2009 Site Environmental Report

Brookhaven National Laboratory
Community Advisory Council
November 4, 2010

BROOKHAVEN NATIONAL LABORATORY
a passion for discovery

Office of Science
U.S. DEPARTMENT OF ENERGY

Purpose of the Annual Site Environmental Report

- **Required by DOE and prepared in accordance with DOE Order 231.1, Environment, Safety and Health Reporting**
  - Documents compliance with DOE O 450.1A and 5400.5
- **Official record of BNL's environmental impact for calendar year 2009**
  - Serves as an historical record; BNL has been preparing SERs since 1971
  - Frequently used to respond to Freedom of Information (FOI) requests
- **Serves as the principal environmental communications vehicle**
  - Distribution includes DOE, DOE Laboratories, regulators, local libraries, and interested stakeholders
  - Over 200 hardcopies and 400 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**

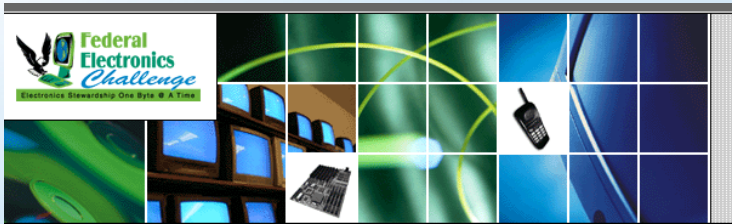
SER - Highlights

- We bring topics of interest to the CAC's attention well before the SER is published.

- Meetings that covered topics in the 2009 SER include:
  - SPDES Permit Revisions
  - Groundwater Updates
  - Peconic River Monitoring
  - EM Remedial Activities
  - Long Island Solar Farm
  - Natural Resource Management to be covered during a future meeting.

Environmental Management System - ISO 14001 Occupational Safety and Health Management System – OHSAS 18001 - Chapter 2

- **EMS/OHSAS Recommended for continued registration**
  - **14 noteworthy practices:**
    - Strong focus on safety improvements in many organizations
    - Pre-review of construction projects (ESH-500A)
    - Electronic fire extinguisher training
    - Infra-red surveys of electrical panels
    - Robust Lesson's Learned at CAD from CERN events
  - **1 minor non-conformance**
    - Improve the use of causal analysis for ES&H issues
- **Two Awards**
  - **DOE P2 STAR Honorable Mention Award**
    - Pollution prevention practices for Total Nitrogen Reduction at BNL Sewage Treatment Plant Using Cafeteria Wastes
  - **Third Federal Environmental Executive Silver Award for Electronics Recycling**
    - Recycled ~81,000 pounds of electronics

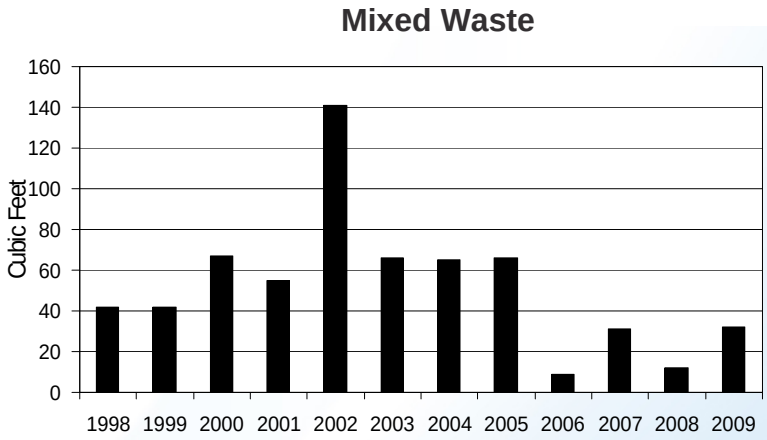


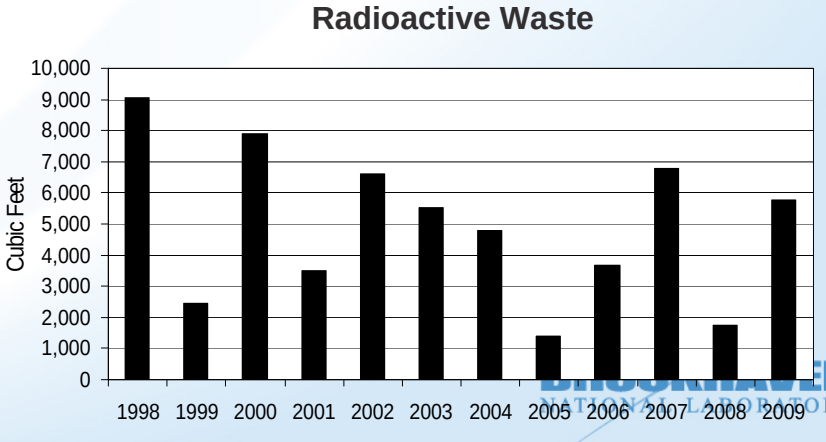
Pollution Prevention (P2) Program – Ch. 2

- **Cost avoidance of over $5.5 million in FY2009**
  - Reduced/recycled/reused 17.9 million lbs. of industrial, sanitary, hazardous, and rad waste
- **Funds invested in FY2009 = $24,000**
  - 15 proposals submitted, 5 funded
  - Annual cost savings = $33,650 from new projects
    - Formaldehyde detoxification
    - Battery Recycling (Big Green Box)
    - Solvent recycling parts washer
    - Mercury Switch replacement
    - Biodiesel Tank

Waste Generation – Ch. 2

- **In 2009, BNL generated the following types and quantities of waste (trend noted):**
  - **Routine Operations**
    - Hazardous Waste: 4.5 tons - down
    - Mixed Waste: 32 ft^3 - up
    - Radioactive Waste: 5,778 ft^3 – up
  - **Nonroutine Operations (ER and BNL)**
    - Hazardous Waste: 12.6 tons - up
    - Mixed Waste: 597 ft^3 - down
    - Radioactive Waste: 32,383 ft^3 – down
- **Pollution Prevention innovations continue to reduce the amount and toxicity of wastes produced**



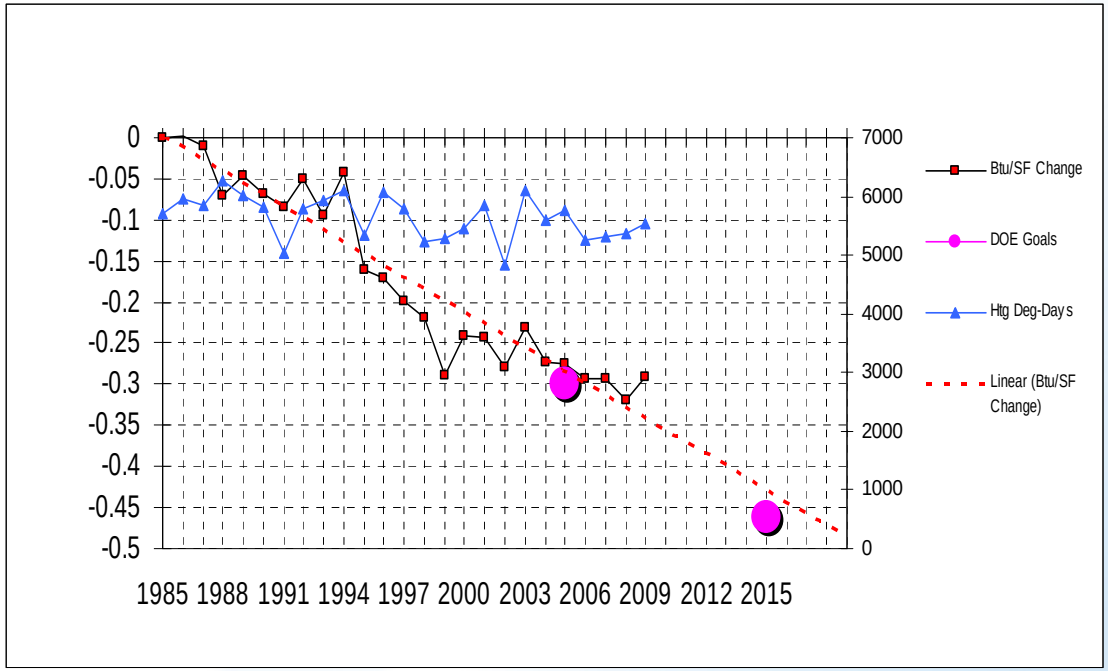


Energy Conservation – Ch. 2

- **E.O. 13423 and 13514 require all Federal Facilities to:**
  - **Reduce Energy**
  - **Reduce Greenhouse Gas**
  - **Reduce Water**
  - **Buy sustainable products**

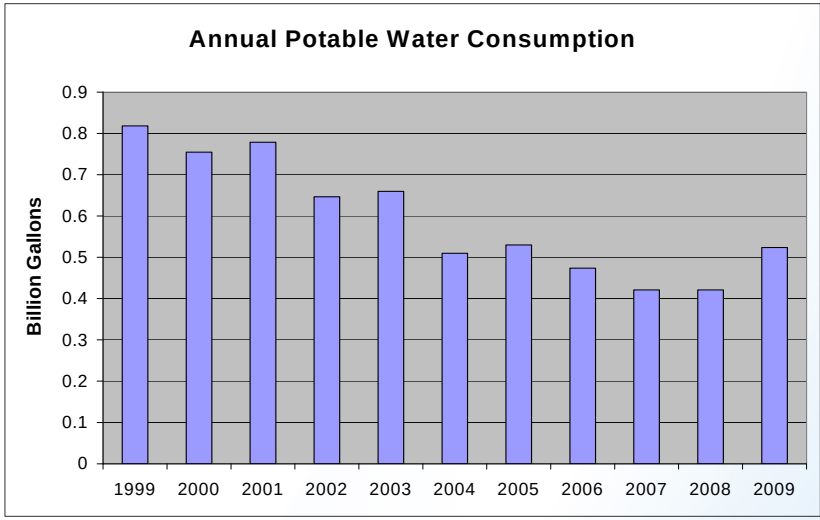
- **2009 Statistics**
  - 257 million kilowatt hours of electricity
  - 2.8 million gallons of fuel oil
  - 36,000 gallons of propane
  - 257 million ft^3 feet of natural gas
  - Energy use per square foot was ~ 8% less than in 2003

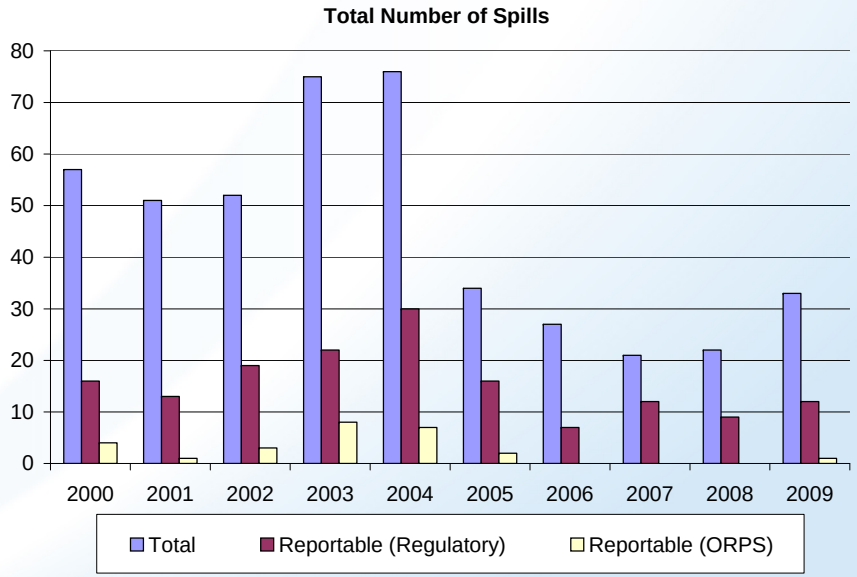
BNL Actual and Target
Building Energy Performance, 1985-2015



Compliance Status - Chapter 3

- **NEPA**
  - **122 additional projects**
    - 110 minor actions
    - 11 Environmental Evaluation Notification forms; all were categorically excluded
    - EA prepared for Long Island Solar Farm
- **Potable Water**
  - 60M gallons higher than 2008
    - Increased CA cooling usage
  - Complied with all drinking water requirements
- **Spills - 33 in 2009**
  - 50% increase over 2008
  - 12 spills reportable to NYSDEC
  - Will increase communications with staff and contractors to identify ways to minimize events





Inspections and Assessments – Ch. 3

- **External Inspections**
  - **SCDHS (Tanks, STP, public water): No deficiencies**
  - **NYSDEC**
    - Petroleum Storage: Minor deficiencies; all corrected
    - Chemical Bulk Storage: Minor deficiencies; all corrected
    - Air: No issues identified
- **Internal Assessments**
  - **DOE-BHSO/CO: Compliance with DOE-O-450.1: Readiness to Declare Conformance**
    - Overall EMS culture at BNL is strong
    - BNL declared conformance in April 2009
  - **DOE-BHSO/CO: Environmentally Preferable Purchasing**
    - Compliance with requirements improved, but BNL still behind schedule in its improvement plan implementation.
  - **DOE observation of programmatic Self-Assessments**
    - Multi-Topic Assessment: Review of waste management programs—7 non-conformances noted. Waste labeling, inspection and outdated subjected areas combined for the 7 findings.
  - **Corrective action plans prepared to address all assessment findings**

Water Monitoring – Ch. 3 & 5

Sewage Treatment Plant

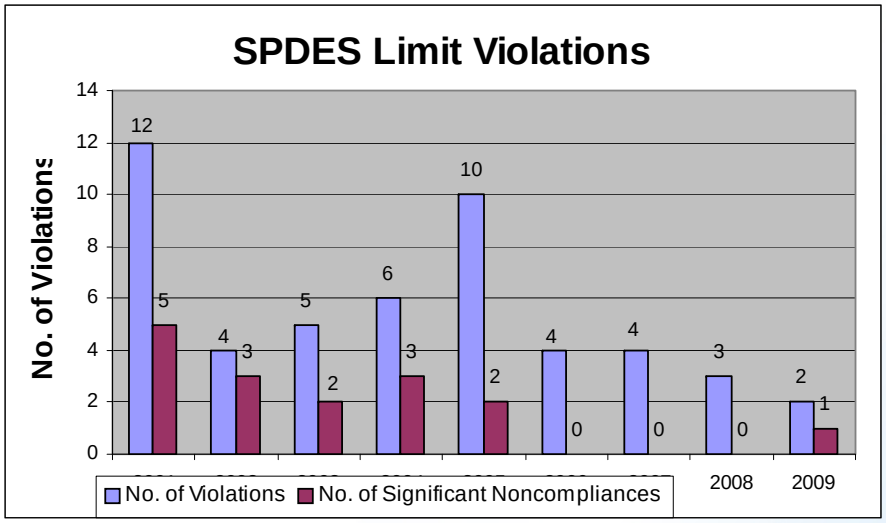
- SPDES – 1 permit exceedance
  - Total iron: sediment fouling
- Surveillance – No unexpected results

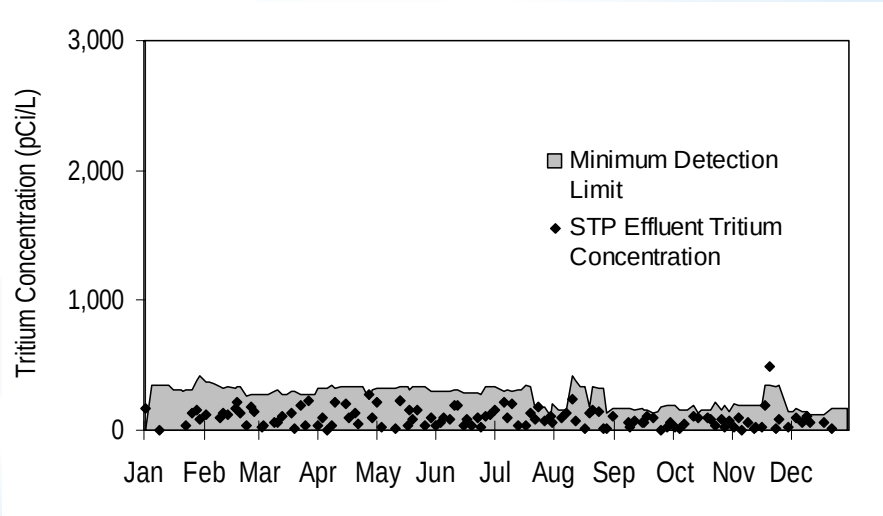
Recharge Basins

- SPDES – 1 permit exceedance
  - Tolytriazole from cooling tower
- Surveillance – No unexpected results

Peconic River

- Tritium: Very low levels of tritium most likely false positive results due to locations. No other nuclides attributable to BNL detected
- Metals consistent with SPDES limits but higher than ambient water quality standards.



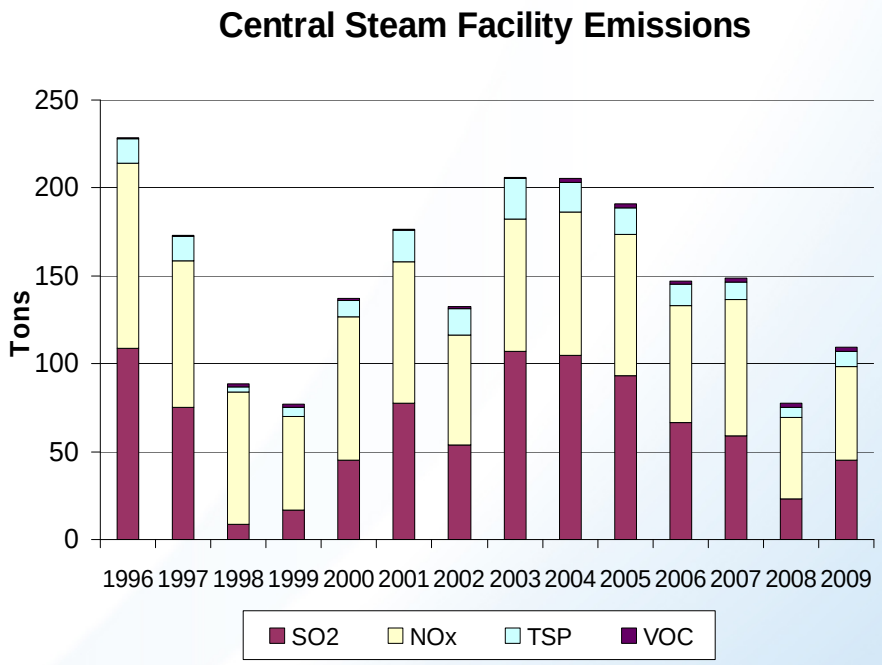


Air Monitoring (Radiological) – Chapter 4

- **Radiological Monitoring:**
  - Brookhaven Linear Isotope Producer
  - Target Processing Lab (Bldg. 801)
  - HFBR (now entering long-term S&M)
    - Total radionuclides released: 1,833 Ci (vs. 2,650 Ci in 2008)
    - BLIP emissions account for 97.9%.
- **Ambient Air Monitoring**
  - All monitoring results are consistent with background and historical measurements

Air Monitoring (Non-Radiological) – Ch. 4

- **Continuous emissions monitoring required for Central Steam Facility Boiler Nos. 6 and 7**
  - All emissions well below permit limits
  - Fuel oil use (1,904,320 gallons); 896,830 gallons more than 2008
  - No exceedances of NO_x limits
  - Opacity exceedances (24) recorded during 2nd and 4th quarters (More than 100,000 measurements taken)



Dose Assessment – Chapter 8

***Radiological dose is calculated for a hypothetical Maximally Exposed Individual (MEI): Person who lives at site boundary, eats home grown vegetables, and locally caught deer and fish*.**

- **Ambient external dose (TLDs):**
  - 71 mrem on site
  - 65 mrem off site: no external dose contribution from BNL operations
- **Regulatory Limits**
  - EPA - 10 mrem (air pathway)
  - NYSDOH - 10 mrem (ingestion pathway)
  - DOE - 100 mrem (from all pathways)

Pathway	Amt. Consumed	Dose
Air immersion	NA	0.07 mrem
Ingestion Fish	15 pounds	0.17 mrem
Ingestion Deer	64 pounds	7.1 mrem
Ingestion Water	None	No Dose
	TOTAL DOSE	7.34 mrem