From:	Gielniewski, Margaret
To:	Paulson.Robert
Cc:	DuFresne, Kristin I - DNR; Killian, James - DNR; Bougie, Cheryl - DNR; Fitzpatrick, William - DNR; Kincaid, Gary W - DNR; Jennifer Knoepfle
Subject:	RE: Tests to Evaluate DNAPL Mobility
Date:	Wednesday, September 27, 2017 11:03:27 AM
Attachments:	image001.png image002.png

Hi Bob,

Please include the following for the tests:

1) Full core photos (natural and UV light) photos should be provided to demonstrate that max saturation intervals were selected.
2) Cross sections should be developed using the cores – it provides a context for where the samples were collected and provides confirmation of core depth control.
3) Conventional horizontal and vertical directional permeability testing to give a hydraulic context and grain size analyses for stratigraphic context; relatively low cost and will give indications of the permeability zones that have transported the NAPL..

As to determining how much is too much—that is a question that deserves a little more consideration—to be informed through additional information.

I am working on an agenda for the meeting next week. I hope it have it out by Friday.

Best regards,
Margaret

From: Paulson.Robert [mailto:Robert.Paulson@we-energies.com]
Sent: Monday, September 25, 2017 11:46 AM
To: Gielniewski, Margaret <gielniewski.margaret@epa.gov>
Cc: 'DuFresne, Kristin I - DNR' <Kristin.DuFresne@wisconsin.gov>; 'James - DNR Killian (James.Killian@wisconsin.gov)' <James.Killian@wisconsin.gov>; 'Cheryl - DNR Bougie (Cheryl.Bougie@wisconsin.gov)' <Cheryl.Bougie@wisconsin.gov>; 'Bill Fitzpatrick (william.fitzpatrick@wi.gov)' <william.fitzpatrick@wi.gov>; 'Gary KIncaid' <kincag@dnr.state.wi.us>; Bartoszek.Brian F <BFBartoszek@integrysgroup.com>; Adler, Kevin <adler.kevin@epa.gov>
Subject: RE: tests you would run to evaluate DNAPL mobility

Thanks Margaret. We plan on doing the mobility tests exactly like we did for the South Branch of the Chicago River.

That being said, the question to answer first is how much is too much?

Bob

-----Original Message-----

From: Gielniewski, Margaret [gielniewski.margaret@epa.gov]
Sent: Monday, September 25, 2017 10:02 AM Central Standard Time
To: Paulson.Robert
Cc: DuFresne, Kristin I - DNR; James - DNR Killian (James.Killian@wisconsin.gov); Cheryl - DNR Bougie (Cheryl.Bougie@wisconsin.gov); Bill Fitzpatrick (william.fitzpatrick@wi.gov); Gary KIncaid; Bartoszek.Brian F; Adler, Kevin
Subject: FW: tests you would run to evaluate DNAPL mobility

Hello Bob,

CH2M provided some feedback on suggested tests to determine potential NAPL mobility (see below).

There are 2 labs that can do the analysis. This analysis has already been done for the South Branch of the Chicago River at the PTS lab in Houston mentioned below. If you elect to use that lab again, attached are the comments we had previously provided on how to collect/transport the cores, how the lab was instructed to perform the tests, and how the results were presented.

The calculation for ebullition potential sounds pretty easy/cheap, so let's do that as well. Since we don't have Laser-Induced Flouresence (LIF) data for the project, ignore that part of the email below.

Happy to get one of our experts on a call with folks; let me know and I'll organize something.

Best regards,
Margaret

From: Finney, David/BOS
Sent: Friday, September 22, 2017 9:30 AM
To: Bayer, Regina/MKE <Regina.Bayer@CH2M.com>
Cc: Gentry, Jeff/PDX <Jeff.Gentry@CH2M.com>; Knoepfle, Jennifer/CHC <Jennifer.Knoepfle@ch2m.com>
Subject: RE: tests you would run to evaluate DNAPL mobility

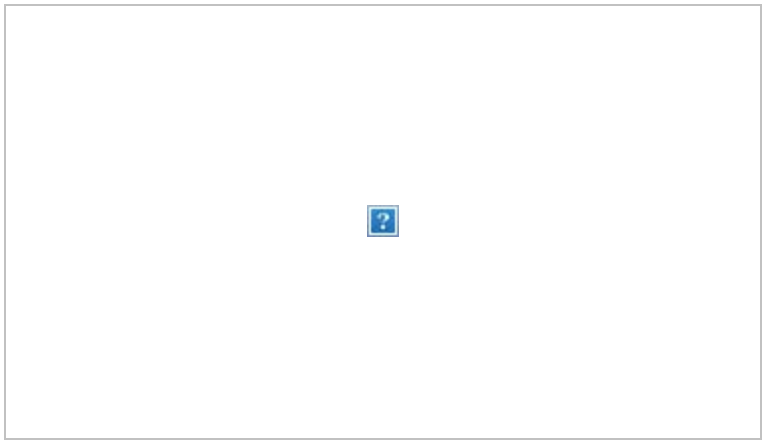
Hi Gina,
If it's seepage of the NAPL that is in question (movement driven by NAPL heads), then for an assessment of potential mobility you would want to collect several in-tact macrocores (in steel/metal sleeves) that you can flash freeze on site with dry-ice. These should span the intervals of interest (e.g. sand stringers within glacial till) and should cover any variability in lithology associated with the NAPL-bearing zones at the site. Normally we drill a sample for visual confirmation before advancing the steel sleeved sampler that will be sent to the lab, so we know we've got an interval of interest.

There are a couple of ways to process these cores, one of which CH2M has developed, which as you would guess is probably what we'd recommend. Someone at CH would work with Test America (former ASL) to complete the lab work. The CH method involves cutting the cores horizontally and

examining x-sections at various depths, and testing full segments ('pucks') of the core. The other method involves cutting the core vertically and subsampling at various points. This method is performed by PTS out of Houston. Below is what I'd recommend. Although this can be performed at either lab, I've put a little detail in on the CH method associated with the mobility tests by water-drive.

Analysis of your cores [suggest several locations across impacted area(s)] to determine NAPL mobility potential as a result of seepage would be as follows:

- Core photography with UV and visible light
- Pore Fluid Saturations (PFS) – Using Dean-Stark API (1998), Sec 4.3 - this would be performed at a number of depths at core segments (thawed) based on core photography results. Not sure of the length of your interval of interest so perhaps assume 3-5 per core
- Grain-size – performed at the locations where PFS is performed
- NAPL Mobility by water drive – This test process is generally performed on those intervals associated with the highest measured PFS. A diagram of how CH performs the method is shown below. Again, I'm not sure of the extent of the issue, so perhaps assume 1 of these per core (highest PFS).



- If there are any existing LIF data sets for the site (upland or otherwise) you may also consider having portions of the core scanned using the same LIF technology (we work with Dakota Technologies to accomplish this). This could allow for a correlation of PFS to existing LIF response data.

If ebullition is a "mobility" concern for NAPL (sheening has been confirmed) that's been expressed, there are a few ways to evaluate the potential for this. One simple approach we've proposed on a site in WA is just to collect COD and TOC data to estimate the limiting methanogenic substrate portion of any organic matter (S_{labile}) and use it to calculate the molar flux of gases (GF_m) using:

Where T = sediment temperature (Viana, 2010)

Based on your email it sounds like potential NAPL seepage is the issue. If that's the case then what you need to consider is what I've bulleted out above.

Let me know if you have any questions or need any additional information.

Thanks,
Dave

From: Bayer, Regina/MKE
Sent: Thursday, September 21, 2017 1:56 PM
To: Finney, David/BOS <David.Finney@CH2M.com>
Cc: Gentry, Jeff/PDX <Jeff.Gentry@CH2M.com>; Knoepfle, Jennifer/CHC <Jennifer.Knoepfle@ch2m.com>
Subject: tests you would run to evaluate DNAPL mobility

Hi Dave,

Jeff Gentry sent me to you (he is practicing delegating). Jennifer and I are supporting EPA with oversight of several MGP sites in Wisconsin. One of the sites is in Green Bay, where a former MGP facility is located along the shores of were the East River joins the Lower Fox River. There is NAPL both within the banks of the shoreline at an elevation that matches up with detects of NAPL within the river sediment, and both buried NAPL within sand seams of the glacial till river bottom, within the soft sediment, and in some cases soft sediment and first 6 inches or more into glacial till (clay). The PRP plans to dredge all the soft sediment. The question they can not answer regards whether the DNAPL in the shoreline, and within the sand seams of glacial till is mobile, or will be mobile after the soft sediment is removed. They have agreed to do some mobility testing, but are asking the Agencies what that testing should be.

Jeff is looking for a basic flow chart, but do you have some basic suggestions? I think I can handle pinpointing where they should collect the samples; need help in the tests that should be run.

Do you need more info?

PN = 421789.FI.WG.01

Thanks so much,
Gina

Gina Bayer
Program Manager
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