radiological facilities.

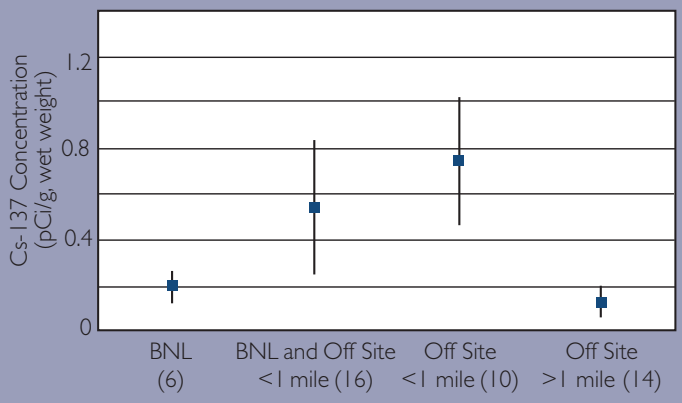
- Airborne tritium in the form of tritiated water vapor (HTO) is monitored throughout the BNL site. In addition to the five blockhouses containing tritium samplers, three pole-mounted monitors used for tritium sampling are located at or near the property boundary. Airborne tritium samples were collected biweekly from each sampling station during 2005. The average tritium concentrations at all of the sampling locations were less than the typical minimum detection limit, which ranged from 1.0 to 6.0 pCi/m^3. The collected data demonstrate that there were no significant differences in ambient tritium concentrations on site or at the site boundary.
- Various state and federal regulations governing nonradiological releases require facilities to conduct periodic or continuous emission monitoring to demonstrate compliance with emission limits. The Central Steam Facility (CSF) is the only BNL facility that requires monitoring for nonradiological emissions. The CSF supplies steam for heating and cooling via boilers to major facilities at the Laboratory. Two of the four boilers are equipped with continuous emission monitors to measure nitrogen oxides and opacity (visible "smoke") and the monitoring results are reported quarterly to the Environmental Protection Agency and the New York State Department of Environmental Conservation. In 2005, there were no measured exceedances of nitrogen oxides above the regulatory limits. Opacity exceedances from these boilers occurred during boiler startups and routine boiler tube soot blowing operations, and required monitoring system calibrations. Changing the sequence of the soot blowing cycle on one of the boilers has virtually eliminated all of the opacity exceedances due to soot blowing. As a result, similar changes will be made to the soot blowing cycle on the other boiler with a continuous opacity monitor.
- Throughout 2005, natural gas prices exceeded those for residual fuel oil. As a result, residual fuel supplied 100 percent of the heating and cooling needs of BNL's major facilities. By comparison, in 1999 natural gas satisfied more than 88 percent of the major facility heating and cooling needs, and in 2002, 36 percent. Consequently, 2005 emissions of particulates, nitrogen oxides, and sulfur dioxide were considerably higher than in these prior years.

Natural Resource Management Program

The BNL Natural Resource Management Program is designed to protect and manage flora and fauna and the ecosystems in which they exist. The Laboratory's natural resource management strategy is based on understanding the site's resources and on maintaining the ecosystem, conducting research, and communicating with staff and the public on ecological issues.

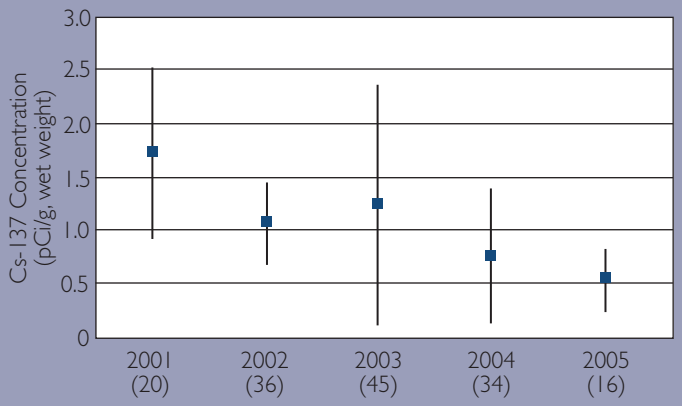
Routine monitoring of flora and fauna is conducted to determine whether current or historical activities are affecting natural resources at the Laboratory.

- In 2005, deer and fish sampling results were consistent with previous years. Deer sampled on site contain higher concentrations of cesium-137 (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. Cs-137 levels in deer have shown a steady decline since 2001. 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 that may travel off site and determined that neither hunting restrictions nor formal health advisories are warranted.
- Because of the Peconic River cleanup project as well as 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 methlmercury 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 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 minimum detection limit, although the values were within the range of those historically reported.



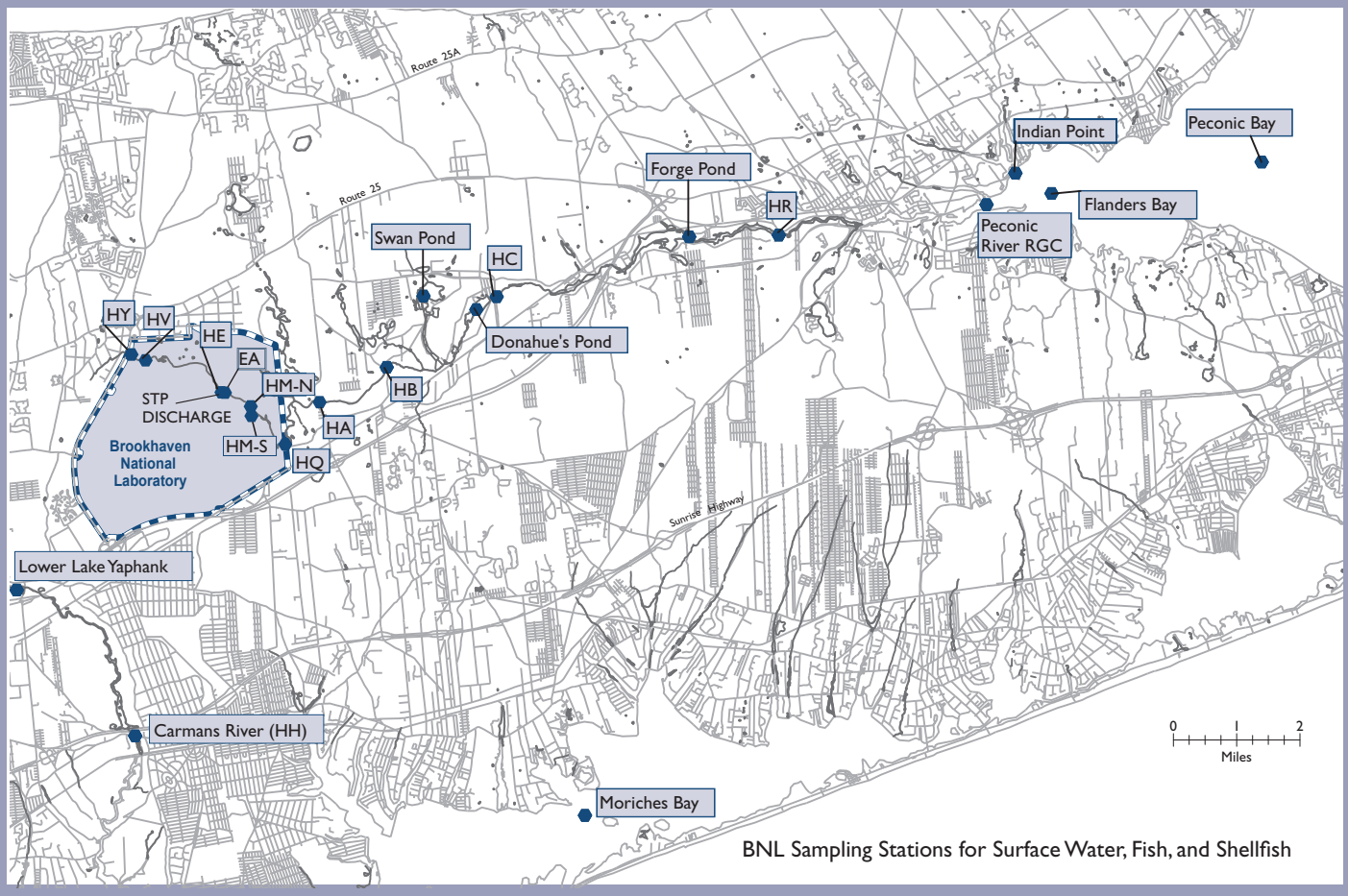
Comparison of Cesium-137 Average Concentrations in Deer, 2005

Notes: Averages are shown for samples collected at BNL, on site and off site within 1 mile, off site but within a 1-mile radius, and off site greater than a 1-mile radius.
Numbers in parentheses indicate the number of samples in that data set.
All values are shown with a 95% confidence interval.



Five-Year Cesium-137 Concentration Trends in Deer Meat at BNL and within 1 Mile of BNL, 2001 – 2005

Notes: Averages are shown for samples collected at BNL, and within 1 mile.
Numbers in parentheses indicate the number of samples in that data set.
All values are shown with a 95% confidence interval.



BNL Sampling Stations for Surface Water, Fish, and Shellfish

Groundwater Protection Management Program

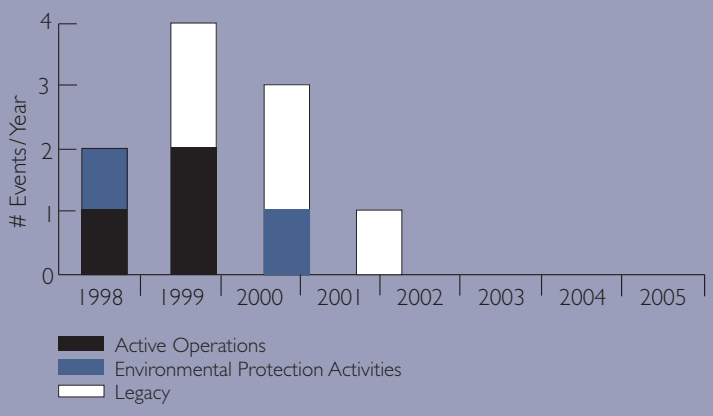
BNL's Groundwater Protection Management Program is designed to prevent any further contamination to groundwater and to restore groundwater quality by integrating pollution prevention efforts through groundwater restoration projects. BNL's Groundwater Contingency Plan describes an orderly process for quickly taking corrective actions in response to unexpected monitoring results. Key elements of the program are the full and timely disclosure to the public of any off-normal occurrences, and regular communication regarding the performance of the program.

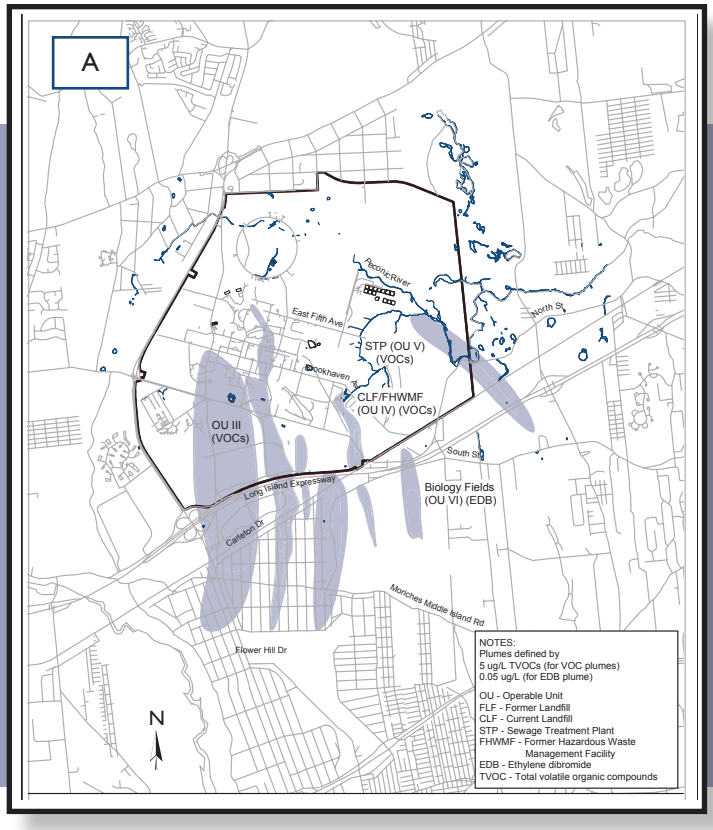
BNL's extensive groundwater monitoring well network is used to evaluate progress in restoring groundwater quality, to comply with regulatory permit requirements, to monitor active research and support facilities, and to assess the quality of groundwater entering and leaving the site.

In 2005, BNL collected groundwater samples from 864 on- and off-site monitoring wells during 2,567 individual sampling events. The Laboratory 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 Brookhaven Linear Isotope Producer (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.
- Monitoring in the Building 96 area indicated that concentrations of volatile organic compounds (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, strontium-90 (Sr-90) concentrations remained stable or declined in monitoring wells located at and downgradient from the former Building 650 sump outfall.
- 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 evalu-

Groundwater Protection Performance, 1998 – 2005





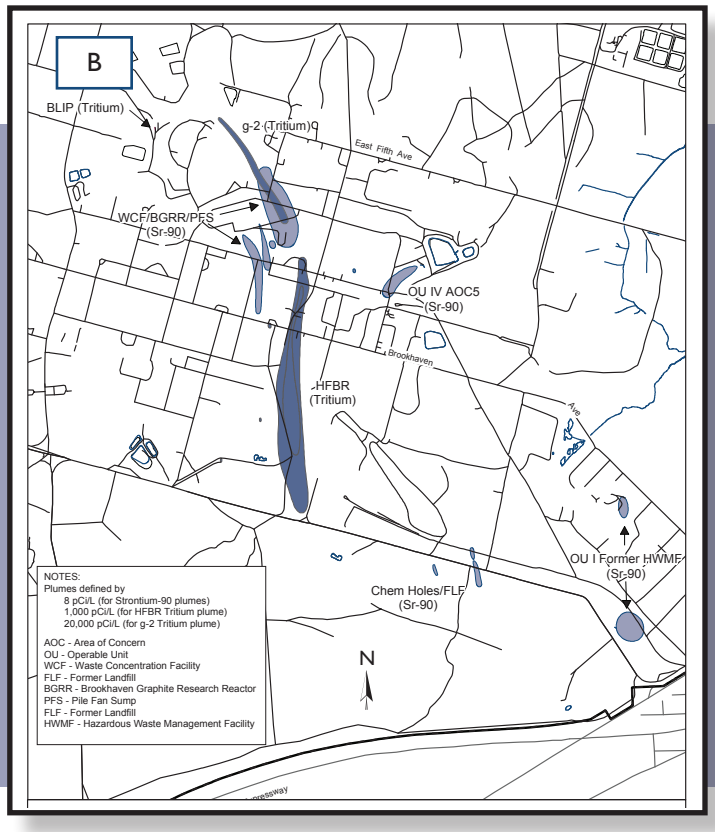
ation of vehicle maintenance operations indicates that all waste oils and used solvents are being properly stored and recycled.

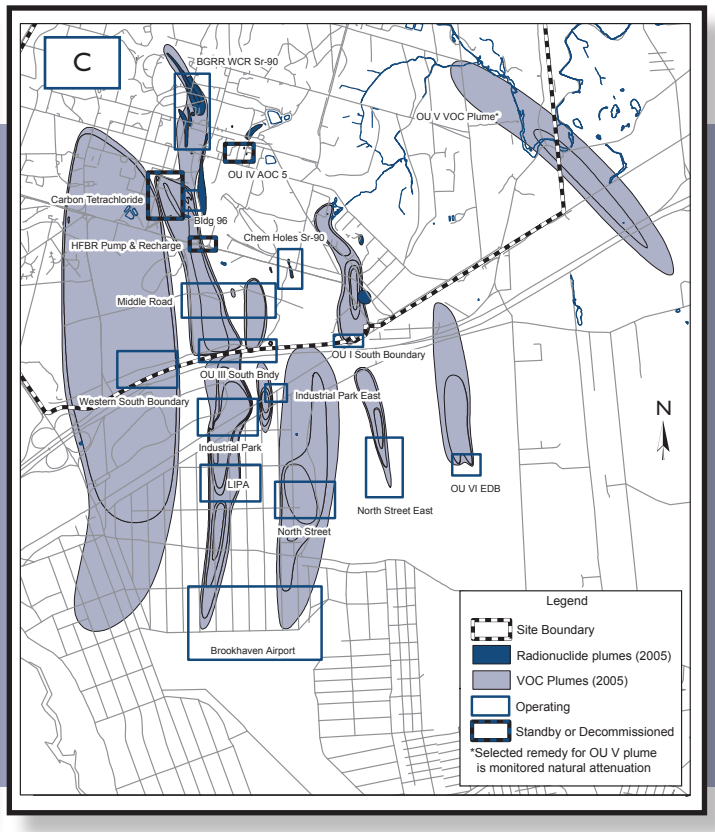
- Under the Environmental Restoration Program, on- and off-site contaminant plumes are monitored to track the progress that the groundwater treatment systems are making toward plume remediation. In 2005, 739 groundwater wells were monitored during 2,282 individual sampling events. The peak tritium concentration during 2005, directly downgradient from the High Flux Beam Reactor, 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 work was scheduled for early 2006.
- BNL'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 the Environmental Protection Agency 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.
- With 14 groundwater remediation systems in active operation, the Laboratory continues to make significant progress in restoring groundwater quality on site. 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.
- Areas of the Laboratory site where past activities have caused groundwater, soil, and sediment contamination continued to undergo monitoring and cleanup in 2005. Program highlights include the completion of cleanup activities in the Peconic River, the former Waste Management Facility, and at the Waste Concentration Facility. Construction of the Strontium-90 Groundwater Treatment System, the last major system planned for the site, was also completed. In addition, the final record of decision for the Brookhaven Graphite Research Reactor was completed. These accomplishments were recognized with a celebration attended by community and political stakeholders.

A. Extent of Volatile Organic Compound Plumes.

B. Extent of Radionuclide Plumes On Site.

C. Locations of BNL Groundwater Remediation Systems.





Water Quality Program

BNL discharges wastewater treated at the Sewage Treatment Plant (STP) into the headwaters of the Peconic River 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 helps ensure that wastewater discharges comply with all applicable requirements and that the public, employees, and the environment are protected.

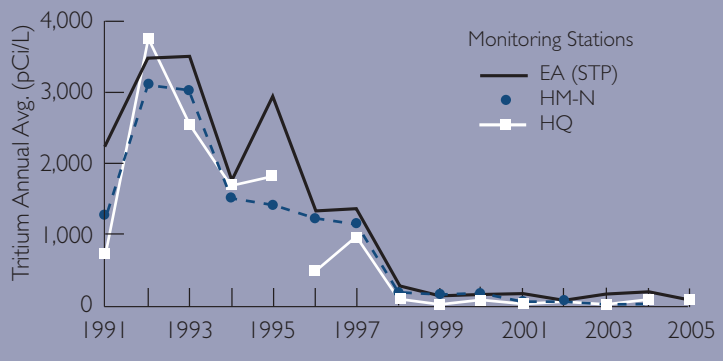
To assess the impact of discharges on the quality of the Peconic River, surface water is monitored at several locations upstream and downstream of the STP discharge points. The Carmans River, located to the west of BNL, is monitored for comparative purposes, as it is not affected by Laboratory operations.

- In 2005, the average radioactivity levels of 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. Tritium was detected above the minimum detection level in samples collected from June through August, due to an increase in discharges from air conditioning condensate from the High Flux Beam Reactor (HFBR). In addition, residual moisture within the HFBR piping system may have contributed to the slightly higher summertime tritium releases. Strontium-90 (Sr-90) was detected in a single sample collected in May, but was not detectable in the effluent. The Sr-90 concentration detected was very similar to levels found in upstream portions of the Peconic River.
- Nonradiological monitoring of the STP for chlorides, nitrates, sulfates, and metals are also performed. The results are compared to the State Pollutant Discharge Elimination System (SPDES) limits (or New York State Ambient Water Quality Standards [NYS AWQS]). In 2005, most of the analytical parameters were within SPDES effluent permit limits. There was one detection of zinc and single instances when aluminum and vanadium exceeded the NYS AWQS, most likely due to interference during analysis by the contract analytical laboratory. Acetone and methylene chloride were periodically detected in the effluent, although both are common solvents that are typically found in background levels in laboratories.
- On-site recharge basins are used to discharge "clean" wastewater streams, including once-through cooling water, stormwater runoff, and cooling tower blowdown, and are suitable for direct replenishment of the groundwater aquifer. BNL's recharge basins are permitted point-source discharges under the Laboratory's SPDES permit. Radiological analyses in 2005 showed low levels of radioactivity detected in all of the basins that were attributable to very low levels of naturally occurring radionuclides, such as potassium-40, and not to BNL operations. Very low levels of tritium were detected in a single sample, and were attributable to inaccuracies of the analytical method.
- In 2005, nonradiological samples from the recharge basins were collected quarterly for volatile organic compounds (VOCs). Low concentrations of disinfection byproducts from products used to control algae and bacteria growth were periodically detected. Acetone and methylene chloride were the only other analytes detected above minimum detection limits, most likely due to cross-contamination of the samples at the contract analytical laboratory due to the presence of these analytes in quality control samples.
- Analytical data for recharge basins show that all parameters, except for aluminum, iron, and lead, complied with the respective groundwater discharge or water quality standards in 2005. Chlorides were found to be higher in discharge samples collected during the winter and are attributed to road salt used to control snow and ice buildup. Iron and aluminum are natural components of soil and readily dissolve in samples when acidified. Iron is also naturally present in Long Island groundwater at concentrations that exceed the New York State groundwater discharge standard. Aluminum and iron concentrations were less than the NYS AWQS in filtered samples and pose no threat to groundwater quality, since the recharge basin acts as a natural filter and removes suspended particulates. Lead was detected in one sample and was considered to be an isolated instance. Lead is present in native soils and is identified in soil sample analyses. Contamination of the water samples with very low levels of soil could be the cause of this finding.
- Lead at the Central Steam Facility outfall continued to be evaluated in 2005. In 2005, the Laboratory cleaned out several upstream manholes that contained sediment found to have high concentrations of lead. During heavy rain, these sediments were being washed downstream and were collecting on the surface of the geotextile placed at the outfall earlier. Cleaning out the manholes precluded future deposits of lead-contaminated soils.
- All recharge basins receive stormwater runoff. Stormwater runoff at the Laboratory typically has elevated levels of inorganics and low pH. The inorganics are attributable to high sediment content and the natural occurrence of these elements in native soil. In an effort to further protect the quality of stormwater runoff, BNL has finalized formal procedures for managing and maintaining outdoor work and storage areas. The requirements include covering areas to prevent contact with stormwater, conducting an aggressive maintenance and inspection program, and restoring these areas when operations cease.
- Several locations are monitored along the Peconic River to assess the overall water quality of the river and to assess any impact from BNL discharges. In 2005, radiological analysis of upstream water samples showed that gross alpha and beta activity was detected at most Peconic River and Carmans River locations. The highest concentrations of gross beta activity were detected downstream and off the Laboratory site. The average concen-

trations from off-site and control locations were indistinguishable from BNL on-site levels and were attributed to natural sources. Samples collected downstream of the STP discharge showed concentrations typical of historical values and were below the applicable drinking water standard. Tritium results for water samples collected upstream and downstream of the STP discharge were below detectable levels, except for a single detection downstream of the STP discharge. In addition, low-level detections of Sr-90 were detected, but are consistent with historical levels and are attributed to worldwide fallout. No VOCs above the maximum detection level were detected in river water samples. Comparing Peconic River water quality data collected upstream and downstream showed that water quality was consistent throughout the river system.

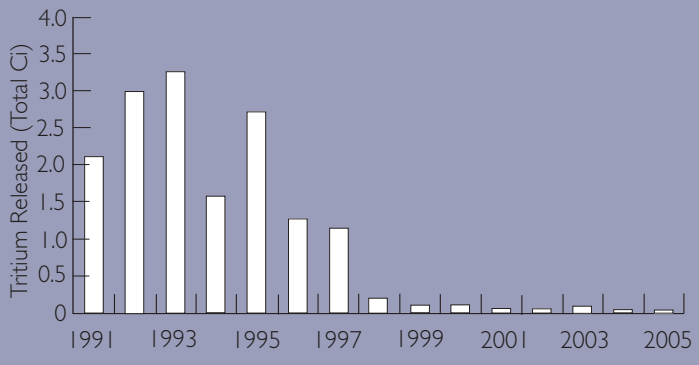
- Some metals were present in concentrations at some locations along the Peconic River that exceeded NYS AWQS both upstream and downstream of the STP discharge. Aluminum and iron are detected throughout the Peconic and Carmans Rivers at concentrations that exceed the NYS AWQS. Both are found in high concentrations in native Long Island soil and, for iron, at high levels in groundwater. Although most metals were detected in upstream samples (indicating a natural presence), the highest levels for silver, copper, lead, nickel, and zinc were detected in samples collected immediately downstream of the Laboratory's STP discharge. The concentrations detected were consistent with the concentrations found in the STP discharge and, in most instances, were within the BNL SPDES permit limits. Filtration of the samples reduced concentrations of most metals to below the NYS AWQS, indicating that most detections were due to sediment carryover.
- Mercury was detected in samples collected downstream of the Laboratory's STP discharge. Metals such as mercury can pose a risk for human consumption when they enter the food chain. In 2005, BNL completed an extensive project to remove contaminants from the Peconic River by excavating 6 to 12 inches of sediment from the river bottom. Remediation began immediately downstream of the STP discharge and continued off site into the County Parks east of the Laboratory's boundary. Once remediation was completed, monitoring of river water, sediment, vegetation, and fish samples was performed to determine the project's effectiveness. Although the mercury levels in the sediments were lower than the pre-cleanup levels, the levels in the water initially rose. This was most likely due to disturbances of mercury deposits within the buried sediments. The mercury levels in the water are expected to drop as the sediments settle and are covered with fresh silt from stormwater runoff.

Sewage Treatment Plant/Peconic River
Annual Average Tritium Concentrations, 1991 – 2005



Note:
NYS Drinking Water Standard is 20,000 pCi/L.

Tritum Released to the Peconic River,
15-Year Trend, 1991 – 2005



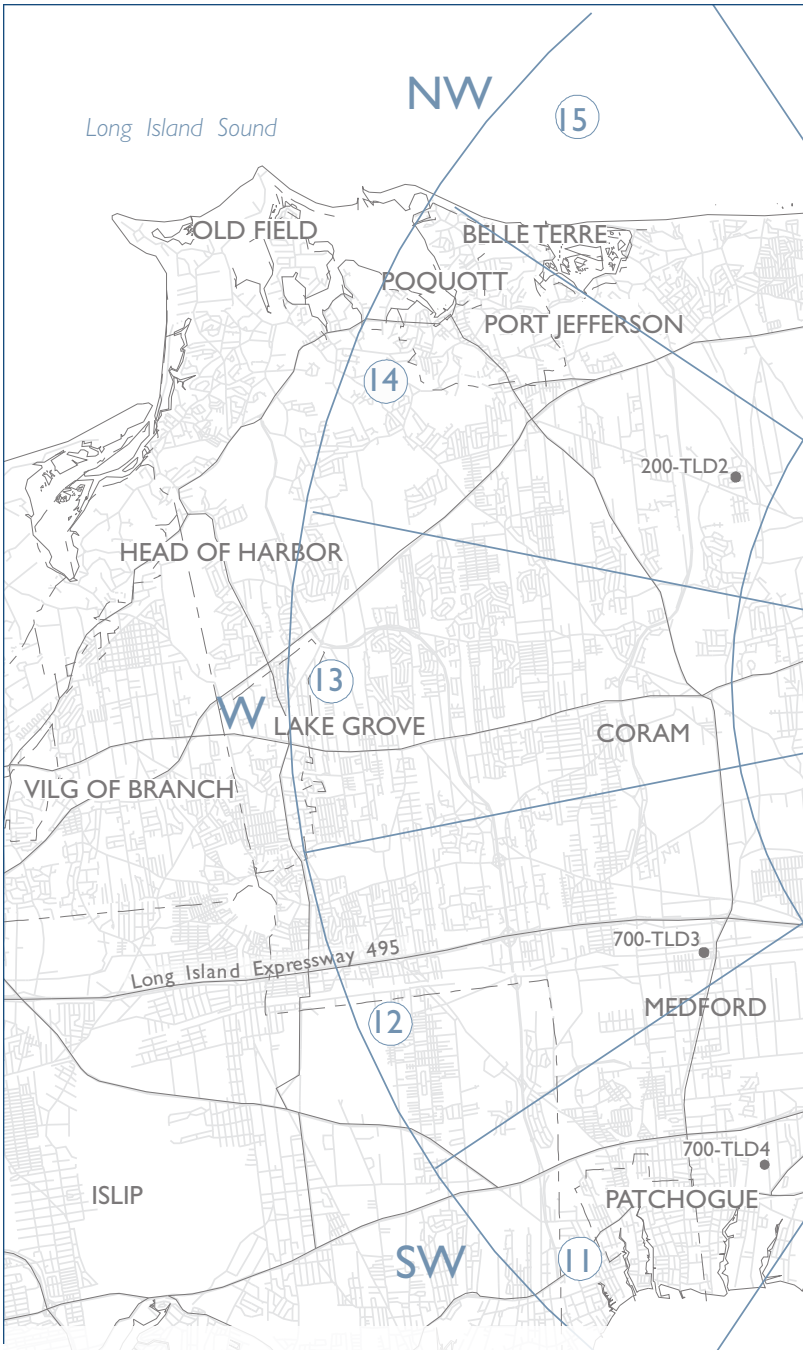
Radiological Dose Assessment Program

BNL routinely evaluates site operations to ensure that the radiological dose impact to the members of the public, Laboratory workers, and the environment is "As Low As Reasonably Achievable." All scientific and operational processes and activities that can in any way impact the health and safety, or potentially contribute to radiological dose are reviewed for their environmental impacts. The potential radiological dose to the public is calculated as the maximum dose to a hypothetical Maximally Exposed Individual (MEI) at the BNL site boundary. Doses are calculated by considering all direct and indirect sources and pathways, such as inhalation of air emissions, ingestion of deer meat and fish, and any immersion dose. The dose assessment routinely shows that the total Effective Dose Equivalent from BNL activities is well below the Environmental Protection Agency (EPA) and DOE regulatory dose limits. The dose from all Laboratory activities in 2005 was found to be insignificant compared to natural background radiation levels.

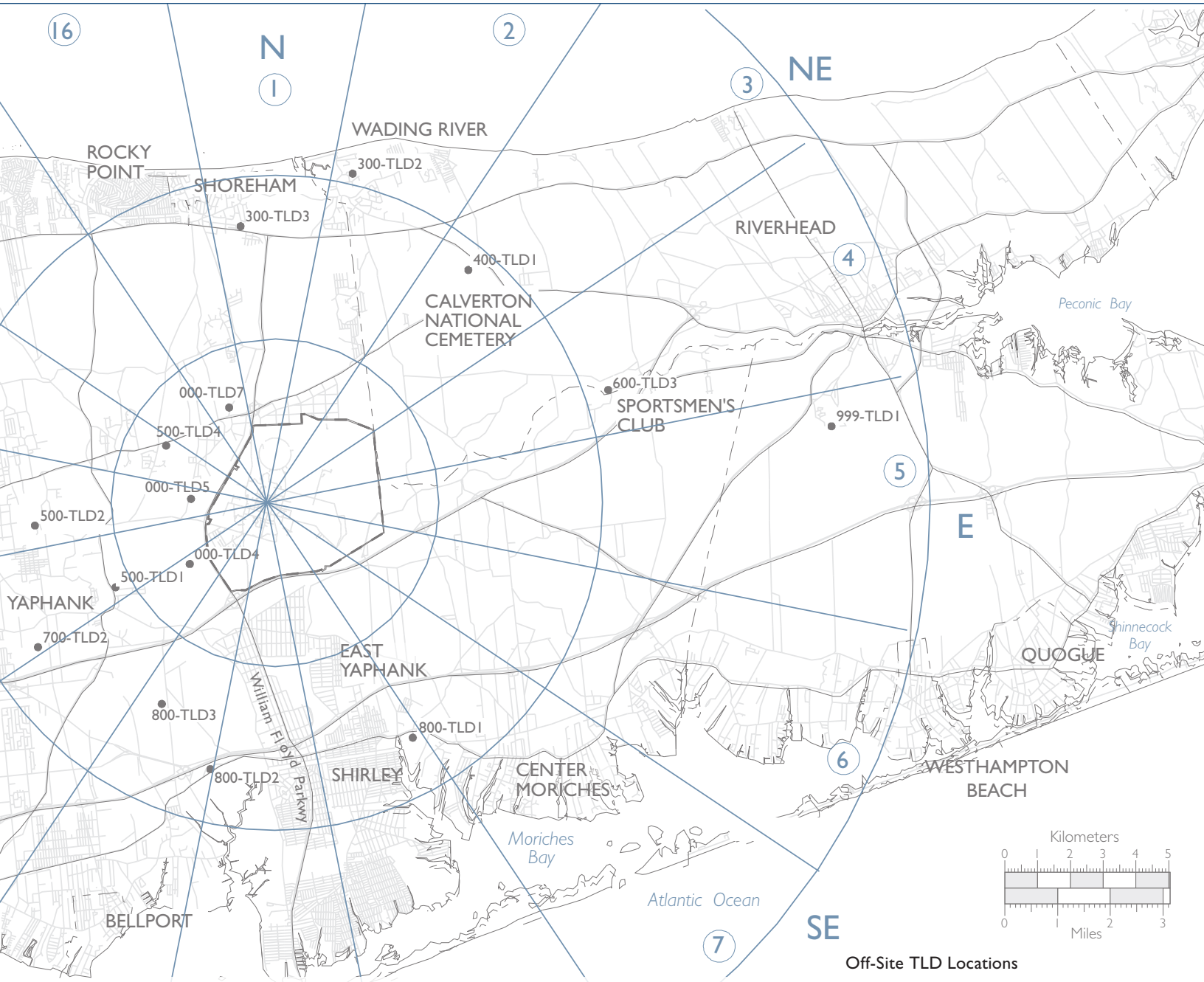
EPA regulates radiological emissions from DOE facilities under the requirements set forth in 40 CFR 61, Subpart H, National Emission Standards for Hazardous Air Pollutants (NESHAPs). This regulation specifies the compliance monitoring and requirements for reporting the radiation doses received by members of the public from airborne radionuclides. The regulation mandates that no member of the public shall receive a dose from DOE operations that is greater than 10 mrem (100 μSv) in a year.

A direct radiation-monitoring program is used to measure the external dose contribution to members of the public and workers from radiation sources at BNL. This is achieved by measuring direct penetrating radiation exposures both on and off site. The direct measurements taken at the off-site locations are with the premise that off-site exposures are true natural background radiation (contribution from cosmic and terrestrial) exposures and represent no contribution from BNL operations. To assess the dose impact of direct radiation from BNL operations, thermoluminescent dosimeters (TLDs) are placed on site and in the surrounding communities. These on-site TLDs are placed at locations known in the past to have radiation contamination, possible radiation scatter, or are near radiological posted areas and therefore have a higher probability that they could contribute to external radiation doses. The external dose measurements showed that there was no dose contribution from BNL operations either to on- or off-site locations.

The MEI is defined as a hypothetical person who resides at the site boundary and has a lifestyle such that no other member of the public could receive a higher dose. This person is assumed to reside 24 hours a day, 365 days a year at the BNL site boundary in the downwind direction, and consumes significant amounts of contaminated fish and deer based on projections from the New York State Department of Health (NYSDOH). In reality, it is highly unlikely that such a combination of "maximized dose" to any single individual would occur, but the concept is useful for evaluating maximum potential risk and dose.



- In 2005, the dose to a hypothetical member of the public exposed to the maximum level of radiation due to Laboratory air emissions was 0.05 millirem (mrem), or less than 0.02 percent of the average annual natural background level of radiation (approximately 300 mrems on Long Island) and well below the 10-mrem limit set by EPA under the Clean Air Act. 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.
- The calculated maximum hypothetical radiation doses for a person eating locally caught deer and fish were estimated at 0.32 mrem and 0.08 mrem, respectively. The annual dose from deer meat is based on a consumption estimate of 64 pounds per person, and the dose due to fish is based on a consumption estimate of 15 pounds per person. Both esti-



Off-Site TLD Locations

mates are very conservative. Fish and deer contaminant levels have dropped significantly, and are expected to drop further, following the recent completion of the Peconic River and site-wide soils cleanup projects. Hunting is not allowed on site, and NYSDOH has determined that no restrictions on hunting or consumption of deer taken near the Laboratory are needed. NYSDOH has also evaluated data on Peconic River fish and concluded that the existing general fish advisory for all New York State ponds and rivers, including the Peconic, is sufficient. This general advisory is to protect residents from eating large amounts of fish that have not been tested or may contain unidentified contaminants.

- 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 also 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 was evaluated for air emissions, tritium emissions during the pre-cooling of the Alternate Gradient Synchrotron snake magnet were assessed, and BLIP emissions. Each of these experiments and the review process met the NESHAPs compliance requirements and did not contribute to the effective dose equivalent.

DOSE IN PERSPECTIVE

Radiological materials are used in many research activities conducted at the Laboratory. This fact sheet explains Brookhaven National Laboratory's (BNL) maximum possible contribution to the radiation dose that a member of the public might receive in any given year and compares that dose to other typical radiation exposures.

What radiation dose might I receive each year?

The radiation dose received by a person is commonly expressed in "rem" or "millirem" (a millirem is one-thousandth of a rem). The average U.S. (and Long Island) resident's radiation dose from natural sources is approximately 300 millirems per year. This originates from natural cosmic and terrestrial radiation, radon, and minerals in food, water, and air. The average U.S. resident is also exposed to about 60 millirems per year from manmade sources, including medical procedures and consumer products. People who smoke tobacco receive a much higher dose, as do people who live in areas where radon is prevalent in the soil or at high altitudes where cosmic radiation is not so effectively shielded by the atmosphere.

Here are some examples of radiation doses from common sources, in millirem per year:

- Cigarette smoking (one pack per day) — 1,300
- Radon from the ground — 200
- Minerals in water, food, and air — 40
- Cosmic radiation — 26
- Chest x-ray — 9
- Fallout from historical worldwide nuclear weapons testing — 1

What radiation dose might I receive from BNL?

The largest hypothetical radiation dose that a member of the public could receive in 2005 from all pathways potentially affected by Laboratory operations—including air, water, deer, and fish — is 1.72 millirems. This is less than 1 percent of the dose Long Island residents receive from natural sources of radiation each year, and 3 percent of the limit set by DOE for man-made sources of radiation. The radiation dose is calculated for a hypothetical person living at the Laboratory boundary for the entire year, eating 64 pounds of local deer meat and 15 pounds of fish caught on site.

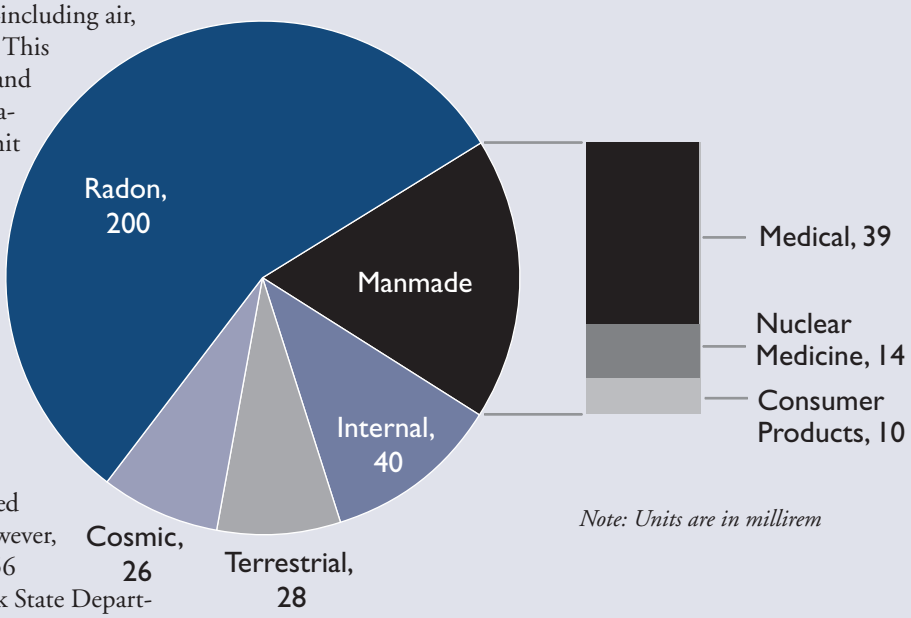
The largest portion of this worst-case dose (1.31 millirems) would result from eating deer meat. (Testing of deer killed by cars on and near Laboratory grounds, and by hunters near the site, shows elevated amounts of cesium-137 in the meat.) However, a person could eat four times as much (256 pounds) and still not exceed the New York State Department of Health "action level" of 10 millirems. In 1999, the state department of health formally concluded that there was no reason to issue health restrictions on consumption of deer taken near the Laboratory. (Hunting is not allowed on site, but deer typically range up to one mile.) The N.Y. State Department of Environmental Conservation and BNL have informed hunters of the test results so they may make their own decisions about whether to eat meat from deer taken near the site.

The radiation dose a person would receive from eating 15 pounds of fish containing cesium-137 at the highest level seen in any part of the Peconic River system would be 0.37 millirem. This dose can be compared to the dose of about 40 millirems a person receives annually from naturally occurring radionuclides in food, air, and water.

The maximum credible radiation dose a member of the public could receive due to Laboratory air emissions in 2005 was 0.05 millirem.

The internal radiation dose from drinking groundwater was expected to be zero. No radionuclides at levels above the Environmental Protection Agency's drinking water standards have been detected off the Laboratory site. On site, there are pockets of groundwater that contain radionuclides; these areas are regularly monitored and drinking water is not drawn from these areas.

For a person to be exposed to even the low levels cited in this fact sheet is an extremely unlikely "worst case" scenario. In reality, it is unlikely that anyone receives the maximum dose from any one pathway, and implausible that anyone receives all of the individual pathway doses together.



Note: Units are in millirem

In 2005, significant progress was made toward completing several cleanup projects of importance to BNL stakeholders, as a result of their involvement in the decision making.

- A decision among DOE, the Environmental Protection Agency (EPA), and New York State Department of Environmental Conservation (NYSDEC) to remove more than 90 percent of the mercury and PCBs in the Peconic River sediment, both on and off site, was reached following extensive public participation. The plan included appropriate methods to clean up the river; measures for protecting environmentally sensitive areas of the river and sensitive species within the river; and measures for reestablishing river vegetation after the cleanup. Final cleanup plans incorporated much of the community's input on each of these issues, and all comments and concerns were responded to and made a part of the written public record. The Peconic River cleanup was completed in 2005.
- DOE, EPA, and NYSDEC agreed on a cleanup plan for the Brookhaven Graphite Research Reactor (BGRR). The plan includes the removal of the reactor pile and contaminated biological shield, accessible pockets of contaminated soil, and the fuel canal structure. The goal is to eliminate more than 99 percent of the radioactive contamination found in the complex. Based on this plan, cleanup activities were started during 2005. A long-term monitoring program will also be implemented. Stakeholders, including the Community Advisory Council and a working group of community members, provided substantial input in the final decisions of the cleanup plan.
- Following extensive review by regulators and the public, a final decision was reached regarding the cleanup of strontium-90 in groundwater on site, and volatile organic compound contamination in on-site and off-site portions of the Magothy aquifer. The primary concern of the community was adequate protection of human health and the environment, given the length of time required for the cleanup process. The final document formalizing the decision was revised to include wording, suggested by community members, that requires DOE to continue searching for more effective and efficient cleanup methods, and to keep the community informed of the results through regular reviews and published reports. Construction of the Strontium-90 Treatment System was completed in 2005 and operation began to remove groundwater contamination by the BGRR.
- The soil excavations at the Former Hazardous Waste Management Facility and Building 811 were completed.

The cleanup plans reached in 2005 put in place the systems to ensure the completion of high-priority environmental restoration projects on and around the Laboratory site, as required by a 1992 agreement among DOE, EPA, and NYSDEC. Working closely with elected officials, regulatory agency representatives, and community members, DOE and BNL openly shared information, extensively solicited input, and provided feedback on how and when that input was used. To acknowledge these achievements, a community-wide cleanup celebration was held at the Laboratory in the fall of 2005.

Strontium-90 Groundwater Treatment System.

Soil cleanup work at the former Hazardous Waste Management Facility.

Peconic River recovery after cleanup and replanting.

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 Environmental Protection Agency 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 they are 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, STL and GEL, 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.

Communication and Community Involvment Program

Communication and community involvement are commitments under BNL's Environmental Management System. The Laboratory maintains relationships with its employees, key stakeholders, neighbors, elected officials, regulators, and other community members.

The goals are to provide an understanding of the Laboratory's science and operations, including environmental stewardship and restoration activities, and to incorporate community input in BNL's decision making. Staff participates in on- and off-site meetings, which include discussions, talks, presentations, roundtables, workshops, canvassing, tours, informal information sessions, and formal public meetings held during public comment periods.

To facilitate effective dialogue between BNL and key stakeholders, several forums for communication and involvement have been established. The Brookhaven Executive Roundtable (BER), established in 1997 by DOE's Brookhaven Site Office, meets routinely with BNL and DOE. These meetings enable Laboratory and DOE representatives to update local, state, and federal elected officials and regulatory agencies regarding BNL's environmental and operational issues, as well as scientific discoveries and initiatives. The Community Advisory Council (CAC), established by BNL in 1998, advises the Laboratory Director on issues related to the Laboratory that are of importance to the community. The CAC is composed of approximately 30 member organizations representing business, civic, education, employee, community, and environmental and health organizations. The CAC meets monthly in sessions open to the public, and sets its own agenda in cooperation with the Laboratory.

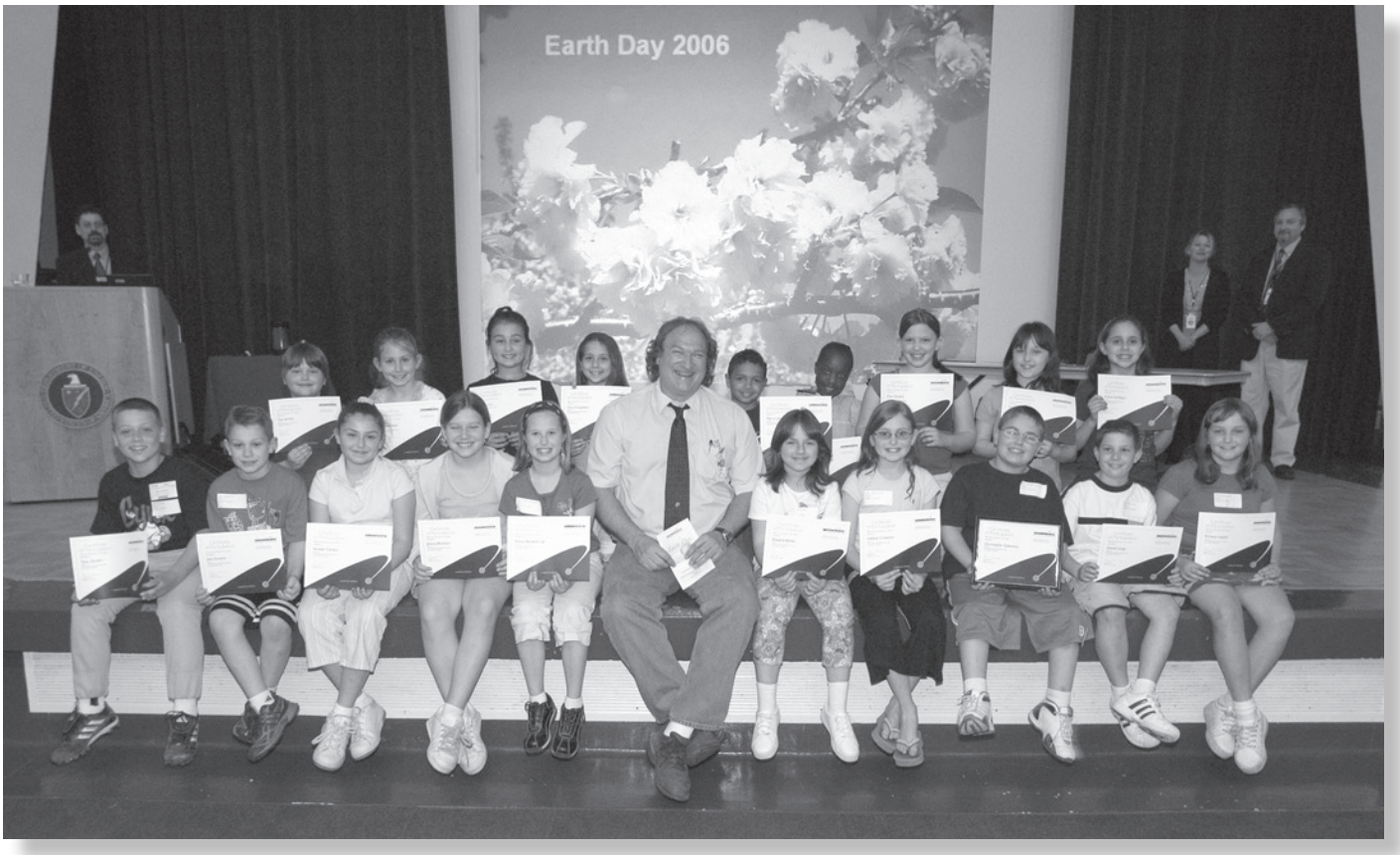
BNL's Envoy Program educates employee volunteers regarding Laboratory issues and provides a link to local community organizations. Feedback shared by envoys helps the Laboratory gain a better understanding of local community concerns. The Speakers' Bureau provides speakers for educational and other organizations interested in BNL, and the Volunteers in Partnership Program supports employee volunteer efforts for charitable organizations. The Laboratory's Summer Sunday tours enable BNL to educate the public by featuring different facilities and program areas. BNL also celebrates Earth Day each year, with activities that promote environmental stewardship, including employee awards and a student art contest with local elementary schools.

To keep employees and the community informed about the Laboratory's research, activities, and issues, including those related to the environment, BNL issues press releases; publishes *Laboratory Link*, a monthly update on BNL science and events; *the Bulletin*, a weekly employee newsletter; and *discover Brookhaven*, BNL's quarterly science magazine. The Laboratory maintains an informative website at www.bnl.gov, where these publications are posted, as well as information about BNL's science and operations, past and present. In addition, employees and the community can subscribe to the Laboratory's e-mail update service at https://lists.bnl.gov/mailman/listinfo/bnl-announce-1.

Environmental Stewardship Award winners.

Earth Day Pledge Tree winners.

Students from West Middle Island Elementary School participate in BNL's annual "Your Environment" art contest.



The SER Team realizes that many other employees contributed to this report and thanks everyone for their assistance.

The SER Team

(Back row) Jeffrey Williams, John Burke, Robert Lee, Douglas Paquette, George Goode, William Dorsch, Timothy Green, Balwan Hooda, Mark Davis, and John Selva
(Front row) Jennifer Higbie, Patricia Yalden, Arland Carsten, Karen Ratel, and Kathleen Robinson
(Jason Remien not pictured)

The Environmental and Waste Management Services Division Field Sampling Team

(From left to right) Robert Metz, Carlee Ogeka, Richard Lagattolla, and Lawrence Lettieri

The Environmental Information Management Services Group

(From left to right) SusanYoung, Alain Domingo, William Dorsch, Frank Tramontano, and John Burke

2005 Site Environmental Report Reader Response Form

The 2005 Site Environmental Report (SER) Summary provides highlights from the Brookhaven National Laboratory 2005 SER report. The report and summary are written to meet the requirements and guidelines of the U.S. Department of Energy and the informational needs of the public.

BNL welcomes your comments, suggestions for improvements, or any questions you may have. Please fill in the information below, and mail your response form to:

Brookhaven National Laboratory
Environmental and Waste Management Services Division
Attention: SER Project Coordinator
Building 120
P.O. Box 5000
Upton, NY 11973-5000

Name _____

Address _____

_____

Phone _____

E-mail _____

Comments, Suggestions, or Questions

_____

_____

_____

☐ I would like to be added to your Environmental Issues mailing list.

BROOKHAVEN
NATIONAL LABORATORY

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