2015 Site Environmental Report

Brookhaven National Laboratory
Community Advisory Council Review
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Manager
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**
  - Author: Karen Ratel
- **Chapter 1 – Introduction**
  - Author: Karen Ratel
- **Chapter 2 – Environmental Management System**
  - Authors: Peter Pohlot / Karen Ratel
- **Chapter 3 – Compliance Status**
  - Author: Jason Remien
- **Chapter 4 – Air Quality**
  - Author: Jeff Williams
- **Chapter 5 – Water Quality**
  - Author: Jason Remien
- **Chapter 6 – Natural and Cultural Resources**
  - Author: Tim Green
- **Chapter 7 – Groundwater Protection**
  - Authors: Bill Dorsch / Douglas Paquette
- **Chapter 8 – Radiological Dose Assessment**
  - Author: Tim Welty
- **Chapter 9 – Quality Assurance**
  - Author: John Burke

### 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$^3$ - down
    - Radioactive Waste: 3,700 ft$^3$ – up
  - **Non-routine Operations**
    - Hazardous Waste: 7.5 tons - down
    - Mixed Waste: 1 ft$^3$ - down
    - Radioactive Waste: 47,748 ft$^3$ - 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\(^3\) 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 MTCO2e
    - 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
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
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\textsubscript{x} limit exceedances
  - No 6-min period opacity exceedances
  - Fuel oil use (9,655 gals); 34,030 gals in 2014.
  - SO\textsubscript{2}, NO\textsubscript{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 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**

Future Presentations

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

QUESTIONS?