Schmenk, Colin R - DNR

From: Paulson, Robert <Robert.Paulson@we-energies.com>
Sent: Monday, October 30, 2017 3:46 PM
To: 'Gielniewski, Margaret'; Heath, Bryan
Cc: Kincaid, Gary W - DNR; Bartoszek, Brian F; Fassbender, Judy L - DNR; Adler, Kevin; DuFresne, Kristin I - DNR; Fitzpatrick, William - DNR; Killian, James - DNR
Subject: RE: Cancel NAPL mobility core collection next week.
Attachments: Table 1.xlsx; Figure 1_Site Location Map.pdf; Figure 3_Selected Borings for Mobility Sampling.pdf; NAPL Sample Analysis Plan.docx; Figure 2_Previous NAPL Investigations.pdf

Margaret,

As you have seen in the response from Bryan Heath, it is our belief that indeed the NAPL mobility testing is the critical path. Below are my observations from prior discussions regarding the NAPL mobility testing and our path forward. If you believe that I have taken any of this out of context please let me know and I would be more than happy to discuss with you.

1) At the 9/19/2017 meeting the Agencies concluded that NAPL mobility testing would be necessary if NAPL were proposed to be left in the sediments.
    a. During the meeting the Agencies indicated the testing should be that which was completed for the South Branch of the Chicago River.
    b. Your email of 9/20/2017 states: "*Then, EPA needs conclusive data showing that sub-surficial clay NAPL is not mobile or soluble to be able to justify leaving NAPL below the surficial clay layer*."
2) In your 9/25/2017 email you provided "some feedback on suggested tests to determine potential NAPL mobility" and again referenced identical testing we conducted for the South Branch of the Chicago River. The email also provided comments that CH2M had prepared for the RPM of the South Branch as well as recommendations on conducting the tests, which in fact were consistent with the testing we conducted on the South Branch including the exact same laboratory.
3) My 9/25/2017 response stated: "*We plan on doing the mobility tests exactly like we did for the South Branch of the Chicago River."*
4) In your 9/27/2017 email you provided 3 items to include in the testing, which we have.
5) During the 10/3/2017 I reiterated our intent to conduct the NAPL mobility testing consistent with the South Branch and incorporating the other comments received. Your meeting minutes state:
    a. "WPSC and Tt to inform EPA and DNR of proposed sample locations and sampling dates.
        i. Sampling will begin within the next two weeks.
        ii. Sample locations to be identified for North and South Focus Areas.
    b. NAPL mobility testing sampling and analysis approach to be consistent with the South Branch of the Chicago River, with a focus on best management practices outlined in the attached NAPL Mobility Assessment Memo, and following Electric Power and Research Institute's (EPRI's) Generic Work Plan (citation included in attached memo).
        i. Identification and sampling of areas that represent a range of DNAPL pore saturations to have a more complete mobility assessment.
            1. In North Focus Area evaluate soft sediment and clay.
            2. In South Focus Area evaluate DNAPL in clay and river bank/near shore sediment."
    c. "Re: non-clay sample mobility
        i. Take into account fissures for core seams bounded by clay.
        ii. Bank and soft sediment (ebullition potential)."
6) Then prior to the 10/17/2017 conference call we provided a list of potential core locations that would provide a range of NAPL pore fluid saturations in both soft sediment, clay and upland. We provided the revised 3D model

as a tool to help select the core locations in addition to the drawings and cross sections that were provided immediately following the 9/19/2017 meeting. Note that the drawings and cross sections were the same ones that I provided you back on July 28, 2017 along with a preliminary 3D model.

7) I posted to both WDNR's RR website and NRT's sharefile a copy of the South Branch NAPL mobility study in order for those that may not have been familiar with the evaluation we proposed to intended to conduct. Also posted with the meeting invite was an EPRI document on DNAPL mobility in sediments.

All that being said; we are a little surprised with the Agency's conclusion that it was unclear how this evaluation would be conducted. Indeed there was a last minute change in the drill rig that, we do not believe, should have been a concern recognizing the scheduled rig and crew also conducted a significant portion of the initial DNAPL delineation coring (in fact the same one that came across the pressurized gas pockets). We have quickly pulled together the attached draft SAP in hopes that our discussion on Tuesday (10/31) can result in proceeding with the core collection beginning the week of 11/13.

If you have any questions feel free to contact me to discuss otherwise I look forward to our call on Tuesday.

Best Regards,

Bob

Best Regards,

Bob

From: Gielniewski, Margaret [mailto:gielniewski.margaret@epa.gov]
Sent: Friday, October 27, 2017 3:50 PM
To: Heath, Bryan
Cc: Kincaid, Gary W - DNR; Paulson, Robert; Bartoszek, Brian F; Fassbender, Judy L - DNR; Adler, Kevin; DuFresne, Kristin I - DNR; Bill Fitzpatrick (william.fitzpatrick@wi.gov); James - DNR Killian (James.Killian@wisconsin.gov)
Subject: RE: Cancel NAPL mobility core collection next week.

Bryan,

You can discuss your proposal on Tuesday during our scheduled meeting time.

Best regards,
Margaret

From: Heath, Bryan [mailto:Bryan.Heath@ncr.com]
Sent: Friday, October 27, 2017 3:33 PM
To: Gielniewski, Margaret <gielniewski.margaret@epa.gov>
Cc: Kincaid, Gary W - DNR <Gary.Kincaid@wisconsin.gov>; Paulson, Robert <Robert.Paulson@we-energies.com>; Bartoszek, Brian F <BFBartoszek@integrysgroup.com>
Subject: FW: Cancel NAPL mobility core collection next week.

Hi Margaret,

I wanted to see if you would have time to discuss the schedule for collecting cores for the mobility analysis with WPS and myself as we contend that the NAPL mobility information you seek is the critical path to completing the MGP

remediation in 2018. There are many tasks that need to be completed in order to implement the remedy in the north and south focus areas. These include preparation and approval of remedial designs and a turbidity containment system design, and contracting and procurement of materials. We currently estimate that these tasks will take about 8 months. That means that, in order to complete the work in the two focus areas in 2018, we will need to begin the design work in January 2018. One of the key data needs for both the remedial design and the turbidity containment system design is understanding the mobility of the DNAPL that may be left in place. This information will help inform the cap and turbidity containment designs in both focus areas.

As I understand it, the mobility analyses can take 6-8 weeks to complete. That means that, if we do not collect the mobility cores in November, we will risk not completing the designs in time to do the remedial work in 2018. Doing the remedial work in 2018 is critical if we are to take advantage of the opportunity to remove MGP-related material during the Fox River PCB project. The Fox River project is already behind a consent-decree-mandated deadline; as a result, if we are unable to address the two focus areas in 2018, we may have to forgo the opportunity to address MGP material and plan, instead, to dredge to the PCB action level and apply a temporary cover to protect the areas until a later remedial action for the MGP material. We would be disappointed to miss that opportunity.

I understand that the driller has availability the week of November 13 to collect cores. Perhaps we could talk in the next day or two, and then have a workgroup meeting next week to focus on the mobility cores. This may be a more efficient way to get you the information you need for approval, rather than assembling a formal SAP.

If you could let me know your availability, I would appreciate it. Please also feel free to call me at 678-808-6061.

Regards, Bryan

Bryan Heath
Manager, EHS
Law Department
678-808-6061
bryan.heath@ncr.com | www.ncr.com

From: Paulson, Robert [mailto:Robert.Paulson@we-energies.com]
Sent: Friday, October 20, 2017 3:58 PM
To: Bartoszek, Brian F <BFBartoszek@integrysgroup.com>; Coleman, Bill (Bill.Coleman@tetratech.com) <Bill.Coleman@tetratech.com>; Lysne, Bjorn <Bjorn.Lysne@tetratech.com>; Jennifer Hagen <Jennifer.Hagen@obg.com>; Eric Hritsuk <Eric.Hritsuk@obg.com>; Heath, Bryan <Bryan.Heath@ncr.com>
Subject: Cancel NAPL mobility core collection next week.

FYI. NO GO ON MONDAY.

Bob

From: Gielniewski, Margaret [mailto:gielniewski.margaret@epa.gov]
Sent: Friday, October 20, 2017 2:54 PM
To: Paulson, Robert
Cc: Adler, Kevin; Bartoszek, Brian F
Subject: FW: Green Bay - NAPL Mobility Testing Location Substitutions/Review and Meeting Notes

Hello Bob,

EPA and DNR want WPSC to hold off on the NAPL testing until a proper SAP is prepared*, reviewed, and comments are resolved. The proposed NAPL work **is not** time critical**. The sampling can be done later in 2017 or early in 2018 to guide the development of the final dredge cutlines for the fall of 2018 dredging. Once a SAP is prepared, adequate time should be allotted for Agency review.

Earlier this week, the EPA and DNR were asked to review a WPSC proposal for sampling. Late Monday, the proposal for sampling for NAPL mobility testing was sent out. The proposal was 4 paragraphs contained in an Outlook meeting invite where the 3D model and the Tetra Tech cross sections were referenced as the info WPSC relied upon for selecting the core locations. WPSC indicated they wanted to start sampling Thursday because they located a different sampling rig (and different drill type) with availability. Upon evaluation of the information provided for review, even with the request to hold off sampling from Thursday to Monday, EPA and DNR do not have adequate information to **clearly** document the scope of the proposed investigation, the collection and analysis methods, or the intended use of the collected information. Although the information may in fact be available to represent that required for the SAP, it is spread out in dozens of emails and attachments with partial reference to work performed elsewhere and references to comments from CH2M. The sampling methods were switched out in just the last week without any evaluation of the effects of the change.

The proposed study is intended to evaluate if NAPL can be left behind and still have a protective remedy. We are receptive to this idea if a case can be made that limited removal is protective. The proposed NAPL mobility study is intended to inform that decision. We have concerns that could readily be addressed in a complete SAP. These include information that clearly identifies the work that is proposed, the field and lab methods, and how the data will be interpreted. The lab analysis methods and information about how and where the testing will be completed should also be included. The SAP should make the case for the sample locations and provide the supporting info (core logs, cross sections, chemistry data, etc.). Finally, the SAP should provide criteria for decisions and justification based on supporting info. If this information has been provided, it cannot be readily identified and/or easily referenced back to a source document.

No sediment removal work is proposed until the end of the construction season next year. A SAP of acceptable quality is required to support Agency decision making prior to providing concurrence. The mix of pieces that are currently in house for review in lieu of a SAP are not sufficient to meet the needs of the project and sampling should not begin on October 23.

Please keep me apprised of when a complete, site-specific SAP will be available.

Best regards,

Margaret

*Copy and paste elements from your existing work plans to make ONE cohesive, site-specific document. EPA and DNR do not want to assume what you want us to glean from pre-existing documents, or to make assumptions about the rest of the information that is not provided.

**This is not an Emergency Response; therefore, EPA needs proper documentation for decision-making BEFORE work commences. We all certainly want to see the work get underway (and completed in Fall 2018), and will continue to prioritize and expedite Green Bay-related work.

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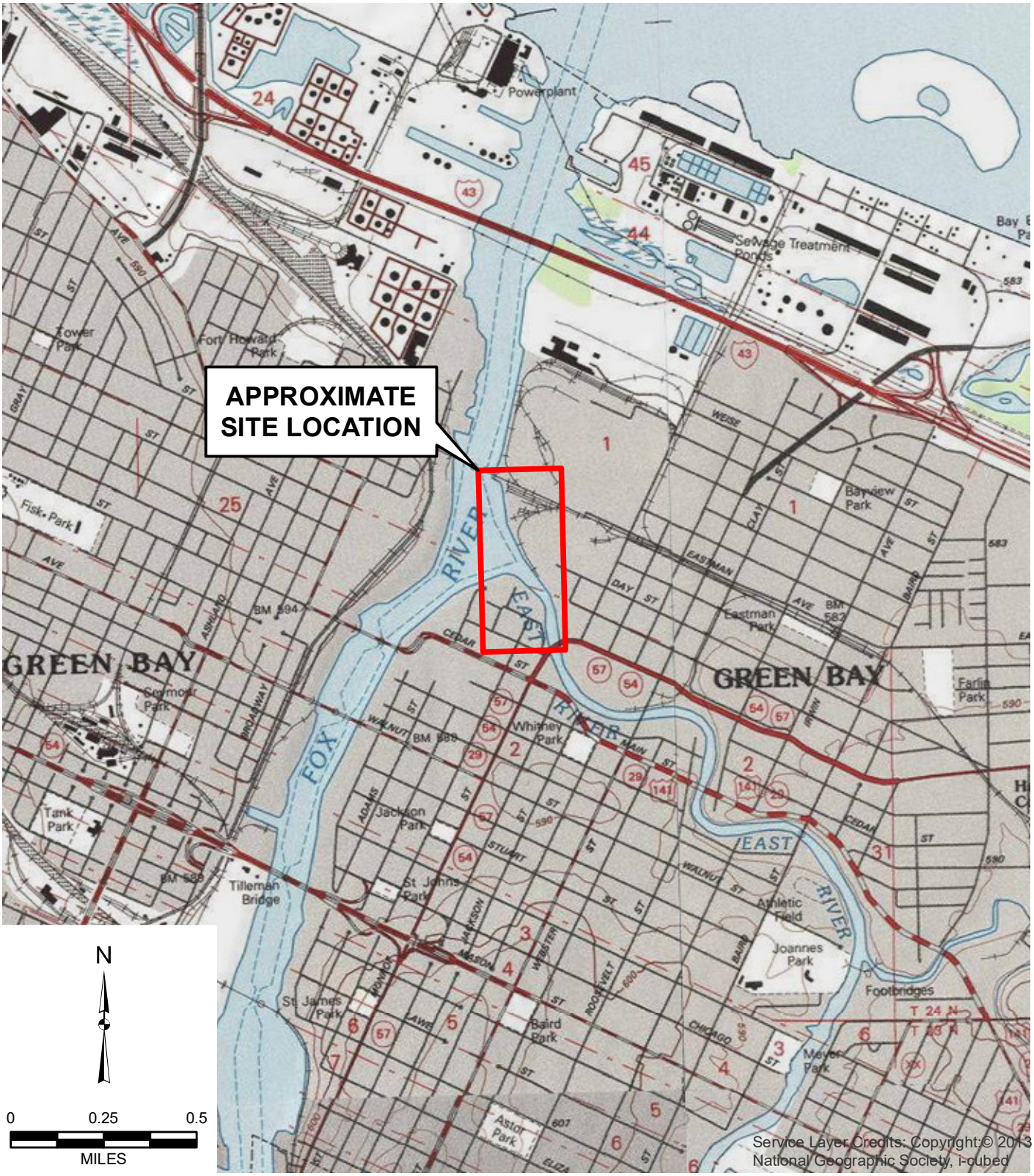
Table 1 - Selected Borings for Mobility Sampling
NAPL Mobility Sampling Technical Memorandum
Former Green Bay MPG, Green Bay, Wisconsin
Wisconsin Public Service Company

Boring	Northing	Easting	Sediment Surface Elevation	Top of Interval (ft btos)	Bottom of Interval (ft btos)	Top of Clay Surface	Thickness (ft)	NAPL	USCS Symbol
North Area									
N-AB3	257164.112	2487881.256	570.77	10.3	12		1.7	YES	SM
N-AB3	257164.112	2487881.256	570.77	13	15.7		2.7	YES	ML
N-AB3	257164.112	2487881.256	570.77	17	19.6		2.6	YES	ML
N-AB3	257164.112	2487881.256	570.77	19.6	20.6	YES	1	YES	CH
N-AH1	257078.1	2487974.66	572.47	10	10.5		0.5	YES	ML
N-AH1	257078.1	2487974.66	572.47	11.5	11.6		0.1	YES	ML
N-AH1	257078.1	2487974.66	572.47	15	16		1	YES	ML
N-H3	257492.245	2487686.135	563.85	13	14		1	YES	CL-ML
N-H3	257492.245	2487686.135	563.85	17.5	19		1.5	YES	CL
N-J2	257469.261	2487722.904	561.98	6	6.5		0.5	YES	SM
N-J2	257469.261	2487722.904	561.98	6.8	7.5		0.7	YES	ML
N-J2	257469.261	2487722.904	561.98	8.5	8.8		0.3	YES	ML
N-J2	257469.261	2487722.904	561.98	11.5	12.3		0.8	YES	CL
N-J2	257469.261	2487722.904	561.98	12.8	13		0.2	YES	CL
N-K4	257430.878	2487696.247	565.251	8.4	9.1		0.7	YES	ML
N-K4	257430.878	2487696.247	565.251	10	10.8		0.8	YES	CL
N-K4	257430.878	2487696.247	565.251	10.8	12.1	YES	1.3	YES	CH
N-K4	257430.878	2487696.247	565.251	15	15.2		0.2	YES	CH
N-N3	257388.87	2487746.958	565.35	10	12.4		2.4	YES	ML
N-N3	257388.87	2487746.958	565.35	12.4	13.2		0.8	YES	SM
N-N3	257388.87	2487746.958	565.35	13.2	14.2		1	YES	ML
N-N3	257388.87	2487746.958	565.35	17.5	21.5		4	YES	CL
N-P2	257362.18	2487782.6	565.75	8.1	9.6		1.5	YES	OL
N-P2	257362.18	2487782.6	565.75	13.6	14		0.4	YES	OL
N-P2	257362.18	2487782.6	565.75	17	17.1		0.1	YES	WOOD
N-P2	257362.18	2487782.6	565.75	17.1	21	YES	3.9	YES	CH

Boring	Northing	Easting	Sediment Surface Elevation	Top of Interval (ft btos)	Bottom of Interval (ft btos)	Top of Clay Surface	Thickness (ft)	NAPL	USCS Symbol
North Area									
N-Y1	257220.894	2487894.028	568.8	5	6.7		1.7	YES	ML
N-Y1	257220.894	2487894.028	568.8	6.7	8.9		2.2	YES	ML
N-Y1	257220.894	2487894.028	568.8	10	10.6		0.6	YES	ML
N-Y1	257220.894	2487894.028	568.8	10.6	12.2		1.6	YES	ML
N-Y1	257220.894	2487894.028	568.8	12.2	13.2		1	YES	ML
N-Y1	257220.894	2487894.028	568.8	17.2	19.6	YES	2.4	YES	CL
N-Y1	257220.894	2487894.028	568.8	21.6	22		0.4	YES	CH
South Area									
S-D6	256744.435	2488106.954	567.739	0	0.5		0.5	YES	OL
S-D6	256744.435	2488106.954	567.739	0.5	1		0.5	YES	CL-ML
S-D6	256744.435	2488106.954	567.739	1	2.1	YES	1.1	YES	CL
S-E2	256669.598	2488064.627	574.608	0.4	1.7		1.3	YES	ML
S-E2	256669.598	2488064.627	574.608	5	7		2	YES	SP-SM
S-F2	256652.954	2488076.799	574.831	0	1		1	YES	OL
S-F2	256652.954	2488076.799	574.831	5	7.5		2.5	YES	ML
S-F6	256716.663	2488133.791	567.781	0	1.7		1.7	YES	OL
S-F6	256716.663	2488133.791	567.781	1.7	2.8	YES	1.1	YES	CL
S-I2	256618.06	2488123.321	573.759	0	4.4		4.4	YES	OL
S-I2	256618.06	2488123.321	573.759	8.4	9		0.6	YES	SW
S-I2	256618.06	2488123.321	573.759	10	10.2		0.2	YES	SW
S-I5	256662.89	2488164.164	567.92	0	0.9		0.9	YES	OL
S-I5	256662.89	2488164.164	567.92	0.9	1.8		0.9	YES	CL
S-I5	256662.89	2488164.164	567.92	2	5.9	YES	3.9	YES	CH
S-K5	256630.778	2488191.06	572.737	0.5	0.6		0.1	YES	OL
S-K5	256630.778	2488191.06	572.737	0.9	1.4		0.5	YES	OL
S-K5	256630.778	2488191.06	572.737	1.4	1.5	YES	0.1	YES	CH
S-N4	256569.218	2488219.379	568.53	0.9	1		0.1	YES	SW
S-N4	256569.218	2488219.379	568.53	1	4		3	YES	CL
S-N4	256569.218	2488219.379	568.53	5	5.5		0.5	YES	SM

Boring	Northing	Easting	Sediment Surface Elevation	Top of Interval (ft btos)	Bottom of Interval (ft btos)	Top of Clay Surface	Thickness (ft)	NAPL	USCS Symbol
Upland Borings									
S-GU	256606.198	2488058.662	584.802	6.5	7.6		1.1	YES	SM
S-GU	256606.198	2488058.662	584.802	10.4	11.1		0.7	YES	SM
S-GU	256606.198	2488058.662	584.802	12.8	12.9		0.1	YES	SM
S-GU	256606.198	2488058.662	584.802	13.2	13.3		0.1	YES	SM
S-GU	256606.198	2488058.662	584.802	14.4	14.5		0.1	YES	SM
S-GU	256606.198	2488058.662	584.802	15.4	15.8		0.4	YES	CL
S-JU	256570.94	2488096.434	584.321	5.8	7.2		1.4	YES	SM
S-JU	256570.94	2488096.434	584.321	10	10.4		0.4	YES	GM
S-LU	256542.206	2488123.579	584.254	5.9	6.2		0.3	YES	SM
S-LU	256542.206	2488123.579	584.254	10	11.6		1.6	YES	SM

Notes:
ft btos - feet below top of sediment
NAPL - non-aqueous phased liquid
USCS - United Soil Classification System
CH - clay of high plasticity
CL - clay of low plasticity
GM - silty gravel
ML - silt
OL - organic silt, organic clay
SM - silty sand
SP - poorly graded sand
SW - well-graded sand



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TDC 10/25/17
REVIEWED BY/DATE:
EJH 10/26/17
APPROVED BY/DATE:

DRAFT

SITE LOCATION MAP

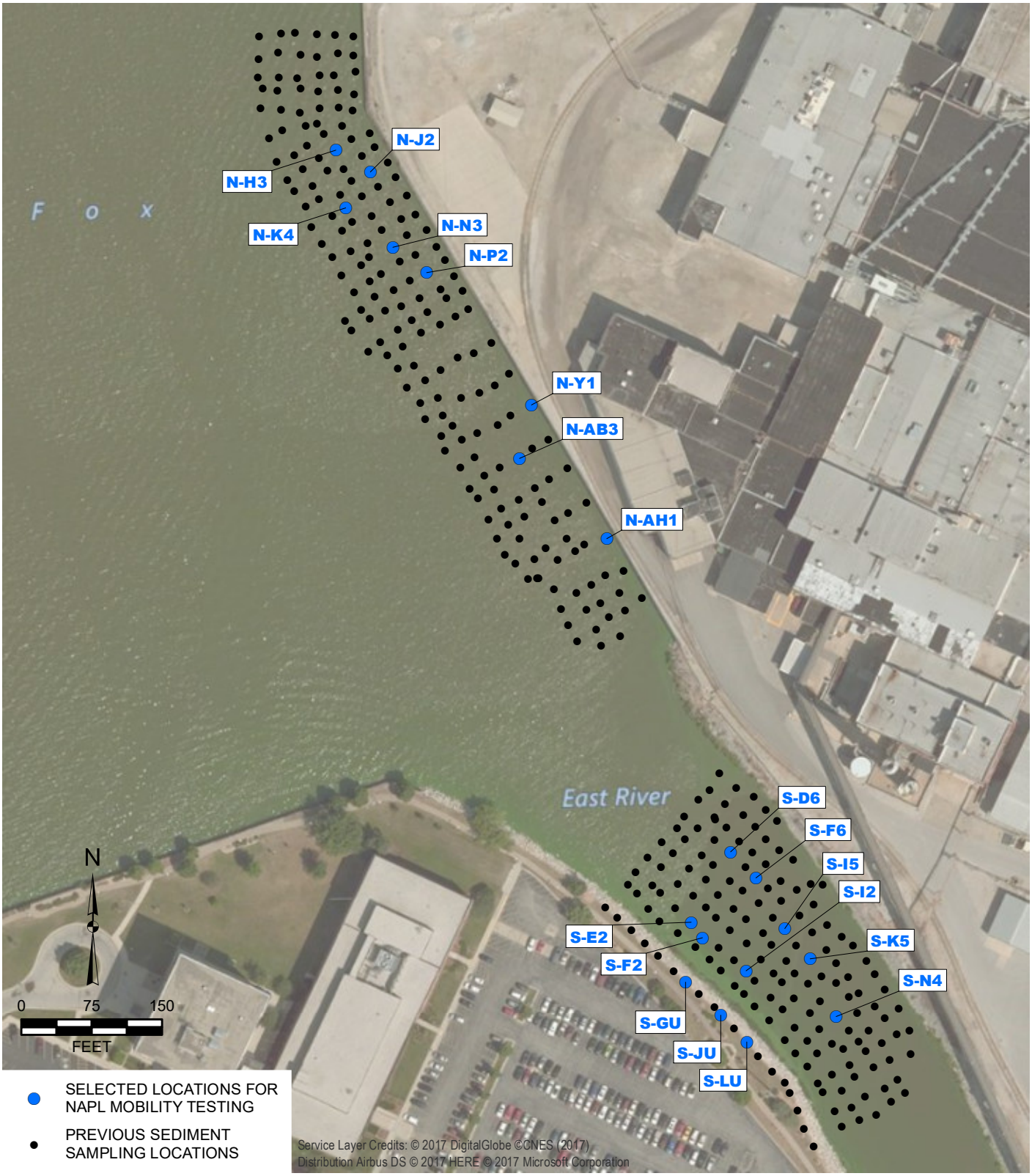
FORMER GREEN BAY MPG, GREEN BAY, WISCONSIN
WISCONSIN PUBLIC SERVICE COMPANY
NAPL MOBILITY SAMPLING TECHNICAL MEMORANDUM

PROJECT NO: 1584

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

Y:\GIS\Projects\1584\MXD\Sediment\NAPL Mobility Tech Memo\Figure 1_Site Location Map.mxd Author: CushmaTD; DateTime: 10/25/2017, 11:32:01 AM



Y:\GIS\Projects\1515\1584\MXD\Sediment\NAPL Mobility Tech Memo\Figure 3_Selected Borings for Mobility Sampling.mxd Author: CushmaTD; Date/Time: 10/25/2017, 12:05:33 PM

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TDC 10/25/17
REVIEWED BY/DATE:
EJH 10/26/17
APPROVED BY/DATE:

DRAFT

SELECTED BORINGS FOR NAPL MOBILITY SAMPLING

FORMER GREEN BAY MPG, GREEN BAY, WISCONSIN
WISCONSIN PUBLIC SERVICE COMPANY
NAPL MOBILITY SAMPLING TECHNICAL MEMORANDUM

PROJECT NO: 1584

FIGURE NO: 3

Natural Resource Technology
AN OBG COMPANY

This Sample Analysis Plan (SAP) describes proposed activities to evaluate the mobility of non-aqueous phased liquid (NAPL) present in the Lower Fox River and East River sediment adjacent to Wisconsin Public Service Corporation's (WPSC) former Green Bay Manufactured Gas Plant (MGP) property (Figure 1). The former Green Bay MGP Site (Site) is located at 700 North Adams Street in Green Bay, Wisconsin (Figure 1).

WEC Business Services, LLC (WBS) manages remedial investigation/feasibility study (RI/FS) activities at the Site using a Multi-Site approach in United States Environmental Protection Agency's (USEPA) Superfund Alternatives Site (SAS) Program. The upland portion of the site is approximately 6.5 acres and adjacent to the confluence of the Lower Fox and East Rivers to the north. The upland portion of the site was remediated in 2003 under the Wisconsin Department of Natural Resources (WDNR) program. The river portion of the Site is within and adjacent to the larger Lower Fox River Sediment polychlorinated biphenyls (PCB) Superfund Project (LFR Superfund Project).

NAPL investigation areas are divided into a North Area and a South Area and include data collected from borings advanced during several investigations:

- A 1995 presence-absence survey for MGP-residuals in the East and Lower Fox Rivers (Natural Resource Technology, an OBG Company [NRT] 2014)
- A 2012 LFR Superfund Project sediment investigation to support remedy design. Sediment cores were advanced to delineate PCB impacts in the sediment, however the boring logs noted a presence of petrochemical, asphalt, and chlorinated solvent odors along with black sediments. Observations of sheen or DNAPL were not recorded on the sediment core logs (NRT 2014)
- A 2014 sediment investigation to characterize sediment adjacent to the former Green Bay MGP (NRT 2014)
- LFR Superfund Project sediment borings in 2016 and 2017 to further delineate NAPL in preparation of dredging activities

All existing data were used to develop the NAPL observations depicted on the cross sections reviewed at and provided following the September 19, 2017 meeting.

OBJECTIVE STATEMENT

The geology of the rivers typically consists of soft sediment overlying a native, hard clay. NAPL has been identified in both the soft sediment and the underlying clay. The proposed LFR Superfund Project dredge design elevation, soft sediment thickness, native clay elevation, and presence or absence of NAPL (as discussed above) are shown on the cross-sections reviewed at and provided following the September 19, 2017 meeting.

The objectives of this investigation are to evaluate NAPL mobility in sediment following implementation of the proposed LFR Superfund Project design.

1. Dredging in the South Area will remove nearly all soft sediment overlying the native clay, leaving the clay layer as the post-construction surface. Therefore, NAPL present in the clay layer will be sampled for mobility.
2. Due to the presence of a bulkhead, dredging in the North Area will not remove all soft sediment overlying the native clay, leaving the soft sediment layer as the post-dredge surface. Therefore, NAPL present in both the soft sediment and clay layers will be sampled for mobility.

FIELD METHODS

Sixty-four borings within the North and South Areas of the investigation were identified to contain NAPL during the previous sediment investigations (Figure 2). Sixteen of the 64 locations will be revisited to assess NAPL mobility in the river, and three samples will be collected from upland areas adjacent to the South Area to evaluate potential for on-going sources of NAPL to the river (Figure 3 and Table 1). These locations were selected to represent a variety of locations throughout North and South Areas, differing depths, and different sediment matrices—soft sediment or clay. The types of NAPL were also considered (i.e., oil-wetted, oil-coated, or oil-stained). In addition, results of previous investigations indicated that NAPL in the North Area may not be

related to the former MGP. The mobility of NAPL from both the North and South Areas will be evaluated and compared to determine what NAPL is or is not related to the former MGP. Overall the borings were selected to provide a wide range of potential mobility.

Each of the 16 selected sediment locations will be re-occupied with a Geoprobe mounted barge operated by Coleman Engineering of Iron Mountain, MI. Prior to advancing the boring, NRT will measure water depth using an aluminum pole and methods described in the USEPA-approved Standard Operating Procedure (SOP) SAS-07-01 and Section 4 of the Multi-Site Field Sampling Plan (FSP, IBS 2008). Surface water elevation at the United States Geological Survey (USGS) gaging station at the US Oil Terminal will be recorded during each day of sample collection. Depth to water data and the surface water elevation will be correlated to document sediment surface elevation. The sediment surface elevation will be compared to the re-occupied sediment boring surface elevation to verify that the proper sediment interval, as measured from the sediment surface, is targeted for mobility sampling. Upland samples will be targeted based on the previous boring depths advanced below ground surface.

After the sediment surface elevation has been confirmed, the boring will be advanced using a barge-mounted Geoprobe in accordance with the existing LFR Superfund Site SOPs. Sediment borings will be advanced in eight-foot intervals to the targeted depth. Each eight-foot core tube will be capped upon removal from the river. Core segments for mobility testing will be selected in advance, according to the information in Table 1. The targeted sample will be cut from the eight-foot core in a maximum undisturbed length of two-feet for shipping purposes. The remainder of the core will be logged and collected in 55-gallon drums as Investigation-Derived Waste (IDW) for future off-site disposal. Core segments sent to the laboratory cannot be logged or pre-screened as they are to be delivered in as undisturbed state as possible.

Void spaces will be filled with plastic cling wrap to minimize core movement, then the two-foot core will be further sealed with a Teflon film followed by plastic end caps and duct tape and stored in an upright orientation. The core caps will be labeled with the proper sample identification criteria outlined in the USEPA-approved SOP SAS-03-01 as described in Section 4 of the Multi-Site FSP (IBS 2008). Top and bottom depths will be recorded on each end of the collected core tubes, and tenth of a foot fractions will be recorded along the length of the core tube. The selected, undisturbed two-foot core tube will be immediately placed in a large cooler containing dry ice to flash freeze the collected sediment and minimize migration of core fluids. Cores will be shipped each day via FedEx (or similar courier) overnight to PTS Laboratories in Houston, Texas for analysis.

PTS will prepare the samples and collect digital photographs using white and ultraviolet (UV) light by ASTM D5079 to identify sediment increments with visual indicators of potential NAPL. Within this testing method, intervals with the greatest observed UV fluorescence response correlates to the greatest concentration of NAPL within the two-foot core tube. Once these discrete intervals of maximum UV light fluorescence are identified, PTS will collect a subsample from the core for water drive testing. More than one subsample maybe selected from a core in order to represent a range of pore fluid saturations.

Selected increments will be analyzed for pore fluid saturation (DNAPL and water) by water drive method (per American Petroleum Institute [API] RP40) to determine *in situ* free product mobility conditions at each sample location. The analytical results include total porosity, air-filled porosity, moisture content, grain density and dry bulk density. The water drive method, as described in API RP40, involves forcing water through a sample to drive it to residual saturation. For the purposes of this memorandum, residual saturation is defined as the ratio of NAPL volume to interstitial pore space, above which NAPL has the potential to mobilize under existing conditions. The water drive method was chosen as it more closely approximates relevant environmental conditions, and its results represent the upper bound of residual saturation (Electric Power Research Institute [EPRI] 2015). Samples in which NAPL is not released during testing indicate the NAPL present is below residual saturation levels and therefore considered immobile.

NAPL will be extracted from the cores and isolated from pore water in samples found to be above the residual saturation for further evaluation by the following methods:

- NAPL density (ASTM D1217)
- Viscosity (ASTM D445)
- Interfacial Tensions (ASTM D971)

Each sample submitted for water drive analysis will be subsampled and sent to TestAmerica Laboratories in University Park, Illinois (TestAmerica) for analyses of the following constituents:

- Volatile organic compounds (VOC)
- Semi-volatile organic compounds (SVOC)
- Metals

Samples from the North area will also be analyzed for the following constituents:

- Dioxins/Furans
- Poly-chlorinated biphenyls (PCB)
- Alkylated polycyclic aromatic hydrocarbons (PAH) at Alpha Analytical

DATA EVALUATION

The results of the mobility sampling will be shared with the USEPA and the LFR Superfund Project team to support ongoing discussions regarding the post-construction sediment surface in the Fox and East Rivers. If mobile NAPL is present in the post-construction sediment surface, additional measures may be required to mitigate NAPL transport from the sediment surface to the over-lying water column. If NAPL in the soft sediment in the North Area is mobile, WBS, USEPA, and the LRF Superfund Project team may evaluate stabilizing the existing bulkhead and removing the soft sediment deposits in this area. Conversely, if none of the NAPL is mobile, no further action after the dredging project is completed will be appropriate.

Analytical will be used to evaluate the range of constituent concentrations within the targeted sample locations to determine with greater certainty the source of observed NAPL within the study area (i.e. MGP-derived or not).

NRT anticipates an approximately two to three month turn around to receive and process the mobility and analytical results before submitted a summary memorandum to USEPA.

REFERENCES

EPRI. 2015. *Generic Work Plan to Assess Dense Non-Aqueous Phase Liquid Mobility in the Subsurface at Manufactured Gas Plant Sites*. Technical Report 3002006708. Technical Update. August.

IBS. 2008. Integrys Business Support, LLC (now known as WEC Business Services, LLC). *Multi-Site Sampling Plan Former Manufactured Gas Plant Sites*. Revision 4. 2008.

NRT 2014. *Focused River Investigation, Former Green Bay MGP, Green Bay, Wisconsin Technical Memorandum No. 1, Rev 1.* August.

FIGURES

Figure 1 – Site Location Map

Figure 2 – Previous NAPL Investigations

Figure 3 – Selected Borings for Mobility Sampling

TABLES

Table 1 - Selected Borings for Mobility Sampling

DRAWN BY/DATE:
TDC 10/25/17
REVIEWED BY/DATE:
EJH 10/26/17
APPROVED BY/DATE:

DRAFT

PREVIOUS NAPL INVESTIGATIONS

FORMER GREEN BAY MPG, GREEN BAY, WISCONSIN
WISCONSIN PUBLIC SERVICE COMPANY
NAPL MOBILITY SAMPLING TECHNICAL MEMORANDUM

PROJECT NO: 1584

FIGURE NO: 2

Natural Resource Technology
AN OBG COMPANY