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

Minutes of Meeting #26

Wednesday, January 29th, 2020
Richmond Middle School (RMS) Library
Hanover, New Hampshire

Attending:
Scott Calkin – Wood E&IS – Scott.Clakin@woodplc.com
Rod Rustad – Wood E&IS – Rod.Rustad@woodplc.com
Darrell Moore (Chair) – USACE - Darrell.A.Moore@usace.army.mil
Robin Mongeon – NHDES – Robin.Mongeon@des.nh.gov
Roelof Versteeg Community Member - Roelof.versteeg@gmail.com
Kristine McDevitt – Community Member – Kristinemcd@hotmail.com
Terry Harwood – Cold regions Research and Engineering Lab (CRREL) Bartlett.Harwood@USACE.army.mil
Chief Martin McMillan – Hanover Fire Dept. Martin.McMillan@hanovernh.org
Muriel Robinette - Dartmouth/GZA -muriel.robinette@gza.com
Bree Carlson – Dartmouth EHS - bree.e.carlson@dartmouth.com
Jack Besse – Wood E&IS – jack.besse@woodplc.com

Observing:
Gary Pasternak – ERDC – gary.A.Pasternak@usace.army.mil
Amy Rosenstein – USACE- Amy.B.Rosenstein@USACE.army.mil
Amy Quentin -Wood E&IS, Inc. Aimy.Quintin@woodplc.com
Steven Lamb – GZA – Steven.Lamb@gza.com
Jeff Pickett – Wood E&IS – Jeffrey.Pickett@woodplc.com
Daniel Adam – Wood E&IS – Daniel Adam2 @woodplc.com

Agenda:

- **Introductions and Review September 2019 Meeting Minutes**
- **Enhanced Permeability Pilot Test**
- **Soil Vapor Extraction and Sub-Slab Depressurization Pilot Test**
- **Water Treatment Plant Update**
- **Remedial Investigation Addendum**
- **Feasibility Study Update**
- **TCE Frequently Asked Questions**
- **Question and Answer**
- **Adjourn**

Items comments and notes:

Wood personnel hand out notes from September 2019 RAB meeting

Review of the meeting minutes from September RAB 2019.

Moore motions to accept meeting minutes. There is a second. The September 15th Meeting minutes were reviewed and accepted.

General introductions of all attendees follow introductory statements by Darrell Moore.

Darrell Moore begins meeting with a general review of the meeting agenda.

Scott Calkin from Wood Environment & Infrastructure Solutions, Inc. (Wood) begins with general overview of the Enhanced Permeability work completed late fall 2019 at Cold Regions Research & Engineering Lab site (CRREL) and highlights the AOC 2 and AOC 9 enhanced permeability worksites.

Wood reviews the history of AOC 2 and AOC 9 including usage and loss of TCE at each AOC as well as a review of soil vapor extraction activities. AOC2 and AOC 9 are the 2 primary sites at CRREL and likely responsible for the TCE contamination of soil gas and groundwater at CRREL.

Wood describes the enhanced permeability work that was completes at AOC 2 and AOC 9 in late November and early December 2019

Wood provides an overview of the material that was injected into the ground at AOC2 and AOC 9. Essentially it was a mixture of water, sand, guar gum and an enzyme to promote the eventual breakdown of the guar after the mixture was pumped into the subsurface under pressure.

Wood reviews the details of the process for making and placing the enhanced injections and describes how the sand guar mixture is injected into each of 3 boreholes at each AOC location.

Wood also indicates that 3 additional shallow soil vapor points (< 50 feet bgs) were completed at each AOC after the completion of the injections. The intent is to hook these new wells up to the SVE Pilot extraction system. However due to current winter weather and snow and ice cover Wood is currently unable to initiate SVE pilot extraction and monitoring. Wood explains that we also need access to some soil vapor monitoring point which are currently covered by snow and filled with ice. Wood need to sample these vapor monitoring points when the SVE system is brought back online to monitor the effectiveness of the permeability enhancement at AOC 2 and AOC9.

Fine grained materials at AOC 2 and 9 extend from ground surface to depths of 30 to 50 feet, then fine sand with increasing permeability with increasing depth of the overburden.

A total of six injection borings, 3 at each AOC were completed, with 7 to 8 injections at each boring location. Based on the quantity of material injected, the sand guar lenses likely extend out approximately 25 feet from each boring. Not planning to determine the lateral extent of the lenses with borings and we did have a few surface breaches of the sand guar to the ground surface via existing well casing and via some previously backfilled borings.

FRx, the injection subcontractor, will be providing Wood with a report containing injection pressures and quantities of sand injected into the formation at each injection level of each boring.

Wood personnel discuss efforts to mitigate the indoor air issues at CRREL and some of the work that is being done. The sub slab depressurization system was shut down as was the Pilot SVE system to see if there were any VI issues as a result of turning these systems off and to assess the overall effectiveness of remedial activities to date.

No VI issues were noted during the shutdown period.

Wood provided and reviewed a number of slides showing results of barometric pressure vs soil gas with the Sub slab depressurization (SSDS) and SVE pilot system off.

October 17 or 18 the New England area experience a storm system that was widely described by weather personnel as a bomb cyclone. The effect of this storm system was a rapid barometric pressure drop and the measured soil gas concentrations at CRREL increased

Wood also explains some of the effects of barometric pressure on vapor sample results.

Wood reviewed a slide to show barometric pressure vs Indoor Air (IA) TCE concentrations in with the SVE and SSDS off. Graph indicates that there currently needs to be a very large barometric change to create and IA issue even with the two extraction systems off.

Question from RAB what is the period shown on the slide? For IA it was a month.

COE NAE speaks to the status of the Draft FS and the finalization of the FS after final Army Reviews.

Wood reviews summarizes the FS. There are two source areas, AOC 2 and AOC 9, and both areas have soil gas contamination. A ground water plume starts beneath each source area and extends westward to the esker and the groundwater extraction network.

The FS was structured to take care of the soil gas problem and the TCE that is partitioning into GW. The intent is to take care of the soil gas issues first then deal with the groundwater plumes from AOC 2 and AOC 9.Wood reviews a slide which shows three remedial alternatives for soil gas which are included in the FS This slide contains time frames for estimated cleanup and the cost for each soil gas alternative.

Wood next reviews a slide that shows seven alternatives that are focused on the groundwater treatment. This slide contains time frames for estimated cleanup and the cost for each groundwater cleanup alternative.

COE NAE points out that as we have gotten better information from pilots test it has allowed the project delivery team to refine and decrease the costs for the future cleanups of soil gas and groundwater.

COE NAE also explains the process for design and construction of a new water treatment plant and the ongoing 30% design for the new treatment plant. The 30% design effort is an optimization and we are currently moving ahead with the 30% design for a smaller treatment plant to deal with the current older, dated and expensive groundwater treatment plant. The Army is currently capturing the plume with the existing extraction network and treatment plant

but pulling in a lot more river water. To avoid unnecessarily treatment of river water we will be moving the extraction wells closer to the source areas at AOC 2 and AOC 9. This will allow a significant for a significant decrease in groundwater extraction rates.

Completion of the new groundwater treatment system design is expected to be completed in the next 1.5 years.

Wood is also working on the RI Addendum for the CT River. Wood reviews a slide providing a brief overview of the CT River investigation findings and the work that remains to be completed to finish the RI Addendum. The investigation detected TCE contamination at approximately 20 feet below the bottom of the CT River. The depth of contamination minimizes the potential for any receptors.

COE NAE reviews the overall CERCLA process with a slide and provides an overview of the steps that will be coming up after the RI and FS.

COE NAE indicates that a Preliminary Assessment will likely be completed by Wood to memorialize the perflourinated compound sampling and analysis that was requested by NHDES and completed by Wood.

Wood personnel indicate that most of the perflourinated compounds detects at CRREL are from wells close to the CT River. No detects occur in the wells located in the central portion of CRREL and along the eastern perimeter.

A two-page report of perflourinated compound data was provided to NHDES when COE NAE received the data.

Darrell reviews the CERCLA process.

COE NAE indicates that after a review of the FAQs that were completed in 2014. It was decided to update the CRREL FAQ pages as a lot has changed at CRREL since 2014. The updates are ongoing and will be available to CRREL employees in the very near future.

Public FAQs may also need to be reviewed. There has been no observed VI in school or residences. What is community interest in reviewing the FAQ?

Wood provide an overview of the work that will be ongoing over the next quarter. Anticipated efforts include:

- Getting the enhanced SVE pilot system up and running. May have some data for the next RAB.
- Finalize the FS report and provide an overview
- Continue working on the groundwater treatment plant design Perflourinated Compound PA report.
- Continue with indoor air monitoring at CRREL facility with Hapsite units.

There was a request or question about collecting an additional round of soil gas samples at the Rivercrest property. COE NAE indicated that there would likely be some additional soil gas

sampling on the CRREL site to monitor the SVE pilot system. COE NAE asked if there was rationale for collecting additional soil gas data. COE NEA does not want to do additional sampling for the sake of sampling there and is currently no risk identified at the Dartmouth Rivercrest Properties. Dartmouth representatives indicated that sampling was desired to support development activities.

COE NAE makes motion to adjourn and it is seconded.