

Environmental Updates

*Brookhaven National Laboratory
Community Advisory Council Review
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Environmental Update Topics

- **Building 811 Demolition Project**
- Former Hazardous Waste Management Facility (Former HWMF) Sr-90 Plume Update
- Western South Boundary Area VOC Characterization Update
- EDB Detection in Off-Site Monitoring Well
- Five Year Review

Former Waste Concentration Facility (Building 811) Demolition

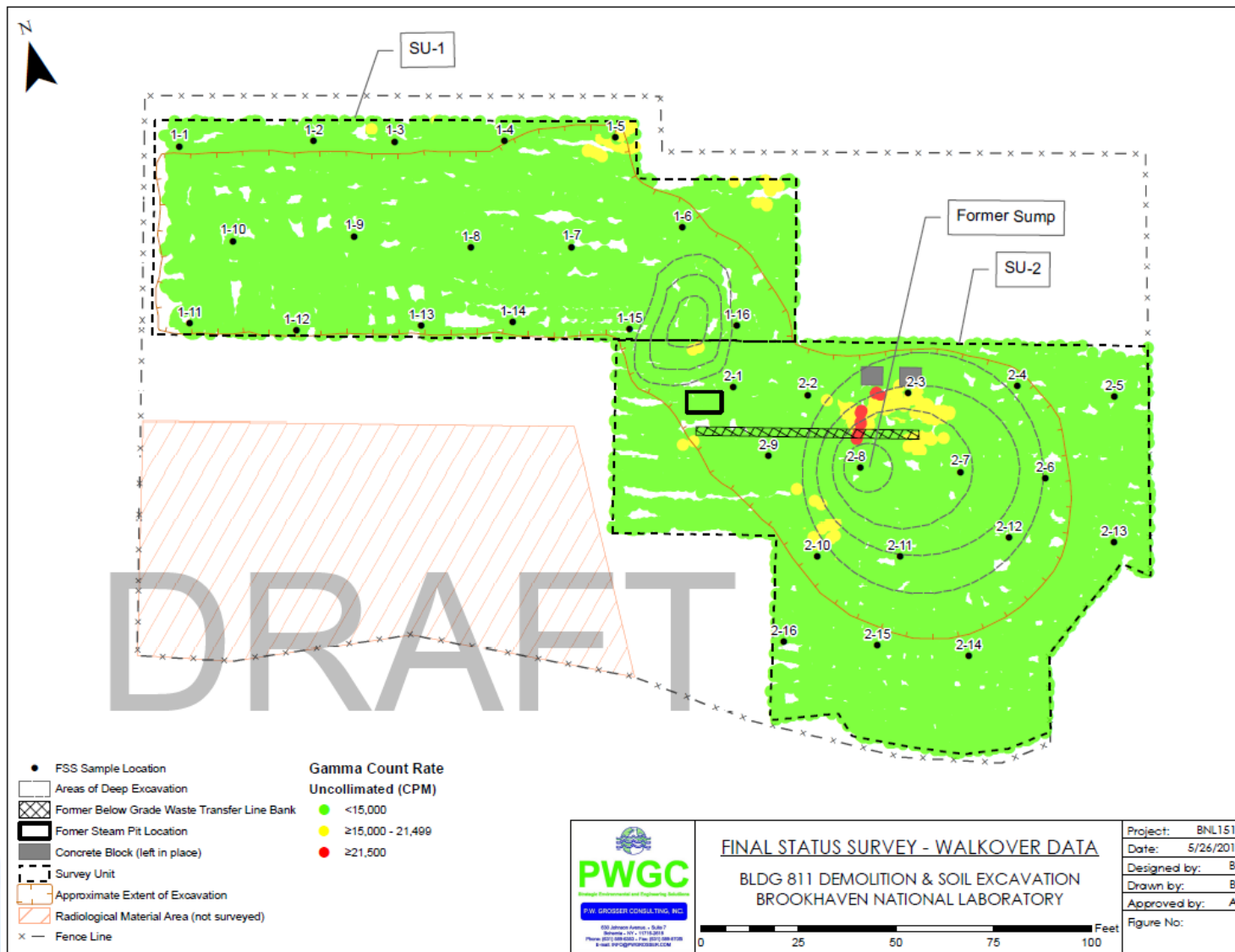
- Last briefed CAC in September 2015
- Operated from 1947 to 2008 as waste processing facility
- Help reduce environmental liability risk to soil and groundwater
- Bldg. 810/811 demolished (August 2015)
- Bldg. 811 foundation and soil removal complete, packaged waste (April 2016)
- Performed final radiological status survey/soil sampling in May 2016 in accordance with approved Field Sampling Plan
- NYSDEC performed site inspection/survey
- Shipped waste for disposal via rail in February and May 2016 - $\approx 1800 \text{ yd}^3$ of waste



Former Waste Concentration Facility (Building 811) Demolition



Building 811 Demolition Final Status Survey



Former Waste Concentration Facility (Building 811) Demolition

Next Steps:

- Review final status survey soil sample data
- ORISE verification of data
- Backfill excavation
- Prepare Closeout Report
- One area to north of excavation remains, not in original scope. Area will be marked and addressed in future.

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Former Hazardous Waste Management Facility (FHWMF) Update

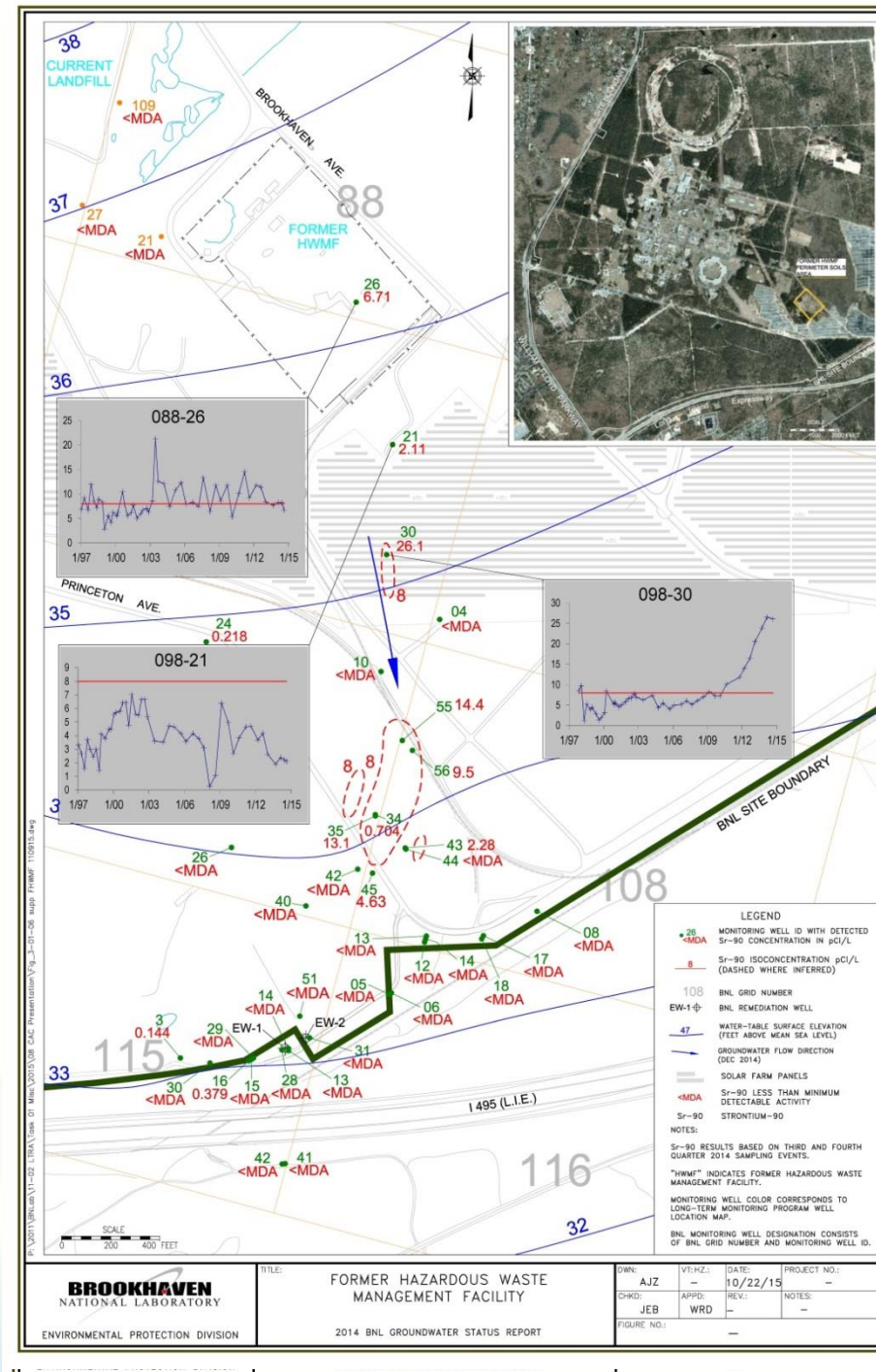
Background:

- HWMF operations began in late 1940s
- Operations at facility ended in 1997
- Soil remediation and D&D completed in 2005
- Remediated soil to avg. of 15 pCi/g Strontium (Sr)-90 (there were higher individual samples up to 80 pCi/g)
- Removed large areas of asphalt and concrete from central yard as part of remediation



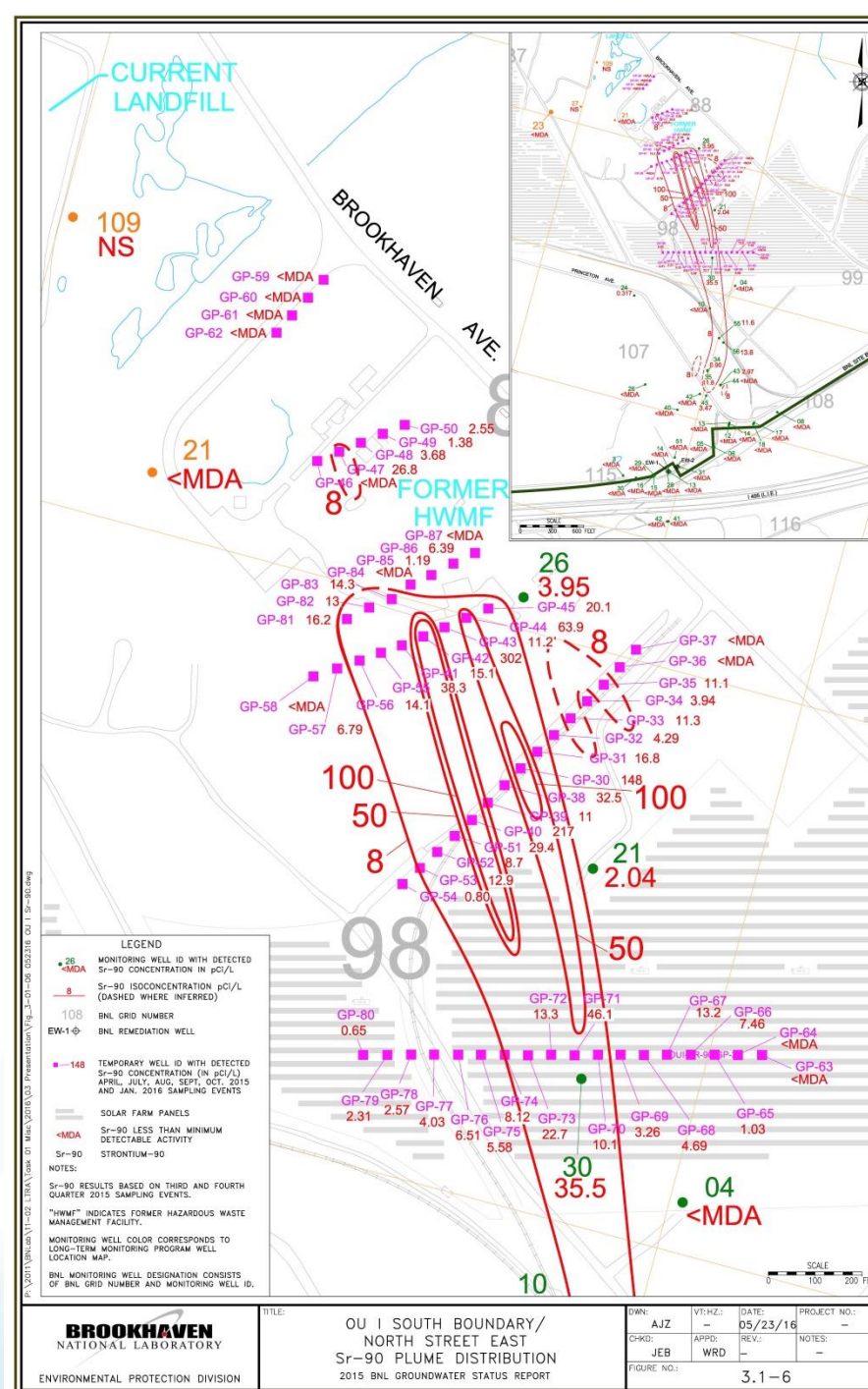
FHWMF Update

- Last briefed CAC November 2015
- Post cleanup groundwater monitoring ongoing
- Based on Sr-90 monitoring well concentrations ranging up to 35 pCi/L since 1997, and the concern for a potential continuing source, it was recommended in the 2014 GW Status Report to characterize Sr-90 at the downgradient perimeter of FHWMF
- Sr-90 Drinking Water Standard (DWS) is 8 pCi/L
- Sr-90 half-life is 29 years
- Sr-90 travels slowly in groundwater (~40-50 feet per year in groundwater)



FHWMF Update

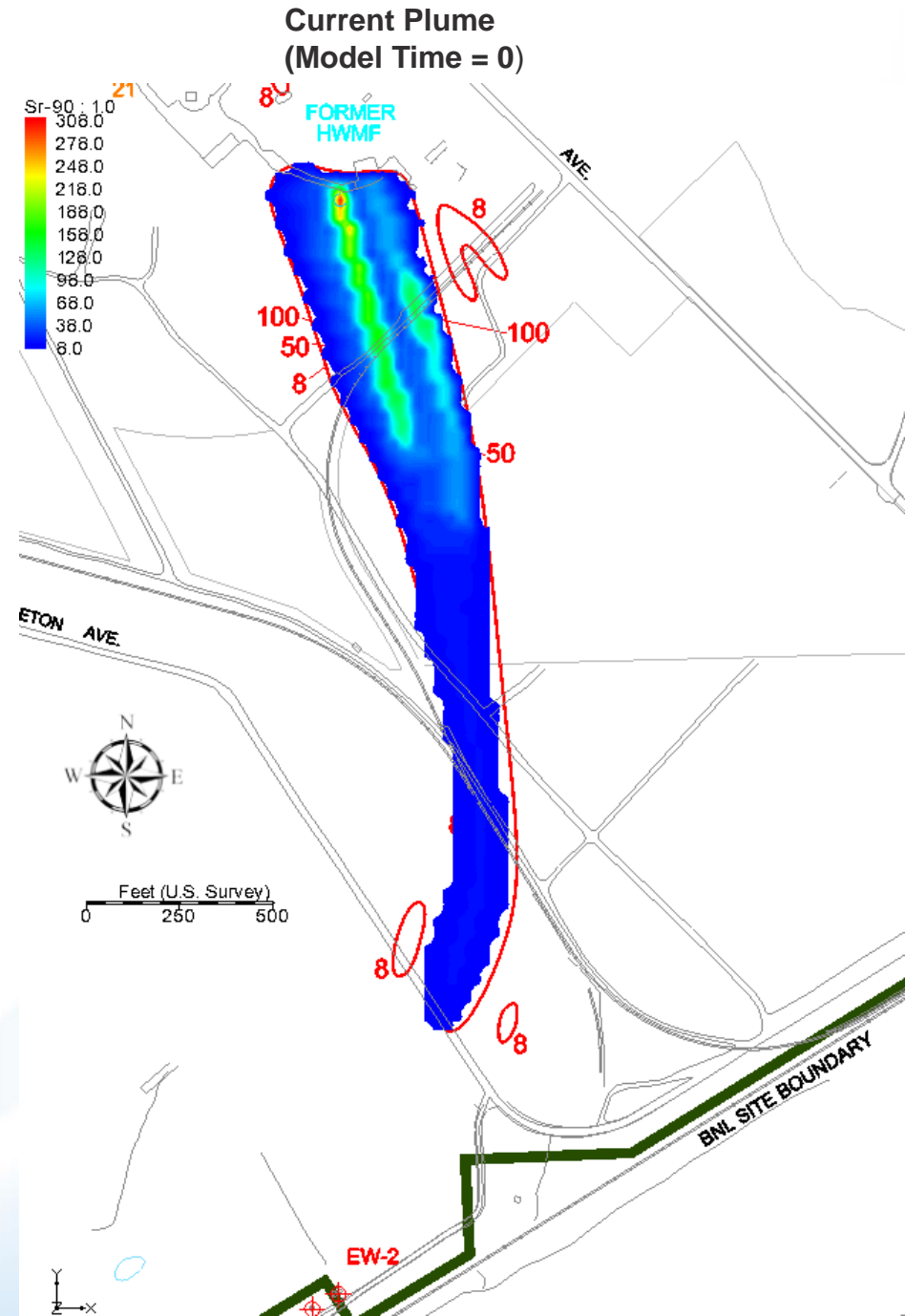
- Began groundwater characterization in April 2015
- Detected 148 pCi/L in first row of temporary wells
- Targeted an area immediately downgradient of majority of spills and operations
- Detected 302 pCi/L immediately downgradient of suspected source area
- Recently obtained additional GW samples from 3 temporary well locations where highest concentrations observed. Results:
 - GP-30 - 234 pCi/L
 - GP-40 - 217 pCi/L
 - GP-42 - 117 pCi/L
- Obtained subsurface soil samples from vicinity of GP-42 (GW concentration of 302 pCi/L) - all intervals Sr-90 not detected



FHWMF Sr-90: Modeling

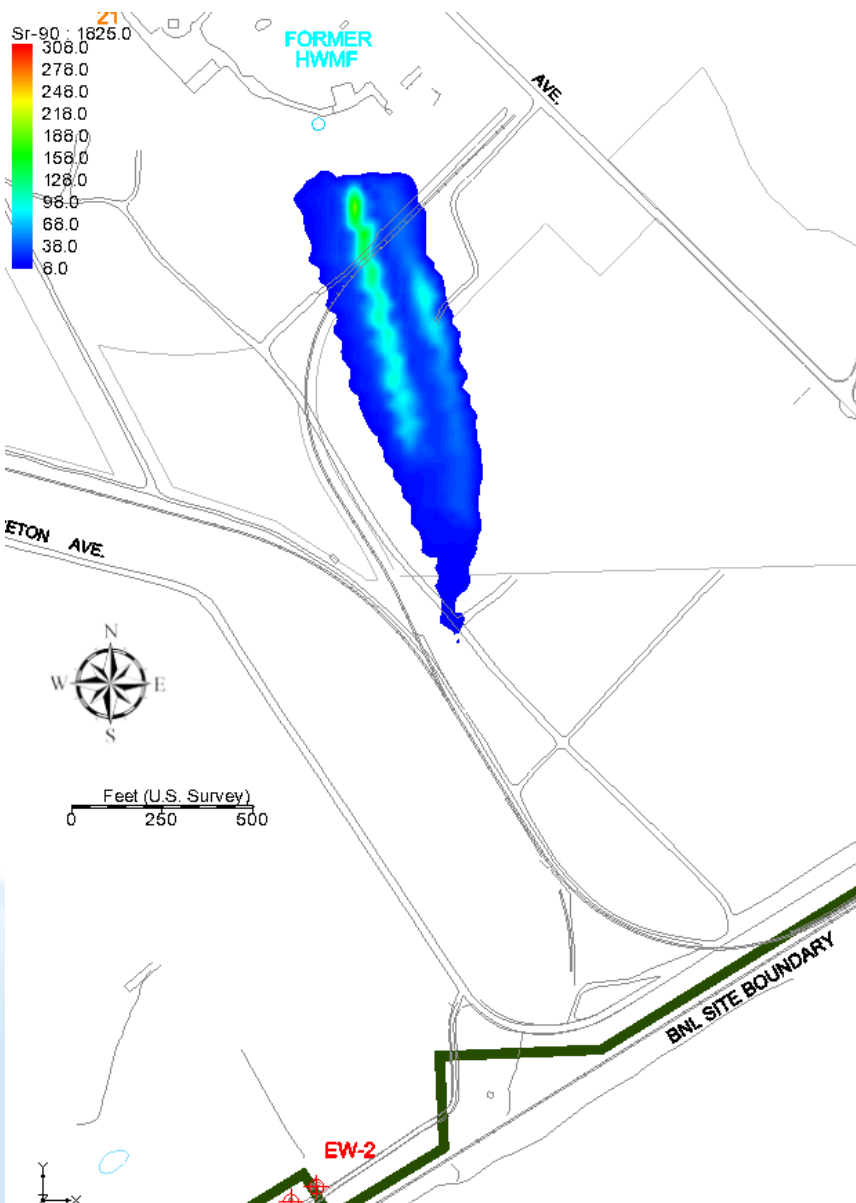
Model simulations assumptions include:

- No dispersion
- Retardation based on site field observations of 45 feet/year Sr-90 migration rate
- Concentrations as per recent data
- Both non-continuing source/continuing source

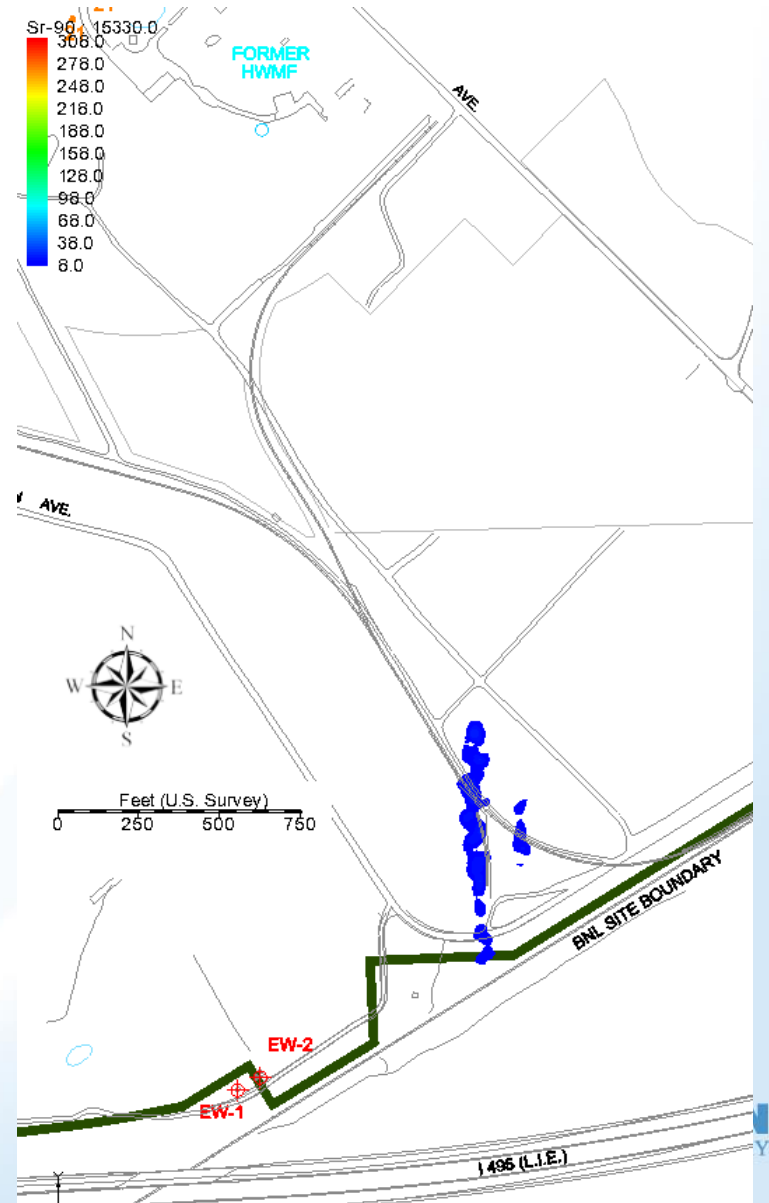


FHWMF Sr-90: Modeling

After 5 Years (2021)

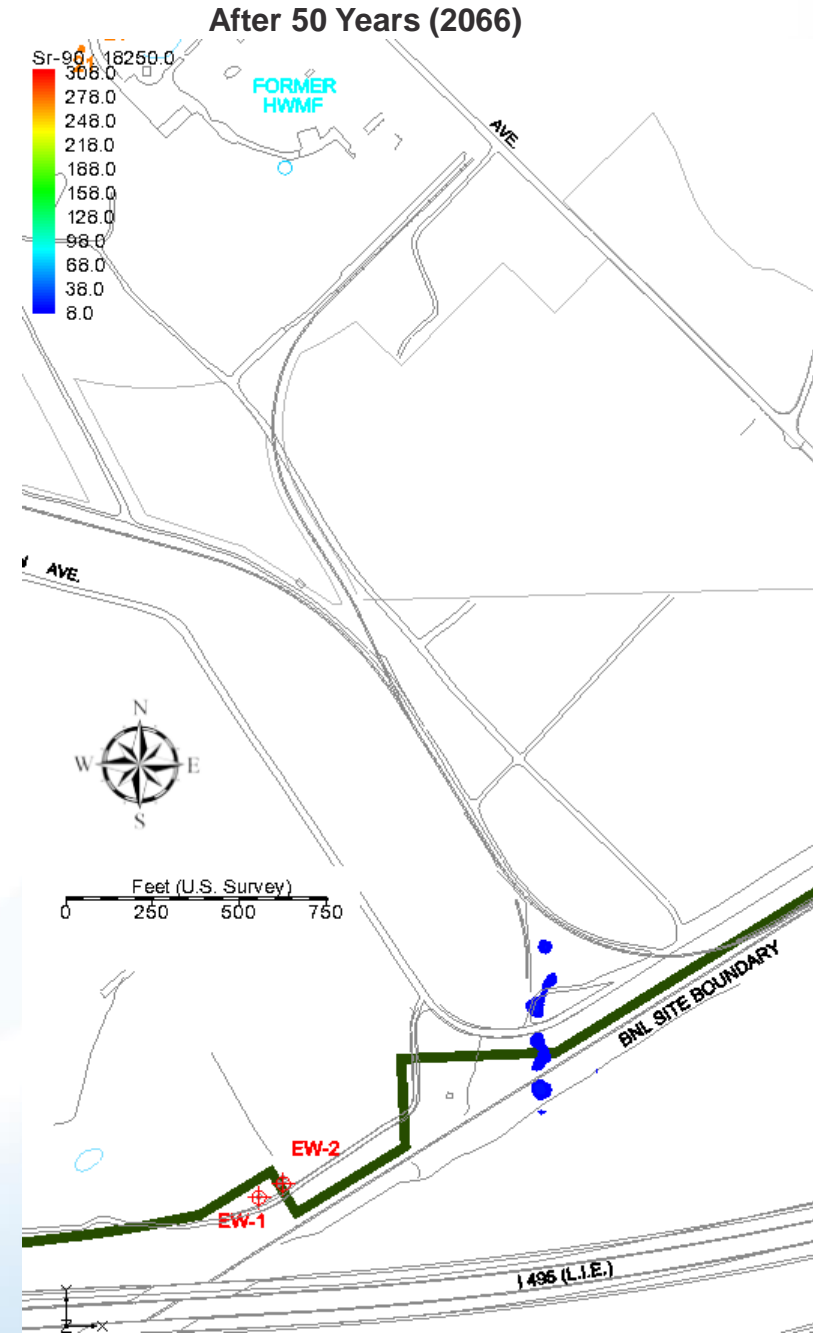


Plume reaches boundary at 8 pCi/L DWS in 42 Years (2058)



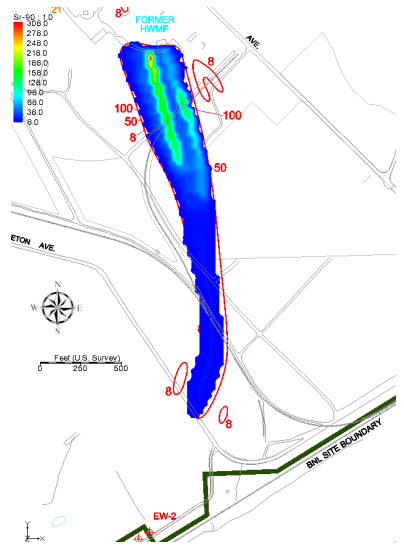
FHWMF Sr-90: Modeling

- Highest off-site concentration is approximately 16 pCi/L after 50 years in 2066
- Plume concentrations drop below DWS in 65 years ~800 feet south of site boundary (between LIE and North St.)

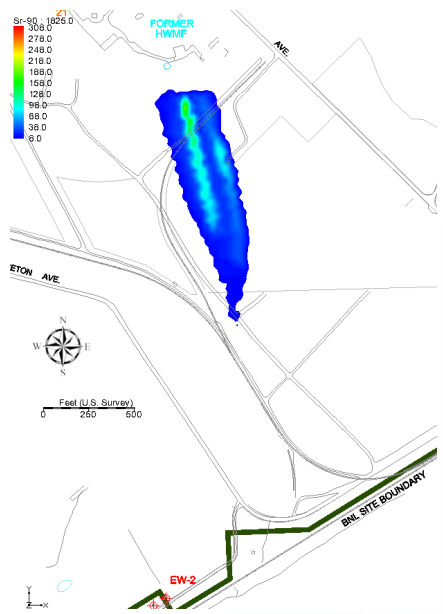


FHWMF Sr-90: Modeling

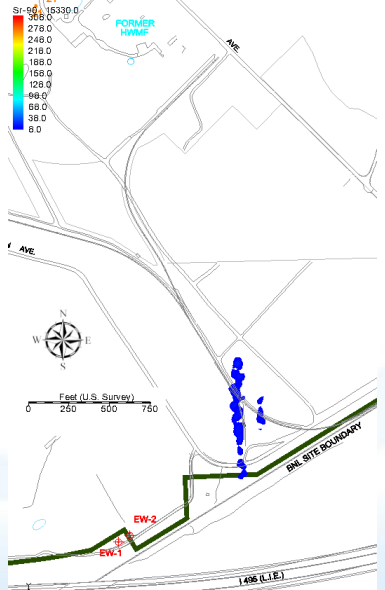
Current Plume (Model Time = 0)



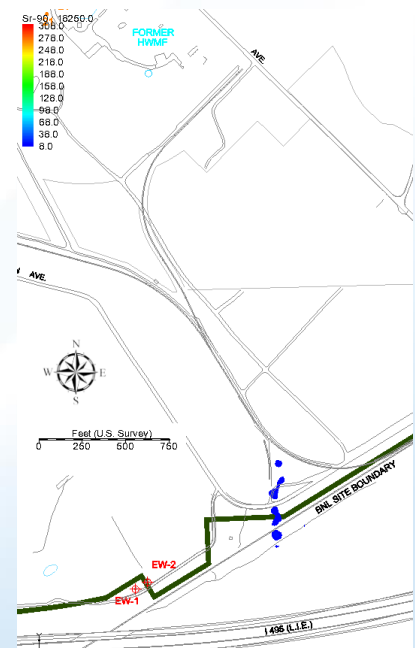
After 5 Years (2021)



Plume reaches boundary at 8 pCi/L DWS in 42 Years



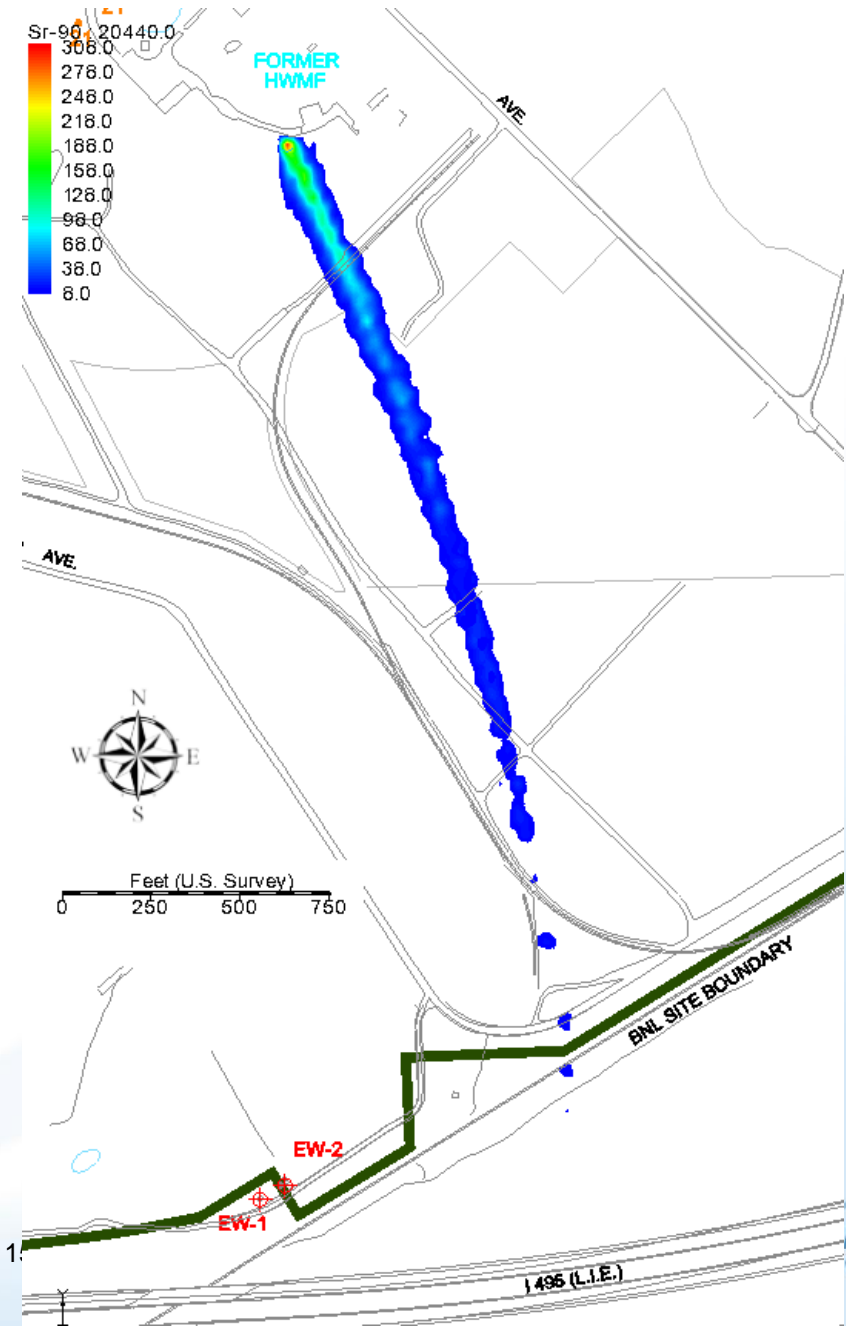
After 50 Years (2066)



FHWMF Sr-90: Modeling

- Constant Sr-90 concentration of 302 pCi/L
- Reaches equilibrium in approximately 56 years
- Highest off-site concentration of approximately 16 pCi/L just south of site boundary at railroad tracks

Assuming a continuing source (After 56 years)

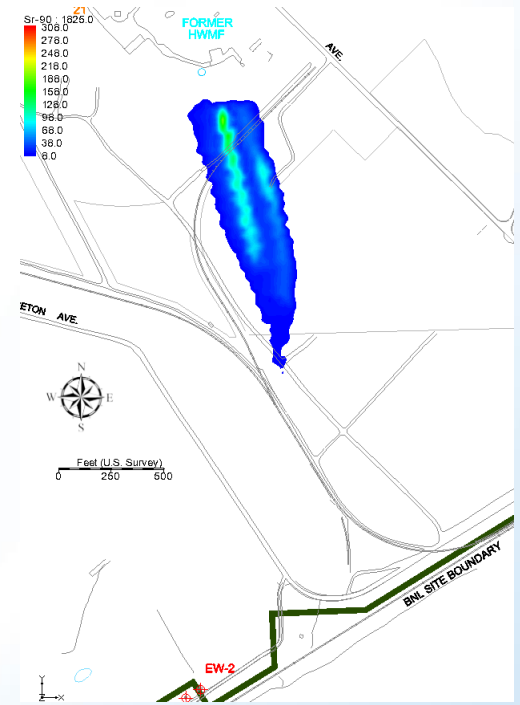
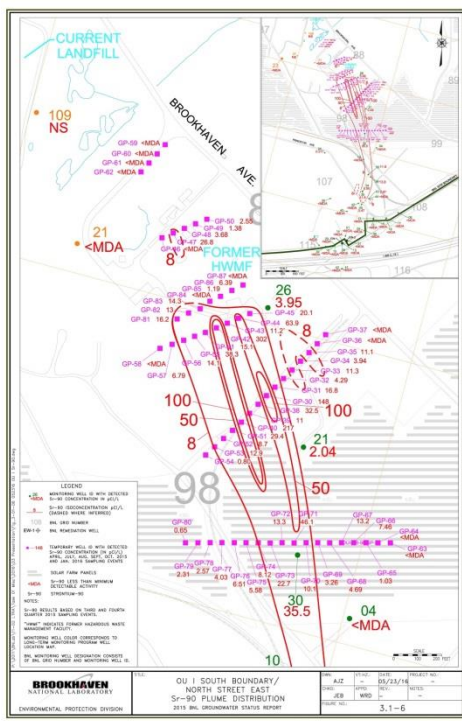


OU I Sr-90 Remedy

- The OU I ROD selected the 1996 OU I Groundwater Removal Action as the final remedy for the Sr-90 in groundwater from the former HWMF (for reference, see OU I ROD and the 1996 Action Memo)
- The remedy is natural attenuation/decay, monitoring, and institutional controls (see 1996 Action Memo).
- Institutional controls of up to 150 years for the Sr-90 in groundwater to reach drinking water standards (see 1996 Action Memo).
- It is stated that based on modeling at the time, the Sr-90 would decay to less than the DWS before reaching the site boundary (see 1996 Action Memo). The maximum Sr-90 concentration detected in the plume as identified in the ROD was 150 pCi/L.

FHWMF Sr-90: Next Steps

- Enhance current monitoring network with combination of permanent and temporary wells
- We need several more years of monitoring data to confirm the modeling predictions (by next Five Year Review in 2021)



Environmental Update Topics

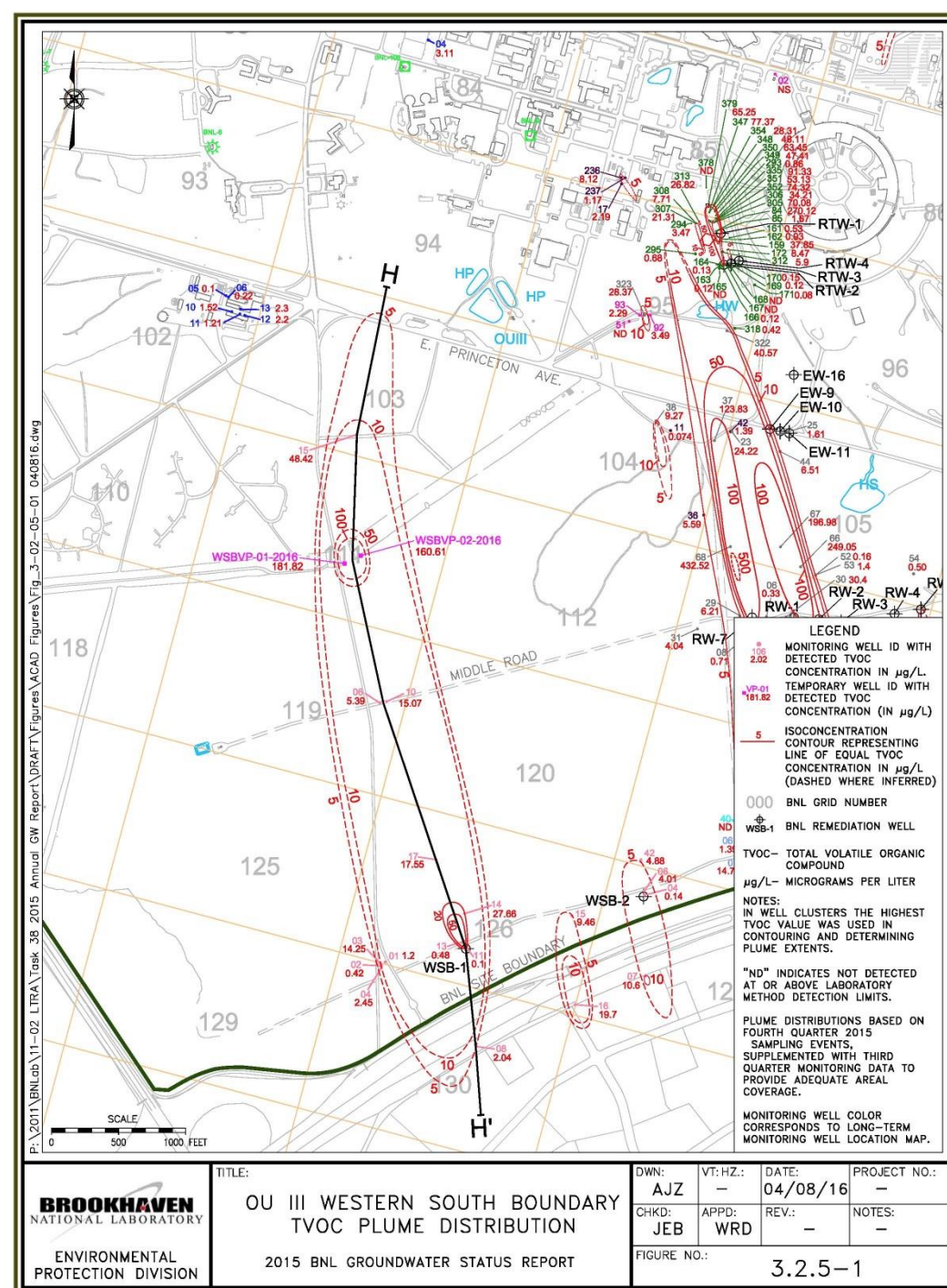
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Western South Boundary: Volatile Organic Compounds (VOCs)

- Installed 2 temporary vertical profile wells as per 2014 GW Status Report recommendation to characterize Freon-12 (February 2016)
- Temporary wells showed trace amounts of Freon-12 but Total VOCs up to 180 ug/L (TCA, DCE)
- These deeper VOCs ~180 ft. below grade and 20-40 ft. deeper than TCA/DCE treated by WSB-1

Next Steps

- Will need to define width and extent of the higher Total VOCs
- Model plume following collection of additional characterization data



Environmental Update Topics

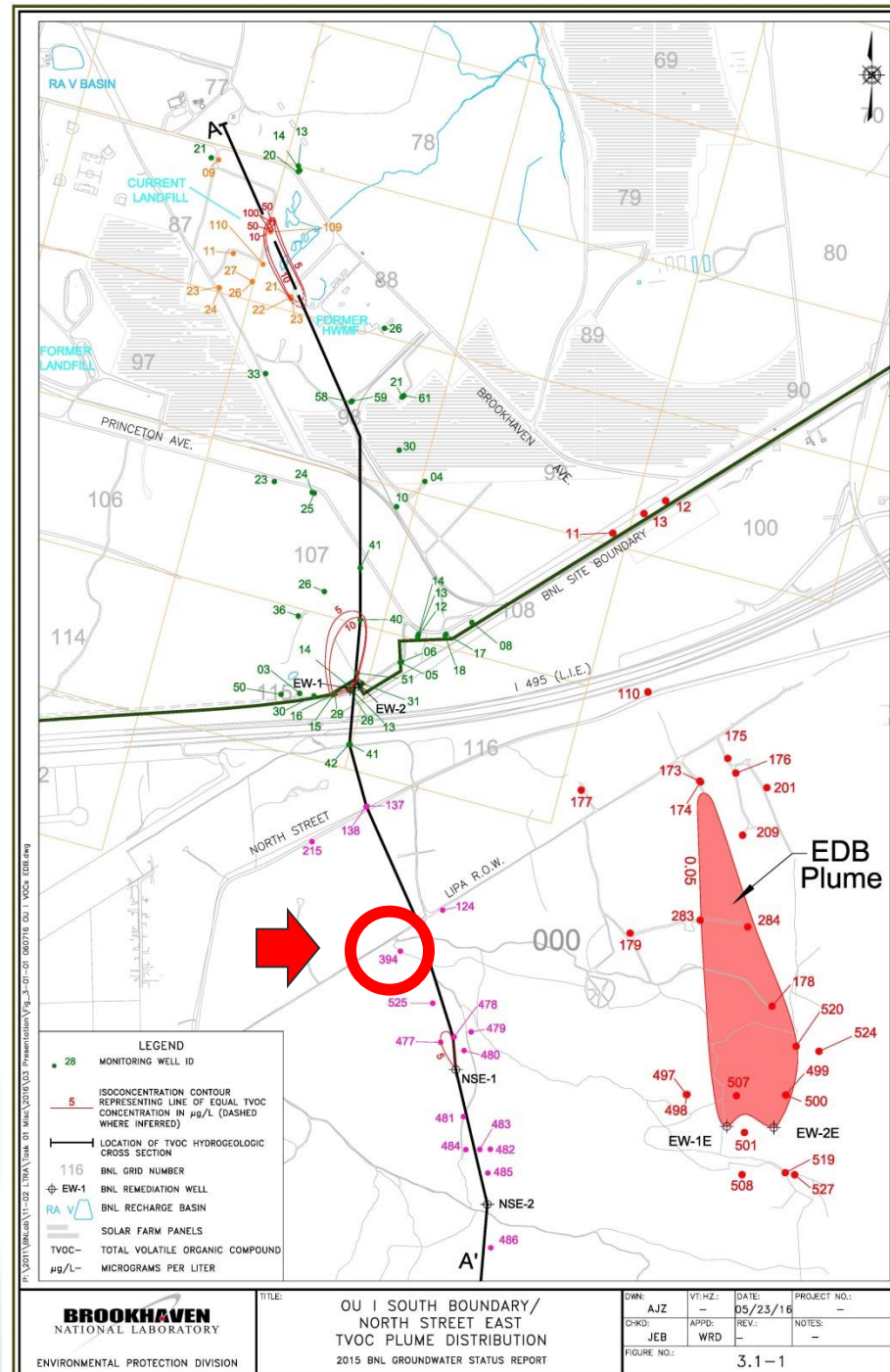
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Ethylene Dibromide (EDB): Well 000-394

- EDB detected in North St. East MW 000-394 (178 ft. below grade) above 0.05 ug/L Drinking Water Standard (DWS) last 2 quarters of 2015 (0.38 ug/L in August and 0.49 ug/L in November)
- Confirmed as per BNL GW Contingency Plan with sample on 4/15/16, sent to 2 labs and detected EDB at 0.54 ug/L (Method 524.2) and 0.68 ug/L (Method 504)
- EDB not previously detected off-site in NSE plume
- Several detections of EDB on-site in OU I from 1997-2005

Next Steps

- Obtain one round of samples from nearby wells 000-138, 000-477, 000-478, 000-479, 000-480, 000-481, 000-484 and analyze using Method 504
- Continue to sample well 000-394, increase frequency from semi-annually to quarterly and analyze for EDB using Method 504
- Extraction well NSE-1 could be restarted to capture EDB if necessary



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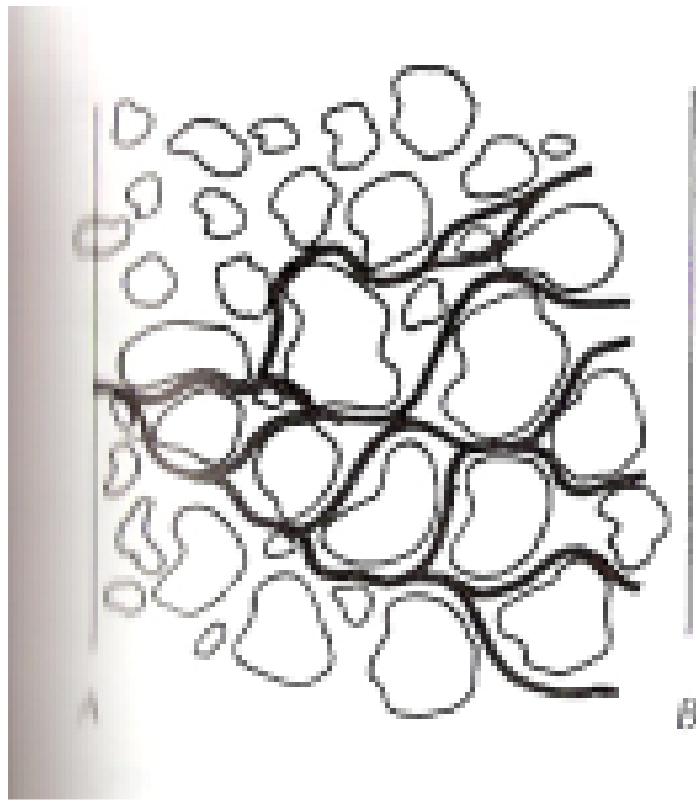
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2016 Five Year Review

- Complete
 - Obtained input from CAC in October 2015
 - Performed interviews and site inspections (EPA site inspection took place today)
 - Prepared draft report, including recommendations – undergoing DOE review
- Next Steps/Schedule
 - Regulator review of draft report – mid-July 2016
 - Brief regulators on highlights/recommendations (along with annual Groundwater Status Report) – July 2016
 - CAC/BER update – fall 2016
 - Public availability – fall 2016

QUESTIONS?

Backup



Groundwater
Flow Direction