

# 2014 Site Environmental Report



*Brookhaven National Laboratory  
Community Advisory Council Review  
October 8, 2015*

**BROOKHAVEN**  
NATIONAL LABORATORY

*a passion for discovery*



# Purpose of the Annual Site Environmental Report

- **Required by DOE and prepared in accordance with DOE Order 231.1B, Environment, Safety and Health Reporting. Documents compliance with:**
  - **DOE Order 436.1, Departmental Sustainability**
    - Requires DOE sites to maintain an Environmental Management System (EMS). An EMS specifies requirements for conducting general surveillance monitoring to evaluate the effects, if any, of site operations.
  - **DOE Order 458.1, Radiation Protection of the Public and Environment**
    - Requires DOE site to maintain surveillance monitoring for determining radiological impacts to the public and environment.
- **Official record of BNL's environmental impact for calendar year 2014**
  - Serves as an historical record; BNL has been preparing SERs since 1971
  - Used to respond to Freedom of Information Act (FOIA) requests
- **Serves as the principal environmental communications vehicle**
  - Distribution includes DOE, DOE Laboratories, regulators, local libraries, and interested stakeholders
- **Available as a downloadable file on the BNL web page, in hardcopy, and as a summary booklet that includes a CD version of the full report, including SER Volume II, Groundwater Status Report**

# Keeping you informed...

- **We frequently bring topics of interest to the CAC's attention well before the SER is published**
  
- **SER Topics covered at CAC meetings in 2014 include:**
  - ✓ SPDES Permit Modification/STP Upgrades Updates
  - ✓ Natural Resource Management Update
  - ✓ Environmental Cleanup Program Progress
  - ✓ Former Reactor Facilities & Groundwater Cleanup Updates
  - ✓ History of the BNL Site
  - ✓ Peconic River Monitoring Updates
  - ✓ Groundwater Treatment System Modifications

# 2014 SER

## Table of Contents/Chapter Authors

### ▪ SER Volume I

- Executive Summary
- Chapter 1 – Introduction
- Chapter 2 – Environmental Management System
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- Chapter 7 – Groundwater Protection
- Chapter 8 – Radiological Dose Assessment
- Chapter 9 – Quality Assurance

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### ▪ SER Volume II

- Groundwater Status Report – Groundwater Protection Group (approved by DOE and regulators in August 2015)

# Chapter 2 - Environmental Management System (EMS) ISO 14001

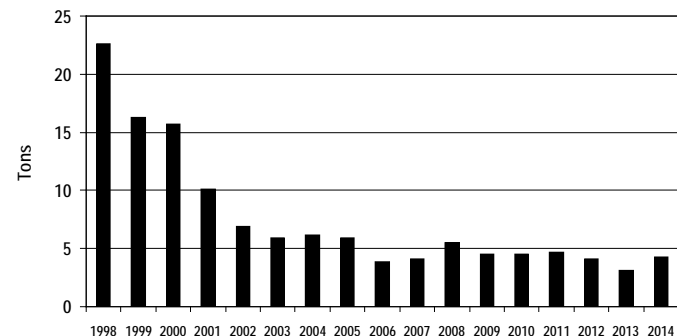


- **EMS Recommended for continued certification by NSF, June 2014**
  - “The system is fully integrated and effective with one minor nonconformity and many system strengths.”
  - 1 Minor Nonconformance: BNL’s Cultural Resource program involving tagging of artifacts that are part of the Historical Identification Tag program.
- **Pollution Prevention (P2) Program**
  - Cost avoidance of over \$4 million in 2014.
  - Reduced/recycled/reused 35.5 million lbs. of industrial, sanitary, hazardous, and rad waste.

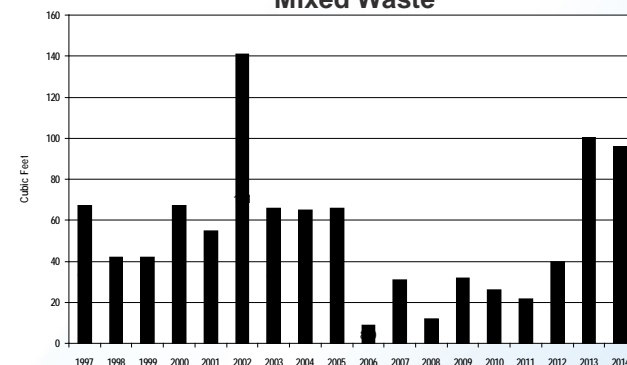
# Chapter 2 – Waste Generation

- As a result of research and cleanup activities, BNL generated regulated waste requiring careful handling and disposal.
- In 2014, BNL generated the following types and quantities of waste (trend noted):
  - **Routine Operations**
    - Hazardous Waste: 4.3 tons - up
    - Mixed Waste: 96 ft<sup>3</sup> - down
    - Radioactive Waste: 3,261 ft<sup>3</sup> – up
  - **Nonroutine Operations**
    - Hazardous Waste: 9.1 tons - down
    - Mixed Waste: 3 ft<sup>3</sup> - down
    - Radioactive Waste: 5,877 ft<sup>3</sup> - up

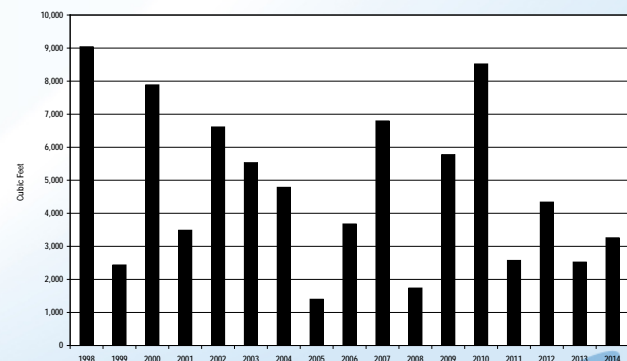
Hazardous Waste



Mixed Waste



Radioactive Waste



# Chapter 2 – Energy Management & Conservation

## ■ 2014 Statistics

- 291 million kilowatt hours of electricity
- 102,000 gallons of fuel oil
- 19,000 gallons of propane
- 670 million ft<sup>3</sup> feet of natural gas
- Energy intensity for 2014 was 22.6% below the 2003 baseline

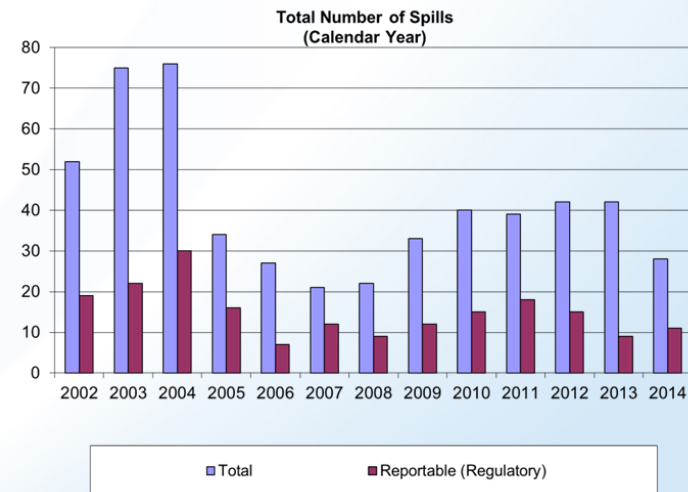


## ■ Utility Energy Service Contract (UESC)

- Environmental benefits include:
  - Electrical savings of 3,549,114 kWh/year
  - Fuel savings of 89,541 mmBtu/year
  - Greenhouse gas reduction of 7,022 MTCO<sub>2</sub>e
  - Building energy intensity reduction of 11%

# Chapter 3 – Compliance Status Overview

- **BNL must comply with 36 permits, including a Title V permit authorizing operation of 130 emission sources**
  - **SPDES Permit** – Renewed in September 2014
  - **Title V Permit** – Renewed in February 2014
- **National Environmental Policy Act (NEPA) – 134 projects reviewed**
  - 127 considered minor actions
  - 7 Environmental Evaluation Notification Forms; all categorically excluded or fell within scope of existing EA
- **Spills – 28 in 2014**
  - 11 reportable to NYSDEC
- **Potable Water**
  - Usage similar to 2012 & 2013
  - Complied with all drinking water requirements



## 2014 BROOKHAVEN NATIONAL LABORATORY Water Quality CONSUMER CONFIDENCE REPORT

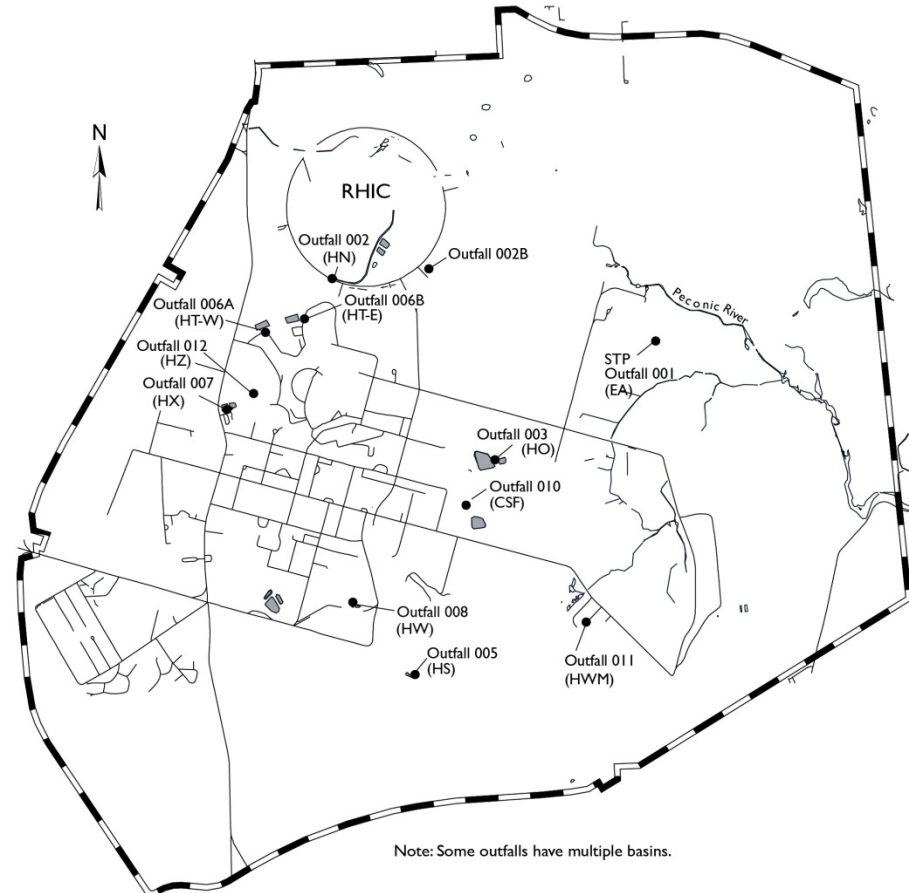
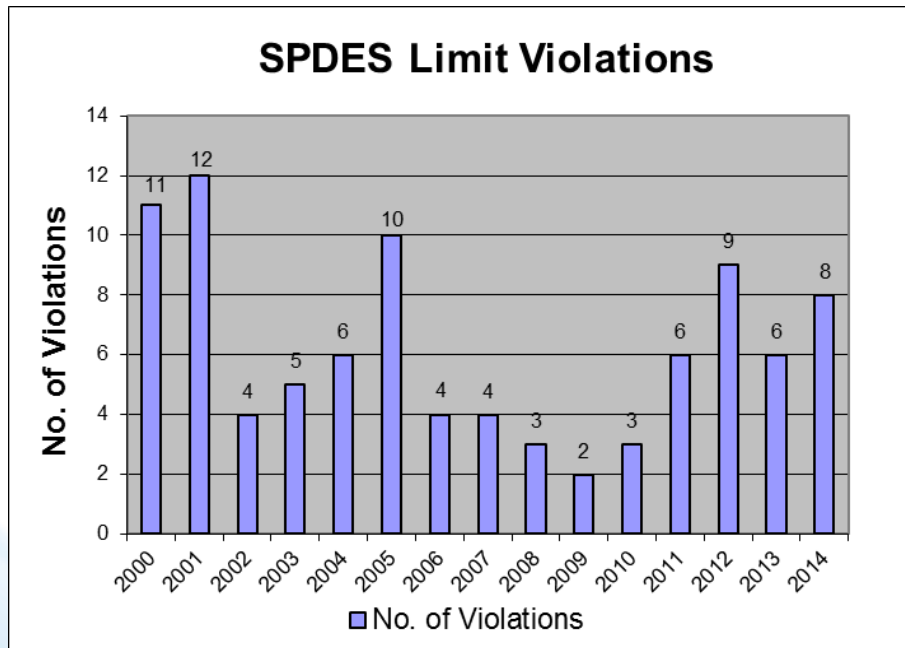
BNL publishes an annual water quality report to provide on-site drinking water consumers with an overview of the Lab's water quality during the previous calendar year. The purpose of this report is to inform you about where your water comes from, what analytical tests are conducted and what they reveal, and how the results compare to New York State standards.





# Chapter 3 and 5 – Water Quality Monitoring

- State Pollutant Discharge Elimination System (SPDES) – 8 permit excursions
  - (2) mercury, (2) total nitrogen at STP
  - (4) at recharge basins for pH (1), oil & grease (2), and HEDP (1)
- Metals detected in surface water samples consistent with SPDES limits
- No VOCs or Tritium detected above contract laboratory's MDLs (All locations)
- No Cs-137, Sr-90, or other gamma-emitting nuclides attributable to Laboratory operations were detected



# Chapter 3 – Inspections and Assessments



- **EPA (RCRA ):** No issues identified

- **NYSDEC**



- Major Petroleum Facility/Chemical Bulk Storage: 8 findings; 7 closed out and final finding being addressed by F&O
- Air: No issues identified during a December 2014 tour of permitted facilities
- SPDES: No issues identified during annual surveillance inspection



- **SCDHS (STP, potable water):** No issues identified at STP, potable water deficiencies identified are being addressed by F&O

# Chapter 4 – Air Quality (Radiological)

## ■ Radiological Emissions Monitoring

### – Three facilities monitored for radionuclide releases:

- BLIP, Building 801 Target Processing Lab and HFBR
- Total radionuclides released: 7,535 Ci (4,919 Ci in 2013)
- BLIP emissions of short-lived radioactive gases O-15 and C-11 accounted for more than 99.99% of total
  - (Half life: O-15=122 seconds, C-11=20.4 min)



## ■ Ambient Air Monitoring

### – Radiological air quality monitored at four on-site locations around the perimeter of the site.

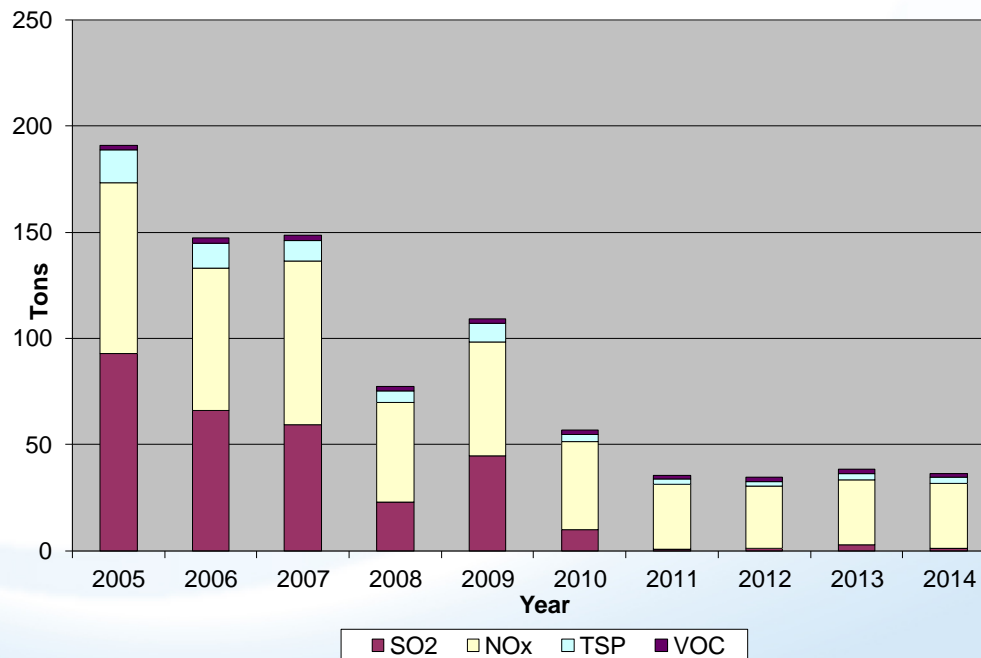
- Gross alpha and beta concentrations consistent with natural background.
- Average tritium concentrations were less than typical MDLs.



# Chapter 4 – Air Quality (Non-Radiological)

- **Continuous Emissions Monitoring System (CEMS) required for Central Steam Facility Boilers 6 & 7**
  - One Boiler 6 NO<sub>x</sub> limit exceedance 7/17 due to utility natural gas line service.
  - One 6-min period opacity exceedance Boiler 6.
  - Five 6-min opacity exceedances Boiler 7.
  - Fuel oil use (34,030 gals); 117,214 gals in 2013.
  - SO<sub>2</sub>, NO<sub>x</sub>, TSP, and VOC emissions well under respective permit limits of 445, 159, 113.3, and 39.7 tons.

Central Steam Facility Emissions

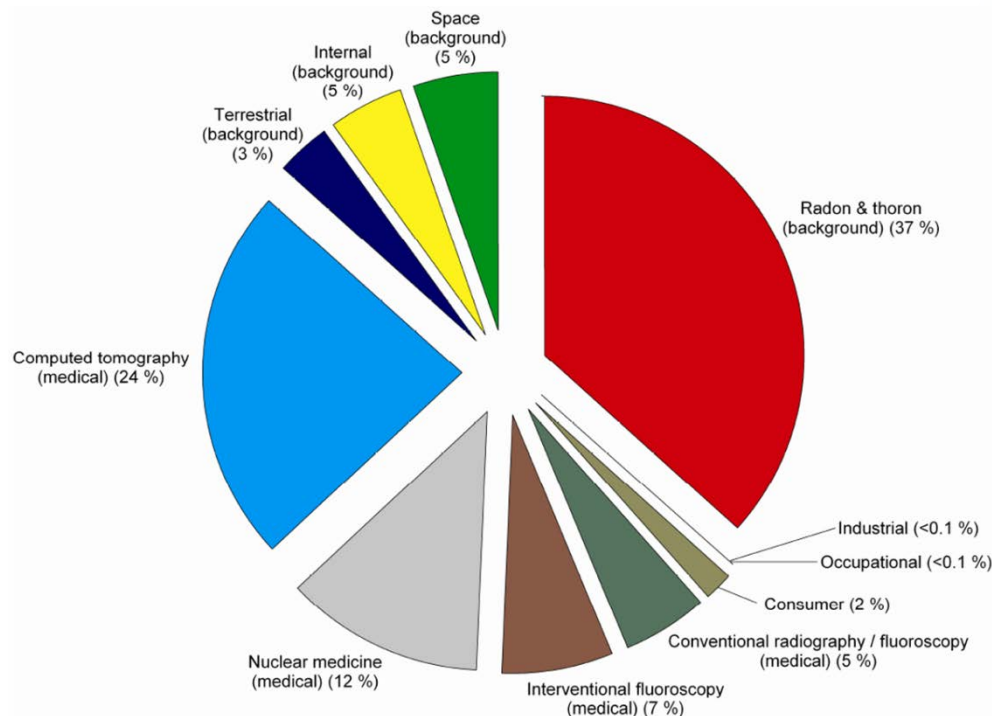


# Chapter 8 - Radiological Dose Assessment

- **Ambient external dose (TLDs)**
  - 69 mrem on site and 69 mrem off site (includes cosmic and terrestrial background)
  - no external dose contribution from BNL operations

- **Total effective dose to the Maximally Exposed Off-site Individual (MEOSI) in 2014 from inhalation and ingestion pathways was 3.15 mrem**

- **Well Below Regulatory Limits**
  - EPA: 10 mrem (air pathway)
  - NYSDOH: 10 mrem (ingestion pathway)
  - DOE: 100 mrem (from all pathways)



Average dose to individual is **620 mrem/year**

From NCRP Report No. 160, "Non-Occupational Ionizing Radiation Exposure of the Population of the United States" (2009)

# Future Presentations

- Chapter 6: Natural and Cultural Resources (January)
- Chapter 7: Groundwater Protection (November)

# QUESTIONS?