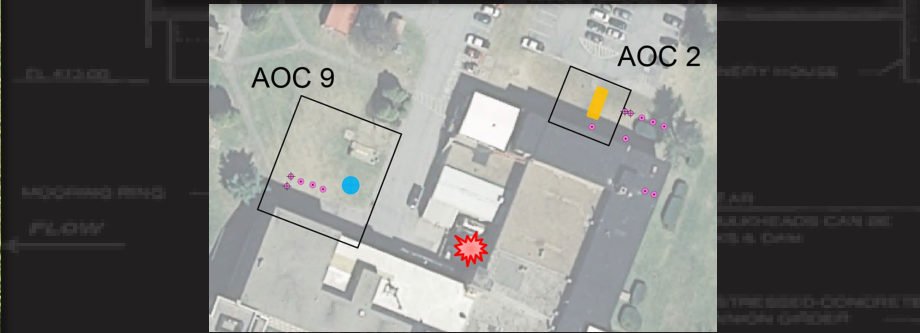
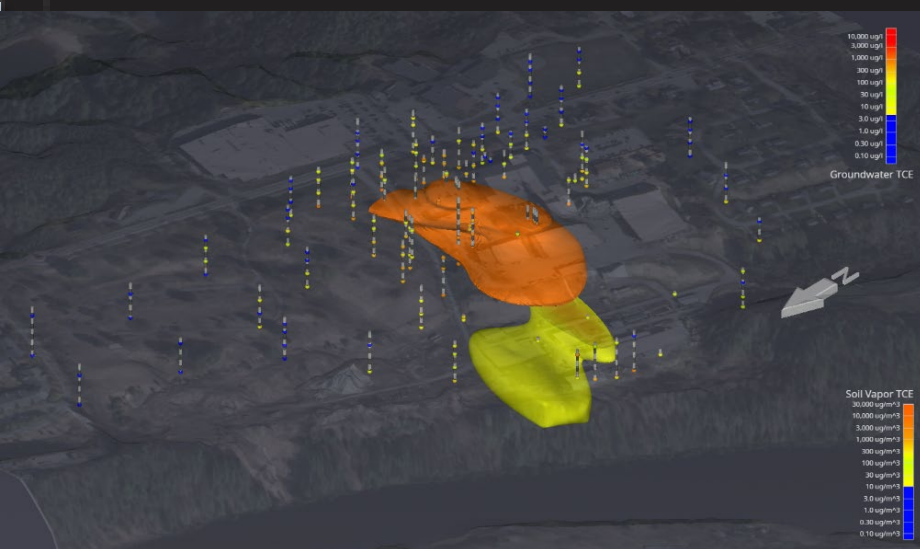


COLD REGIONS RESEARCH AND ENGINEERING LABORATORY RESTORATION ADVISORY BOARD MEETING

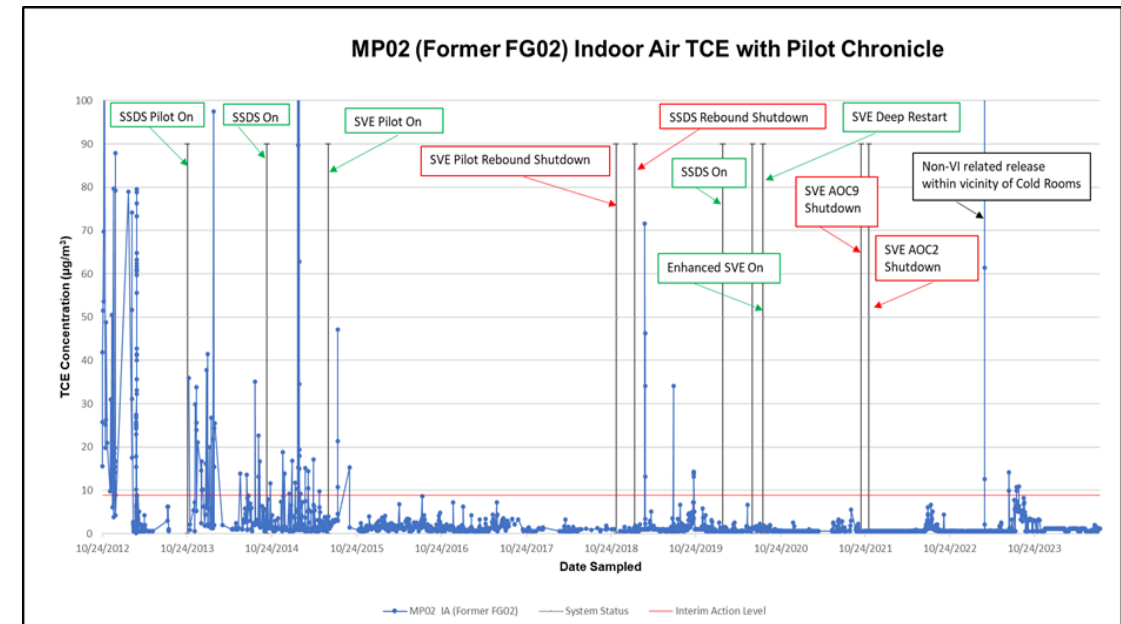
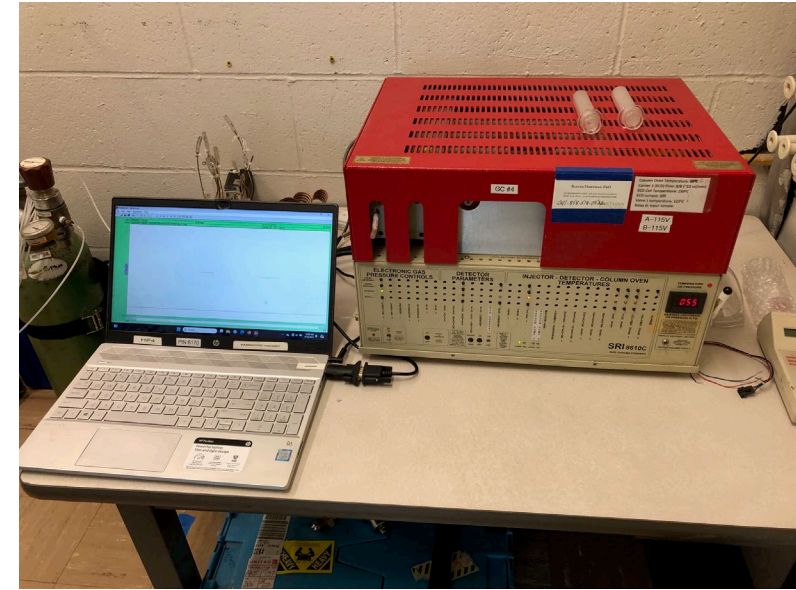
Christopher Kane, USACE Project Manager
Date: 18 September 2024

"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."





- Introductions
- History/Background of Trichloroethene (TCE) Use at CRREL
- On-Site Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Investigation Status
- Connecticut River Remedial Investigation Status
- Groundwater Management Zone Sampling
- Groundwater Treatment Plant Update
- Other Buildings and Occupied spaces Sampling
- Remedial Systems Update
- Administrative Record Update
- Upcoming Work This Quarter
- Adjourn





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INTRODUCTIONS

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Members

- Christopher Kane, RAB Chair and USACE Project Manager
- Kristine McDevitt, Community Member
- Bree Carlson, Member Representing Dartmouth
- Roelof Versteeg, Community Member
- Deputy Chief/Fire Marshal Michael Gilbert, Member Representing Town of Hanover
- Tony Daigle, Member Representing SAU 70

Support

- Laurie Haines-Eklund, USAEC Team Lead
- Roberto Rivera - USAEC Environmental Support Manager
- Amy Rosenstein, USACE Risk Assessor
- Dan Groher, USACE Engineer
- Whitney Sauve, USACE Engineer
- Dr. Steve Potts, USACE Geologist
- Katherine Miller, USACE Chemist
- Terry Harwood, ERDC-CRREL IRP Manager
- Dr. Jay Clausen, ERDC-CRREL Deputy IRP Manager
- James Wieck, GZA/Dartmouth
- Scott Calkin, WSP PM
- Wolfgang Calicchio, WSP Chemist
- Amy Quintin, WSP Risk Assessor
- Ryan Ordnung, WSP Hydrogeologist
- Jack Besse, WSP Engineer

Regulatory Agencies

- Drew Hoffman, NHDES POC
- Rene Nahlik, NHDES PM
- Richard Spiese, VTDEC POC





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HISTORY/BACKGROUND



TCE used as an industrial chemical from 1960 – 1987

TCE first detected in groundwater in 1990

Water Treatment Plant constructed in 1994

TCE Vapors first detected in 2010

- Indoor air sampling began

USACE involvement began in 2011

- Sampling intensified to determine extent of TCE in indoor air
- Soil Vapor Extraction Pilot from May 2014 to Present
- Remedial Investigation Report completed June 2018
- Final Feasibility Study Report completed January 2021


Current indoor air sampling conducted during the work week in the Main Lab and intermittently in other CRREL buildings.


Indoor Air Memo was sent to CRREL and AEC on 9/13/24. An FIO copy will be sent to NHDES once finalized.



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PRIMARY AREAS OF CONCERN (AOCS) FOR TRICHLOROETHENE (TCE)

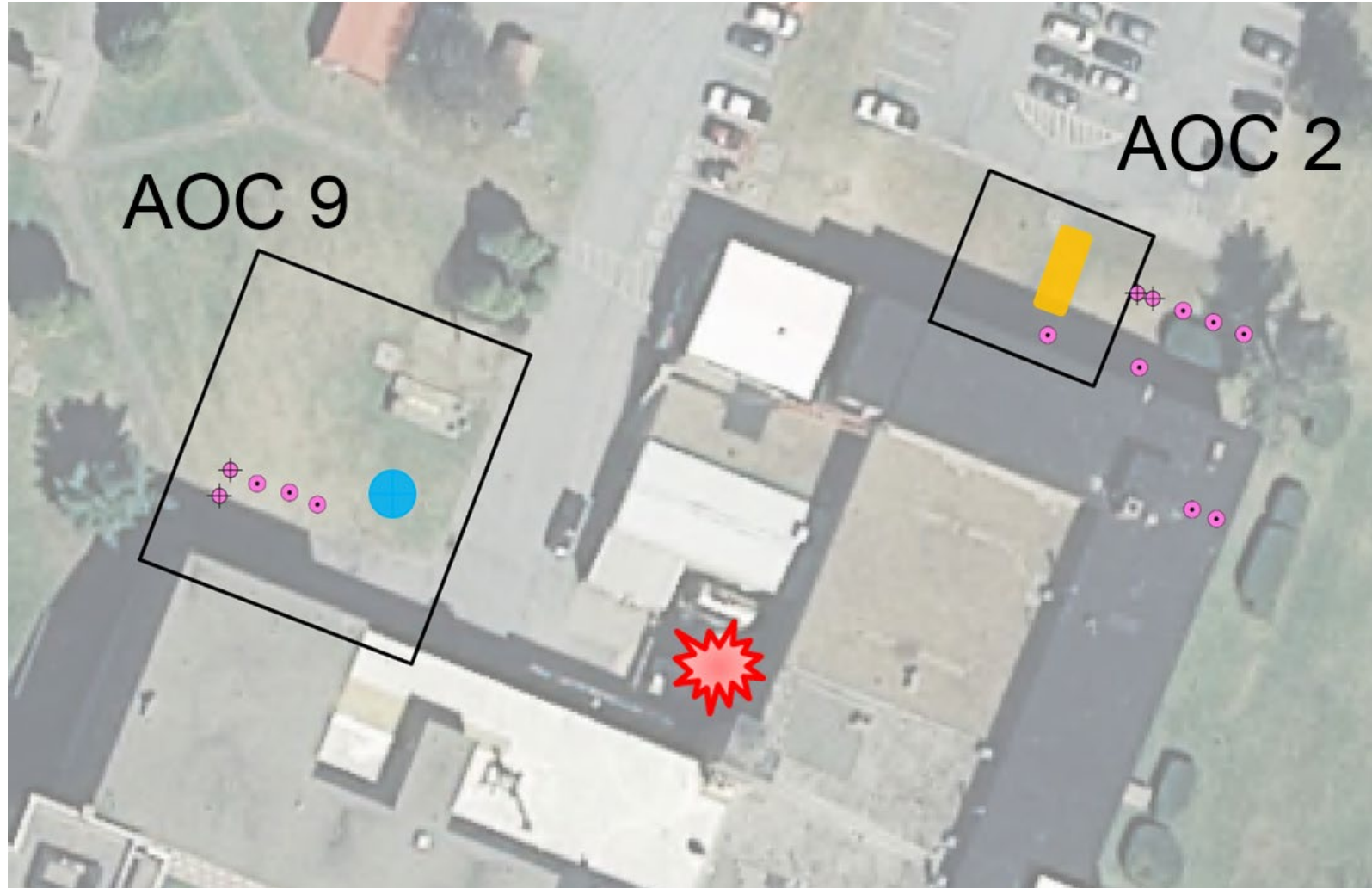
 Underground Storage Tank

 Ice Well

 Soil Vapor Monitoring Well

 Soil Vapor Extraction Well

 Aboveground Storage Tank Deflagration

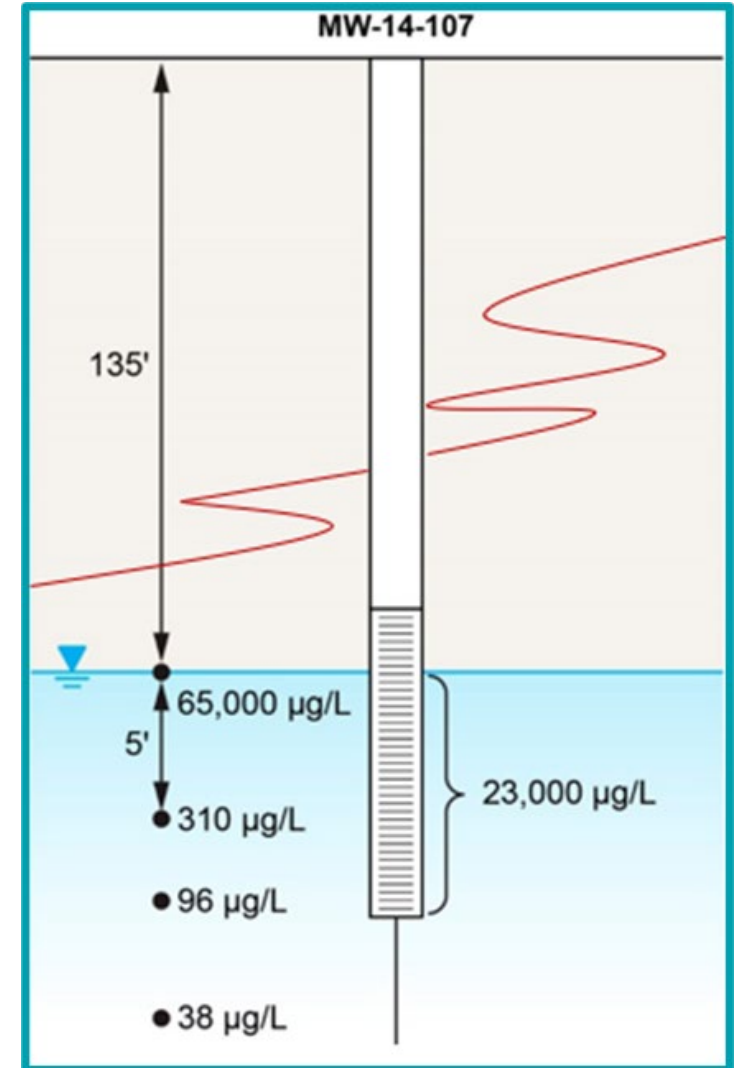
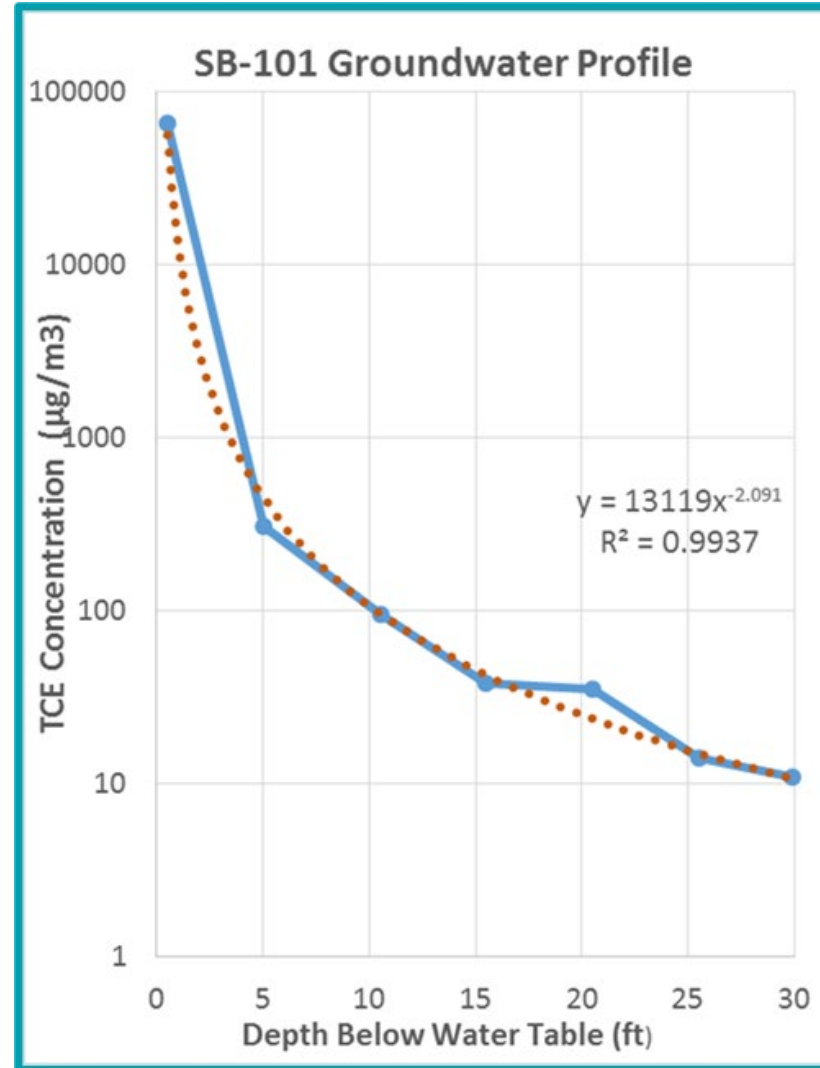




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SOIL GAS PLUME GENERATES THE GROUNDWATER PLUME

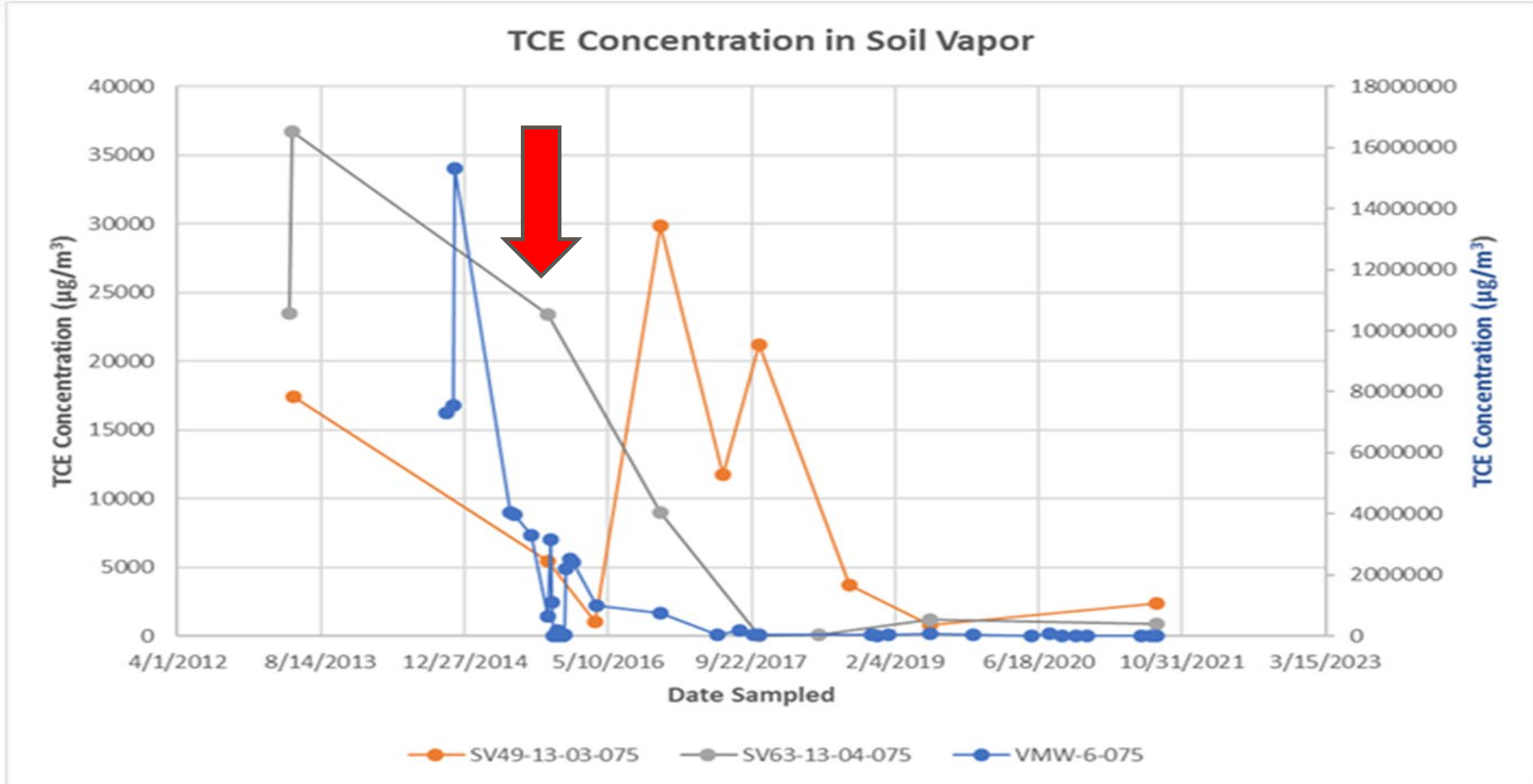
- Soil gas TCE concentrations in source areas up to 10,000,000 $\mu\text{g}/\text{m}^3$ (1,850 ppm_v)
- TCE in groundwater at the water table at 65,000 $\mu\text{g}/\text{L}$ (groundwater profiler data)
- Monitoring well (10 ft screen) TCE at 23,000 $\mu\text{g}/\text{L}$
- Groundwater and soil gas are in equilibrium based on Henry's law.
- Groundwater velocity is 0.5 to 1 ft/day





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SVE REMOVED ~3,600 KILOGRAMS (~7,940 POUNDS) OF TCE FROM SOIL GAS



SVE Pilots shutdown on 11/09/2021



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ON-SITE CERCLA INVESTIGATION STATUS

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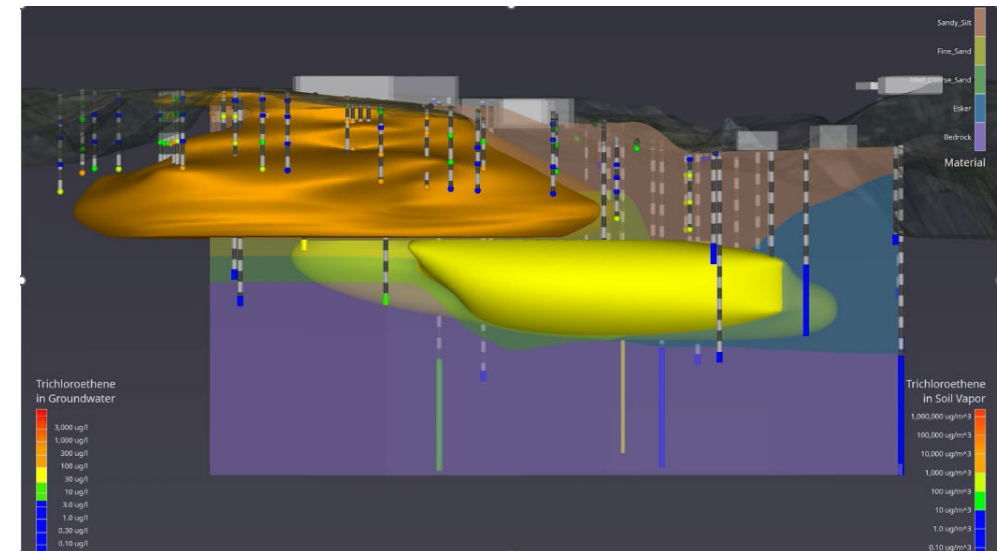
Next Steps:

1. Resolve NHDES Feasibility Study comments regarding Applicable or Relevant and Appropriate Requirements (ARARs)

- NHDES evaluating in conjunction with CT River RI as part of holistic review
- May result in a brief Addendum to the Final Feasibility Study

2. Once resolved, Proposed Plan and Decision Documents will follow thereafter

- Provides public and stakeholders an opportunity to comment on selected remedy(s) per CERCLA, including public meetings as part of each document cycle.
- Provides formal record and rationale for the selected remedy(s) and commits parties to the remedy(s).





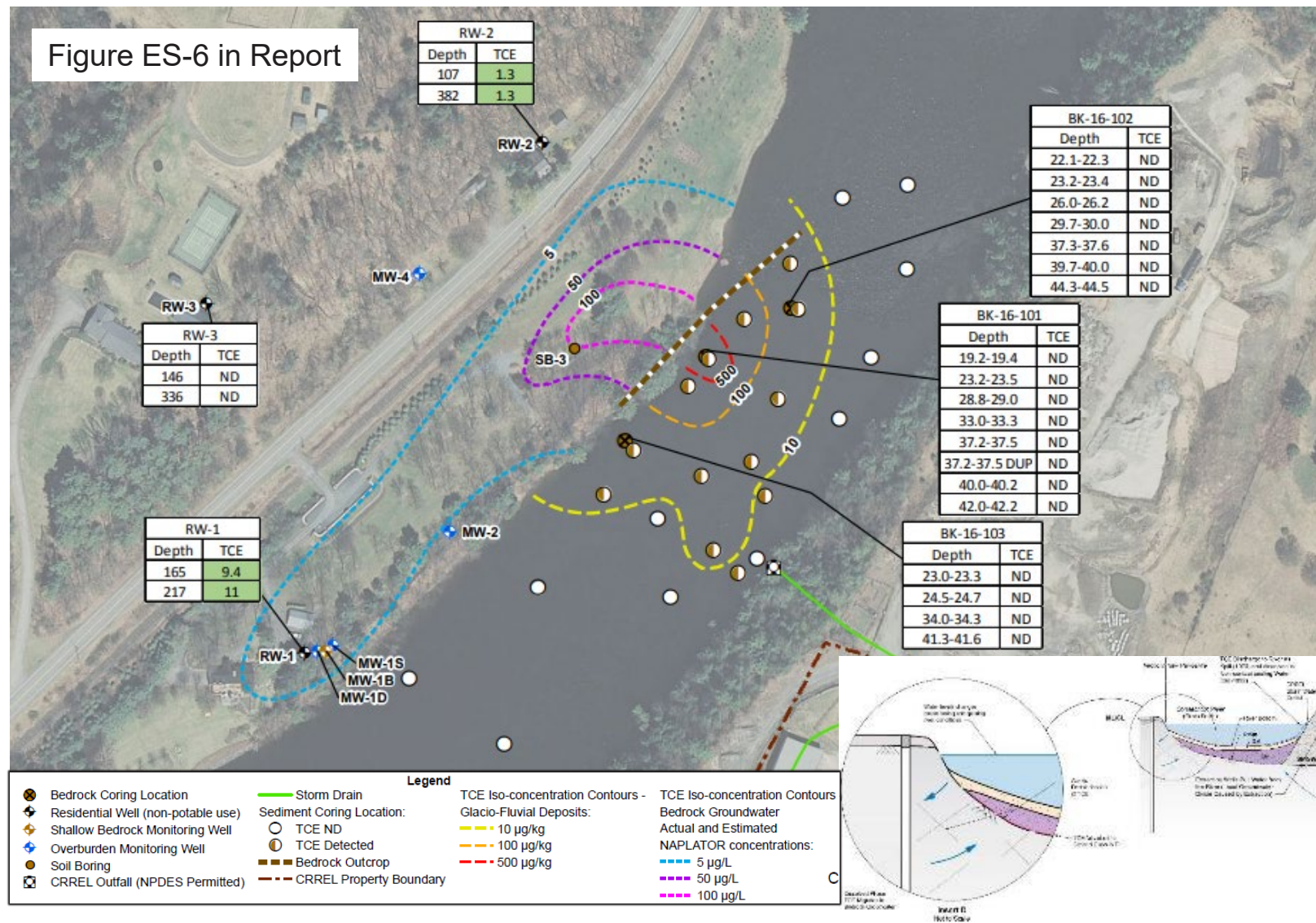
CONNECTICUT RIVER REMEDIAL INVESTIGATION REPORT



NHDES provided initial comments October 3rd 2023, and a response to comments was issued by USACE, which then held two calls with NHDES May 23rd and July 9th 2024. The first call was a chance for USACE to provide a detailed technical briefing on the CSM both on-site and for the CT River, and the second call served as NHDES's opportunity to present their understanding and to seek clarification on certain details. The goal of the calls was to seek consensus on the path forward for these CERCLA documents.

Once NHDES comments are resolved the document will be finalized.

A Draft Feasibility Study will be revised and resubmitted to USACE for review following RI comment resolution.



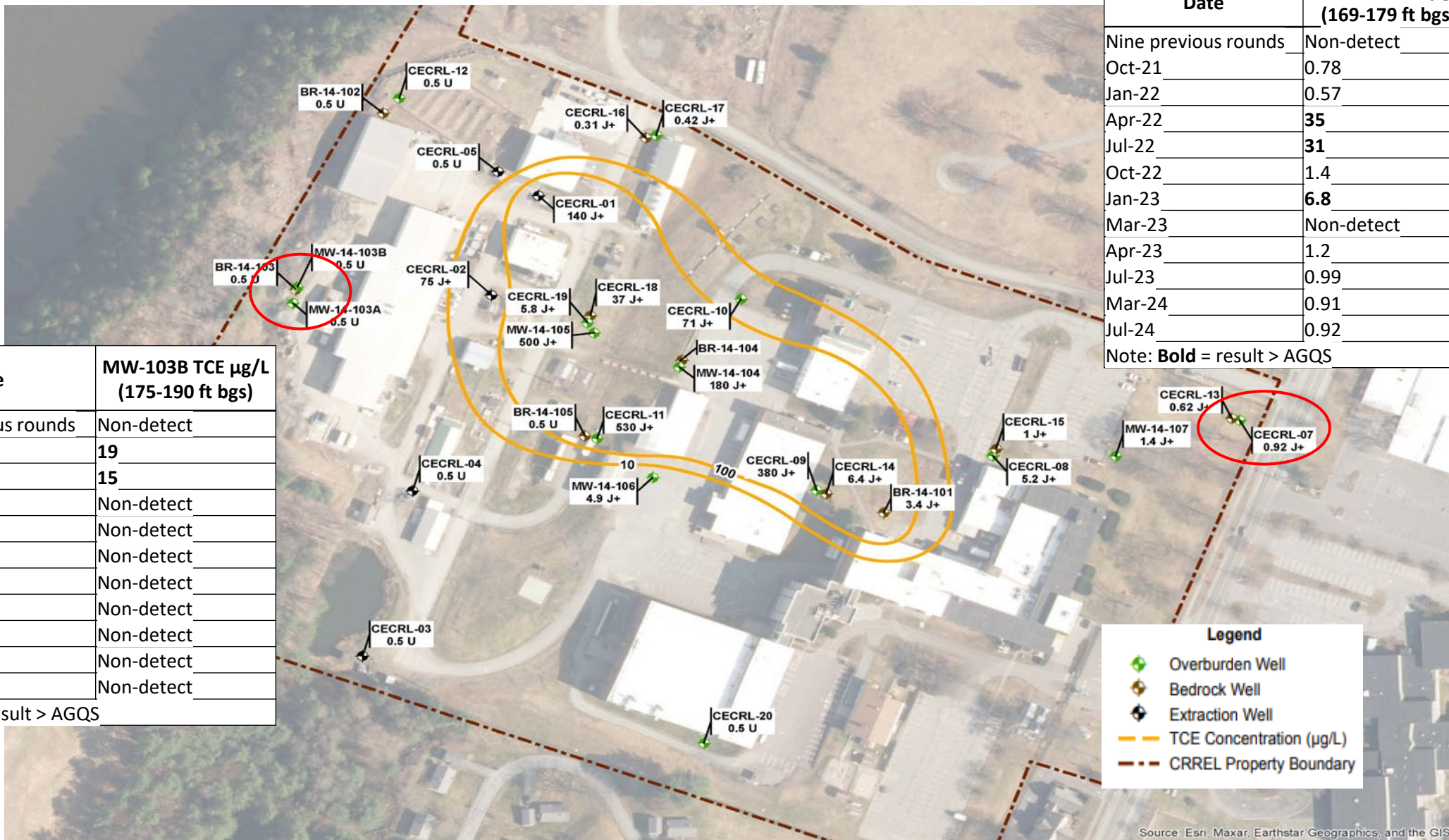


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GROUNDWATER MANAGEMENT ZONE SAMPLING

JULY 2024

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Date	MW-103B TCE µg/L (175-190 ft bgs)
Twenty previous rounds	Non-detect
Jan-22	19
Apr-22	15
Jul-22	Non-detect
Oct-22	Non-detect
Jan-23	Non-detect
Apr-23	Non-detect
Jul-23	Non-detect
Mar-24	Non-detect
Jun-24	Non-detect
Jul-24	Non-detect

Note: **Bold** = result > AGQS

Date	CECRL-07 TCE µg/L (169-179 ft bgs)
Nine previous rounds	Non-detect
Oct-21	0.78
Jan-22	0.57
Apr-22	35
Jul-22	31
Oct-22	1.4
Jan-23	6.8
Mar-23	Non-detect
Apr-23	1.2
Jul-23	0.99
Mar-24	0.91
Jul-24	0.92

Note: **Bold** = result > AGQS

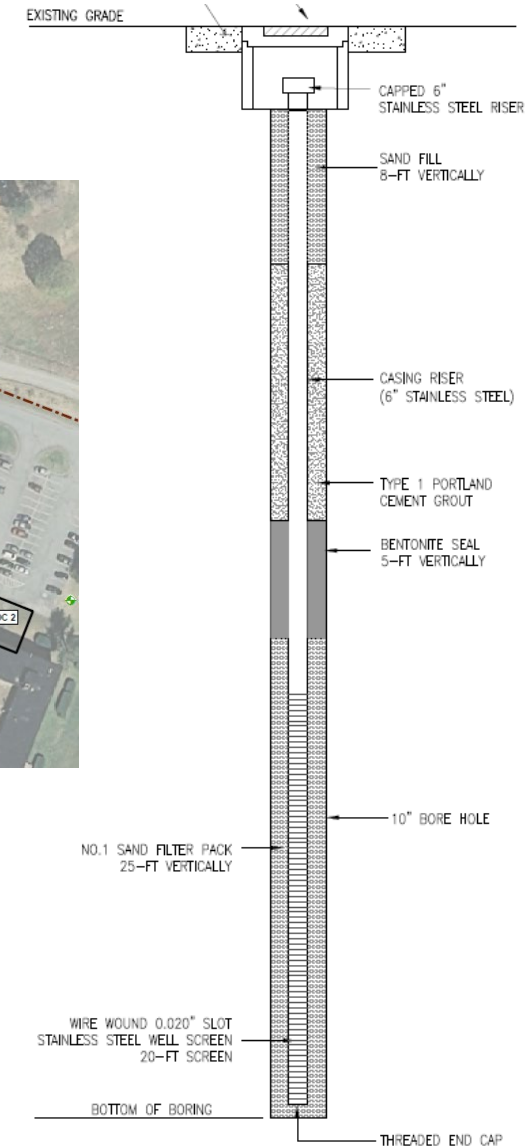
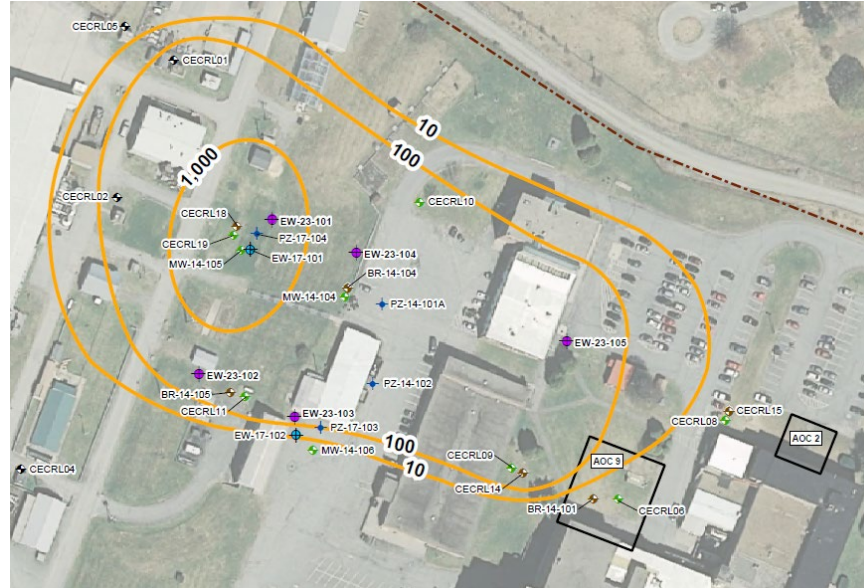
Legend	
	Overburden Well
	Bedrock Well
	Extraction Well
	TCE Concentration (µg/L)
	CRREL Property Boundary



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GROUNDWATER TREATMENT PLANT DESIGN STATUS

- Treatment plant design on hold pending completion of the ROD.
- Pilot extraction well design commenced January 2023, Draft Final Well Design was submitted to USACE for approval in spring 2023.
- Anticipate installing and operating pilot wells to deepen understanding of aquifer characteristics and demonstrate capacity to limit migration of TCE to production wells as a potential 2025 activity.





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OTHER BUILDINGS AND OCCUPIED SPACES

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- HAPSITE® sampling of other buildings and occupied spaces was initiated on August 1 and completed on September 5, 2024.
- Initial estimate of 485 other occupied spaces requiring 17 work-days of sampling (29 samples/day + QA/QC).
- 461 occupied spaces were sampled – based on actual locations.
- Sampling took five (5) full weeks (25 work-days) to complete.
- Additional effort to sample was due to logistics of HAPSITE® access and subsequent responses to observed conditions (exceedances and location conditions requiring communication to facility).
- TCE concentrations in indoor air ranged from non-detect to 76 $\mu\text{g}/\text{m}^3$.



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OTHER BUILDINGS AND OCCUPIED SPACES-CONTINUED

Building	Floor	Estimated # of rooms	# of Hapsite Samples Collected Under Current Plan	Estimated # of Occupied Spaces to Sample	Estimated # of Days to Complete Sampling	Actual Number of Samples
Main Laboratory (includes Lab Addition)	Sub-Basement	3	1	2	9.8	3
	Basement	80	5	75		51
	First	129	4	125		102
	Second	87	6	81		89
TIAC	Ground	17	1	16	1.3	13
	First	7	1	6		13
	Second	4	1	3		11
	Third	15	1	14		14
Ice Engineering	Basement	3	1	2	1.7	7
	First	12	1	11		10
	Second	36	0	36		21
LMO	Ground	15	5	10	1.0	10
Facility Engineering (DPW)	First	7	2	5		5
	Ground	3	0	3		12
RS-GIS	First	10	0	10		11
	Basement	21	1	20	1.4	15
	First	10	1	9		6
CDC	Second	12	1	11		11
	Basement	10	3	7	0.5	5
Vehicle Storage	First	8	5	3		6
	Ground	2	0	2		3
DPW Storage building	First	3	0	3		3
Greenhouse	Ground	2	0	2	1.0	2
FERF	Ground	2	0	2		10
	Basement	5	0	5		1
GWTP	First	3	2	1		5
Climatic Cold Chamber	First	8	6	2		5
Ballistics Lab	Ground	5	0	5		5
Project Support Facility	Ground	5	0	5		1
Asphalt Laboratory	Ground	1	0	1		1
Geophysical Research Facility	Ground	1	0	1		2
Navy Pond House	Ground	1	0	1		1
Red Metal Storage Shed # 1	Ground	1	0	1		1
Red Wooden Storage Shed # 2	Ground	1	0	1		1
Green Storage Shed # 3	Ground	1	0	1		1
Smokers Shed	Ground	1	0	1		1
South Gate Guardhouse	Ground	1	0	1		1
North Gate Guardhouse	Ground	1	0	1		1
Estimated Total				485	Actual Total	461
Estimated Days to Complete				17	Actual Days to Complete	25



OTHER BUILDINGS AND OCCUPIED SPACES RESULTS

- Eight location exceedances of the site-specific indoor air action limit of $8.8 \mu\text{g}/\text{m}^3$ were encountered.
- Six (6) location exceedances ranging from $12 \mu\text{g}/\text{m}^3$ to $76 \mu\text{g}/\text{m}^3$ occurred on the 2nd floor of the Main Laboratory building.
- One (1) location exceedance at $15 \mu\text{g}/\text{m}^3$ on the 1st floor of the Main Laboratory building.
- One (1) location exceedance ranging from $9.4 \mu\text{g}/\text{m}^3$ to $12 \mu\text{g}/\text{m}^3$ on the 1st floor of the Lab Addition.
- Main Laboratory 2nd floor exceedances due to missing or off Healthmates[®] and were resolved after replacement of missing Healthmate[®] and turning on of existing Healthmates[®] in those offices.
- Main Laboratory 1st floor exceedance likely due to repair activities and an open sanitary sewer drain
- Lab Addition 1st floor exceedance due to presence of consumer product that contains TCE as an ingredient (Weld-On 3)



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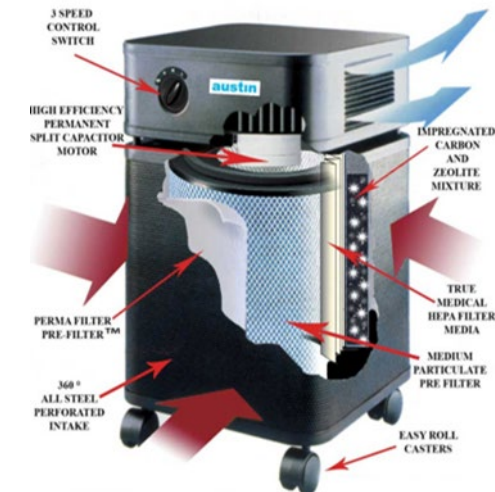
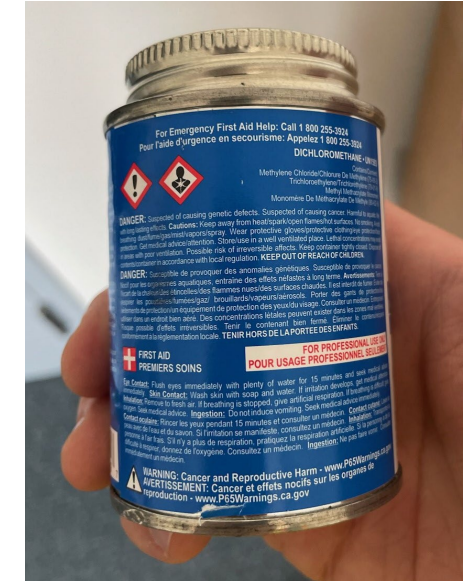
OTHER BUILDINGS AND OCCUPIED SPACES RESULTS-CONTINUED

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Take aways:

1. Keep Healthmates® on
 2. Check “off the shelf” consumer product SDS or ingredients list
- The plan going forward is to monitor buildings two times a year for the next two years and re-evaluate/reduce indoor air monitoring accordingly, as presented in the revised Indoor Air Monitoring Plan Memo.





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INTERIM REMEDIAL SYSTEMS UPDATE

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Soil Vapor Extraction (SVE) pilot systems were shut down/decommissioned in October and November 2021. Tentative restart Summer 2025.

Site-wide soil vapor sampling conducted in August 2023. TCE in soil vapor is generally higher than the 2021 sampling and has not stabilized, indicating rebound is ongoing.

Healthmates® continue to operate, filters were replaced March 15th – 18th, 2024.

Plenum Air Purifying Units electrical switches were rewired and have been on since May 29, 2024.

Sub-slab depressurization systems are currently running.

Actively monitoring indoor air quality daily with the HAPSITE® for protection of human health.

VaporSafe® monitoring for 2024 will be completed on September 26 and will be restarted pending funding in Summer 2025. Sample tubing will remain in place.

Changeout of Plenum Air Purifying Unit filters is planned for the 4th quarter of 2024.





ADMINISTRATIVE RECORD UPDATE



The Administrative Record is available for review:

- CRREL library (hard copies)
- CRREL SharePoint (digital copies) site and
- Howe Library in Hanover (digital copies)
 - Includes all final reports
 - See the information desk to access the files

September 2024:

- 6 documents added
- 2024 up to present including:
 - groundwater reports





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UPCOMING WORK

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Indoor Air

- Continued HAPSITE® monitoring of the Main Lab, FERF, and LMO as well as other CRREL buildings
- VaporSafe® monitoring for 2024 ending September 26
- Routine sampling of sub-slab depressurization systems
- Prepare revised indoor air monitoring approach and work plan in Fall 2024
- Plenum Study approach and work plan for Fall 2024
- Plenum Air Purifying Unit filters planned changeout in the 4th quarter of 2024
- CRREL/NAE planning removal of TCE impacted glycol discovered in a pipe within the Mechanical room

Groundwater

- Monitor GMZ boundary wells, next sampling tentatively scheduled for October 2024
- Finalized pilot groundwater extraction well design
- Groundwater Treatment Plant Design Restart pending funding/new contract

Soil Gas

- Finalize Synoptic Soil Gas/Rebound August 2023 Report
- Draft Soil Vapor Extraction Pilot Test Report
- SVE Pilot Re-Start pending funding/new contract

CRREL RI/FS/Proposed Plan/Decision Document

- Resolve NHDES Feasibility Study Comments
- Draft Proposed Plan and Decision Document

Connecticut River RI/FS

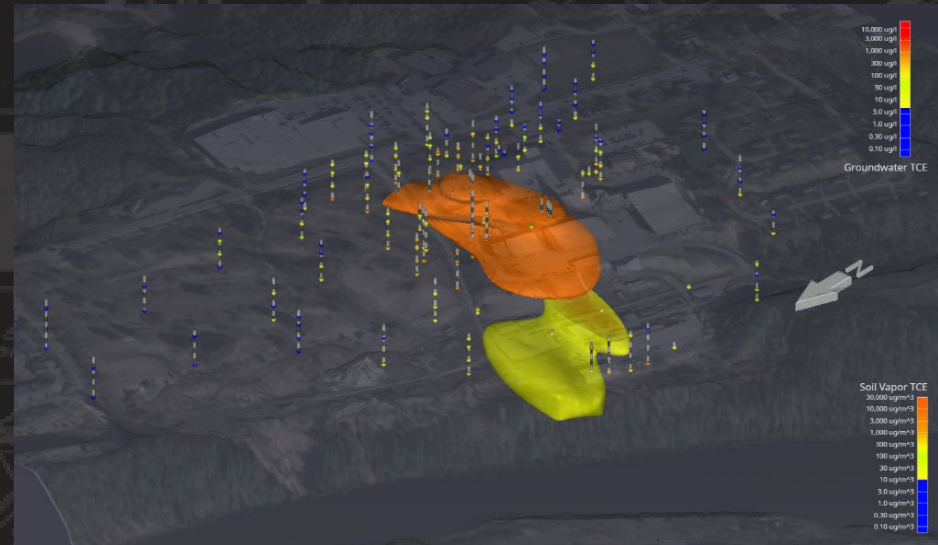
- Prepare Final RI incorporating NHDES Comments
- Submit Draft Feasibility Study after the RI is finalized for USACE Review
- Next Steps-Draft Proposed Plan and Decision Document



QUESTIONS OR COMMENTS

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