

2012 Site Environmental Report



*Brookhaven National Laboratory
Community Advisory Council Review
November 14, 2013*

*Jason Remien
Interim Manager
Environmental Protection Division*

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 2012**
 - 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
 - Over 100 hardcopies and 100 CD versions requested and distributed last year
- **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 Topic covered at CAC meetings in 2012 include:**
 - ✓ Brookhaven Graphite Research Reactor (BGRR) Explanation of Significant Differences (ESD)
 - ✓ Operable Unit III Explanation of Significant Differences (ESD) for Freon 11
 - ✓ SPDES/Wastewater Treatment Modification Project
 - ✓ OU III Southern Boundary groundwater treatment system extraction well

2012 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

Authors

Karen Ratel
Karen Ratel
Peter Pohlot / Karen Ratel
Jason Remien
Jeff Williams
Jason Remien
Tim Green
Bill Dorsch / Douglas Paquette
Benny Hooda
John Burke

▪ SER Volume II

- Groundwater Status Report – Groundwater Protection Group (submitted to DOE and regulators for approval mid August 2013)

Chapter 2 - Environmental Management System (EMS) ISO 14001

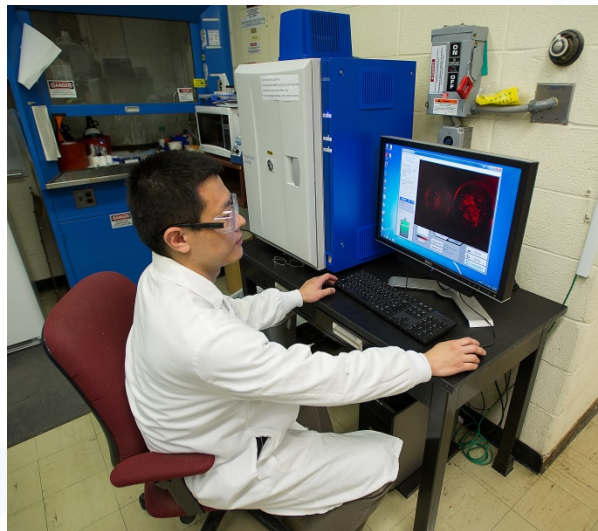
- **EMS Recommended for continued certification by NSF, June 2012**
 - **1 Minor Nonconformance:** Need for better document control to prevent unintended use of obsolete documents.
 - **22 Positive Practices**
 - ✓ **Communication, Consultation and Participation**
 - ✓ **Environmental/Safety Planning**
 - ✓ **Environmental/Safety Training and Operations**



Registered to
ISO 14001

Chapter 2 – Pollution Prevention (P2) Program

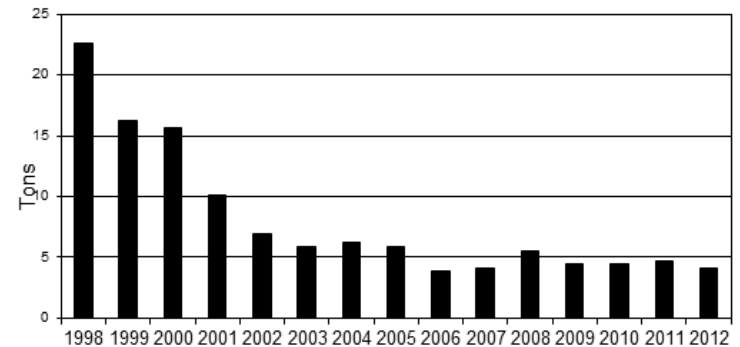
- **Cost avoidance of over \$3.0 million in FY 2012**
 - Reduced/recycled/reused 13.1 million lbs. of industrial, sanitary, hazardous, and rad waste
- **Funds invested in FY 2012 = \$13,500**
 - 8 proposals submitted, 3 funded
 - Annual cost savings ~ \$179,000 from new projects
 - Average payback ~ 1 month



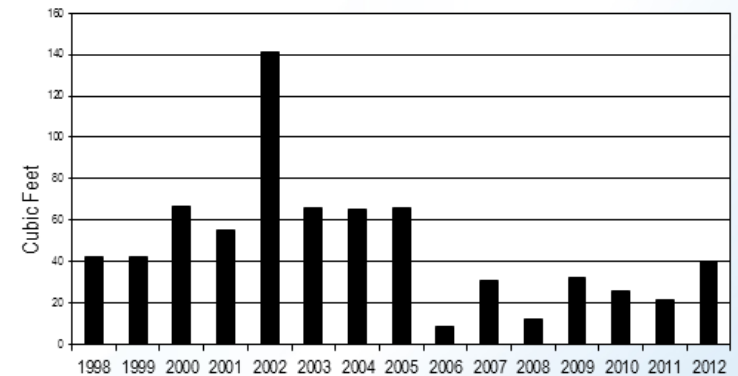
Chapter 2 – Waste Generation

- As a result of research and cleanup activities, BNL generated regulated waste requiring careful handling and disposal
- In 2012, BNL generated the following types and quantities of waste (trend noted):
 - Routine Operations
 - Hazardous Waste: 4.1 tons - steady
 - Mixed Waste: 40 ft³ - up
 - Radioactive Waste: 4,340 ft³ – up
 - Nonroutine Operations (ER and BNL)
 - Hazardous Waste: 36 tons - down
 - Mixed Waste: 68 ft³ - down
 - Radioactive Waste: 12,970 ft³ - down

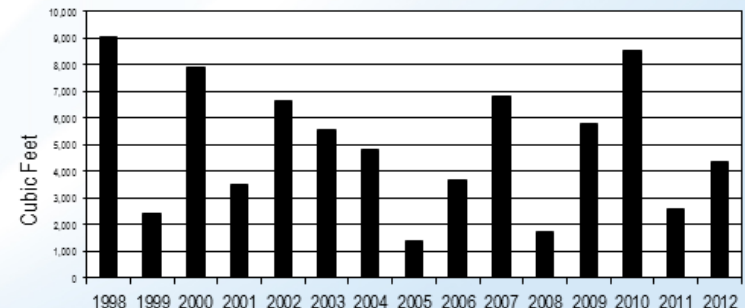
Hazardous Waste



Mixed Waste



Radioactive Waste



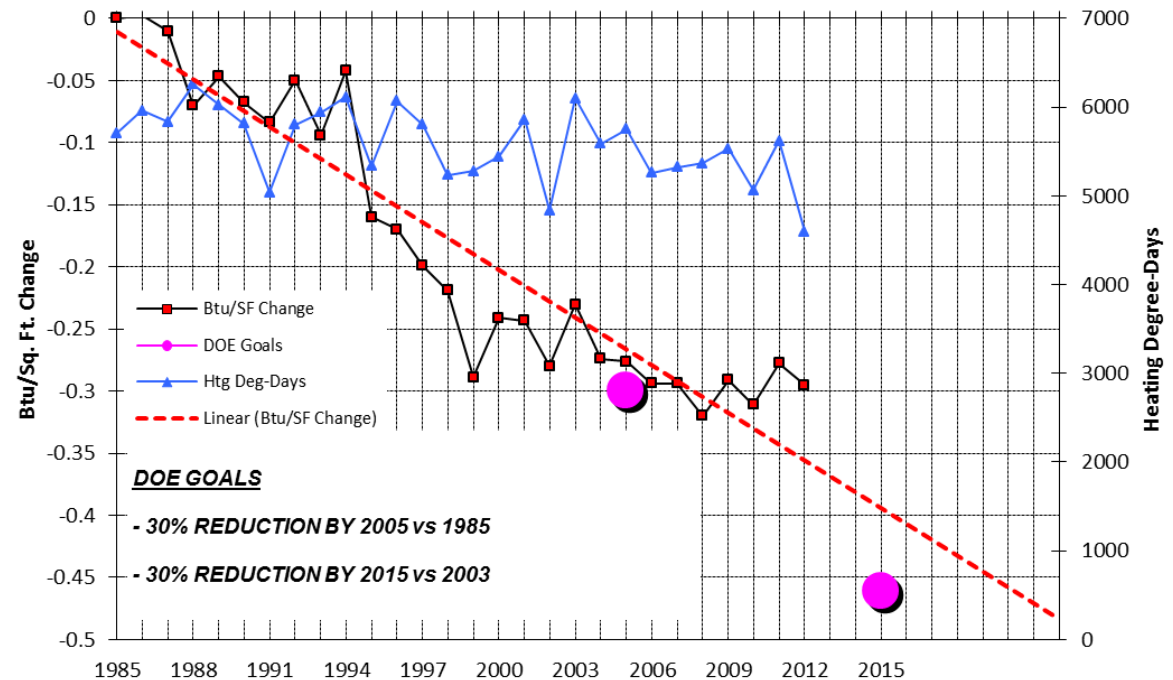
Chapter 2 – Energy Management & Conservation

■ 2012 Statistics

- 278 million kilowatt hours of electricity
- 108,000 gallons of fuel oil
- 17,000 gallons of propane
- 581 million ft³ feet of natural gas
- Energy use per square foot was ~ 7.3% less than in 2003 (SSP goal is 30% by FY 2015)

BUILDING ENERGY PERFORMANCE

BTU / FT² Change (%) vs. Baseline Years



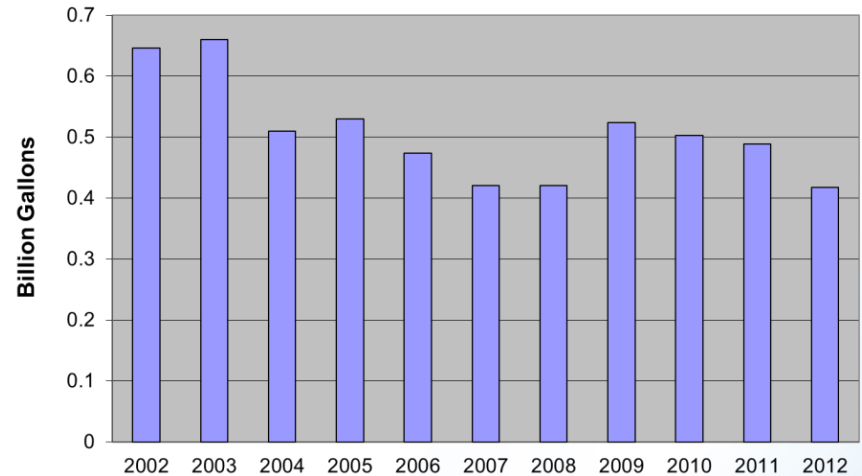
■ EO 13514/DOE O 436.1

- Establishes aggressive sustainability goals
- Requires preparation of a Site Sustainability Plan (SSP) to target actions to meet the goals
- Summary of goals and status of BNL's SSP provided in Chapter 2

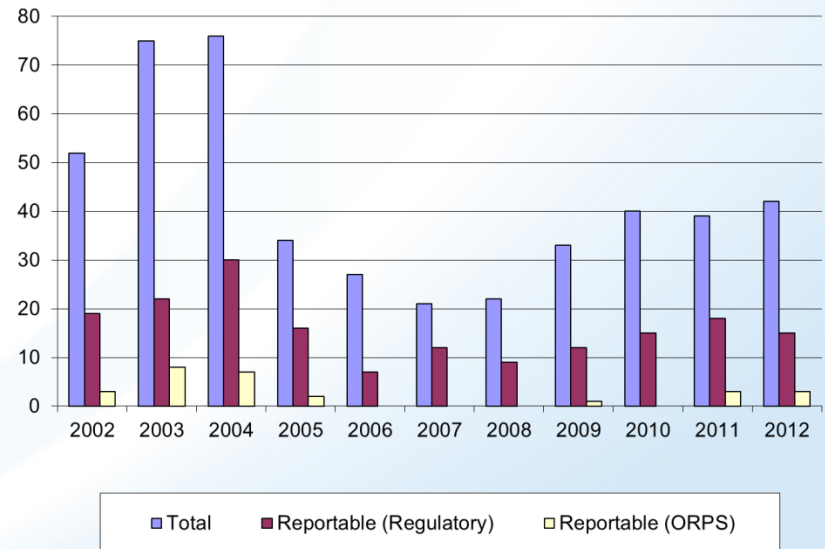
Chapter 3 – Compliance Status Overview

- **NEPA - 104 additional projects reviewed for NEPA**
 - 96 considered minor actions
 - 8 Environmental Evaluation Notification Forms; all categorically excluded or fell within scope of existing EA
 - One project, Management of the White-tailed Deer Population at BNL, was determined to require an EA, which will be completed in 2013
- **Potable Water**
 - 71M gallons lower than 2011
 - Complied with all drinking water requirements
- **42 spills in 2012**
 - 15 spills reportable to NYSDEC
 - 3 ORPS reportable releases
 - All associated with loss of refrigerant from air conditioning systems
 - Increase due to spills attributable to construction activities

Annual Potable Water Consumption



Total Number of Spills



Chapter 3 – Inspections and Assessments

- **Environmental Occurrence Reports (6)**
 - (2) Associated with shipments of radioactive waste to EnergySolutions (free liquids in intermodals and torn containers)
 - (3) Associated with the release of refrigerant from air conditioning equipment
 - Brush fire and associated petroleum release to soil from destroyed brush truck
- **External Inspections**
 - **EPA and RCRA:** EPA did not conduct any RCRA inspection in 2012
 - **SCDHS (STP, public water):** Minor deficiencies identified (being addressed)
 - **NYSDEC**
 - Major Petroleum Facility/Chemical Bulk Storage: 5 minor findings; all addressed
 - Air: No issues identified during the Relative Accuracy Test Audit
 - SPDES: No issues identified during annual surveillance inspection
 - RCRA: No inspection in 2012

Chapter 3 – Inspections and Assessments (continued)

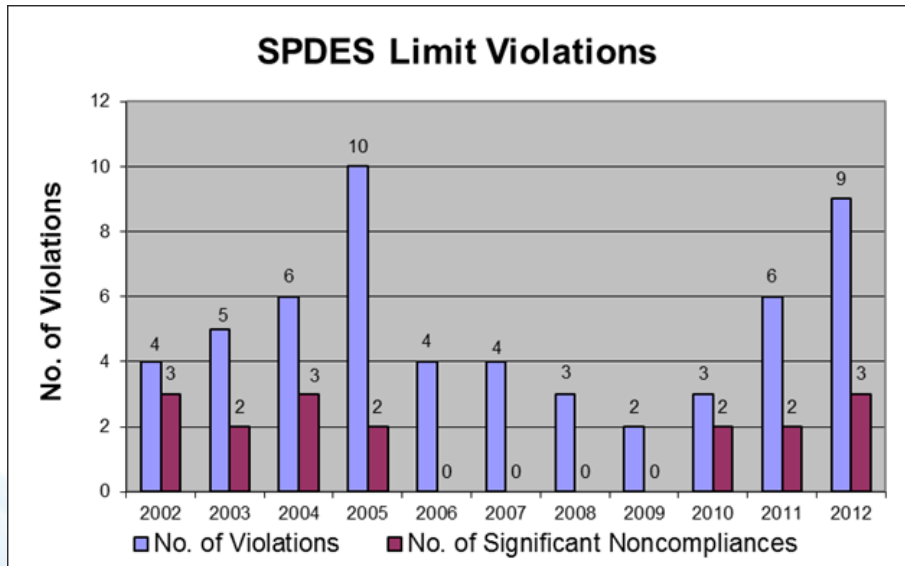
- **Internal Assessments (DOE-BHSO)**
 - **Readiness Assessment for Transition of the BGRR and HFBR Long-Term Surveillance and Maintenance**
 - Consisted of verification of the completion of the required actions and development of an action list that will be monitored and tracked to completion through the Laboratory's Assessment Tracking System (ATS)
 - **Surveillance of BNL's Response to the Building 705 Stack Drain Tank High-Level Alarm**
 - BHSO concluded that the alarm response was inadequate and recommended that BNL evaluate the event and consider potential vulnerabilities across the site
 - **Surveillance of BNL's SPDES Discharge Monitoring Report Preparation**
 - No findings were identified
 - **BHSO-CH: Assessment of BNL's Packaging and Transportation Program**
 - Overall, transportation operations at the Laboratory are performed as required and BNL has been implementing improvements

Corrective action plans prepared to address all assessment findings

Chapter 3 and 5 – Water Quality Monitoring

■ Sewage Treatment Plant

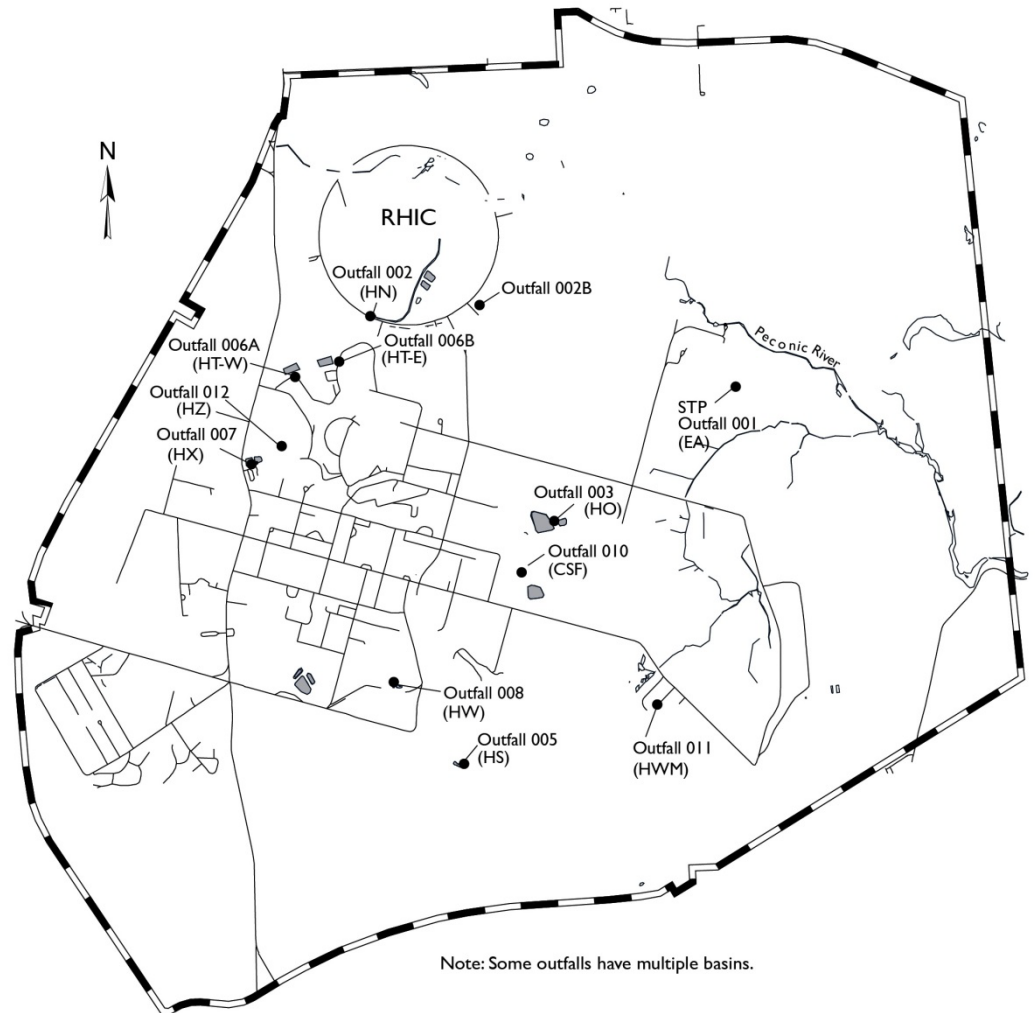
- SPDES: 3 permit excursions; (1) iron, (1) total nitrogen, and (1) total nitrogen load
- Tritium detected only once above the MDA
 - Maximum concentration of 630 ± 350 pCi/L
 - Annual average - 43 pCi/L
 - Total released - 0.015 Ci
- Cs-137 not detected
- Sr-90 detected twice in effluent
 - Very close to detection limit and consistent with background levels



Chapter 3 and 5 – Water Quality Monitoring (Continued)

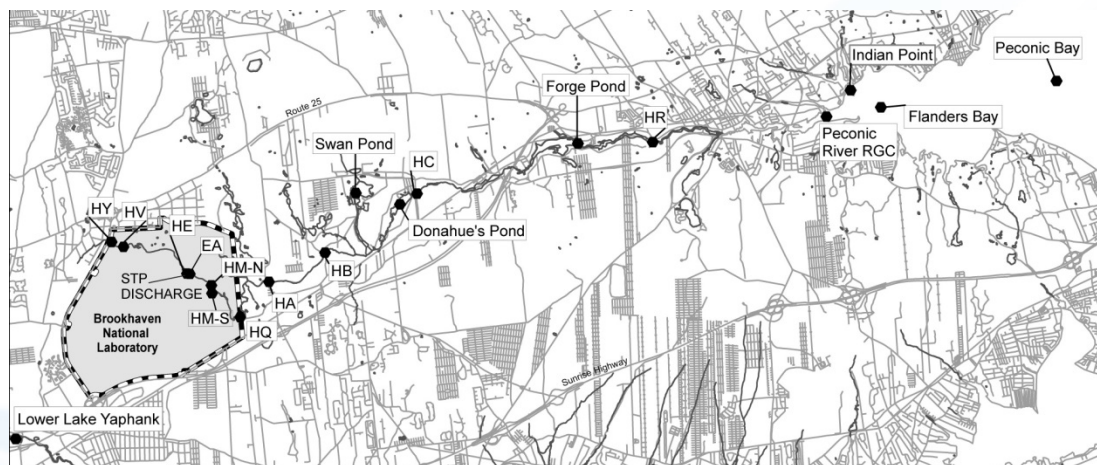
■ Recharge Basins

- SPDES: 6 permit excursions; (5) pH (runoff from construction sites) and (1) oil & grease
- No gamma emitters detected
 - Natural products only
- Tritium detected in single sample at Basin HT-W at low level (550 ± 290 pCi/L)
- Elevated gross alpha/beta results observed at Basin HW (due to high sediment content)



Chapter 3 and 5 – Water Quality Monitoring (Continued)

- **Peconic River**
 - No gamma emitting nuclides attributable to BNL detected
 - Low-level alpha and beta upstream and downstream attributed to natural products (e.g., K-40)
 - Very low levels (<5% of DWS) of Sr-90 detected at most sampling stations (including control location); all concentrations were consistent with background levels
 - Tritium not detected above MDA
 - Metals consistent with SPDES limits



Chapter 4 – Air Quality (Radiological)

■ Radiological Monitoring

- Brookhaven Linear Isotope Producer, Building 801 Target Processing Lab, HFBR
 - Total radionuclides released: 4,901 Ci (5,793 Ci in 2011)
 - BLIP emissions of short-lived radioactive gases (O-15 and C-11) accounted for 99.99% of total
- BGRR: Continuous monitoring of contamination control enclosure, January-April 2012 (0.0014 Ci tritium released)

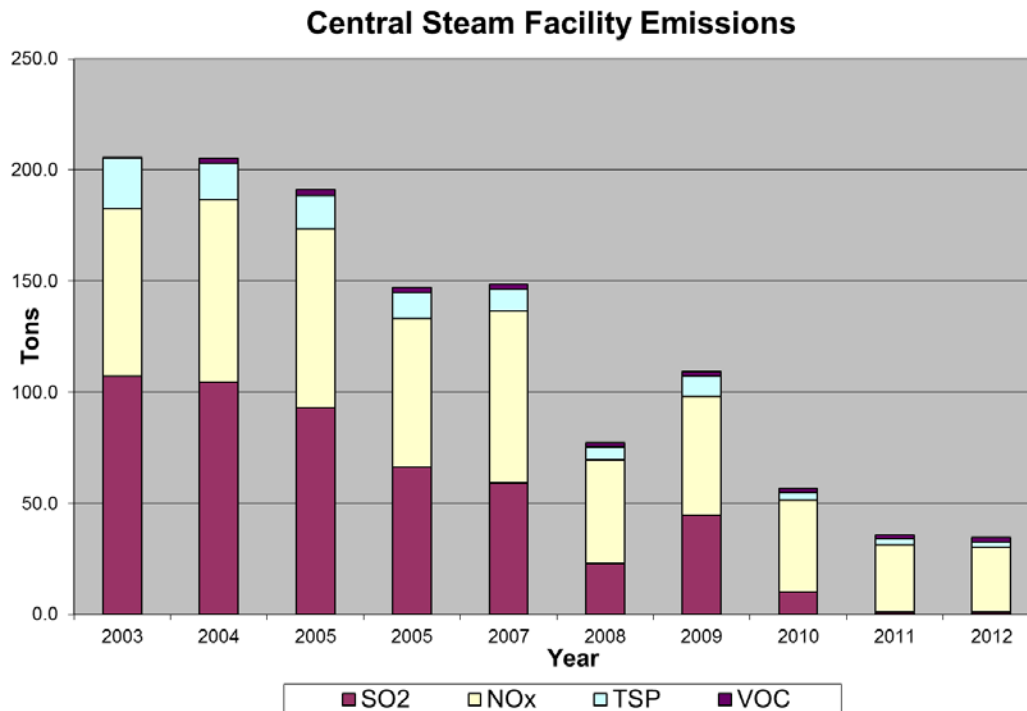
■ Ambient Air Monitoring

- Radiological air quality monitored at nine on-site locations around the perimeter of the site:
 - Gross alpha and beta concentrations consistent with natural background
 - Average tritium concentration less than MDAs



Chapter 4 – Air Quality (Non-Radiological)

- Continuous emissions monitoring required for Central Steam Facility Boiler Nos. 6 & 7
 - No measured exceedances of NO_x limits
 - Nine 6-min periods opacity exceedances (Boiler 6 on Jan. 4)
 - Fuel oil use was 43,438 gallons; 31,490 gallons 2011
 - SO₂, NO_x, TSP, and VOC emissions well under respective permit limits.



Chapter 8 - Radiological Dose Assessment

- **Ambient external dose (TLDs)**
 - 68 mrem on site and 62 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 2012 from inhalation and ingestion pathways was 2.55 mrem**

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

Future Presentations

- Chapter 6: Natural and Cultural Resources
- Chapter 7: Groundwater Protection

QUESTIONS?