2016 Site Environmental Report

Brookhaven National Laboratory

Community Advisory Council Review

October 12, 2017

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Environmental Protection Division

Manager

70 YEARS OF DISCOVERY

A CENTURY OF SERVICE

U.S. DEPARTMENT OF ENERGY

BROOKHAVEN NATIONAL LABORATORY

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 2016**
  - 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 and in limited hardcopy**

Keeping you informed…

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

- **2016 SER Topics covered at CAC meetings included:**
  - ✓ Alternating Gradient Synchrotron Environmental Assessment (EA)
  - ✓ Groundwater Cleanup Updates
  - ✓ BNL Site Sustainability Plan Update
  - ✓ Peconic River Supplemental Cleanup
  - ✓ NSLS Hazard Removal Project
  - ✓ BNL's EMS – External Audit Results and Future Changes
  - ✓ CERCLA 5-Year Review
  - ✓ Buildings 810/811 Demolition Project Closeout
  - ✓ Natural Resource Management Updates
  - ✓ Deer Management

2016 SER
Table of Contents/Chapter Authors

• **SER Volume I**	**Authors**
▪ Executive Summary	Karen Ratel
▪ Chapter 1 – Introduction	Karen Ratel
▪ Chapter 2 – Environmental Management System	Peter Pohlot / Karen Ratel
▪ Chapter 3 – Compliance Status	Jason Remien
▪ Chapter 4 – Air Quality	Jeff Williams
▪ Chapter 5 – Water Quality	Tim Green
▪ Chapter 6 – Natural and Cultural Resources	Tim Green
▪ Chapter 7 – Groundwater Protection	Bill Dorsch / Douglas Paquette
▪ Chapter 8 – Radiological Dose Assessment	Tim Welty
▪ Chapter 9 – Quality Assurance	John Burke

- **SER Volume II**
  - 2016 Groundwater Status Report – Groundwater Protection Group

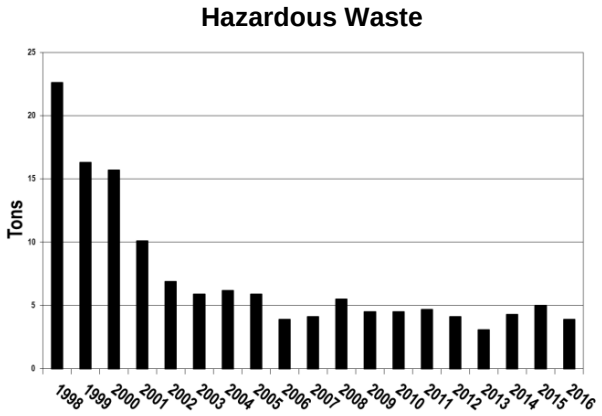
Chapter 2 -
Environmental Management System (EMS) ISO 14001

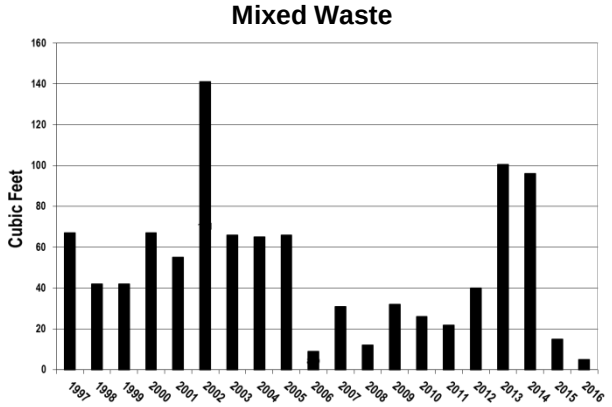
- **EMS Recommended for continued certification by NSF, June 2016**
  - The system is fully integrated and effective with several noteworthy practices and two opportunities for improvement:
    - Consider using the assessment database to record the responses to findings from regulatory agencies
    - Consider assigning back up roles and responsibilities for system activities

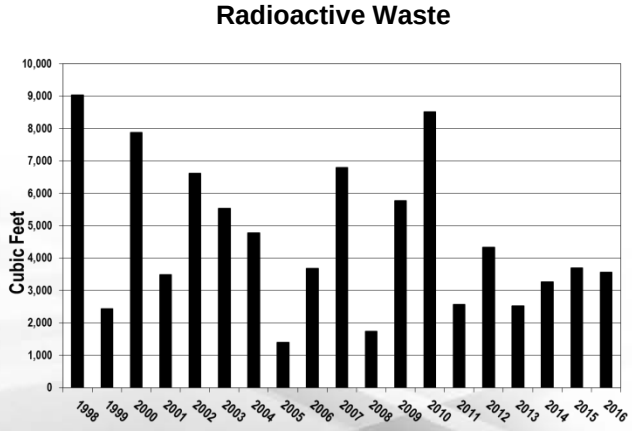
- **Pollution Prevention (P2) Program**
  - Cost avoidance of over $1.6 million in FY 2016
  - Reduced/recycled/reused 7.9 million lbs. of industrial, sanitary, and hazardous waste
    - The Lab's annual recycling rate was 74% (DOE Goal – 50%)
  - Awards:
    - USEPA's Northeast Regional Federal Green Challenge – Leadership Award for the NSLS-I Decommissioning Project
    - US DOE's Gold Level Green Buy Award
    - Green Electronics EPEAT Award

Chapter 2 - Waste Generation

- **As a result of research and cleanup activities, BNL generated regulated waste requiring careful handling and disposal.**
- **In 2016, BNL generated the following types and quantities of waste (trend noted):**
  - **Routine Operations**
    - Hazardous Waste: 3.9 tons - down
    - Mixed Waste: 5 ft^3 - down
    - Radioactive Waste: 3,562 ft^3 - down
  - **Non-routine Operations**
    - Hazardous Waste: 6 tons - down
    - Mixed Waste: 19 ft^3 - up
    - Radioactive Waste: 5,218 ft^3 - down







Chapter 2 - Energy Management & Conservation

- **2016 Statistics***
  - 269 (282) million kilowatt hours of electricity
  - 669,000 (65,000) gallons of fuel oil
  - 14,476 (15,000) gallons of propane
  - 460 (646) million ft^3 feet of natural gas

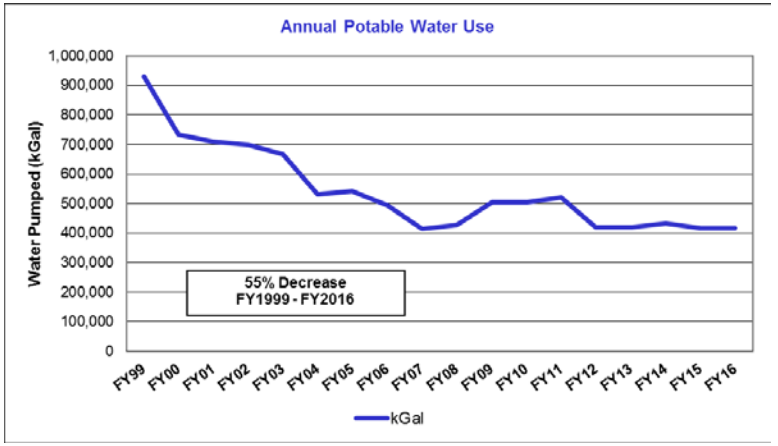
  *** Values in parenthesis are 2015 statistics (for comparison purposes)**

- **Other Notable Accomplishments**
  - Electric load reduction curtailment programs – reduced electric demand by 25 MW, saving approximately $1.2M
  - Increased Northeast Solar Energy Research Center (NSERC) array to 816 kW generating approximately 553,715 kWh of electricity
  - Site Sustainability Plan – New electric and steam meter installations; new energy efficient lighting installed in parking lots and offices; continued training/education on energy conservation initiatives

Chapter 3 - Compliance Status Overview

- **BNL must comply with 33 permits, including a Title V permit authorizing operation of 130 emission sources**

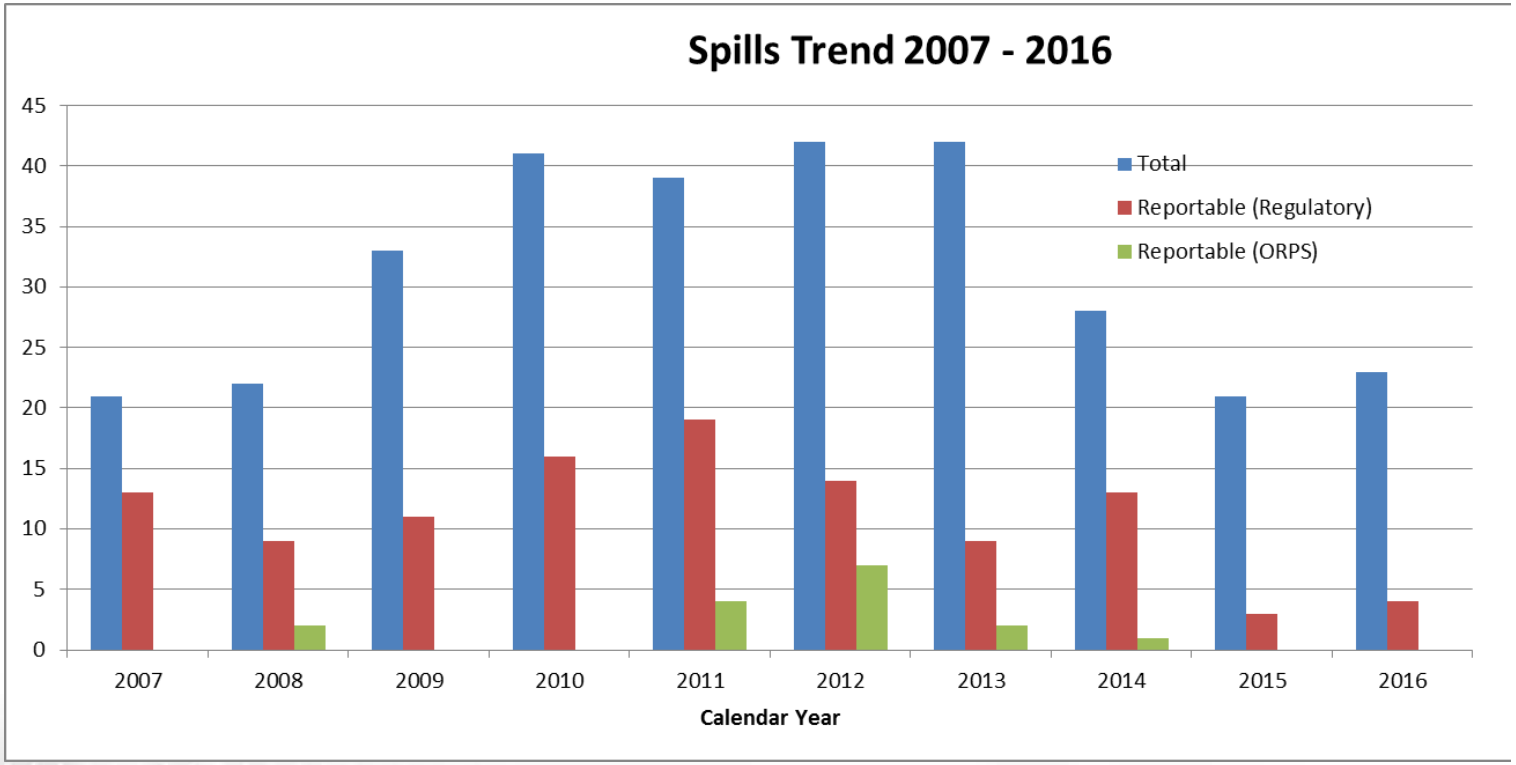
- **91 additional projects reviewed for NEPA**
  - 85 considered minor actions
  - 5 Environmental Evaluation Notification Forms; all categorically excluded or fell within scope of existing EA
  - Completed EA for AGS Complex
- **Potable Water**
  - Usage similar to 2014 & 2015
  - Complied with all drinking water requirements
- **Tanks**
  - PBS and CBS inspections by NYSDEC (70 tanks) identified 4 minor deficiencies; all were corrected in accordance with NYSDEC directives



2017 BROOKHAVEN NATIONAL LABORATORY Water Quality CONSUMER CONFIDENCE REPORT

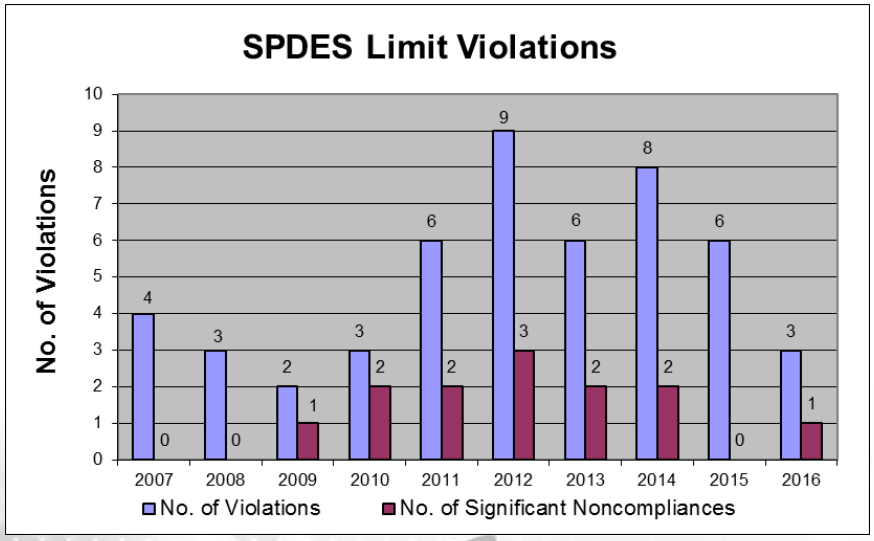
Chapter 3 - Spills and Reportable Incidents

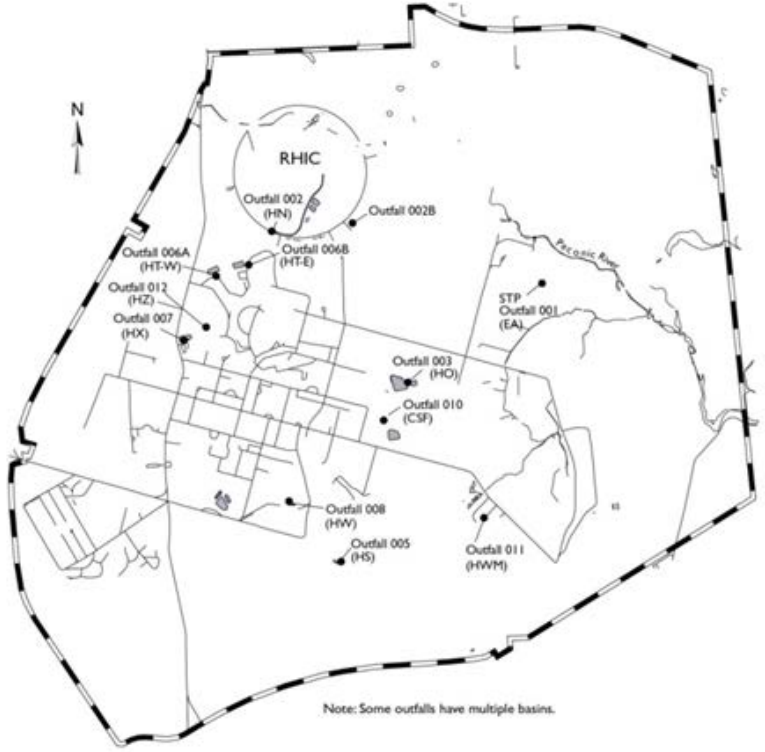
- **23 spills in 2016**
  - 5 spills reportable to NYSDEC (All closed out)
  - No DOE reportable spills



Chapter 3 and 5 – Water Quality Monitoring

- State Pollutant Discharge Elimination System (SPDES) – 3 permit excursions
  - (2) ammonia at STP
  - (1) Tolytriazole (TTA) at Outfall 002 (HN)
- Some metals exceeded ambient water quality standards; however, filtration showed source of inorganics to be suspended in sediment or attributable to natural sources
- No VOCs detected above contract laboratory's MDLs (All locations)
- Tritium less than MDL in all sample locations
- No Cs-137, Sr-90, or other gamma-emitting nuclides attributable to Laboratory operations were detected





Chapter 3 - Inspections and Assessments

- **External Inspections**
  - **EPA:** Consolidated multi-media inspection performed and all concerns identified were subsequently resolved and EPA review of information provided by BNL uncovered no concerns
  - **NYSDEC**
    - Air: No issues identified during observation of Annual Relative Accuracy Test Audit of the CSF Continuous Emissions Monitoring System
    - SPDES: No issues identified during annual surveillance inspections
  - **SCDHS (STP, potable water):** No issues identified at STP, potable water deficiencies identified are being addressed by F&O
- **Internal Assessments (Multi-Topic)**
  - **Focus on BNL's NEPA and Cultural Resources Programs**
    - (2) Noteworthy Practices
    - (2) Observations
    - (5) Opportunities for Improvement

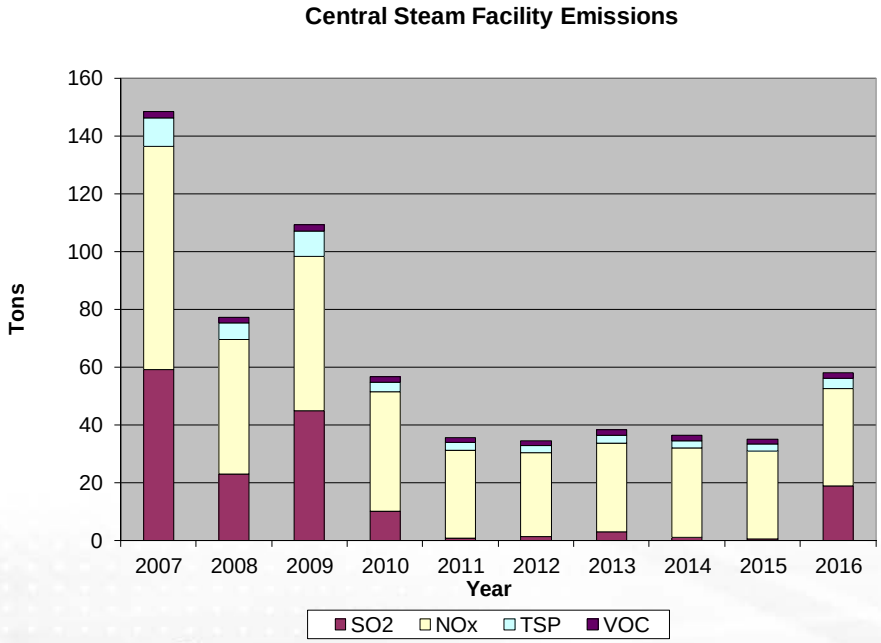
Chapter 4 - Air Quality (Radiological)

- **Radiological Emissions Monitoring**
  - **Three facilities monitored for radionuclide releases:**
    - BLIP, Building 801 Target Processing Lab, and HFBR
    - Total radionuclides released: 10,426 Ci (4,551 Ci in 2015)
    - 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 at or less than typical MDLs

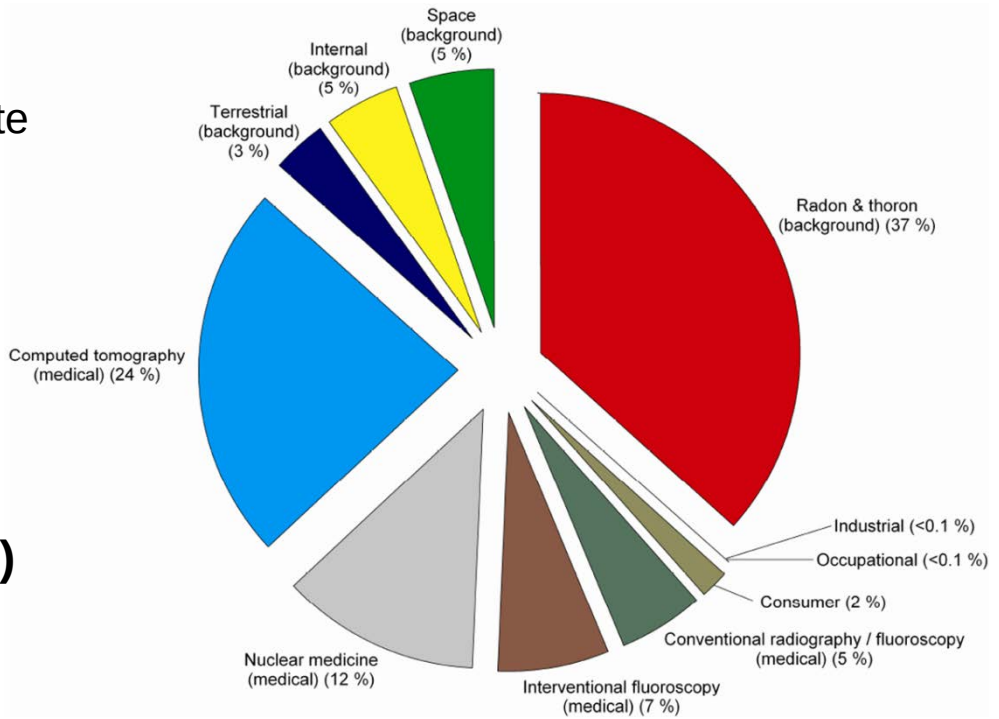
Chapter 4 - Air Quality (Non-Radiological)

- **Continuous Emissions Monitoring System (CEMS) required for Central Steam Facility Boilers 6 & 7**
  - No NO_x limit exceedances
  - No 6-min period opacity exceedances
  - Fuel oil use: 804,380 gals (9,655 gals in 2015)
  - SO_2 , NO_x, TSP, and VOC emissions well under respective permit limits of 445, 159, 113.3, and 39.7 tons



Chapter 8 - Radiological Dose Assessment

- **Ambient external dose (TLDs)**
  - 64 mrem on site and 60 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 2016 from inhalation /immersion (0.62 mrem) and ingestion (2.54 mrem) pathways was <u>3.16 mrem</u>**
- **Well Below Regulatory Limits**
  - EPA: 10 mrem/year (air pathway)
  - NYSDOH: 10 mrem/year (ingestion pathway)
  - DOE: 100 mrem/year (from all pathways)



Average dose to individual is **<u>620 mrem/year</u>**

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 (November)**

QUESTIONS?