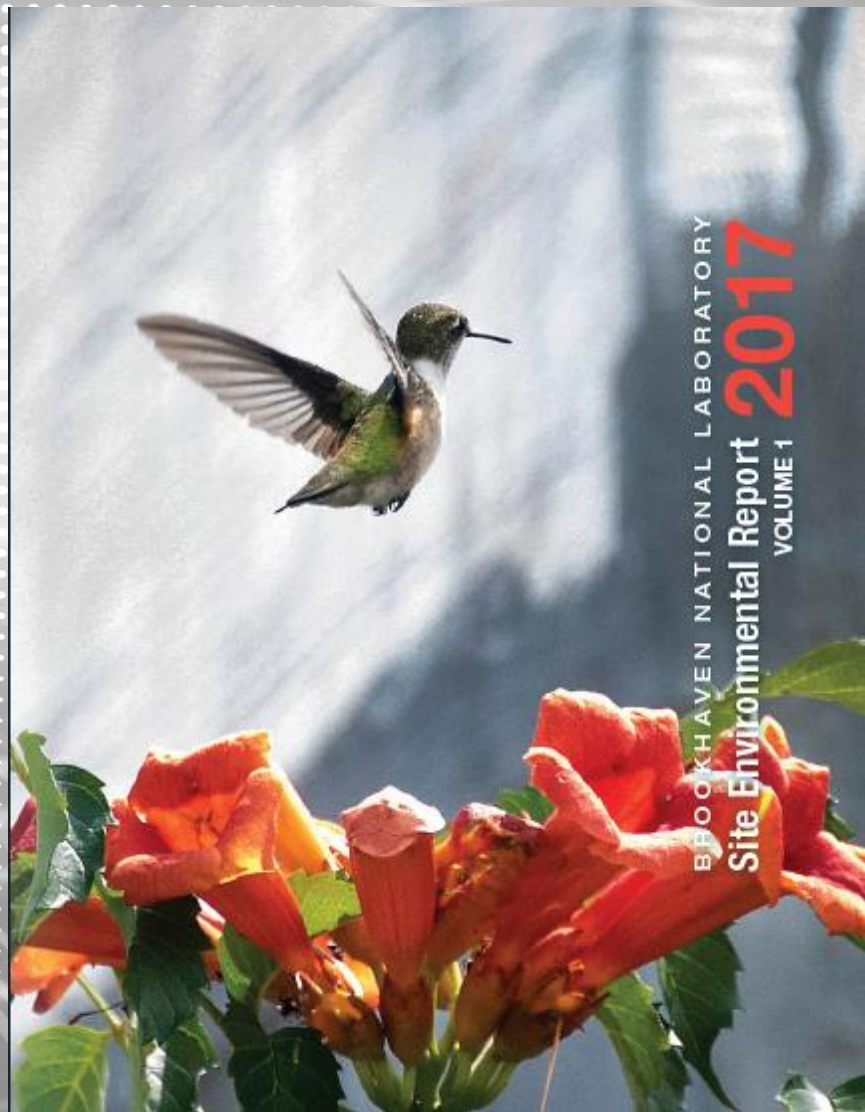


2017 Site Environmental Report

Brookhaven National Laboratory
Community Advisory Council Review
November 8, 2018

Jason Remien
Environmental Protection Division
Manager



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 2017**
 - Serves as an historical record; BNL has been preparing SERs since 1971.
 - Can be 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.
- **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**

- **2017 SER Topics covered at CAC meetings included:**
 - ✓ BNL Site Sustainability Plan Update
 - ✓ Natural Resource Management Updates
 - ✓ Groundwater Cleanup Updates
 - ✓ Peconic River Supplemental Cleanup
 - ✓ CERCLA 5-Year Review
 - ✓ Deer Management
 - ✓ 1,4 – Dioxane Sampling Updates
 - ✓ Community Wildfire Protection Plan

2017 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**

- 2017 Groundwater Status Report – Groundwater Protection Group

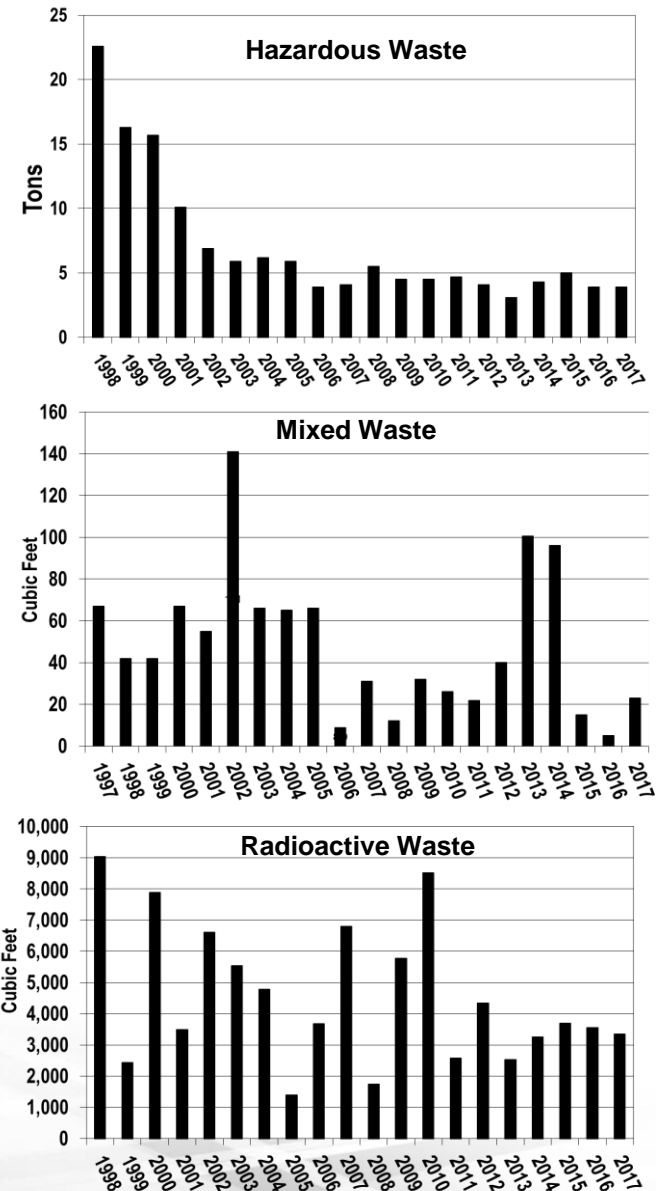
Chapter 2 - Environmental Management System (EMS) ISO 14001

- **Assessments verify continued conformance to ISO14001 Standard during 2017**
 - The system is fully integrated and effective. A new third party registrar, ERMCVS, has been brought on board to assess BNL's EMS. An internal assessment identified a number of noteworthy practices, several weaknesses in documentation requirements and new Legionella requirements that were implemented without going through the standard requirements management process.
- **Pollution Prevention (P2) Program**
 - Cost avoidance of over \$3.5 million in FY 2017
 - Reduced/recycled/reused 9.3 million lbs. of industrial, sanitary, and hazardous waste
 - The Lab's annual recycling rate was 74% (DOE Goal – 50%)
 - Awards:
 - 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 2017, BNL generated the following types and quantities of waste (trend noted):
 - **Routine Operations**
 - Hazardous Waste: 3.9 tons - same
 - Mixed Waste: 23 ft³ – up
 - Radioactive Waste: 3,345 ft³ – down
 - **Non-routine Operations**
 - Hazardous Waste: 4.3 tons - down
 - Mixed Waste: 9 ft³ - down
 - Radioactive Waste: 8,064 ft³ - up

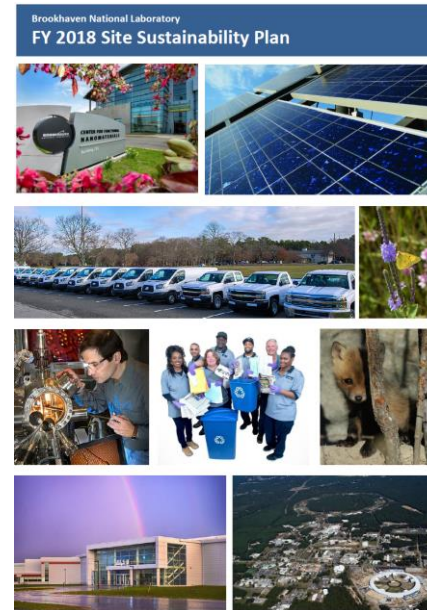


Chapter 2 - Energy Management & Conservation

■ 2017 Statistics*

- 270 (269) million kilowatt hours of electricity
- 105,000 (669,000) gallons of fuel oil
- 14,591 (14,476) gallons of propane
- 565 (460) million ft³ feet of natural gas

* Values in parenthesis are 2016 statistics (for comparison purposes)



■ Other Notable Accomplishments

- Electric load reduction curtailment programs – reduced electric demand by 25 MW, saving approximately \$1M
- Northeast Solar Energy Research Center (NSERC) generated 968,445 kWh of electricity
- NYPA Power Contract: Fifth full year of a 10-year contract that includes 15 MW of renewable (nearly zero GHG) hydropower. This contract saved \$27.4 million in 2017.

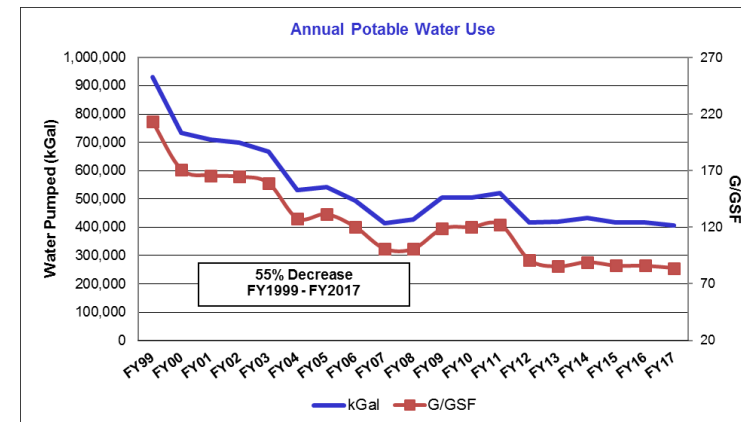
Chapter 2 - Other Topics

- **Environmental Restoration**
 - **BGRR/HFBR**
 - Continued long-term surveillance and maintenance
 - **Peconic River**
 - Excavation and disposal of 108 cubic yards of mercury-contained sediment
- **Groundwater Treatment Systems**
 - Discussed in Chapter 7 and SER Volume 2, Groundwater Status Report
- **Communication and Community Involvement**
 - 1,4-Dioxane Planned Groundwater Sampling
 - Natural Resources Program – Deer Management
 - Peconic River Post Cleanup Surveillance
 - CERCLA 5-Year Review
 - Environmental Updates: Building 811 D&D; FHWMF Sr-90 Plume; VOCs in the Western South Boundary
- **Environmental Monitoring Program**
 - 5,492 sampling events of groundwater, potable water, precipitation, air, flora and fauna, soil, sediment, and discharges



Chapter 3 - Compliance Status Overview

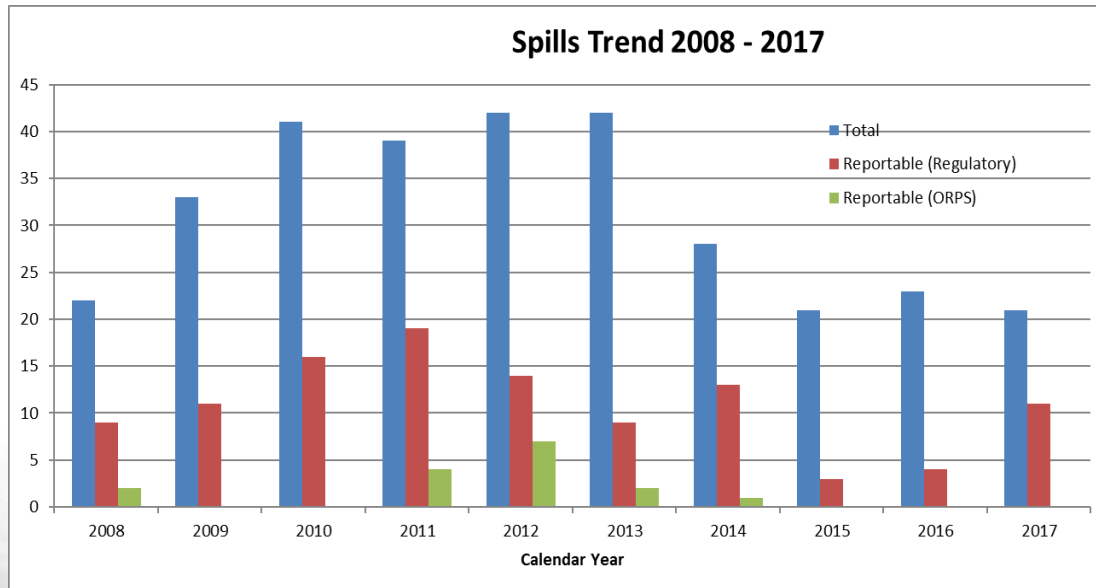
- **BNL must comply with 34 permits, including a Title V permit authorizing operation of >130 emission sources**
- **146 additional projects reviewed for NEPA**
 - 144 considered minor actions
 - Two Environmental Evaluation Notification Forms; all categorically excluded or fell within scope of existing EA
- **Potable Water**
 - Usage similar to 2015 & 2016
 - Complied with all drinking water requirements
- **Tanks**
 - Due to favorable past performance on past audits and strong overall program, NYSDEC exempted the Laboratory from its annual inspection in 2017.
 - Internal Assessment did identify some issues that are currently being tracked to completion.



2018 BROOKHAVEN NATIONAL LABORATORY
Water Quality
CONSUMER CONFIDENCE REPORT

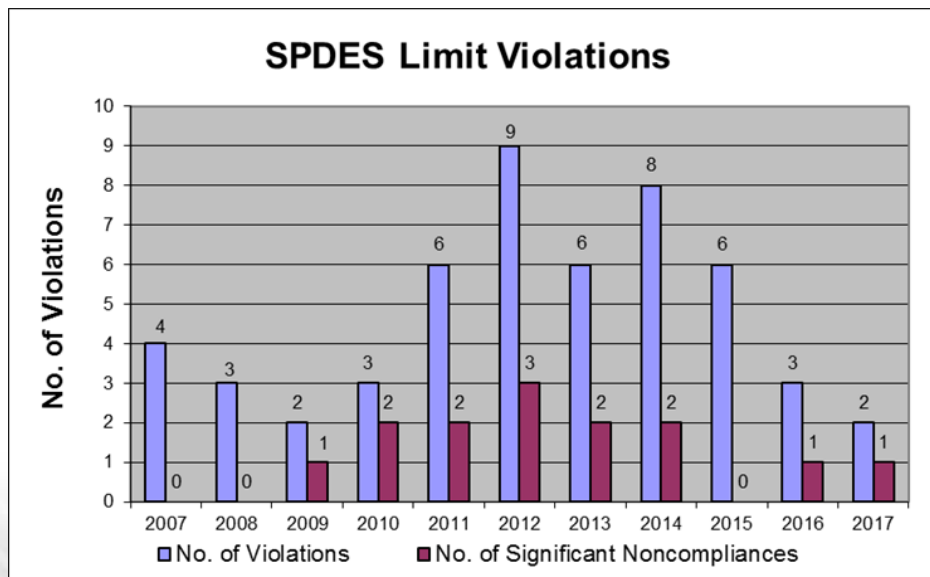
Chapter 3 - Spills and Reportable Incidents

- **21 spills in 2017**
 - 11 spills reportable to NYSDEC
 - All but three (3) <1 gallon
 - AGS Siemens Motor-Generator Set (~10 gallons)
 - Bldg. 555 Freight Elevator (~30 gallons)
 - Dump Truck Hydraulic Lift (~4 gallons)
 - No ORPS reportable spills



Chapter 3 and 5 – Water Quality Monitoring

- State Pollutant Discharge Elimination System (SPDES) – 2 permit excursions
 - (1) BOD₅ at STP
 - (1) HEDP 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



HEDP: 1-Hydroxyethylidene-1, 1-diphosphonic acid

Monitoring Station HM-N

Chapter 3 - Inspections and Assessments

External Inspections



- **EPA:** Unannounced RCRA Compliance inspection and announced SPCC Field Inspection. Both inspections did not identify any deficiencies.



▪ **NYSDEC**

- Air: No issues identified during full compliance evaluation of regulatory emission sources including review of records
- SPDES: No issues identified during annual surveillance inspection
- RCRA: Two-day inspection by three inspectors did not identify any concerns or violations



- **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 "Tank", "Air", and Liquid Effluent Subject Areas**
 - (8) Noteworthy Practices
 - (16) Observations
 - (15) Opportunities for Improvement
 - (8) Minor Nonconformances

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: 10,660 Ci (10,426 Ci in 2016)
 - 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)
- **This data supports radiological dose assessment (Chapter 8)**



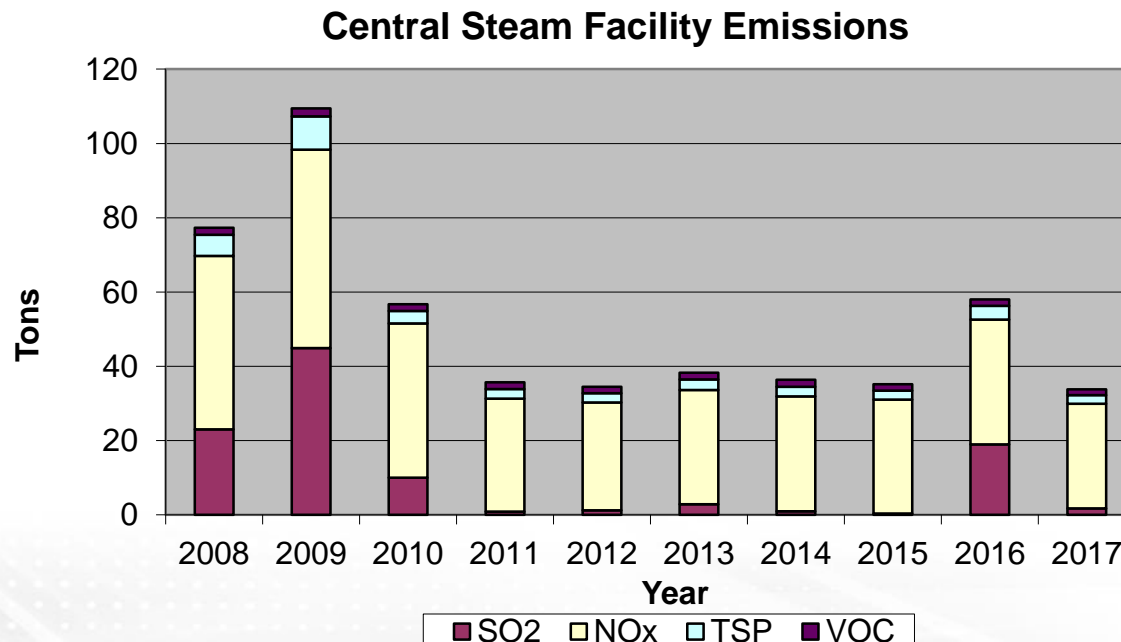
■ Ambient Air Monitoring

- **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



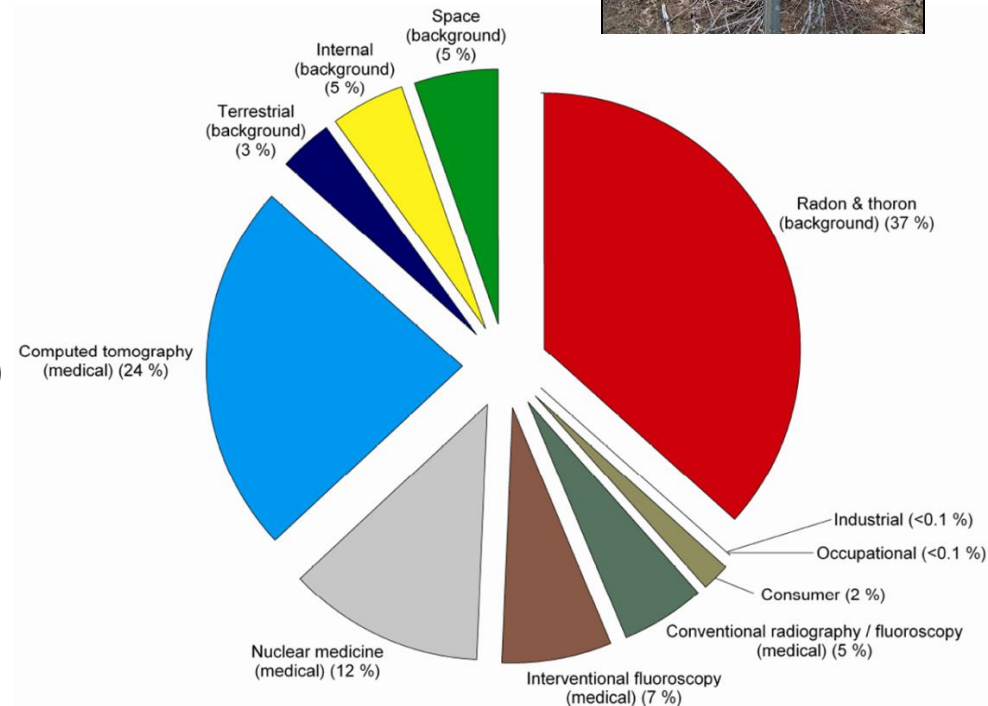
Chapter 4 - Air Quality (Non-Radiological)

- **Continuous Emissions Monitoring System (CEMS) required for Central Steam Facility Boilers 6 & 7**
 - No NO_x limit exceedances
 - Eight 6-min period opacity exceedances for Boiler 7
 - Fuel oil use: 65,070 gals (804,380 gals in 2016)
 - SO₂, 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)**
 - 65 mrem on site and 61 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 2017 from inhalation /immersion (0.72 mrem) and ingestion (4.89 mrem) pathways was 5.61 mrem**
- **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 **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 (December)
- Chapter 7: Groundwater Protection (January)

QUESTIONS?