

# 2015 Site Environmental Report



*Brookhaven National Laboratory  
Community Advisory Council Review  
September 8, 2016*

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**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 2015**
  - 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 2015 included:**
  - ✓ P2/Sustainability at BNL
  - ✓ Peconic River Monitoring/Supplemental Sampling/Remediation Plan
  - ✓ Buildings 810/811 D&D
  - ✓ Natural Resource Management Update
  - ✓ Former Reactor Facilities & Groundwater Cleanup Updates
  - ✓ 2016 Five-Year Review
  - ✓ Community Wildfire Protection Plan

# 2015 SER

## Table of Contents/Chapter Authors

### ▪ SER Volume I

- Executive Summary
- Chapter 1 – Introduction
- Chapter 2 – Environmental Management System
- Chapter 3 – Compliance Status
- Chapter 4 – Air Quality
- Chapter 5 – Water Quality
- Chapter 6 – Natural and Cultural Resources
- 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 2016)

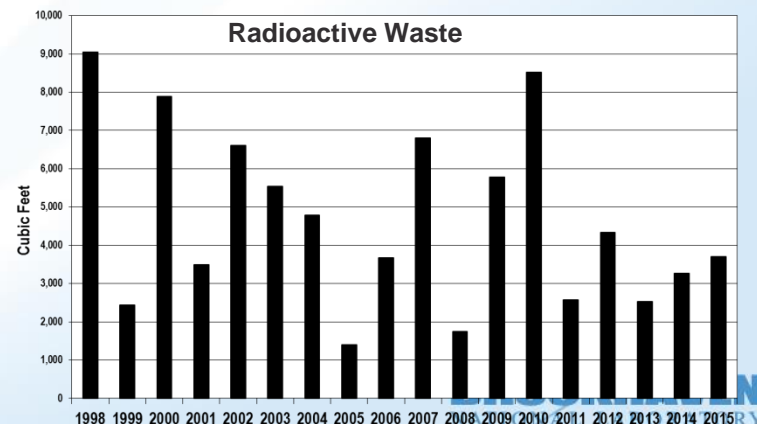
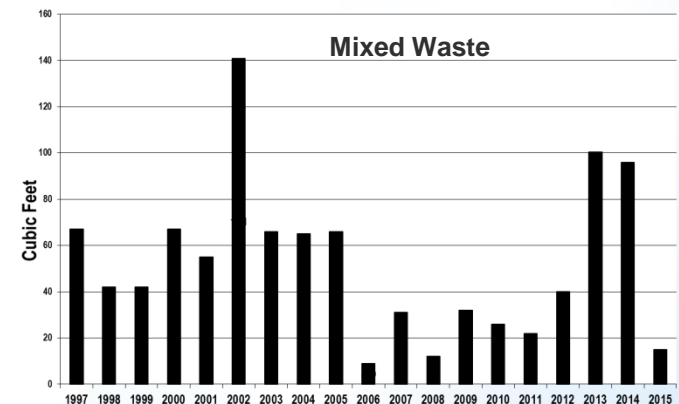
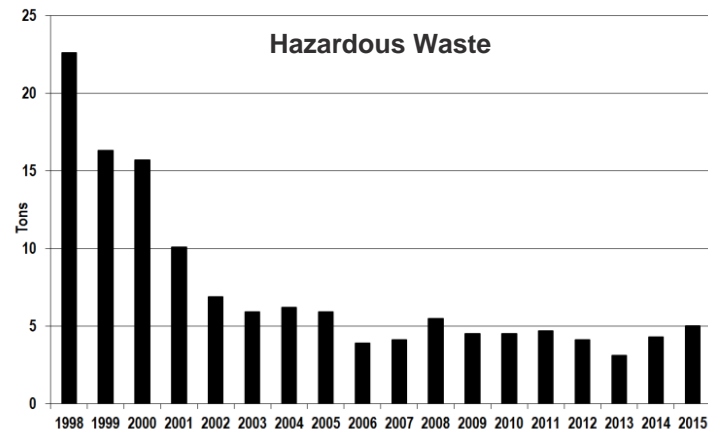
# Chapter 2 - Environmental Management System (EMS) ISO 14001



- **EMS Recommended for continued certification by NSF, June 2015**
  - The system is fully integrated and effective with multiple positive practices and two opportunities for improvement:
    - Simplifying documentation for EMS/OSHAS-related management systems
    - Clarifying process employed for the graded approach of the “Effectiveness Review” as it applies to EMS/OSHAS-related systematic nonconformities
- **Pollution Prevention (P2) Program**
  - Cost avoidance of over \$81.1 million in FY 2015.
  - Reduced/recycled/reused 26.1 million lbs. of industrial, sanitary, and hazardous waste.
    - Significant increase in numbers due to the UESC and the NSLS projects
    - The Lab’s annual recycling rate was 77%

# Chapter 2 – Waste Generation

- As a result of research and cleanup activities, BNL generated regulated waste requiring careful handling and disposal.
- In 2015, BNL generated the following types and quantities of waste (trend noted):
  - Routine Operations
    - Hazardous Waste: 5.0 tons - up
    - Mixed Waste: 15 ft<sup>3</sup> - down
    - Radioactive Waste: 3,700 ft<sup>3</sup> – up
  - Non-routine Operations
    - Hazardous Waste: 7.5 tons - down
    - Mixed Waste: 1 ft<sup>3</sup> - down
    - Radioactive Waste: 47,748 ft<sup>3</sup> - up



# Chapter 2 – Energy Management & Conservation

## ■ 2015 Statistics\*

- 282 (291) million kilowatt hours of electricity
- 65,000 (102,000) gallons of fuel oil
- 15,000 (19,000) gallons of propane
- 646 (670) million ft<sup>3</sup> feet of natural gas

\* Values in parenthesis are 2014 statistics  
(for comparison purposes)

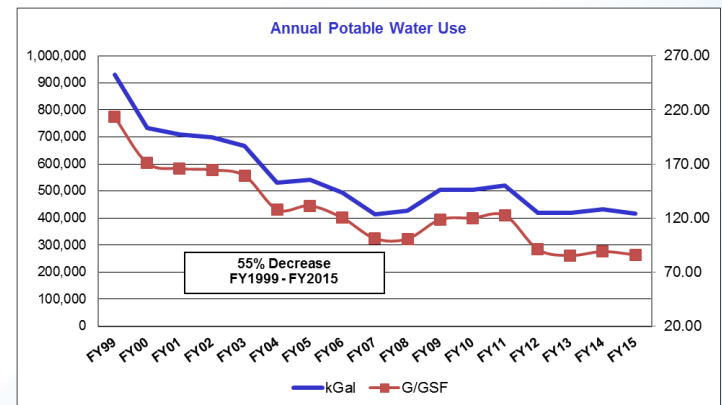


## ■ Utility Energy Service Contract (UESC)

- 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
- 132 additional projects reviewed for NEPA
  - 127 considered minor actions
  - 5 Environmental Evaluation Notification Forms; all categorically excluded or fell within scope of existing EA
  - Initiated EA for AGS Complex
- **Potable Water**
  - Usage similar to 2013 & 2014
  - Complied with all drinking water requirements
- **Tanks**
  - Due to strong performance on past annual petroleum bulk storage compliance audits and strong overall program, the NYSDEC exempted the Laboratory from its annual inspection in 2015

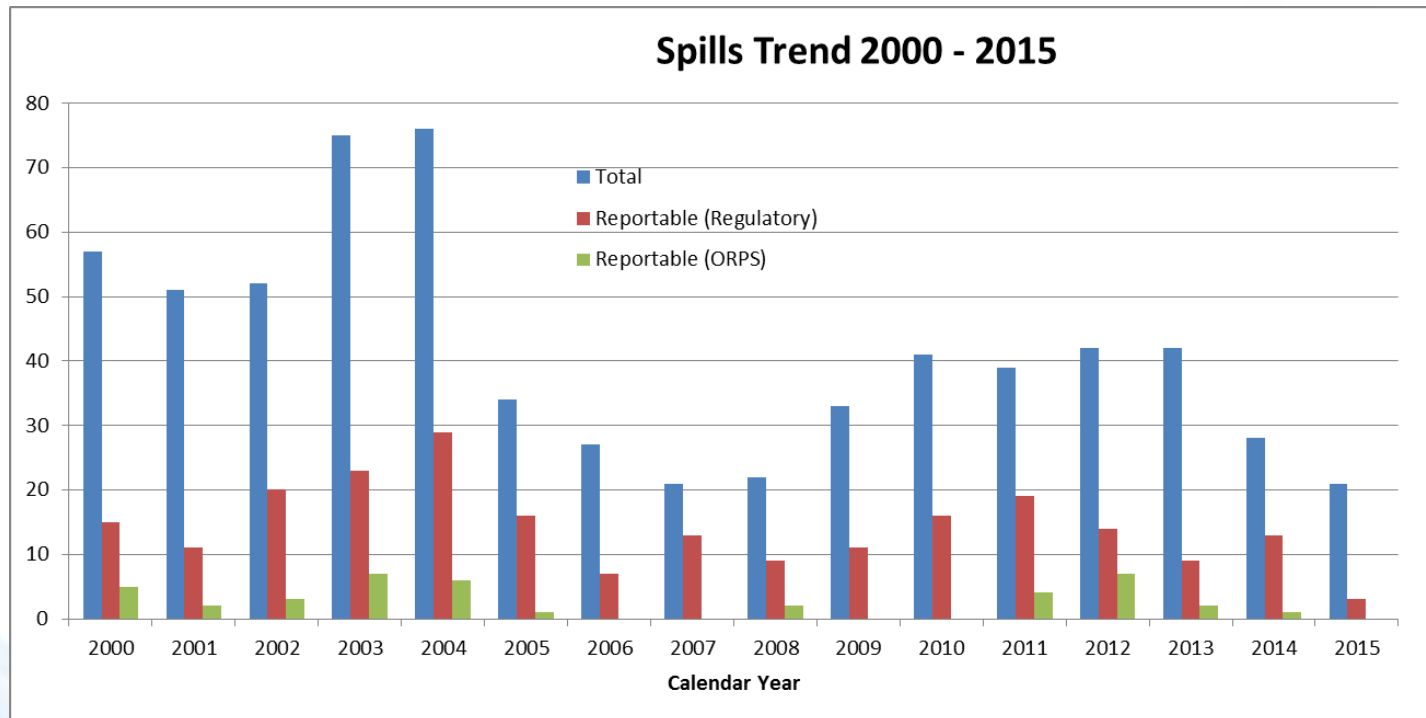


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**Water Quality**  
CONSUMER CONFIDENCE REPORT



# Chapter 3 – Spills and Reportable Incidents

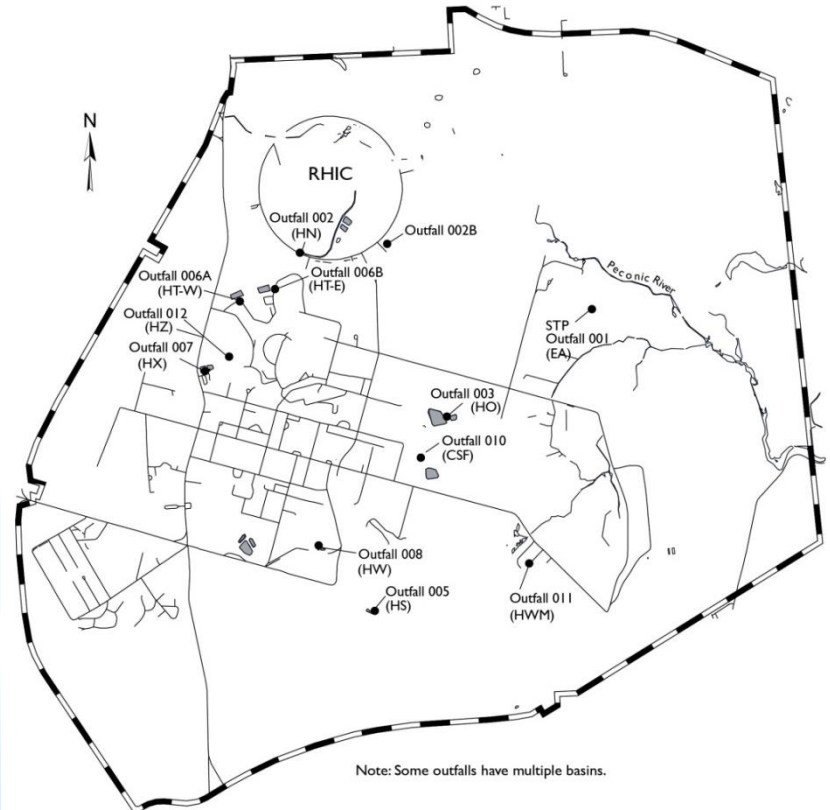
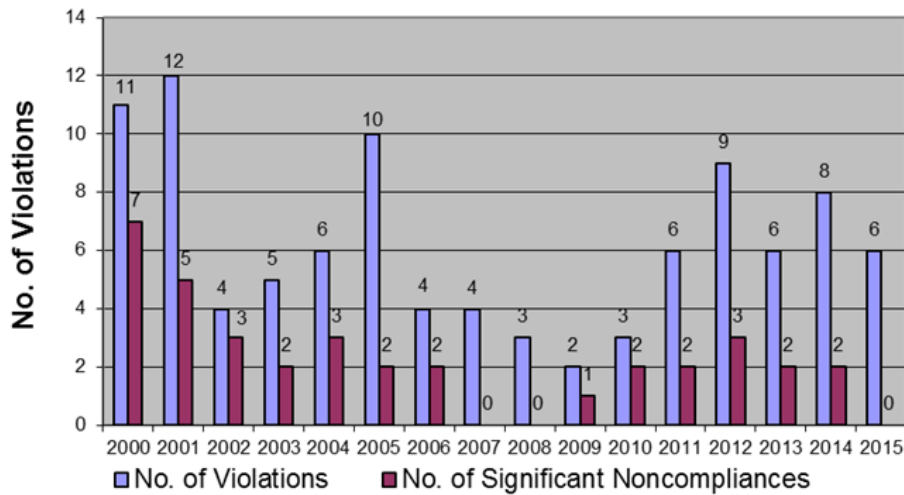
- 21 spills in 2015
  - 3 spills reportable to NYSDEC (All closed out)
  - No Occurrence Reporting and Processing System (ORPS) reportable spills
  - 25% reduction compared to 2014



# Chapter 3 and 5 – Water Quality Monitoring

- State Pollutant Discharge Elimination System (SPDES) – 6 permit excursions
  - (1) total nitrogen, (1) iron, and (2) ammonia at STP
  - (2) administrative at CSF/HW for failure to collect samples
- Metals detected in surface water samples consistent with SPDES limits or attributable to natural sources
- No VOCs detected above contract laboratory's MDLs (All locations)
- Tritium detected above MDL in a single sample collected at Basin HO (375 ± 229 pCi/L)
- No Cs-137, Sr-90, or other gamma-emitting nuclides attributable to Laboratory operations were detected

**SPDES Limit Violations**



# Chapter 3 – Inspections and Assessments



▪ **EPA (RCRA/UST):** Inspection performed in 2015 did not identify any issues with RCRA Program and minor UST Program deficiencies identified were addressed immediately.



▪ **NYSDEC**

- Air: No issues identified during August 2015 tour of permitted facilities.
- SPDES: No issues identified during annual surveillance inspections.
- RCRA: In February, NYSDEC performed a RCRA inspection and four violations were identified.



▪ **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: 4,551 Ci (7,535 Ci in 2014)
- BLIP emissions of short-lived radioactive gases O-15 and C-11 accounted for 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.

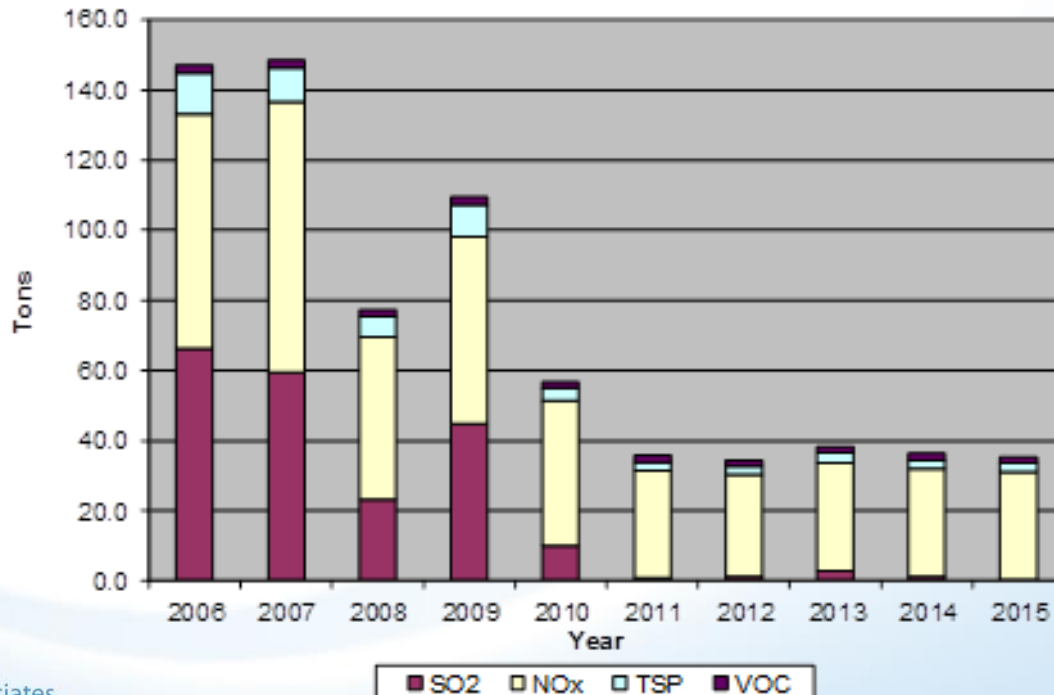
- Gross alpha and beta concentrations consistent with natural background.
- Average tritium concentrations were less than typical MDLs.



# Chapter 4 – Air Quality (Non-Radiological)

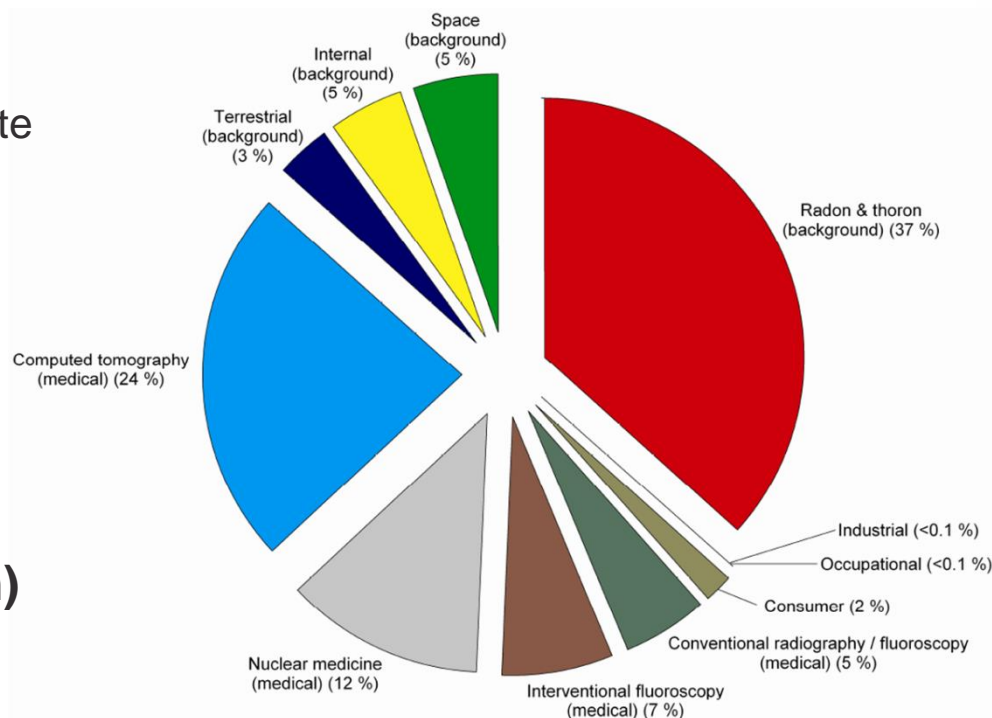
- **Continuous Emissions Monitoring System (CEMS) required for Central Steam Facility Boilers 6 & 7**
  - No NO<sub>x</sub> limit exceedances
  - No 6-min period opacity exceedances
  - Fuel oil use (9,655 gals); 34,030 gals in 2014.
  - SO<sub>2</sub>, NO<sub>x</sub>, TSP, and VOC emissions well under 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)**
  - 64 mrem on site and 59 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 2015 from inhalation /immersion (0.28 mrem) and ingestion (2.87 mrem) 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 (October)**
- **Chapter 7: Groundwater Protection (November)**

# QUESTIONS?