

Groundwater Update

*Brookhaven National Laboratory
Review of Plumes, Treatment Systems,
Performance and Progress*

*Presentation to Community Advisory Council
November 10, 2016*

*Bill Dorsch, Manager
Groundwater Protection Group*

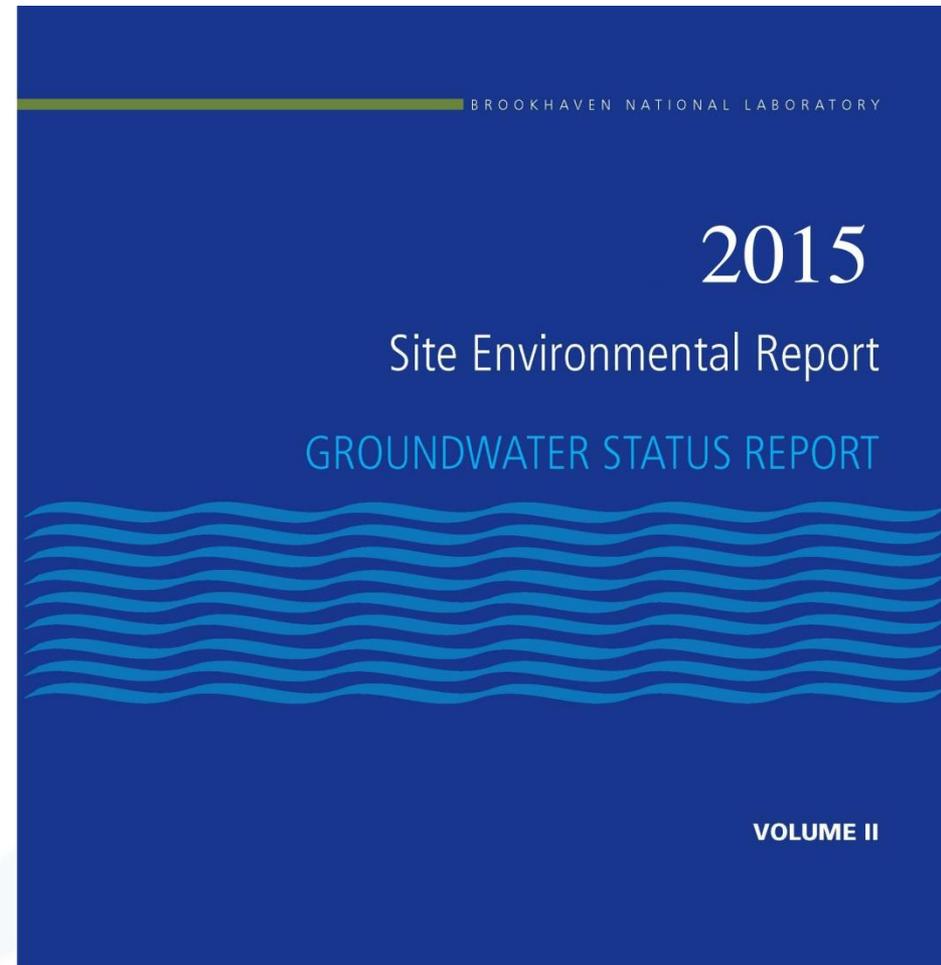


Agenda

- General Status of Plumes and Remediation Systems/System Optimization
- Building 452 Freon-11 and g-2 Tritium Plume Status
- Current Groundwater Issues and Upcoming Plans
- NYSDEC/NYSDOH Data Request – 1,4 Dioxane
- 5 Year Review Status

Groundwater Status Report (Volume 2 of Site Environmental Report)

- Presentation provides up to date status on groundwater cleanup program progress
- Web link for 2015 Groundwater Status report:
<https://www.bnl.gov/gp/g/2015gw-report.php>

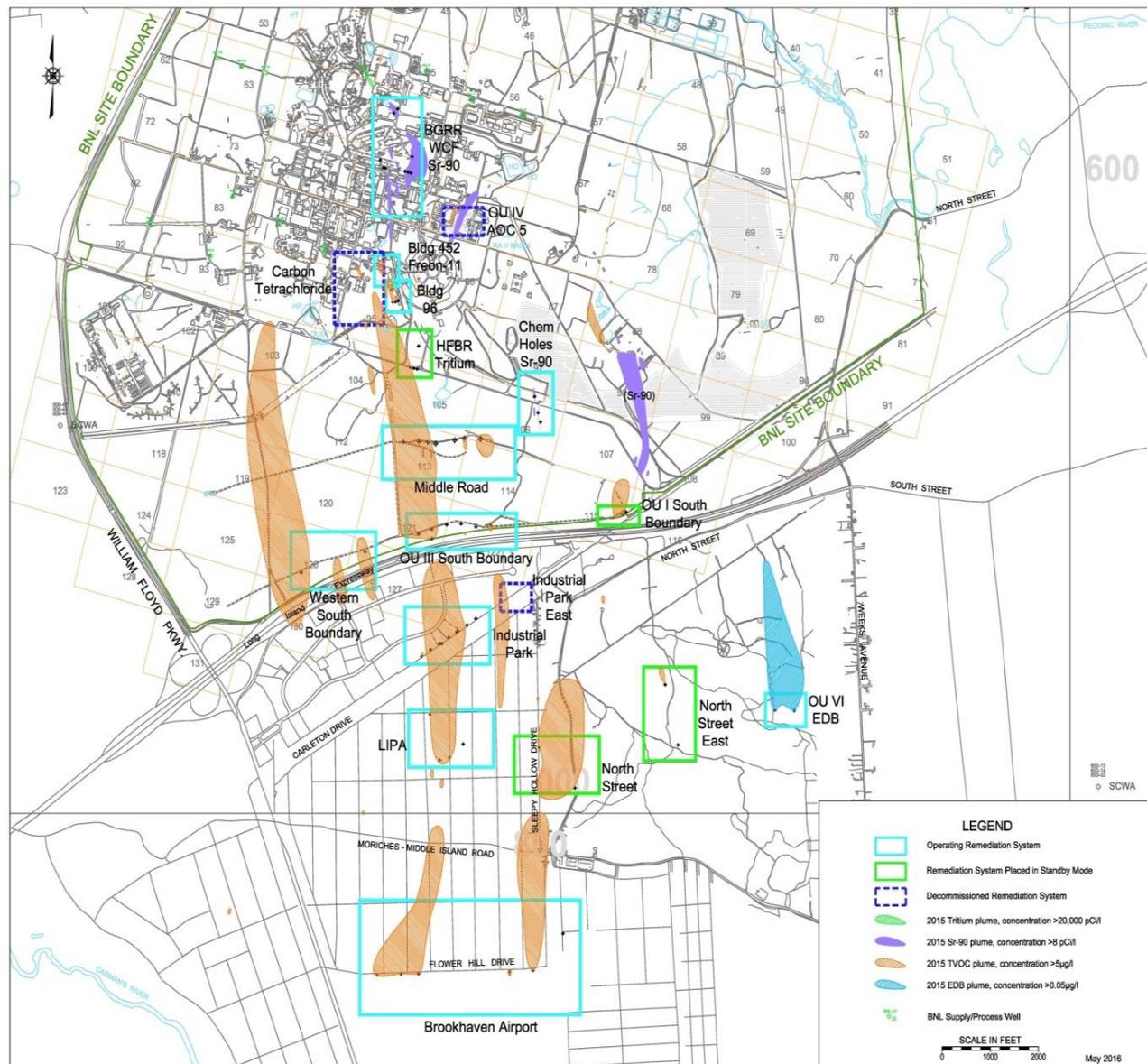


Groundwater Treatment Systems/Plumes Status

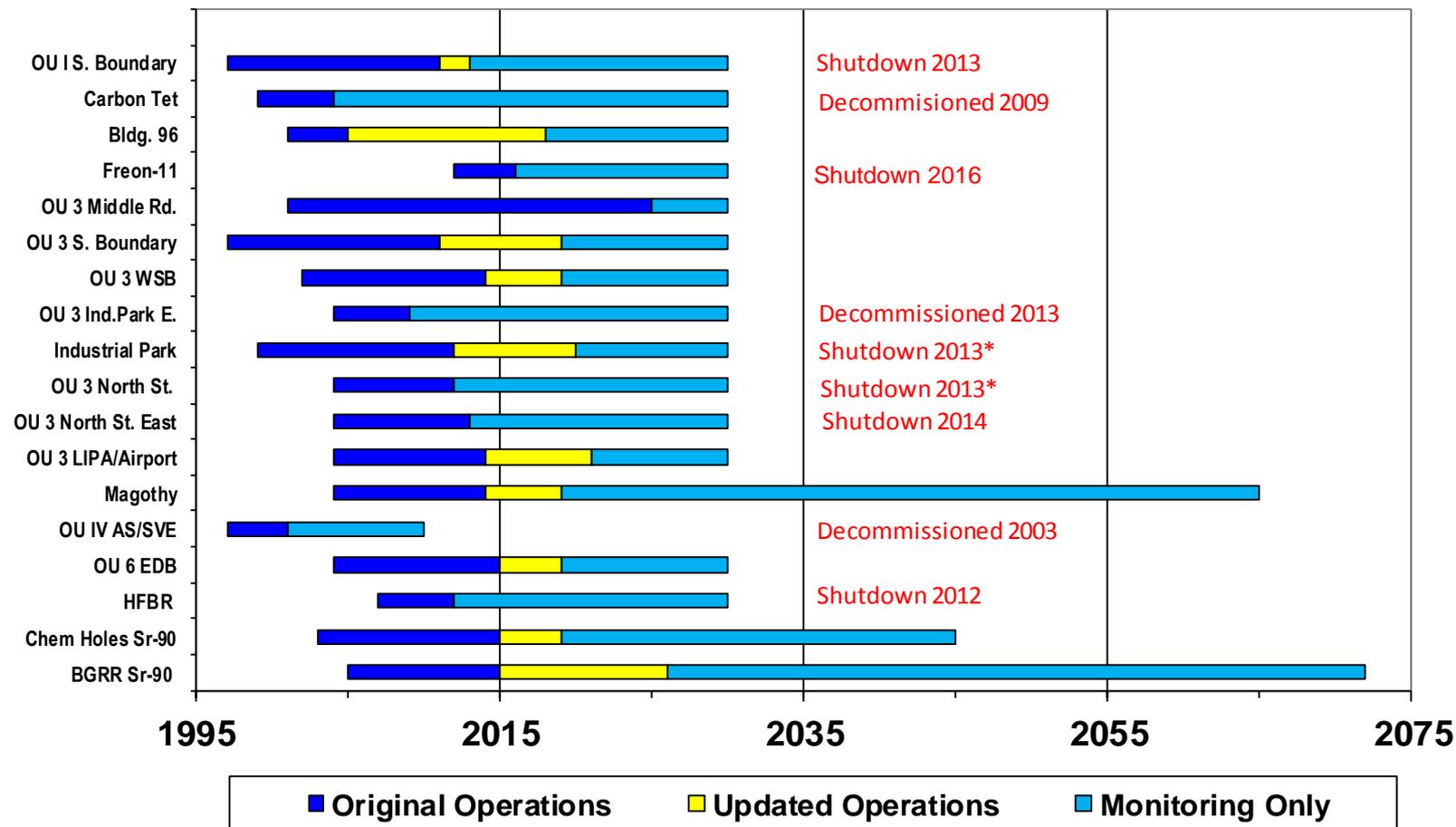
11 systems operating
 4 systems currently shut down
 3 systems decommissioned

1996 - 2015:

- 24.5 billion gallons of contaminated groundwater treated and recharged to the aquifer
- 7,382 lbs VOCs removed
- 31 mCi Sr-90 removed



Groundwater Treatment System Status



Groundwater Treatment System Status

Treatment System	Original Design Shutdown Date	Shutdown Date (Actual/Projected)	Total Number of Extraction Wells	Extraction Wells Currently Operational	Overall System Status
OU I S. Boundary	2011	2013 A	2	0	Shutdown
Carbon Tet	2004	2004 A	2	0	Decommissioned
Bldg. 96	2005	2018	4	1	Operational
Bldg. 452 Freon-11	2016	2016 A	1	0	Shutdown
OU 3 Middle Rd.	2025	2025	7	3	Operational
OU 3 S. Boundary	2011	2019	8	2	Operational
OU 3 Western South Boundary	2014	2019	2	1	Operational
OU 3 Industrial Park	2012	2013A/2020	9	6	Operational ^a
OU 3 Industrial Park E.	2009	2010 A	2	0	Decommissioned
OU 3 North St.	2012	2013 A	2	0	Shutdown
OU 3 North St. E.	2013	2014 A	2	0	Shutdown
OU 3 LIPA	2014	2019	4	1	Operational
OU 3 Airport	2014	2021	6	5	Operational
Magothy ^b	--	--	--	--	--
OU IV AS/SVE	2001	2003 A	AS/SVE	0	Decommissioned
OU 6 EDB	2015	2019	2	2	Operational
HFBR Pump and Recharge	2012	2013 A	4	0	Shutdown
Chemical Holes Sr-90	2015	2019	3	1	Operational
BGRR Sr-90	2015	2026	9	7	Operational

Notes-

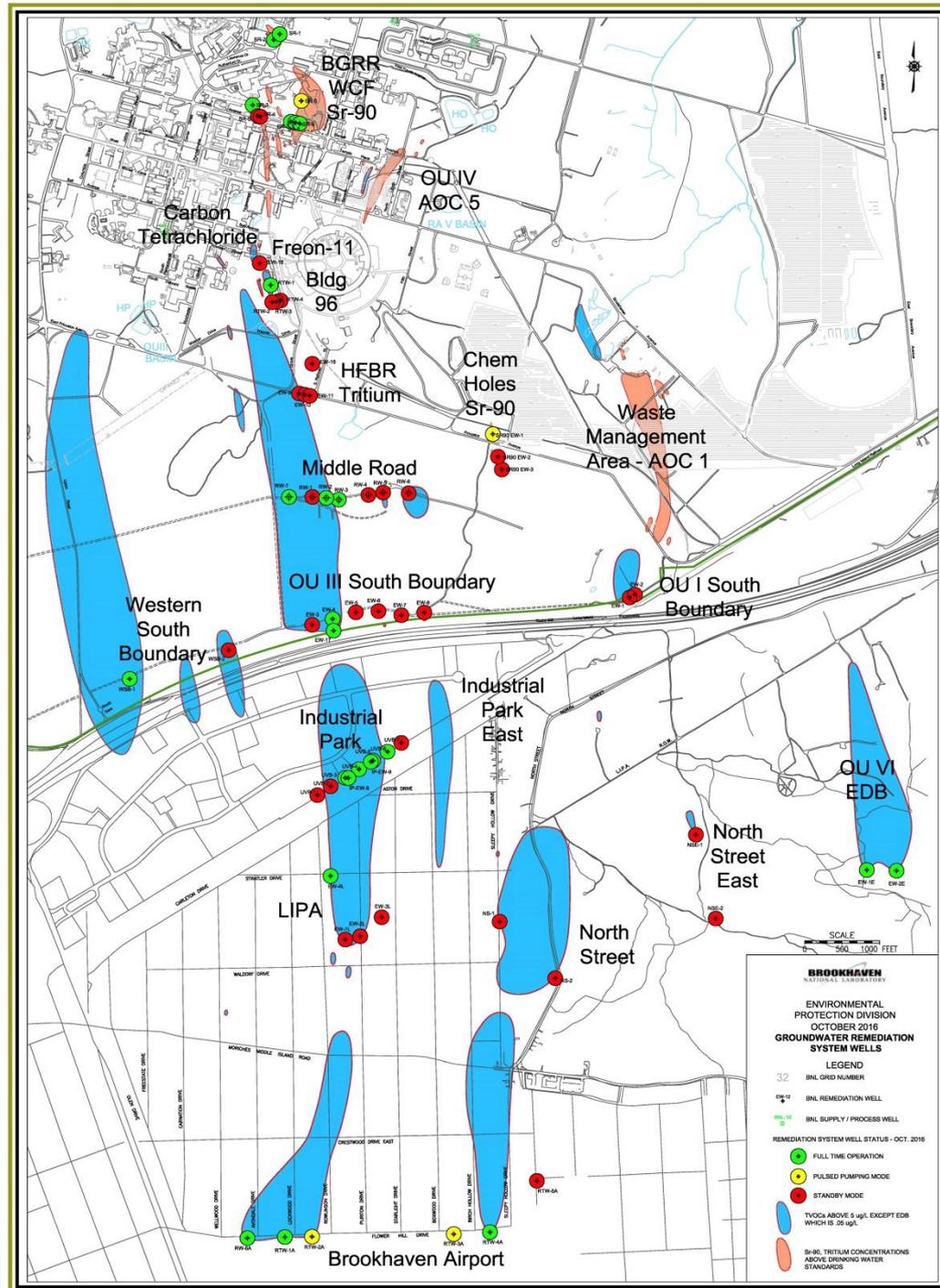
A - Actual

^a - System was approved for shutdown in 2013. 4 upper glacial wells were restarted due to VOC rebound. 2 new Magothy wells in full operation.

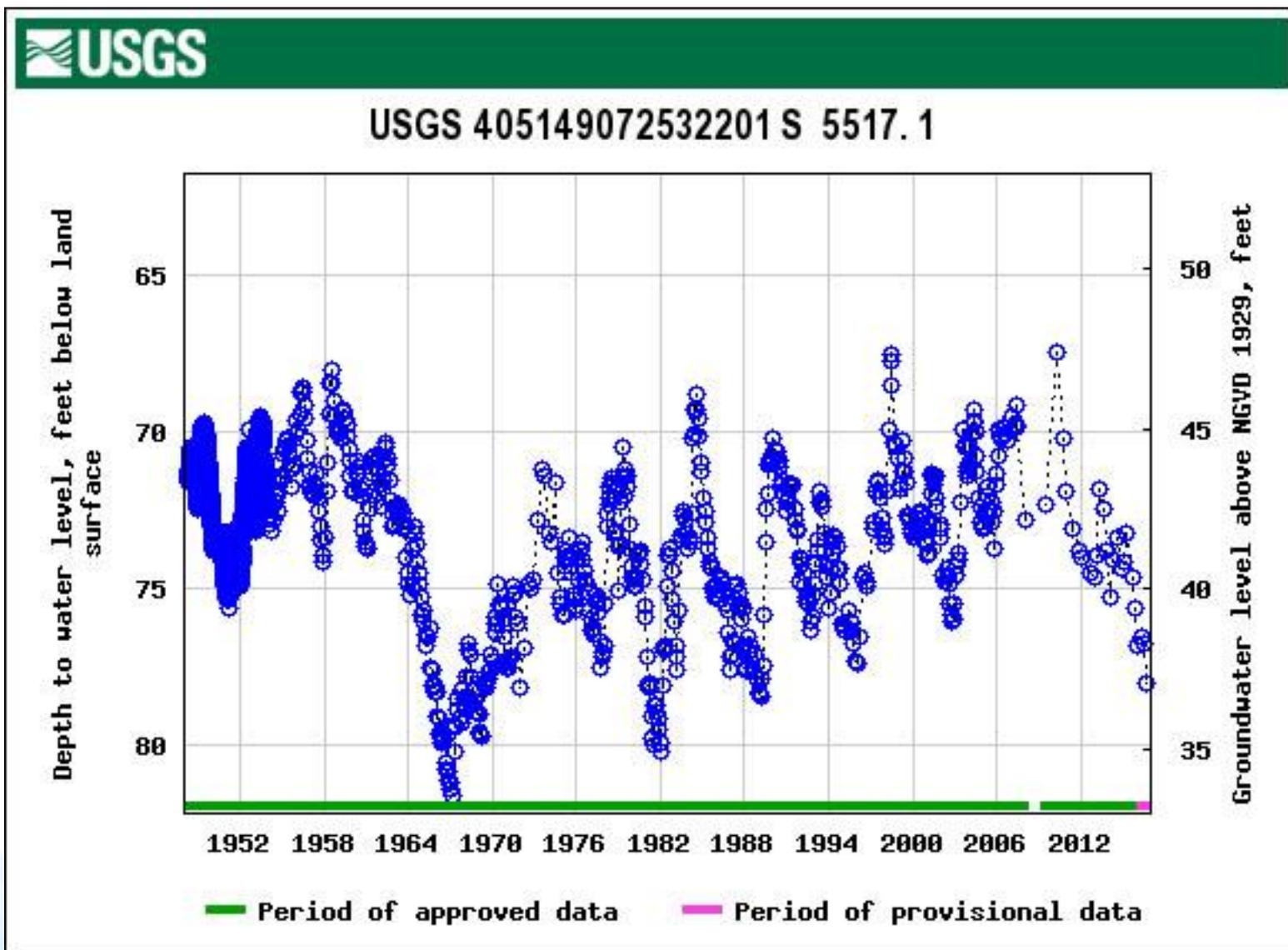
^b - Magothy wells are integrated into other treatment systems.

Extraction Well Status

- Systems are routinely evaluated for optimization.
- A number of operating systems have individual extraction wells on standby
- In some cases we will restart one or more extraction wells for systems that have been shut down based on monitoring results showing rebounding concentrations.
 - Example – Industrial Park



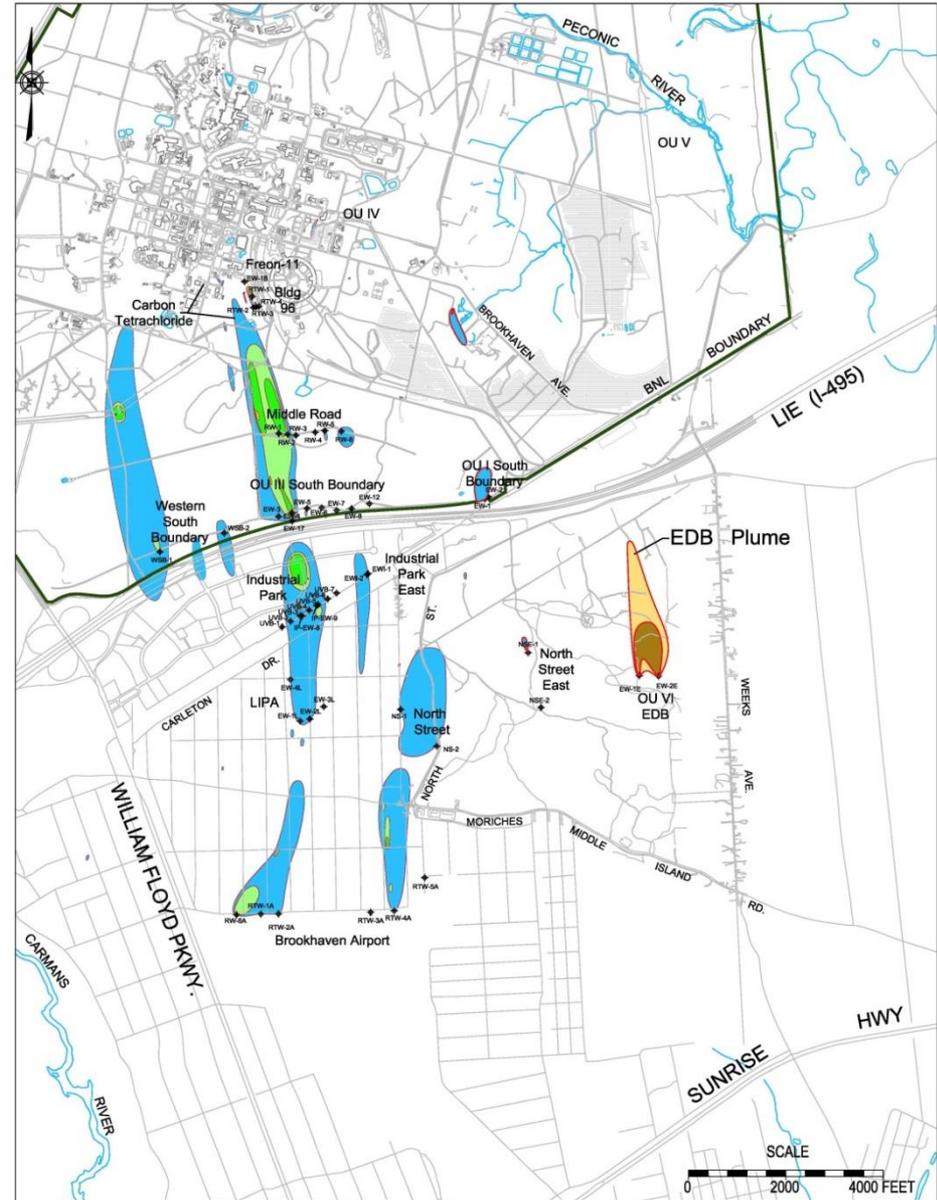
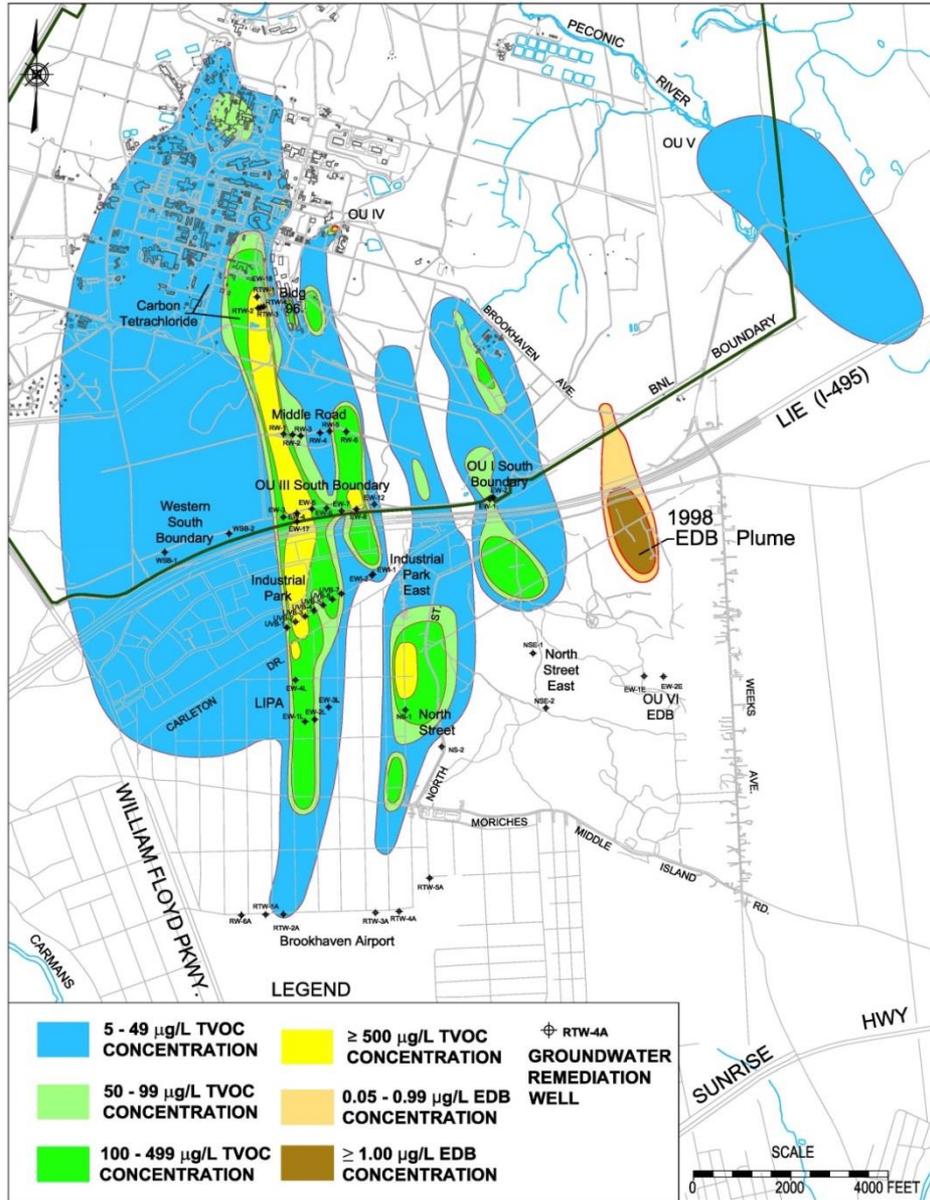
Long Term Hydrograph of Water Table at BNL



VOC Remediation Progress 1997 to 2015

1997

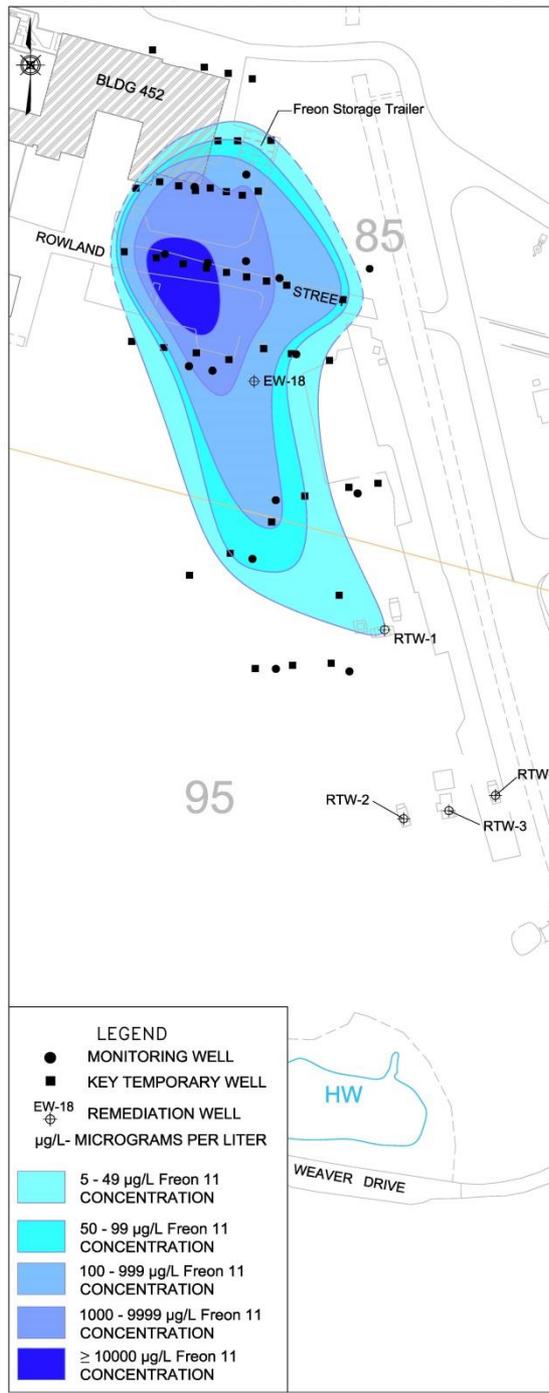
2015



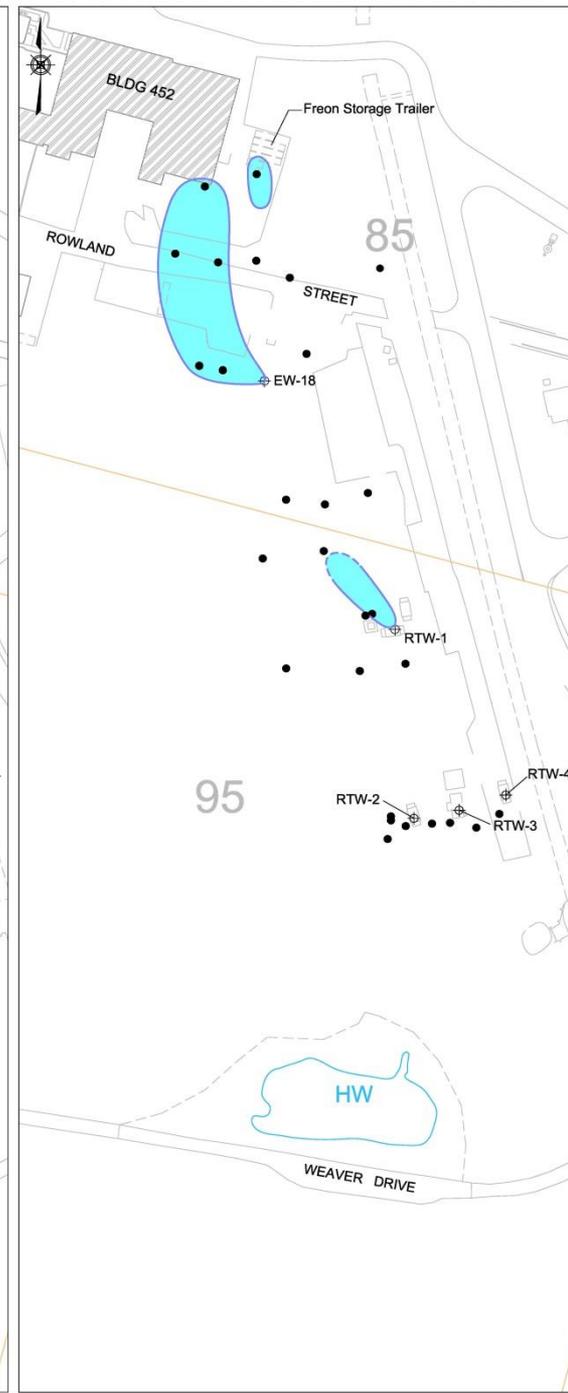
Building 452 Freon-11 Treatment System Status

- Plume discovered in 2011. Maximum concentration detected was 38,000 $\mu\text{g/L}$ (Drinking Water Standard is 5 $\mu\text{g/L}$)
- Air stripper treatment system installed, and in operation by early 2012
- By late 2015, all Freon-11 concentrations were <50 $\mu\text{g/L}$ capture goal
- Approximately 100 pounds of Freon-11 removed from the aquifer
- Following regulatory approval, system shutdown in March 2016
- Continued groundwater monitoring during shutdown period.
 - Concentrations currently <15 $\mu\text{g/L}$

2011 FREON-11 PLUME DISTRIBUTION

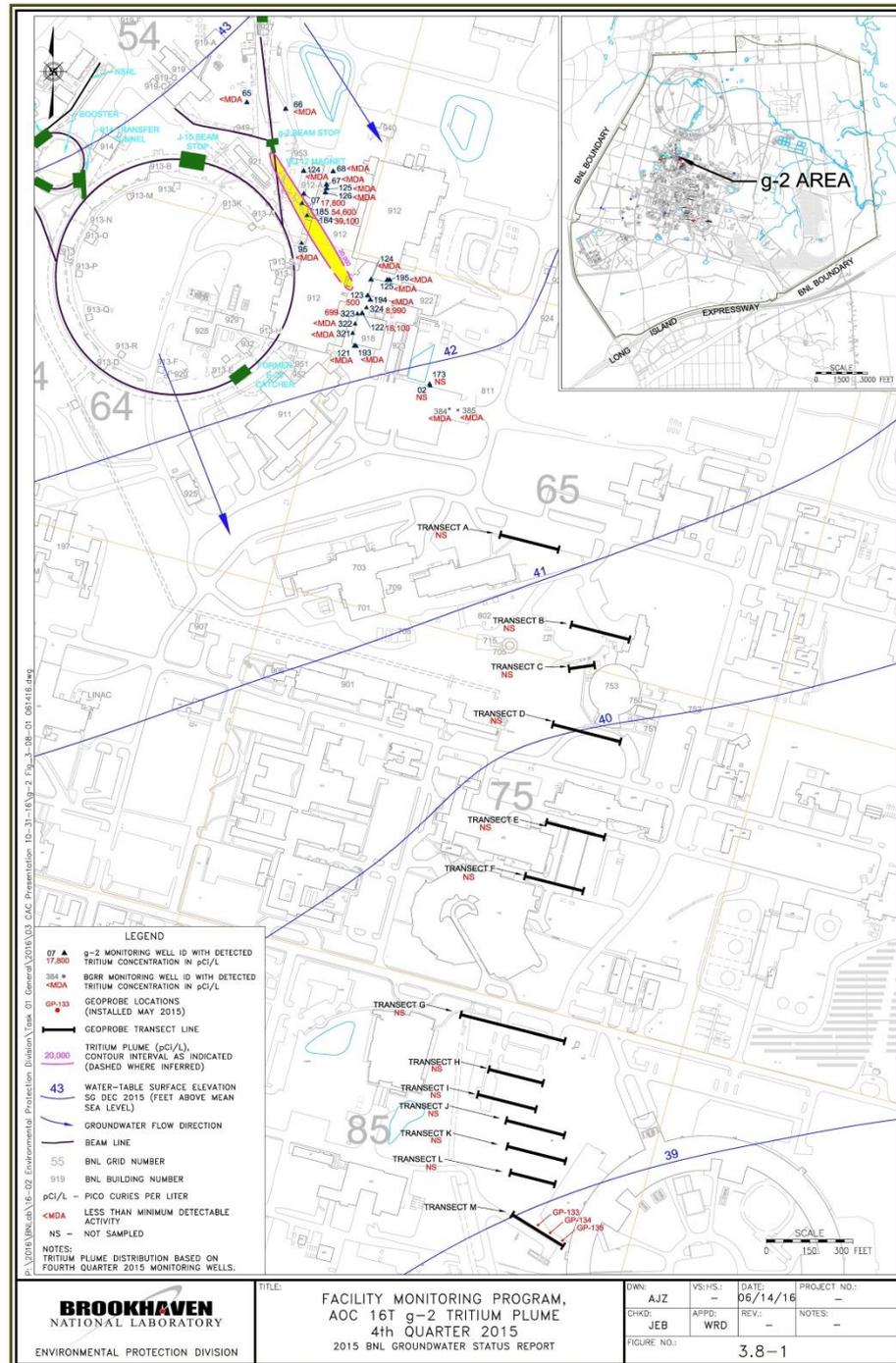


2015 FREON-11 PLUME DISTRIBUTION



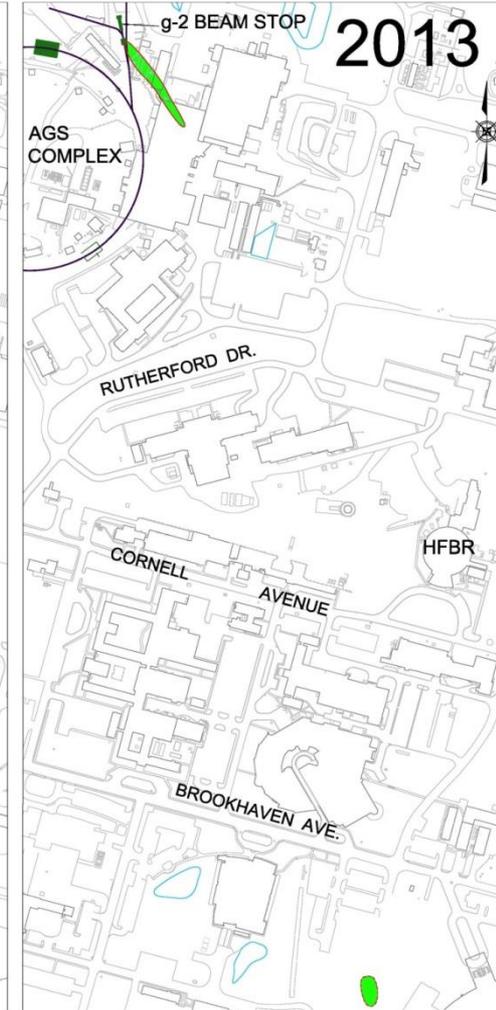
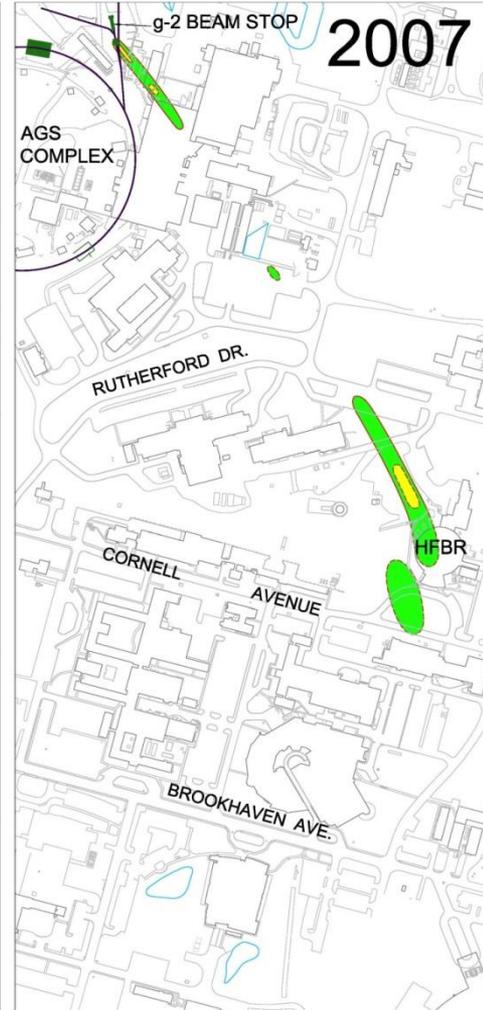
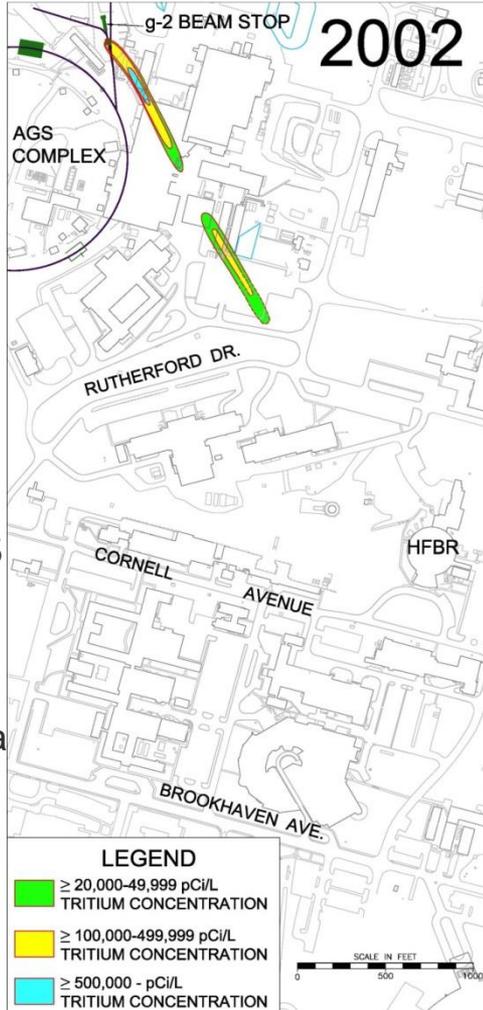
g-2 Tritium Plume Monitoring

- Tritium continues to be detected above the 20,000 pCi/L Drinking Water Standard in source area wells. Up to 55,000 pCi/L during 2015.
 - Maintain cap. Continue monitoring
- Tritium concentrations in the downgradient plume segment have decreased to less than the DWS



g-2 Plume Comparison

- 2007-2015 tracked plume segment progressively downgradient using temporary wells.
- Plume attenuated over time
- Maximum concentration in 2015 was 18,600 pCi/L
- Discontinue groundwater monitoring in the area south of Brookhaven Avenue.



NYSDEC/NYSDOH Data Request – 1,4-Dioxane

- 1996 Safe Drinking Water Act (SDWA) requires EPA to issue a list of unregulated contaminants every 5 years to be monitored by public water systems. This monitoring provides a basis for future regulatory actions to protect public health. 1,4-dioxane was listed as an unregulated contaminant in 2012 (most recent listing)
- 1,4-dioxane is a volatile organic compound that has been widely used as a stabilizer for TCA.
- No federal maximum contaminant level (MCL) or specific New York State standard has been established for 1,4-dioxane in drinking water.
 - As New York State does not have a specific standard for this contaminant it is considered as an unspecified organic contaminant for which the standard is 50 µg/L.
- In August 2016, NYSDEC/NYSDOH formally suggested that BNL analyze for 1,4-dioxane within site plume core wells that have or had 1,1,1-trichloroethane (TCA). EPA asked if 1,4-dioxane was evaluated as a possible contaminant of concern at BNL.
- BNL is developing a plan in response to the NYSDEC/NYSDOH request to sample wells for 1,4-dioxane.

2016 Five Year Review

- Complete
 - Report submitted to regulators June 2016
 - Briefed regulators on highlights/recommendations
 - Received regulatory comments
- Next Steps/Schedule
 - Submit responses to comments to regulators in late November/December
 - Public availability in early 2017

Questions?

