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

Minutes of Meeting #14

Wednesday, March 16, 2016
Richmond Middle School (RMS) Library

Attending: Darrell Moore, USACE-NAE, Co-Chair
Kristine McDermott, Citizen Volunteer Absent
Jonathan Brush, Dresden School Dist.
Roelof Versteeg, Citizen Volunteer
Katherine Connolly, Town of Hanover
Tim McNamara, Dartmouth College, Co-Chair
Martin McMillan, Hanover Fire Chief
Ken Richards, NHDES
Scott Calkin, Amec Foster Wheeler
Rod Rustad, Amec Foster Wheeler
Glen Gordon, Amec Foster Wheeler

Observing: Terry Harwood, ERDC
Keith Hoddinot, USACE
Jeff Pickett, Amec Foster Wheeler
Bryan Ambrust, ERDC-CRREL
Andrea Clark, Army Public Health
Larry Cain, USACE-NAE
Gary Pasternak, ERDC
Nick Castongay, CDM Smith

Agenda:

1) Introductions
2) Meeting Minutes from December 2, 2015 Meeting
3) Event 12 Indoor Air Results
4) Soil Gas Impacts to Groundwater
5) Connecticut River Bathymetry/Side Scan
6) Upcoming Work
7) Comments from the Public
8) Schedule next meeting
9) Adjourn

1) Introductions and sign in for the RAB members and attendees.

2) Review and acceptance of the meeting minutes of December 2, 2015.

3) Discussion of Event 12 IA sampling results was provided by Mr. Darrell Moore of COE NAE see power point presentation slides and notes that follow summarizing the discussion.

   a) Generally results in the indoor air Concentrations were not above 8.8 action level at various Buildings at CRREL. The Frost Effect Facility (FERF) results were at 19 $\mu g/m^3$

which is above the 8.8 action level. Indoor Air (IA) at all other buildings at CRREL ranged from 0.17 to 5.4 µg/m^3

b) Discussion of the 8.8 level vs Hazard Quotients (HQ). Actions by the COE and PDT are taken on the HQs 1 to 2 HQ such as additional investigation and more IA measurements. More immediate and more significant actions are taken when HQ of 3is encountered. These actions typically involve moving people and finding methods to reduce the HQ.

c) FERF concentrations at 19 µg/m3 is causing the COE NAE and PDT to take some additional samples and do some additional investigation. We will also likely be investigating and looking for potential indoor air point sources. FERF concentrations may not necessarily be a vapor intrusion (VI) issue at the FERF. We may do some additional sub slab sampling at the FERF in the future as well.

4) Darrell reviews the figures showing the results of the event 12 IA and SS data results for CRREL.

5) Rod Rustad now begins a discussion of the soil gas sampling events conducted in the fall of 2015. This event was a synoptic event essentially a single comprehensive sampling event of 200 plus soil gas points at 83 separate locations at and around the CRREL facility.

a) Rod provides a detailed discussion of the soil gas hotspots in particular AOC 2 and AOC 9 and a comparison of 2011 to 2014 sampling results vs fall/ October 2015 synoptic results.

b) Rod explains how the pilot SVE system is likely affecting the soil gas results and how the SVE pilot has pulled out over 200 gallons of TCE form AOC

c) Rod provides a discussion of the comparison of the pre 2014 soil gas data to the October 2015 soil gas data and affects that we are seeing as a result of the operation of the Pilot SVE system.

d) There is a group discussion of low concentrations seen in Oct data at Rivercrest and Dartmouth housing in 2015 sampling events vs previous sampling of the same points and how barometric pressures can affect and dilute soil gas concentrations.

e) Rod explains the that the Oct 2015 sampling event was collect during a decreasing barometric pressure events and the bags were inflated by the sampling points as the samples were collected.

f) Rod further explains that barometric pressure does not change the concentration of the TCE in the subsurface however it can affect or sampling results. Barometric pressure does seem to affect sampling results based on the data we have seen.

g) Question from RAB member. Do we (Amec or the COE NAE) know how much TCE was lost at AOC 2 and 9? Do we have estimates that there could have been losses of several thousands of gallons of TCE in the AOC 2 and AOC 9 areas? COE NAE indicates that there was a loss up to 6,000 gallons from the July UST event at AOC 9.

h) Soil gas data for the period 2010 to 2014 consists of a number of sampling events and the data is from numerous iterative soil gas sampling events. Important point is that soil gas event in October 2015 was post 4 months of SVE operation.

i) Rod provides a discussion of diffusion and advection discussion and how the processes are different. Diffusion is process of chemical moving from high to low concentration vs advection which is drive by an outside factor like pulling air out of the ground with a blower.

j) Brief discussion of the boundary Pilot study area and why it might not be good idea to install a treatment system in this area. Could pull TCE from AOC 2 to the boundary.

k) Pilot study is likely not to be the final remedy. D. Moore explains that we need to do a Feasibility Study to come up with the final remedy that will be open to discussion and comment by the RAB and public.

6) Glen Gordon goes through discussion of the SVE pilot operation and monitoring. We have had about 6 months of operation through mid December 2015 then shut down for 30 days to look at rebound. After 30 days of shutdown restarted system in mid Jan. Now currently through end of Feb have over 8 months of operation of the SVE system.

a) Glen explains that we are collecting data from the pilot system to determine how well the system can control the diffusion / migration of TCE. We are also gather information to allow us to scale the system up and get information to design a larger more complete system. Scaled up system would still be an interim measure vs the final measure. Looking at scale up in AOC 2 and AOC 9 areas in 2017. With one SVE well (deep) operation may be reaching out 250 feet away from the extraction wells,

b) Review the pictures of TCE product removed Clean Harbors pick up of the system condensate for recycling.

c) Glen lead a discussion of the Praxis Pneulog system and how the system is used to measure vertical foot by foot profile of where the air flow is coming from in the various wells measured and what the relative concentrations TCE coming into the wells for the soil formations. Provided and overview of the graphs from pneulog that show orders of magnitude decreasing in TCE concentrations previous to operating the SVE system then after shutdown of the system in mid December 2015. Profiles were from the SVE extraction wells and another SVE well west of AOC 2. The profiles are comparisons after 6 months of SVE operation.

d) Question for the RAB. Can you use or inject air for makeup air or could we use passive wells to allow air to be drawn into the formation. Glenn answers yes, however that would add some complexity and require additional engineering controls, however we have not currently looked at these scenarios. Question from the RAB. Could vent or make up air wells vent to the air if the system went down. Yes they could but valves could be used to seal off the makeup air wells.

e) Question from the RAB. Have we seen a decrease in the ambient air concentrations since we started the SVE Pilot system? We would need very calm conditions to measure ambient air conditions. Very difficult to get consistent ambient results.

f) When we 1st turned on the system we were getting 4000 mg/kg now we are getting about 300 mg/kg

g) Rod pulls up site picture showing the source areas of TCE and soil in relation to the groundwater plumes and provide overview of the relationship of soil gas to concentrations pre and post SVE operation. Discussion of the groundwater data collection from MW114-07 and the decreasing concentrations at MW114-07. Important point is that NAPL likely did not make it to the groundwater and that soil gas may be a primary contributing factor to why the groundwater is contaminated.

h) Question/input from RAB. So this mean that we are not likely looking at a dense non aqueous phase liquid (DNAPL) layer sitting deep in the Groundwater say on top of bedrock. Yes that is probably correct assumption based on all data we have seen. Discussion of the results from CECRL08 and the increasing concentrations at CECRL08. Reason is that we may be moving / mobilizing more highly contaminated vapor from AOC 9 to AOC 2. There was also a brief discussion of the stratigraphic vapor layers and the geologic contacts.

7) Scott leads a discussion of Bathymetry and Hydrographic data collection to date in the CT River west of the CRREL facility. Scott shows the slide of the bottom depths of the CT River west of the CRREL facility. Scott indicates there will be additional sub bottom profiling in the river this spring to determine presence and thickness of river bottom sediments. The sample locations shown on the current figure are very draft and will need to refine the program based on the results of the sub bottom profiling and review of the high and low points in the river.

a) Scott also indicates that we did do some side scan sonar of the river bottom. Scott provides a few examples of the side scan sonar data and what it shows for features such as logs and possible outcrop of bedrock in the river bottom.

b) Scott reemphasizes the current sample locations are tentative and will be discussed with NHDES in future meetings and calls with NHDES.

8) VT bedrock well data discussion with Darrell Moore leading the discussion.

a) NHDES adds that the VT well work will be a bit of a challenge as NHDES will be asking what concentrations will be seen when the wells are being pumped. This will be an interesting situation as VTDEC will be engaged in how to handle the well situation in VT. However NHDES feels and it is NHDES perspective that the Army needs to do enough work in the field to try and figure out where the TCE in VT wells came from.

b) Rod provide a very quick review of the geology and hydrogeology of the site in VT.

9) Wrap up now 5:45 Review of upcoming events.

a) RI July 2016

b) SVE Pilot study report May 2016

c) EE/CA and Design of the SVE

d) River sub bottom profiling end of this month

The COE NAE believes work is moving forward in a positive way.

COE NAE indicates there was a meeting with VTDEC and NHDES last week and previous months.

Kathleen Connolly announces that she is resigning from the RAB and introduces Martin MacMillan as her successor. RAB thanks Kathleen for her service and in turn she compliments the project on their technical execution of the work. RAB welcomes Martin.

Next RAB to be likely early June.

June 8th may be next RAB Meeting need to avoid Graduation days.

Moved to adjourn at 1800 hours motion made and accepted.