

1/17/2018

**United States Army Corps of Engineers – New England District  
Cold Regions Research and Engineering Laboratory (CRREL)  
Restoration Advisory Board**

**Minutes of Meeting #20**

**Wednesday, January 17<sup>th</sup>, 2018  
Richmond Middle School (RMS) Library  
Hanover, New Hampshire**

Attending: Jeff Pickett - Amec Foster Wheeler – [Jeffrey.Pickett@amecfw.com](mailto:Jeffrey.Pickett@amecfw.com)  
Rod Rustad - Amec Foster Wheeler – [Rod.Rustad@amecfw.com](mailto:Rod.Rustad@amecfw.com)  
Scott Calkin – Amec Foster Wheeler – [Scott.Calkin@amecfw.com](mailto:Scott.Calkin@amecfw.com)  
Darrell Moore (Chair) – USACE - [Darrell.A.Moore@usace.army.mil](mailto:Darrell.A.Moore@usace.army.mil)  
Ken Richards – (Absent) NHDES – [Kenneth.Richards@des.nh.gov](mailto:Kenneth.Richards@des.nh.gov)  
Kristine McDevitt – Community Member – [Kristinemcd@hotmail.com](mailto:Kristinemcd@hotmail.com)  
Glen Gordon - Amec Foster Wheeler – [Glen.Gordon@amecfw.com](mailto:Glen.Gordon@amecfw.com)  
Chief Martin McMillan – Hanover Fire Dept. [Martin.McMillan@hanovernh.org](mailto:Martin.McMillan@hanovernh.org)  
Julia Griffin Hanover Town Manager- [Julia.griffin@hanovernh.org](mailto:Julia.griffin@hanovernh.org)  
Jay Badams – Superintendent SAU 70 – [jaybadams@sau70.org](mailto:jaybadams@sau70.org)  
Tony Daigle – SAU 70 – [anthonydaigle@sau70.org](mailto:anthonydaigle@sau70.org)  
Tim McNamara (Chair)- Dartmouth College–  
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Observing: Jack Besse - Amec Foster Wheeler – [Jack.Besse@amecfw.com](mailto:Jack.Besse@amecfw.com)  
Bryan Ambrust– USACR-ERDC – [Bryan.R.ambrust.civ@mail.mil](mailto:Bryan.R.ambrust.civ@mail.mil)  
Terry Harwood – CRREL– [bartlett.harwood@usace.army.mil](mailto:bartlett.harwood@usace.army.mil)  
Gary Pasternak – CRREL  
Larry Cain- USACE – [Larry.Cain@usace.army.mil](mailto:Larry.Cain@usace.army.mil)

Agenda:

- Review/Accept September 13, 2017 Meeting Minutes
- Summary of synoptic soil gas sampling conducted in October 2017, comparison to previous sample rounds
- Smoke testing the Main Laboratory
- Healthmate shutdown pilot test
- Soil vapor extraction pilot test update
- Status of Feasibility Study and Engineering Evaluation/Cost Analysis reports
- Public Comments
- Schedule next meeting and adjourn

Items comments and notes:

Darrell Moore calls the meeting to order at about 16:10.

Completed quick introductions of the personnel at the meeting.

Darrell asks about approval and acceptance of the meetings minutes so moved to accept meeting minutes accepted from September 2017 RAB meeting

Couple of new guests are present for the meeting including Dr. Jay Badams Superintendent of SAU70 and Julia Griffin Hanover Town Manager

USACE announces that the Remedial Investigation RI report for the CRREL site is out on the street for review and comments. There is relatively large community interest in the RI Report and need to maintain transparency. However as of today Jan 17, 2018 the US Army COE has not received any comments from the general public on the RI Report.

Amec Foster Wheeler (AFW) provides a quick review of the History of CRREL for various new attendees. The background discussion is led by AFW using a 3d model to review the site conceptual model, site geology and findings of the RI work completed to date at the CRREL site.

AFW personnel review the important AOCs 2/9 and 13 in the site conceptual model and provides an overview of the potential methods of release of primarily TCE to the environment at CRREL including soil, groundwater and air.

The AOC 9 release was believed to be approximately 5 to 6 thousand gallons of TCE and was lost to the surrounding soils immediately west of the main lab building, the storm water system and CT River. TCE release at AOC 2 was from a 10,000 gallon UST that likely leaked over time from the 1960s until its removal. The TCE over time mixed with groundwater water that is being captured by the current extraction wells installed in the esker deposit which runs north to south along the western property boundary of the CRREL facility.

AFW provides an overview of the geology and hydrogeology of the site. The layers of the lacustrine (glacial lake deposits) Lake Hitchcock deposits are reviewed and the esker feature and extraction wells are discussed. It is important to note that there is up to 230 feet of overburden soils from ground surface to bedrock at the site.

Rod Rustad of AFW explains that the varved soils at the site are approximately 30 to 50 feet thick and extend from ground surface to up to 50 feet below ground surface. At the CRREL site there is a lot of

unsaturated soils 100 to 150 feet above the water table. This is not typical of most site in New England where the groundwater table may only be 10 to 20 feet below the ground surface.

There were many soil borings and various intrusive field investigation completed at CRREL over the last few years to investigate the geology and the extent of TCE at CRREL.

AFW provide a description of the two release models at the CRREL at AOC 2, slow leaks over time and AOC9 Tank rupture in 1970 and potential surface releases due to activities at the former ice well.

AFW describes why the contamination likely did not go deeper into the water table due to the thickness of the lake deposits and the ability of the lacustrine deposit to absorb the TCE preventing it from getting directly to the groundwater table. The RI findings were very consistent from boring to boring and the investigation data clearly showed decrease in concentration of TCE with increasing depth in the water table. TCE sank through the unsaturated soils and was primarily absorbed or volatilized as a vapor phase in the unsaturated soils.

There was a further discussion by the RAB members of the reason TCE exists in the unsaturated zone thick soils act like a sponge soaking up the TCE before it gets to the deep groundwater table

It was also discussed and noted that currently the extraction wells are capturing the TCE that flows from the AOCs generally westward toward the CT River.

There was a discussion about how the 3 wells in Norwich on the west side of the CT River may have been impacted and the lack of contamination in bedrock at CRREL. The TCE in the Norwich bedrock wells was likely a result of TCE flow from 1970 spill at AOC 9 to the CT river and then movement of TCE through river sediments into bedrock in VT.

AFW provided a discussion of the soil gas and how soil gas is likely impacting groundwater at the site.

AFW provides an overview the CT River and Norwich well TCE contamination with respect to the recent investigation of the CT River.

Review of the bathymetry survey near the outfall from CRREL and into the CT River indicated that there was a deep pool in the CT River north of the CRREL facility storm water outfall.

There is a thin veneer of glacial till just above bedrock along the western shore of the CT River. It has now been 47 to 48 years since the spill and what we are seeing is what is left in the deep river sediments/soils. TCE is likely hung up or held in the deep till and likely remains a continuing source of TCE to the Norwich bedrock wells.

Core borings of the bedrock on the western side of the CT river indicates that the bedrock is much more fractured on the west shore than bedrock at the facility or the eastern shore of the CT River and likely allows the transmission of TCE into the bedrock fractures which are likely connected to the Norwich Bedrock wells along route 5 due west of CRREL.

There was also a discussion of the orientation of the bedrock fractures which are likely connected to the Norwich bedrock wells.

AFW provided an overview of the relatively recent sampling of the Norwich wells. This sampling under non-stressed conditions indicated concentrations of 15ug/l which was much less than during 1990s when concentrations in the same well were detected up to and over 1000 ug/L.

The glacial tills found just above bedrock and below the alluvial river deposits were tested and were found to contain up to 970ug/kg of TCE.

AFW provided additional discussion of the River flow data from the Wilder dam in 1970. The flow data indicated there was very little flow in the area of the CT River in July 1970 when the TCE spill occurred and TCE was released to the CT River via the CRREL storm system outfall.

Further discussion of the 1970 spill and potential flow paths during that time frame.

There were 3 individual homeowner wells in Norwich VT that had potential impacts and those wells were sampled frequently in the mid to late 1990 by the state of VT as were other bedrock wells in the area. No other wells were identified as containing TCE.

More than one hour was spent on the site overview of the background.

Move on to the agenda

AFW reviewed the October soil gas sampling event the review included onsite and offsite soil gas results.

The 2012 and 2014 soil gas figures were presented and discussed.

The October 2016 soil gas sampling was completed after the SVE Pilot at AOC 2 removed about 300 gallons of TCE from the AOC 2 area.

Nov 2016 removed 450 gallons of TCE from AOC 2 starting to see some effects.

Reviewed the October 2017 soil gas figure and the effects of pilot test at AOC 2 and AOC 9 where approximately 500 gallons of TCE from AOC 2 and 80 gallons of TCE from AOC 9 were removed. The Army is continuing to monitor soil gas concentrations both at the CRREL site and at offsite locations.

Smoke testing overview at CRREL by AFW.

Objective of the smoke testing was to determine if there any piping or conduits that may allow TCE vapors get into the Main Lab at CRREL. AFW reviewed the findings of the smoke testing at CRREL.

Could you look at slip lining some of the pipelines at CRREL - suggestion by Dartmouth.

Healthmate testing during the holiday period at CRREL was discussed by AFW personnel.

AFW personnel shutdown most of the healthmate units at CRREL and tested and reviewed the results over the holiday period from Christmas to New Years.

Results indicate that the Healthmates may be able to be shut down during the winter months as we did not detect any increase in concentration of TCE in Indoor air in the Main Lab facility during the shutdown period and this is good news.

Question from the RAB is there any way to extrapolate how much TCE may remain in the ground at CRREL? AFW COE response was that there could be approximately 50% left of the total that was lost.

AFW Final slide. What will we be doing in future reporting period?

Drafting the Feasibility Study Report (FS)

Finalize the RI Report

Design of SVE System as an Interim measure. COE should have the draft FS Report available in 2018 April time frame. Likely early summer to get RAB and our public input on the FS Report.

Would be good to package the project for the public in the proposed plan phase as this phase of the project is specifically targeted for public involvement in the remedy selection process.

Important to remember that by law the Army will evaluate the no action option relative to clean up.

Christine is looking for an Open house for the community and would like to get another open house.

Roloef would like to have open house money to be spent at critical points vs lots of community outreach.

Town Manager would like to see a mailing or something out on a website for additional community relations outreach.

Community would like to see some additional updates for the community and good PR to see the Army reaching out to the community.

Meeting adjourned at 5:55 pm.