

Department of Navy Naval Weapons Industrial Reserve Plant Bethpage Restoration Advisory Board Meeting

Operable Unit 2 Groundwater Monitoring/ Modeling Results

Presented by:
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Tetra Tech
17 May 2023

Operable Unit 2 Groundwater Monitoring, Treatment, and Interim Action Update Outline

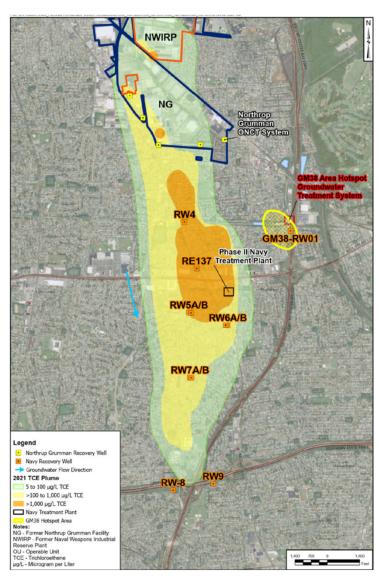


- Overview of the OU2 Remedial Activities
- OU2 Groundwater Monitoring Activities
- OU2 Groundwater Fate and Transport Modeling

OU2 Groundwater Remediation Overview



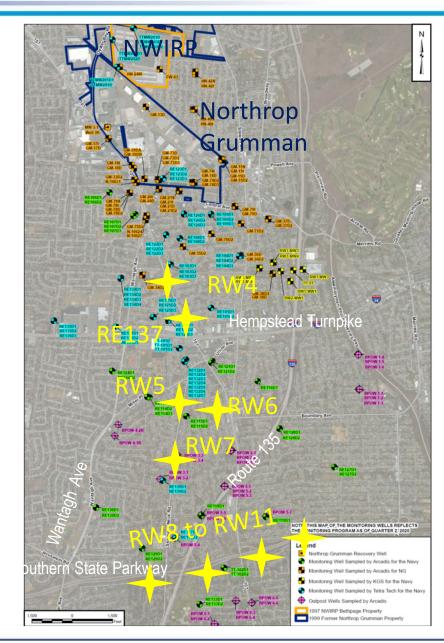
- Northrop Grumman Onsite Containment System –
 1998
- Navy GM38 Area Hotspot Treatment System 2009
- Navy GM38 Advanced Oxidation Process (AOP) May 2021
- Navy Phase I Recovery Well RW4 to GM89 Treatment System – April 2021
- Navy RE137 Interim Treatment System March 2022
- Navy Phase II Recovery Wells 5 of 6 complete
- Navy Phase II Treatment System under construction
- Navy Phase III Recovery Wells 2 of 4 completed



OU2 Groundwater Monitoring Program



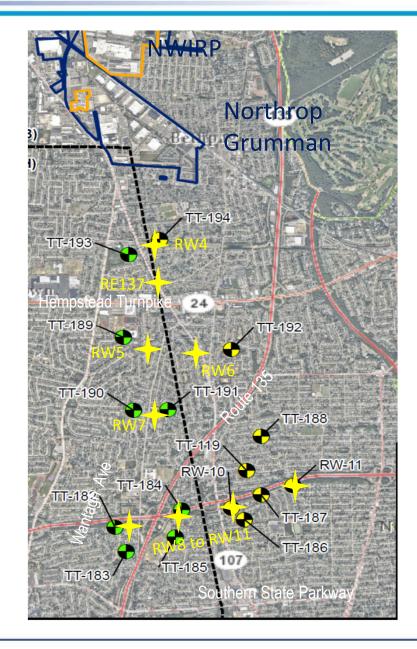
- Monitoring OU2 plume migration, attenuation, and cleanup
- Groundwater samples 180 wells on a quarterly, semi-annual, or annual basis, and analyzed for Volatile Organic Compounds (VOCs) and 1,4-dioxane
- Recovery Wells RW4 and RE137 are installed and operating
- Recovery Wells RW5A/5B, RW6A/B, RW7A/B, RW8 and RW9 are installed
- Recovery Well RW10 vertical profile boring and monitoring wells are installed, currently evaluating the data
- Drilling moved to Recovery Well RW11 area early May



OU2 Groundwater Monitoring Program



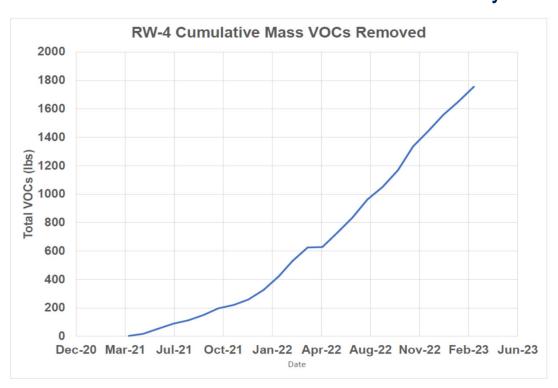
- New monitoring wells continue to be added as needed:
 - Shallow and intermediate-depth groundwater data gap wells (200 to 350 feet below ground surface): completed in 2022
 - ➤ Additional data gap wells planned for 2023 and 2024 to support plume cleanup and capture analysis
 - Monitoring well program has shifted from plume delineation to support of plume cleanup

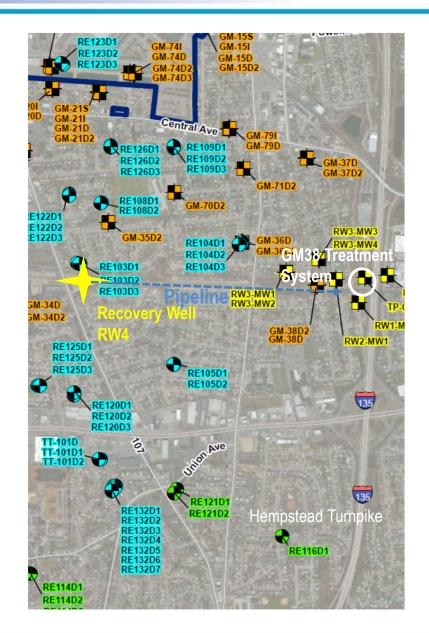


OU2 Groundwater Monitoring – Recovery Well RW4 (Phase I)



- Well and pipeline started operation in April 2021
- Trichloroethene (TCE) mass removal continues, pumping rate is 0.72 million gallons per day (MGD)
- 102 Pounds of VOCs were removed in March 2023
- Groundwater is treated at GM38 Treatment System

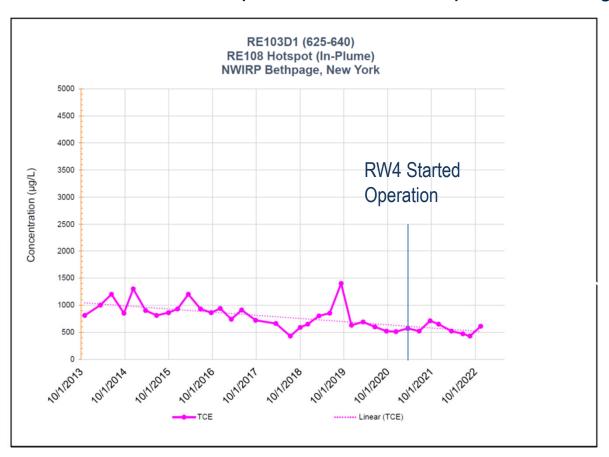


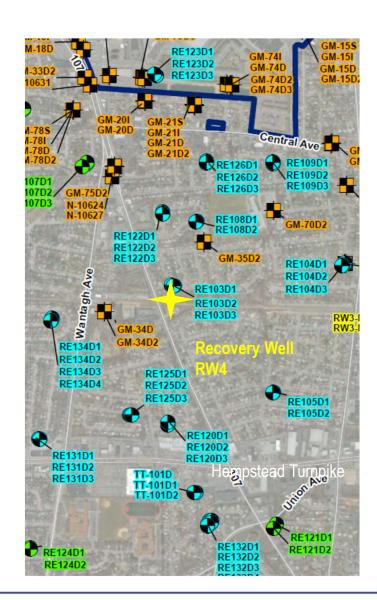


OU2 Groundwater Monitoring – Recovery Well RW4 (Phase I)



- Changes in water level and VOC concentrations in nearby monitoring wells are used to evaluate effectiveness of recovery wells
- Water level data is processed with computer modeling



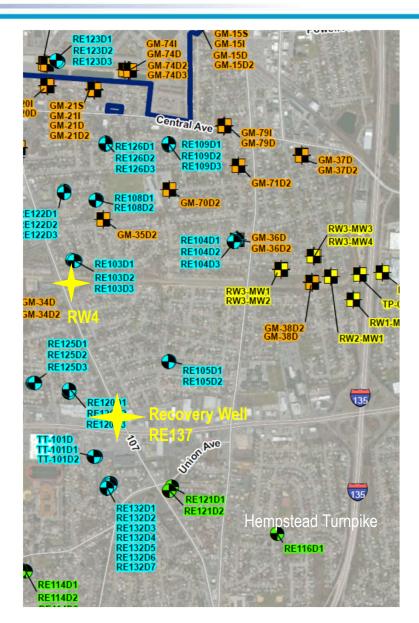


OU2 Groundwater Monitoring – Recovery Well RE137



- Well started operation in March 2022
- Trichloroethene (TCE) mass removal continues, pumping rate is 0.52 MGD
- Groundwater is treated locally using Advanced Oxidation Process (AOP) system and Granular Activated Carbon (GAC), discharged into adjacent basin
- 129 Pounds of VOCs were removed in March 2023

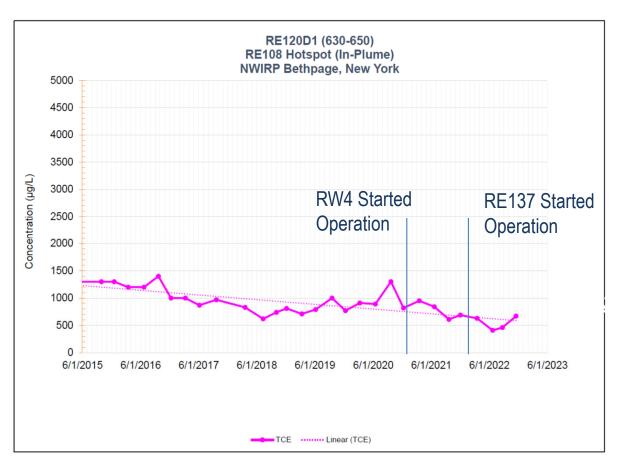


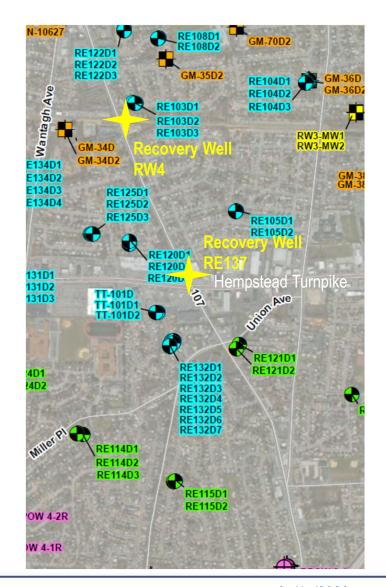


OU2 Groundwater Monitoring – Recovery Well RE137



- Pilot testing Startup in March 2022
- Planned operation through December 2023, and potentially longer

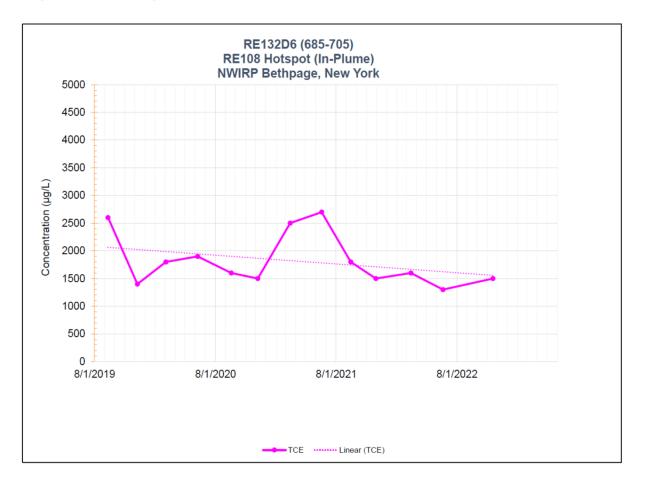


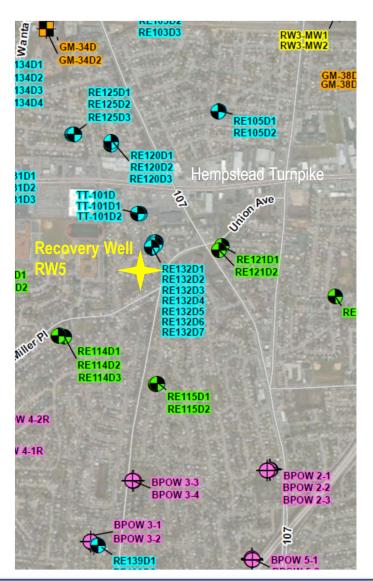


OU2 Groundwater Monitoring – Recovery Well RW5 (Phase II)



 RW5A/B installation completed (May 2023) with planned operation in 2023

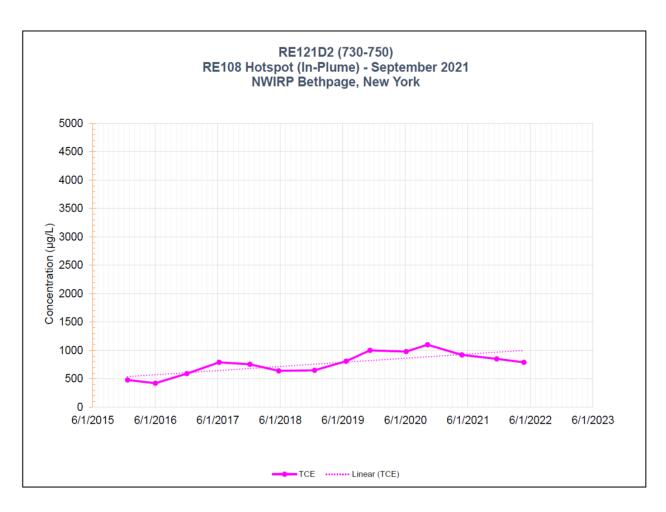




OU2 Groundwater Monitoring – Recovery Well RW6 (Phase II)



 RW6A/B are installed and planned for operation in 2023

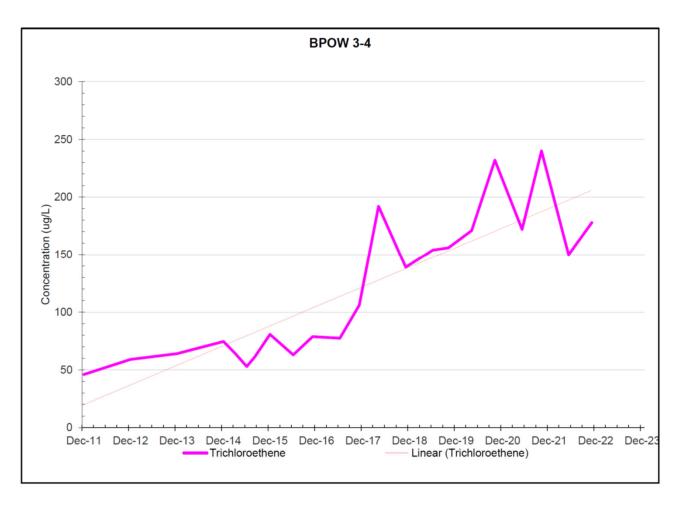


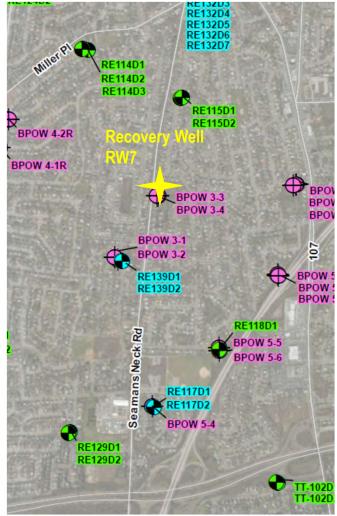


OU2 Groundwater Monitoring – Recovery Well RW7 (Phase II Extension)



 RW7A/B are installed and planned for operation in 2023

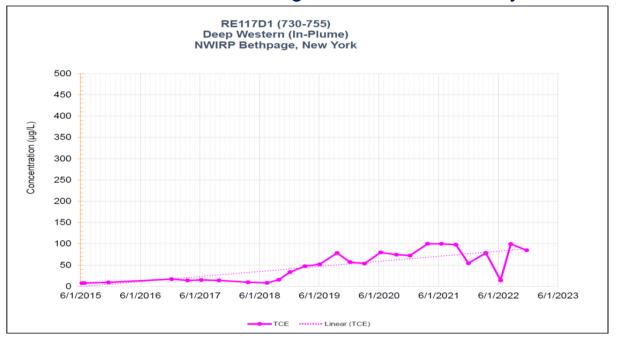


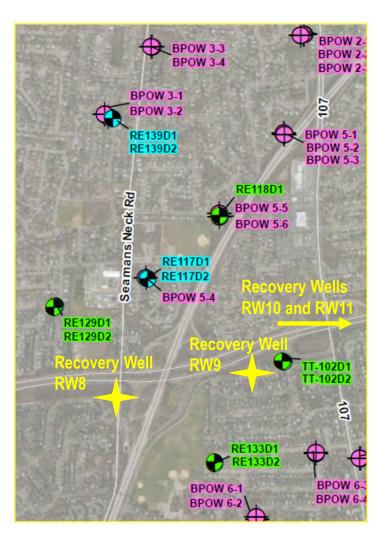


OU2 Groundwater Monitoring – Recovery Well RW8 to RW11 (Phase III)



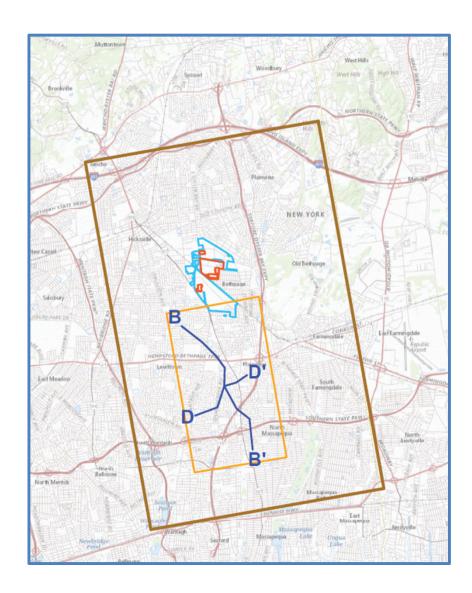
- Recovery Wells RW8 and RW9 target deep groundwater at monitoring well RE117
- RW8 and RW9 are installed, pumping tests completed in December 2022. Design activities are underway, with system to be constructed in 2024
- RW10 VPB and monitoring wells completed
- RW11 VPB and monitoring wells started in May 2023





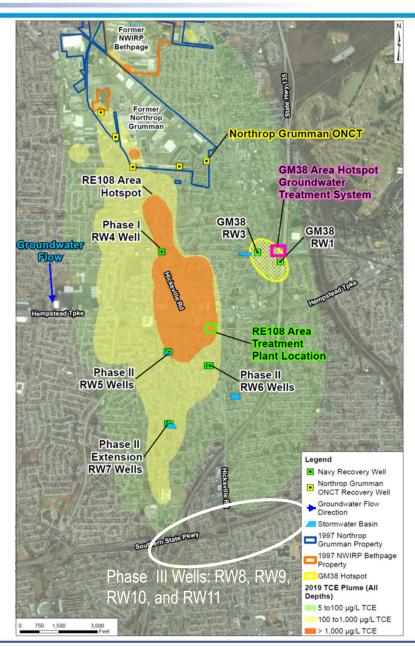


- Flow model used to evaluate OU2 plume behavior over time
- Model is approximately 42 square miles and 2 million cells
- Design, evaluate, and optimize remedial systems



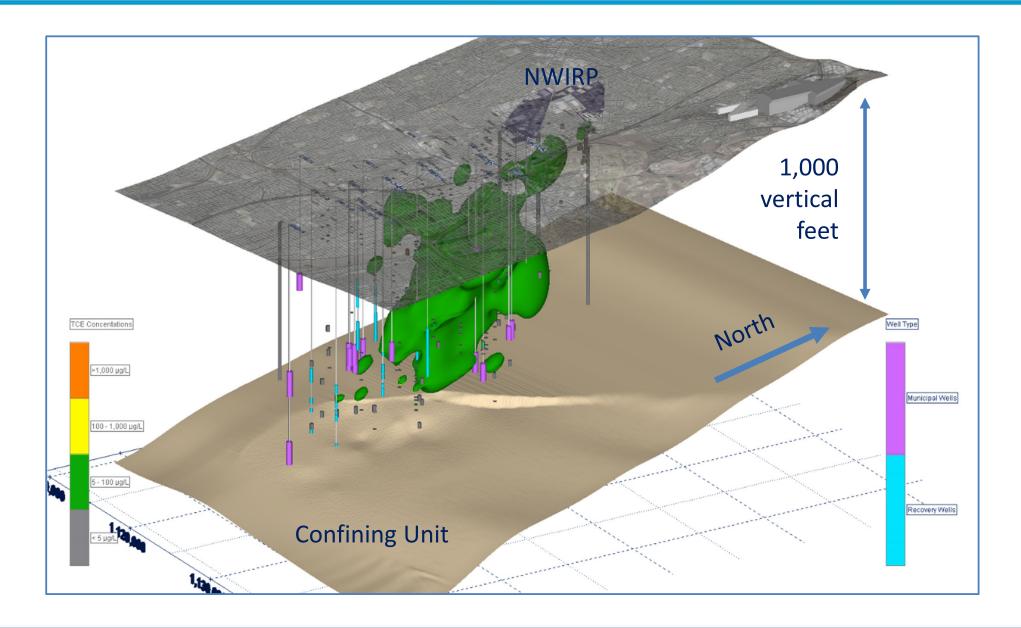


- Plume boundaries are shown using trichloroethene (TCE) as:
 - ➤ Green 5 to 100 micrograms per liter (ug/L)
 - ➤ Yellow 100 to 1,000 ug/L
 - ➤ Orange greater than 1,000 ug/L
- Boundary includes non-OU2 contributors



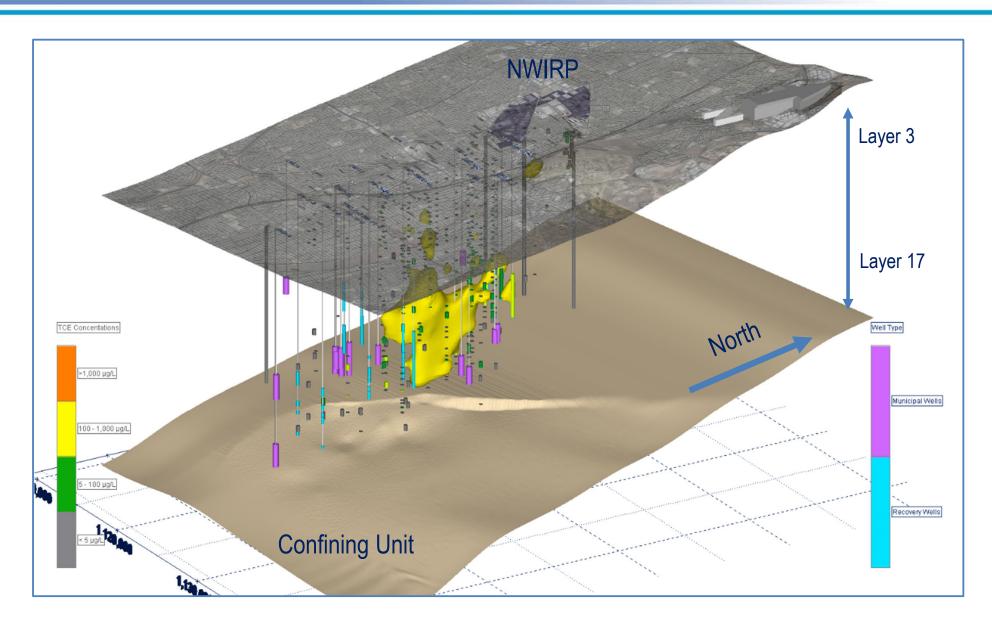
OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume





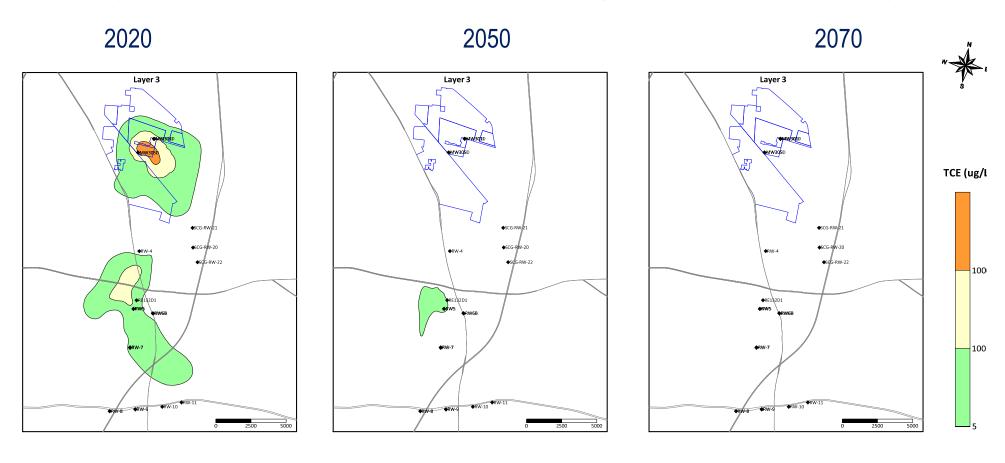
OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume





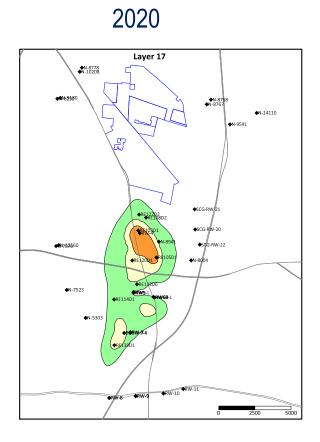


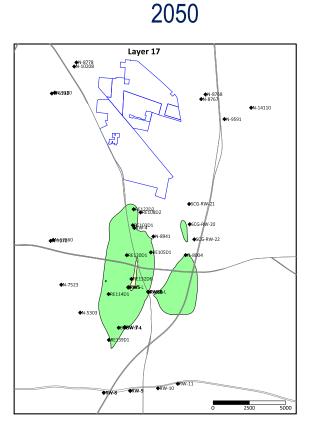
- Layer 3 (Approx. 250 feet below ground surface) plume cleanup estimates (Trichloroethene)
- Different layers and concentrations cleanup at different rates (Shallow layers cleanup faster)

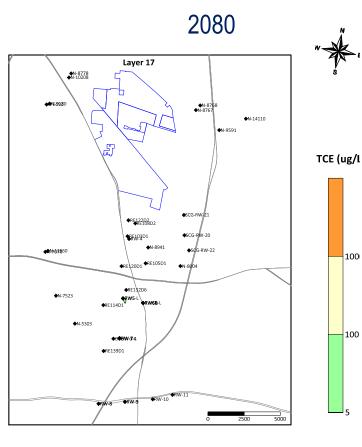




- Layer 17 (Approx. 700 feet below ground surface) plume cleanup estimates (Trichloroethene)
- Different layers and concentrations cleanup at different rates (Deeper layers take longer)









• Three-dimensional plume video

05/17/2023



RAB Member Questions

05/17/2023