

**Enbridge Superior Terminal
Nemadji River / Nemadji Corridor (NC)
GIS Registry Update**

BRRTS#: 02-16-513788

SUBMITTAL DATE: January 21, 2020

RELEASE OR ACTIVITY NAME: **Enbridge Energy - Nemadji River**

SITE INFORMATION

Date of Discovery (if applicable)	1/24/2003	Date of Rediscovery (if applicable)	<i>Multiple Dates, see below</i>
WDNR Notification/ Start Date	1/24/2003	WDNR Closure Date (if applicable)	3/24/2010
Coordinates of Release (decimal degrees)	Lat: 46.68836° N Lon: 92.06175° W	Coordinates of Release (WTM91)	X: 362347.31326 Y: 692597.10295
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Previous Report and Memorandum References (if applicable)	<p><i>WDNR GIS REGISTRY CONTINUING OBLIGATION (CO) PACKET.</i> Enbridge WDNR Closure Date March 24, 2010, downloaded from BRRTS website on 1/25/2019.</p> <p><i>Tank 16-17 Ditch Investigation.</i> Barr Technical Memorandum, December 16, 2011.</p> <p><i>2014 Superior Terminal Hydrant Replacement Project.</i> Barr Technical Memorandum, November 24, 2014.</p> <p><i>Superior Terminal Historical Contamination: Historical Nemadji Release Corridor.</i> Barr Technical Memorandum, June 15, 2016.</p> <p><i>Nemadji Corridor Response: Tank 13/16 Pipeline Excavation,</i> Barr Technical Memorandum, March 7, 2019.</p>		
Release Description and Notification	<p>On January 24, 2003, approximately 4,500 barrels of crude oil were released from Superior Terminal facility (Terminal) pipeline infrastructure south of Tank 13 (Figures 1 and 2). Crude oil migrated through stormwater ditches to the southwest towards Tank 18 and to the southeast all the way to the Nemadji River. Remediation and investigation activities were undertaken and the Wisconsin Department of Natural Resources (WDNR) closed the site with continuing obligations on March 24, 2010 with the understanding that residual impacts remained above Residual Contaminant Levels (RCLs), as structural impediments limited remediation activities, and the site will remain an industrial facility. Based on communications with the WDNR, an area around the <i>Nemadji</i></p>		

River release was labeled the Nemadji Corridor (NC) for future reporting purposes (Figure 2).

Since 2011, residual hydrocarbon impacts (soil and water) have been encountered below the ground surface in multiple infrastructure project excavations within the established NC boundaries (Figures 1 and 2). Below is a list of sites where impacts have been encountered between 2011 and 2019:

- *2011 Pipeline Excavation:* In August of 2011, hydrocarbon impacted soil was encountered beneath pipelines located along the Terminal road north of Tank 16 and 17.
- *2014 Hydrant Excavation:* In September of 2014, hydrocarbon impacts were encountered in a fire hydrant excavation on the north side of the Terminal Road.
- *2015-2016 Infrastructure Projects:* Historical impacts were encountered in multiple infrastructure upgrade excavations along the south side of the Terminal road between Tanks 16 and 18. (Tank 18 Valves, 3/30/2015; Field Booster 16, 3/31/2015; Field Booster 216, 4/18/2016; Field Booster 17, 11/16/2015 and 12/16/ 2015; Field Booster 17, 12/17/2015; and Tank 14/17 Potholes, 8/17/2015; and, Tank 14/16 Excavation, 8/24/2015).
- *2018 Tank 13/16 Pipeline Excavation:* Historical impacts were encountered in a pipeline construction excavation between Tanks 16 and Tank 13 in October of 2018.

Hydrocarbon impacts encountered in the NC typically consist of excavation water with a hydrocarbon sheen or a small volume of free-product and/or soil with evidence of hydrocarbon impacts (e.g., headspace reading > 10 parts per million or ppm, hydrocarbon odor, hydrocarbon sheen or free-product, and/or discoloration). Conditions observed within the excavations can vary by location and depth.

Site-specific technical memorandums for each of the Nemadji Corridor sites have been submitted to the WDNR that describe the response actions and residual impacts for the above sites within the NC. Field screening and sampling methods and guidance described in the WDNR-approved *Enbridge Superior Terminal Facility-Wide Site Investigation and Response Action Plan (SI/RAP)* (2014) and *Addendum* were followed to document the environmental conditions and identify the closure pathways for the sites.

Response Action Summary

**Date of Excavation,
Extents and
Material Disposal**

Project excavations within in the NC boundary where residual historical hydrocarbon impacts have been encountered are described below. Site locations and extents are shown on the Table 1 field logs and on Figure 2.

2011 Pipeline Excavation (Tank 16 -17 Ditch) (August 2011): Historical hydrocarbon impacted soil and free-product were encountered beneath Terminal pipelines in a maintenance excavation located south of the Terminal road and north of the Tank 16-17 basin. The excavation was approximately 40 feet long (SW to NE), 25 feet wide (SE to NW), and up to 6 feet deep.

2014 Hydrant Excavation (September 2014; Table 1-Sheet 1): Historical hydrocarbon impacted soil was encountered in a fire hydrant upgrade excavation on the north side of the Terminal Road and southeast of Tank 13. The excavation was approximately 35 feet long (SW to NE), 15 feet wide (SE to NW), and up to 10 feet deep.

2015-2016 Infrastructure Projects (2015-2016): Historical hydrocarbon impacted soil was encountered in multiple infrastructure upgrade project excavations south of the Terminal road between Tanks 16 and 18. Project excavations include:

- *Field Booster 16 (March 2015; Table 1-Sheet 2):* Historical hydrocarbon-impacted soil and free-product were encountered in a booster pump maintenance excavation located east of Booster Pump 16. The excavation was approximately 15 feet long (SW to NE), 20 feet wide (SE to NW), and up to 10 feet deep.
- *Tank 18 Valves (March 2015; Table 1-Sheet 3):* Historical hydrocarbon-impacted soil was encountered in a valve maintenance excavation located south of the Terminal road and north of the Tank 18 basin. The excavation was approximately 15 feet long (SE to NW), 10 feet wide (SW to NE), and up to 7 feet deep.
- *Tank 14/17 Potholes (August 2015; Table 1-Sheet 4):* Historical hydrocarbon-impacted soil was encountered in 5 of 7 potholes and two narrow hydrovac trenches located south of the Terminal road and north of the Tank 17 basin. The potholes were located in an approximately 65 foot long (SW to NE) by 10 foot wide (SE to NW) area. The potholes advanced to the top of the buried infrastructure at approximately 6 to 8 feet in depth; however, water in the potholes was at approximately 2 to 3 feet below the ground surface and limited deeper observations.
- *Tank 14/16 Excavation (August 2015; Table 1-Sheets 5, 6):* Historical hydrocarbon-impacted soil was encountered in an infrastructure maintenance excavation located south of the Terminal road and north of the Tank 17 basin. The excavation was approximately 90 feet long (SW to NE), up to 20 feet wide (SE to NW), and up to 8 feet deep.
- *Field Booster 17 (November & December 2015; Table 1-Sheet 7, 8, 9):* Historical hydrocarbon-impacted soil was encountered in infrastructure improvement excavations located south of the Terminal road and north of the Tank 17 basin. The excavations included:

	<ul style="list-style-type: none"> ○ <i>Potholes (Table 1-Sheet 7)</i>: 10 potholes located northeast of Tank 17 and Field Booster 17 (<i>Table 1-Sheet 7</i>). The potholes were located in a 60-foot long (SW to NE) and 10-foot wide (SE to NW) area. The potholes advanced to the top of the buried infrastructure at approximately 6 to 8 feet in depth; however, water in the potholes was at approximately 2 to 3 feet below the ground surface and limited deeper observations. ○ <i>Excavation NE of Field Booster 17 (Table 1-Sheet 8)</i>: An excavation located northeast of Field Booster 17 (<i>Table 1-Sheet 8</i>). The excavation was approximately 40 feet wide by 40 feet long and up to 8 feet deep. ○ <i>Excavation North of Field Booster 17 (Table 1-Sheet 9)</i>: An excavation located north of Field Booster 17 (<i>Table 1-Sheet 9</i>). The excavation was approximately 30 feet wide by 30 feet long and up to 6 feet deep. ● <i>Field Booster 216 (April 2016; Table 1-Sheet 10)</i>: Historical hydrocarbon-impacted soil was encountered in an infrastructure construction excavation located south of the Terminal road and north of the Tank 16 basin. The excavation was approximately 35 feet long (SW to NE), 15 feet wide (SE to NW), and up to 10 feet deep. <p><u>2018 Tank 13/16 Pipeline Excavation (October 2018; Table 1-Sheet 11):</u> Soil with historical hydrocarbon impacts was encountered in a pipeline construction excavation south of the Terminal road and north of Tank 16. The excavation was approximately 30 feet long (SW to NE), 20 feet wide (SE to NW), and up to 14 feet deep.</p> <p>All of the Nemadji Corridor excavations described above were completed in close proximity to existing Terminal infrastructure. Hydrocarbon-impacted soil and water removed from the excavations were segregated for off-site disposal. Impacted soil was transported to the Terminal Soil Management Area (SMA) until off-site disposal could be coordinated. Impacted water removed from the excavation was containerized until off-site disposal could be coordinated. All excavations were backfilled with clean fill material or terminal infrastructure was constructed within them.</p>
<p>Groundwater Depth and Nearest Monitoring Well</p>	<p>Water was observed in some of the excavations between 2 and 6 feet below ground surface (bgs). The water table at the Superior Terminal is typically between 3 and 6 feet bgs based on data from the Superior Terminal Groundwater Monitoring Program. The nearest monitoring wells to the NC are MW-24 (1,400 feet to the northeast) and MW-6 (1,200 feet to the south), and MW-20 (1,200 feet to the southeast; Figure 2).</p>

Soil Field Screening Results Summary

Field screening soil samples were collected from the sidewalls and bottoms of the impacted NC site excavations, where feasible. Sample collection was limited in some locations by excavation size, unsafe entry conditions, and the use of excavation/trench boxes. Field screening results are summarized below and site investigation logs are provided in Table 1. Hydrocarbon impacted soil was removed when feasible for off-site disposal. However, in the excavations described below with residual hydrocarbon impacts, additional remedial excavation could not be completed due to the presence of nearby Terminal infrastructure.

2011 Pipeline Excavation (August 2011): Based on field screening results, limited residual hydrocarbon impacts were identified in soil (e.g., discoloration, odor) in the bottom of the final excavation below the exposed pipelines and below the direct contact zone. No analytical samples were collected based on field screening observations and inferred historical contamination source. The excavation was open for two weeks and no new contamination was observed.

2014 Hydrant Excavation (September 2014; Table 1-Sheet 1):

Six field screening soil samples were collected from the excavation sidewalls and bottom (four samples from the direct contact zone at 2 feet bgs, and two samples at the base of excavation, 8 feet bgs). Headspace readings from these samples were between 0.0 and 1.4 ppm and no other evidence of hydrocarbon impacts was detected.

2015-2016 Infrastructure Projects (2015-2016; Table 1-Sheets 2 - 10):

Field Booster 16 (Table 1-Sheet 2): Fourteen field screening samples were collected from the excavation sidewalls and bottom (nine samples were collected from the direct contact zone at 2-4 feet bgs) and five samples were collected between 5-10 feet bgs). Two field screening samples (located beneath the eastern corner of the Field Booster) had headspace readings > 10 ppm (S-2 @ 3 feet bgs = 75.8 ppm; S-3 @ 6 feet bgs = 303 ppm) and evidence of hydrocarbon impacts (e.g., odor, sheen).

Tank 18 Valves (Table 1-Sheet 3): Seven field screening samples were collected from the excavation sidewalls (six samples were collected from the direct contact zone at 3 to 4 feet bgs, and two samples were collected between 4.5 and 5 feet bgs). All of the field screening soil samples had headspace readings between 0.0 and 0.1 ppm and no other evidence of hydrocarbon impacts.

Tank 14/17 Potholes (Table 1-Sheet 4): No field screening samples were collected from the potholes due to accessibility. Evidence of hydrocarbon impacts (e.g., sheen, product) was observed on surface of water within 5 of the 7 the potholes.

Tank 14/16 Excavation (Table 1-Sheets 5, 6): Twenty field screening samples were collected from the excavation sidewalls and bottom (ten samples were collected from the direct contact zone at 1 to 4 feet bgs, and ten samples were collected from 5 to 8 feet bgs). The direct contact zone field screening soil samples had headspace readings between 0.0 and 35.4 ppm and no other evidence of hydrocarbon impacts (e.g., odor, sheen) was identified. The field

screening samples below the direct contact zone had headspace readings between 0.6 and 589 ppm and a hydrocarbon odor and sheen were identified in some identified. The apparent residual impacts appeared to be primarily located along/beneath the buried pipelines.

Field Booster 17 Contamination (Table 1-Sheet 7, 8, 9):

- *Potholes (Table 1-Sheet 7):* Hydrocarbon impacts (e.g., sheen and/or free-product) were observed in 10 potholes northeast of Field Booster 17. No screening samples were collected based the clear presence of impacts, the limited access to soil in the potholes, and the planned excavation of the area.
- *Excavation NE of Field Booster 17 (Table 1-Sheet 8):* Ten field screening samples were collected from the excavation sidewalls and bottom (four samples were collected from the direct contact zone at 1.5 to 2 feet bgs and six samples were collected between 5 and 8 feet bgs). The field screening soil samples had headspace readings 0.0 ppm and no evidence of hydrocarbon impacts (e.g., odor, sheen) was identified.
- *Excavation North of Field Booster 17 (Table 1-Sheet 9):* Four field screening samples were collected from the excavation sidewalls (two samples were collected from the direct contact zone at 2 to 3 feet bgs, and two samples were collected at 6 feet bgs). Field screening soil samples S-1 and S-3 had headspace readings exceeding 10 ppm and a hydrocarbon odor. Analytical samples were collected from those locations, as described below.

Field Booster 216 (Table 1-Sheet 10): Field screening was not conducted in the final excavation due the presence of sheet piling and limited excavation access. No free-product or other definitive evidence of residual impacts was observed in open excavation.

2018 Tank 13/16 Pipeline Excavation (October 2018; Table 1-Sheet 11):

Eight field screening samples were collected from the excavation sidewalls and bottom (four samples were collected from the direct contact zone at 2 feet bgs, and four samples were collected at 14 feet bgs). The field screening soil samples had headspace readings between 0.2 and 1.8 ppm and no evidence of residual hydrocarbon impacts (e.g., odor, sheen) was identified.

Analytical Sampling Results Summary

Where feasible, as indicated above, analytical soil samples were collected from excavations with historical impacts identified by headspace readings >10 ppm. Soil samples were submitted to the laboratory for some or all of the following laboratory analyses: petroleum volatile organic compounds (PVOCs), diesel range organics (DRO), and polycyclic aromatic hydrocarbons (PAH). Analyte concentrations were compared to the WDNR Industrial Direct Contact (DC) and Groundwater Residual Contaminant Levels (RCLs). The locations of the project excavations are shown on Figure 2, the analytical sampling locations are shown in Table 1 and the results are summarized below. Table 2 summarizes the PVOC, Naphthalene, DRO, and PAH concentrations and RCL exceedances.

2011 Pipeline Excavation (August 2011): No analytical samples were collected based on field observations.

2014 Hydrant Excavation (September 2014; Table 1-Sheet 1): No analytical samples were collected based on field screening results and observations.

2015-2016 Infrastructure Projects (2015-2016):

Field Booster 16 (Table 1-Sheet 2): Soil sample *FB16-S-1* and *FB16-S-3* were collected from the direct contact zone and samples *FB16-S-2* and *FB16-B-1* were collected from below the direct contact zone. Samples *FB16-B-1*, *FB16-S-1*, and *FB16-S-2* had one or more analyte concentrations above the WDNR Groundwater RCLs. All of the samples had analyte concentrations below the DC RCL.

Tank 18 Valves (Table 1-Sheet 3): No analytical samples were collected based on field screening results.

Tank 14/17 Potholes (Table 1-Sheet 4): No analytical samples were collected based on limited accessibility in the pothole borings.

Tank 14/16 Excavation (Table 1-Sheets 5, 6): Soil sample *TK 14/16-S-1*, *TK 14/16-S-1* and *TK 14/16-S-3* were collected from the direct contact zone, and samples *TK 14/16-B-1* and *TK 14/16-B-2* were collected from below the direct contact zone. The analyte concentrations from the direct contact zone samples were below the laboratory detection limits; however, the benzene concentrations in the deeper samples exceeded the Groundwater RCL. All of the analyte concentrations in the samples were below the DC RCL.

Field Booster 17 (Table 1-Sheet 9): Soil sample *FB17-S-1_3* was collected from the direct contact zone (3 feet bgs), and *FB17-S-2_6* was collected from below the direct contact zone (6 feet bgs). The benzene concentration of *FB17-S-2_6* (0.024 mg/kg) exceeded the Groundwater RCL. The rest of the analyte concentrations in both samples were below Groundwater and DC RCLs.

Field Booster 216 (Table 1-Sheet 10): No analytical samples were collected based on limited accessibility to sidewalls and bottom (sheet piling).

2018 Tank 16 Pipeline Excavation (October 2018; Table 1-Sheet 11): No analytical samples were collected based on field screening results.

Risk Assessment Discussion

Direct Contact Receptor	There is little to no new evidence of direct contact risk based on the field screening and analytical assessment results, the presence of clean backfill, and Enbridge employee awareness and safety requirements.
Surface Water Receptor	There does not appear to be any additional future risk to surface water receptors from the documented residual contamination based on the assessment results, the site location, and the depth of the identified residual impacts.
Groundwater Receptor	The nearest private water well receptor is located upgradient and more than 350 feet to the west of the NC. Although analyte concentrations were detected in the soil above the WDNR Groundwater RCL's, the conditions encountered in the field are consistent with the conditions that were present at the time of site closure. Therefore, there is little to no evidence of additional risk to groundwater. In addition, groundwater at the Superior Terminal is addressed and monitored on a facility-wide basis through the established hydrogeologic performance standard approved by the WDNR.
Vapor Receptor	There are several small pipeline operation buildings located within the NC boundary. None of the buildings have a basement, personnel working on site wear combustible gas detectors, and occupancy of the buildings is minimal. These buildings are not considered vapor receptors because they do not meet the vapor intrusion pathway conditions outlined in the approved Facility-wide SI/RAP and addendum.

Residual Contamination and Continuing Obligations Discussion

Residual Contamination and Structural Impediments	<p>Based on the above listed sites location within the NC boundary and documented environmental conditions, all of the sites can be reasonably attributed to the 2003 historical release. Based on analytical sampling, there is no new evidence of residual soil contamination exceeding WDNR Direct Contact Zone RCL criteria. Residual soil contamination exceeding the Groundwater RCL criteria remains in some of the project locations and is comparable to the concentrations in soil left in place at the time of site closure.</p> <p>The completion of the projects listed above and the associated excavation of hydrocarbon impacted soil have improved environmental site conditions in the NC and at the Terminal. Additional excavation of material with residual impacts was not feasible due to the presence of Terminal infrastructure. The excavations were backfilled with clean fill or covered by Terminal infrastructure.</p>
Response Action Approval and Continuing Obligations	Historical impacts encountered in the above excavations are within the established NC boundary and are consistent with conditions present at the time of site closure. There is no new identified risk to direct contact, groundwater, surface water, or vapor receptors associated with the <i>Nemadji River</i> release. Enbridge met the Continuing Obligation Land Use Limitations or Conditions (WDNR, 2010) by excavating and disposing of accessible impacted soil during

the project activities. Enbridge will notify the WDNR about any future discovery of historical impacts or identified change in environmental conditions in the NC.

Additionally, groundwater conditions at the Superior Terminal are monitored as part of the Facility-Wide hydrogeologic performance standard and, if evidence of contamination is identified, it will be reported to the WDNR and managed in accordance with the approved *Facility-Wide SI/RAP* and *Addendum*.

Since additional contamination was not encountered during the excavation work described above, this summary will be used to update the existing Nemadji River Continuing Obligations BRRTs GIS Package (#02-16-513788) and provide documentation of appropriate waste management. No additional response, investigation, or reporting activities associated with the above listed sites is anticipated.

Attachments:

Table 1	Site Investigation Field Sampling and Screening Logs
Table 2	Soil Analytical Data Summary
Figure 1	Site Location
Figure 2	Site Layout

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility 2014 Hydrant Replacement (Tank 13)

Equipment used: PID -ionization detector with 0.7 eV lamp

Background Headspace: 0.0 ppm

Date: 9/25/14

Sample Nomenclature (Location - sample type - #): _____

Sampler: REE

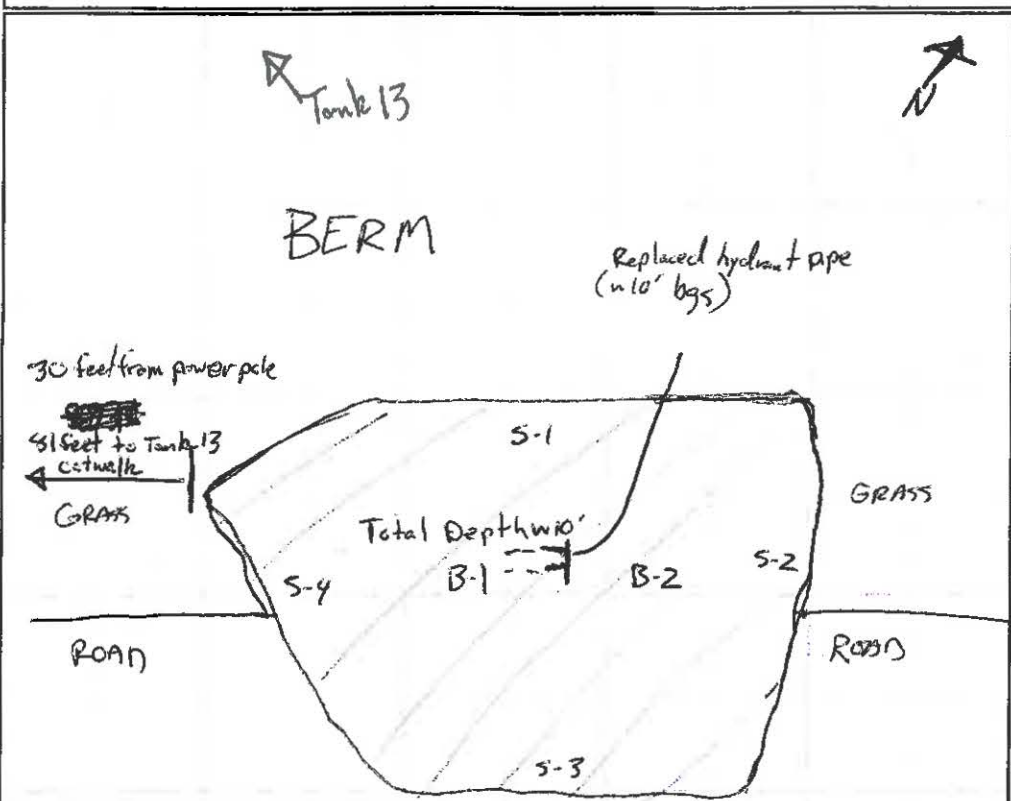
Soil Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Calibration Time: ZOZ



Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
e: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
	2	215	CL	Reddish brown	N/A	1.4
	2					0.2
	2					0.3
	2					0.8
	8					0.0
	8	245				0.6

SITE SKETCH: north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features... 1 inch/grid = 10 FEET



No Residual contamination was observed.
 Contaminated soil to SMA: 2 dumptrucks & 1 Hydraulic
 Excavation to be backfilled after hydrant replacement

TABLE 1 SHEET 1 OF 11 (2014 Hydrant Excavation; 9/25/2014) SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility Field Booster 16, Superior Terminal, Wisconsin

Equipment used: Photo -ionization detector with 11.7 eV lamp

Background Headspace: 0.3 ppm

Date: 3/31/15

Sample Nomenclature (Location - sample type - #): FB16 -

Sampler: CJG2

Soil Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Calibration Time: 1100



Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
Sample ID: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
S-1	2	1400	CL	Red brown/none	none/none	0.3
S-2	3	1400	CL	Red brown/none	slight petro / no sheen	75.8
S-3	6	1406	CL/SP	Red brown/black	strong petro / rainbow sheen	303+
S-4	2	1405	CL	Red brown/none	none/none	5.5
S-5	2	1405	CL	Red brown/none	none/none	0.6
S-6	6	1405	CL	Red brown/none	none/none	5.2
S-7	3	1405	CL	Red brown/none	none/none	0.3
S-8	5	1410	CL	Red brown/none	none/none	6.2
S-9	3	1410	LL/SP	Red brown/none	none/none	0.5
S-10	2	1410	CL	Red brown/none	none/none	0.4
S-11	3	1415	CL	Red brown/none	none/none	0.3
S-12	4	1415	CL	Red brown/none	none/none	1.3
S-13	6	1415	CL	Red brown/none	none/none	4.2
B-1	10	1415	CL	Red brown/none	slight petro / no sheen	9.4
Field Samples						
-S-1	3	1430	CL	collected	at S-2	
-S-2	6	1435	CL/SP	collected	at S-3	
-S-3	3	1440	LL/SP	collected	at S-9	
-B-1	10	1445	CL	collected	at B-1	

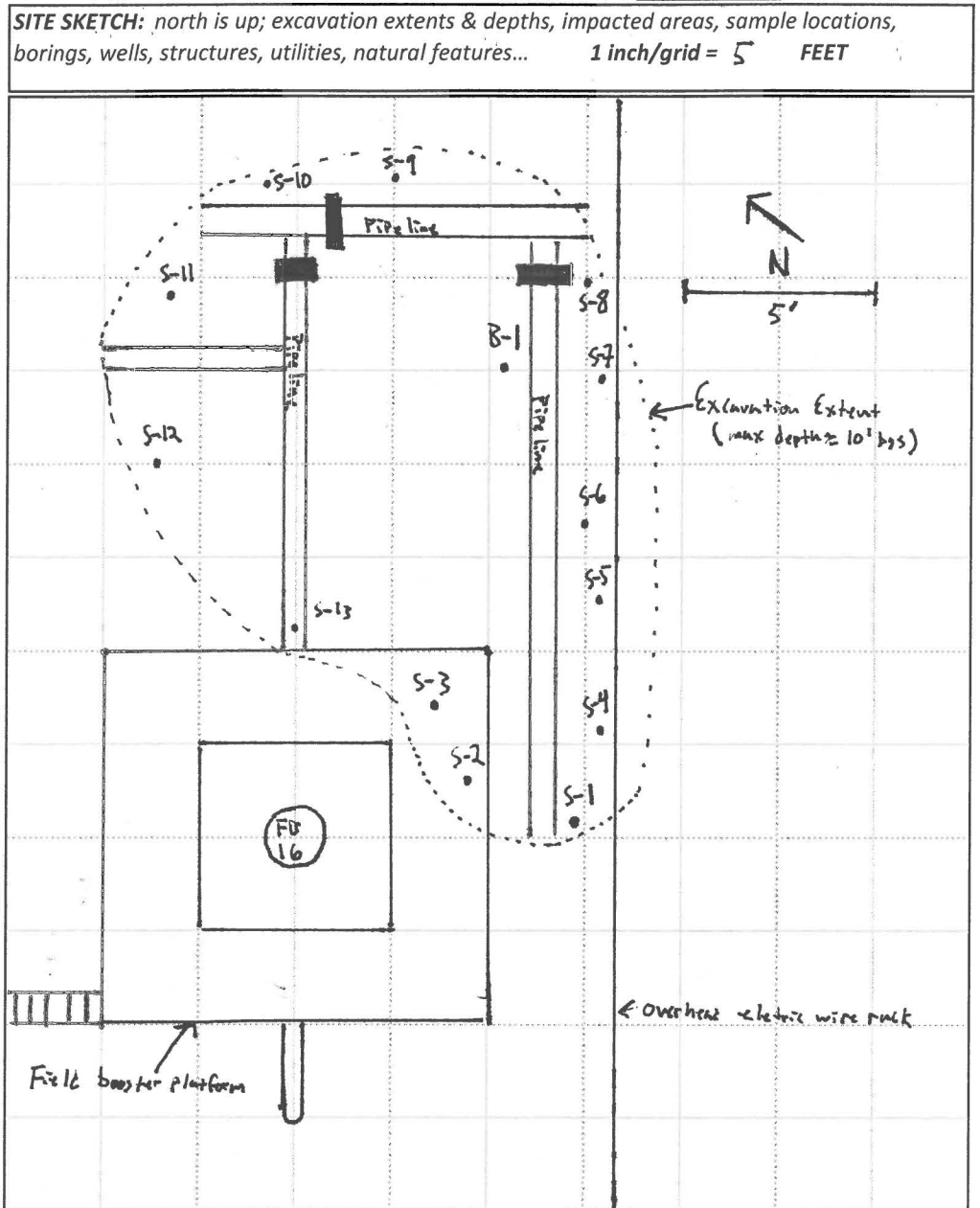


TABLE 1
SHEET 2 OF 11 (Field Booster 16 Excavation; 3/31/2015)
SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility Valves North of Tank 18

Equipment used: Probe -ionization detector with 11.7 eV lamp

Background Headspace: 0.0 ppm

Date: 3-30-15



Sample Nomenclature (Location - sample type - #): _____

Sampler: NR52

Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Calibration Time: 0925

Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
Sample ID: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
-1	4	10:45	CL	Reddish brown	none/none	0.1
S-2	3					0.0
S-3	4.5					0.0
S-4	5					0.0
S-5	3					0.0
S-6	4					0.0
S-7	4					0.1

SITE SKETCH: north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features... 1 inch/grid = 10 FEET

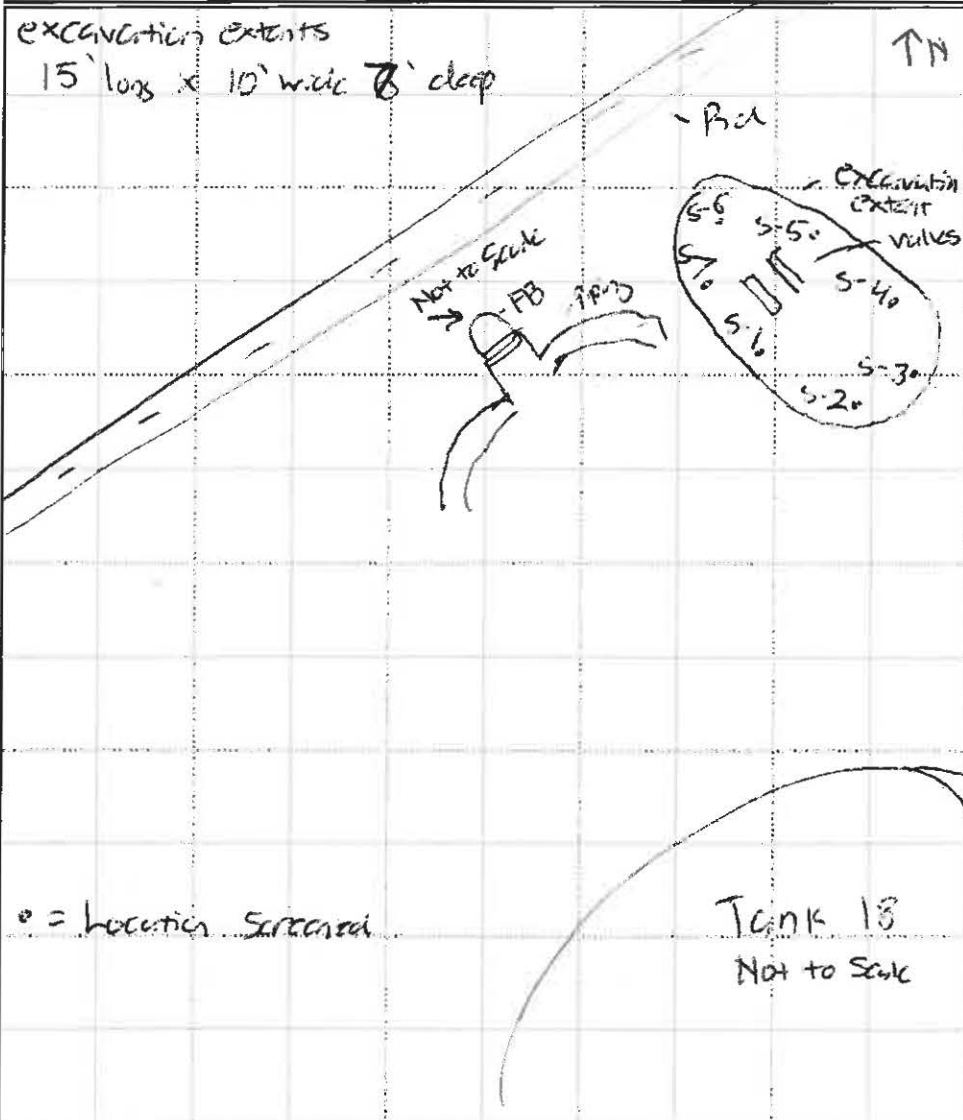


TABLE 1
SHEET 3 OF 11 (Tank 18 Valves; 3/30/2015)
SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility Tank 14/17 Potholes Field Station

Equipment used: -ionization detector with eV lamp Background Headspace: ppm

Date: 8-17-15

Sample Nomenclature (Location - sample type - #):

Sampler: NR52



Calibration Time:

Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
le: TK99-S-1	<u>4</u>	<u>16:30</u>	<u>CL</u>	<u>Reddish brown</u>	<u>Petroleum/Rainbow</u>	<u>275</u>

SITE SKETCH: north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features... 1 inch/grid = 20 FEET

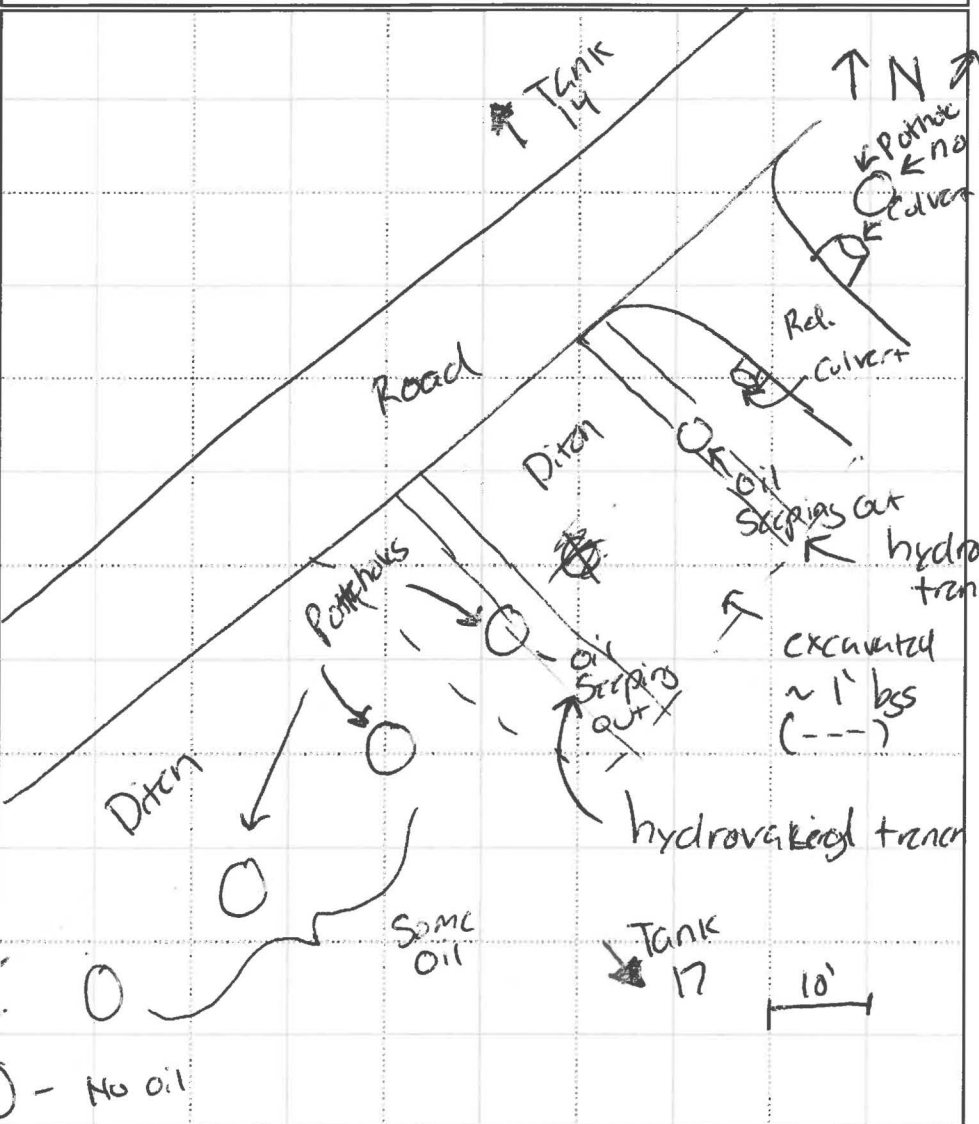


TABLE 1
SHEET 4 OF 11 (Tank 14/17 Potholes; 8/17/2015)
SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility Tank 14/16 Embankment Terminal Superior WI

Equipment used: Photo -ionization detector with 11.7 eV lamp

Background Headspace: 0.0 ppm

Date: 8-24-15

Sample Nomenclature (Location - sample type - #): _____

Sampler: NRS2

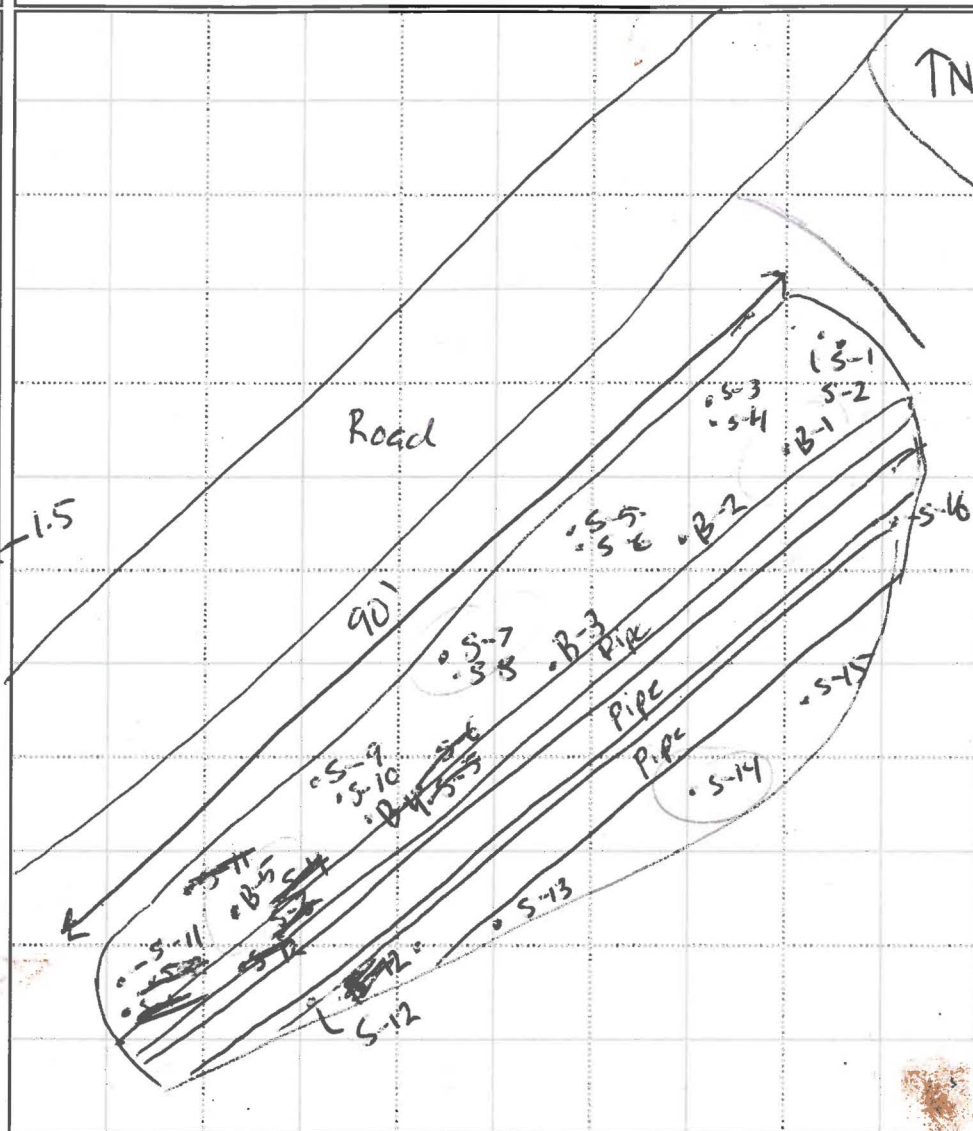
Soil Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Calibration Time: 0850



Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
Sample: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
S-1	2'	1005	CL	Reddish brown	none/none	0.8
S-2	6.5'				slight/none	5.9
S-3	2.5'				none/none	0.3
S-4	5'				none/none	18.8
S-5	1.5'				none/none	0.0
S-6	7'				moderate sheen	42.4
S-7	2'				slight/none	0.8
S-8	6'				none/none	8.9
S-9	2'	1010				0.0
S-10	6'					18.6
S-11	1'					5.0
S-12	2'					2.2
S-13	3'					0.5
S-14	1.5'					35.4
S-15	2.5'					3.5
B-1	6'	1035			strong sheen	589+
B-2	7'				slight/none	7.9
B-3	8'				none/none	18.3
B-4	8'				none/none	0.8
B-5	7.5'				moderate sheen	182.0

SITE SKETCH: north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features... 1 inch/grid = 20 FEET



B-3
B-1
B-5
above B-5
S-14

TABLE 1
SHEET 5 OF 11 (Tank 14/16 Excavation. 8/24/2015)
SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

all odor is a petroleum odor

excavation 6' deep at NE end and 8' deep at SW end

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility Tank 14/16 Embankment Terminal Superior WI

Equipment used: Photo-ionization detector with 11.7 eV lamp

Background Headspace: 0.0ppm

Date: 8-24-15

Sample Nomenclature (Location - sample type - #): _____

Sampler: NRS2



Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Calibration Time: 0850

All analytical samples

Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
pl: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
4/16-S-1	1.5'	11:00	CL	Reddish brown	none/none	S-3 (0.3)
4/16-S-2	1.5'	11:10				S-11 (1.5)
4/16-S-3	1'	11:15				S-14 (35.4)
4/16-B-1	6'	11:25			Moderate nose	B-1 (584)
4/16-B-2	8'	11:35			Moderate sheen	B-5 (782)

SITE SKETCH: north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features... 1 inch/grid = FEET

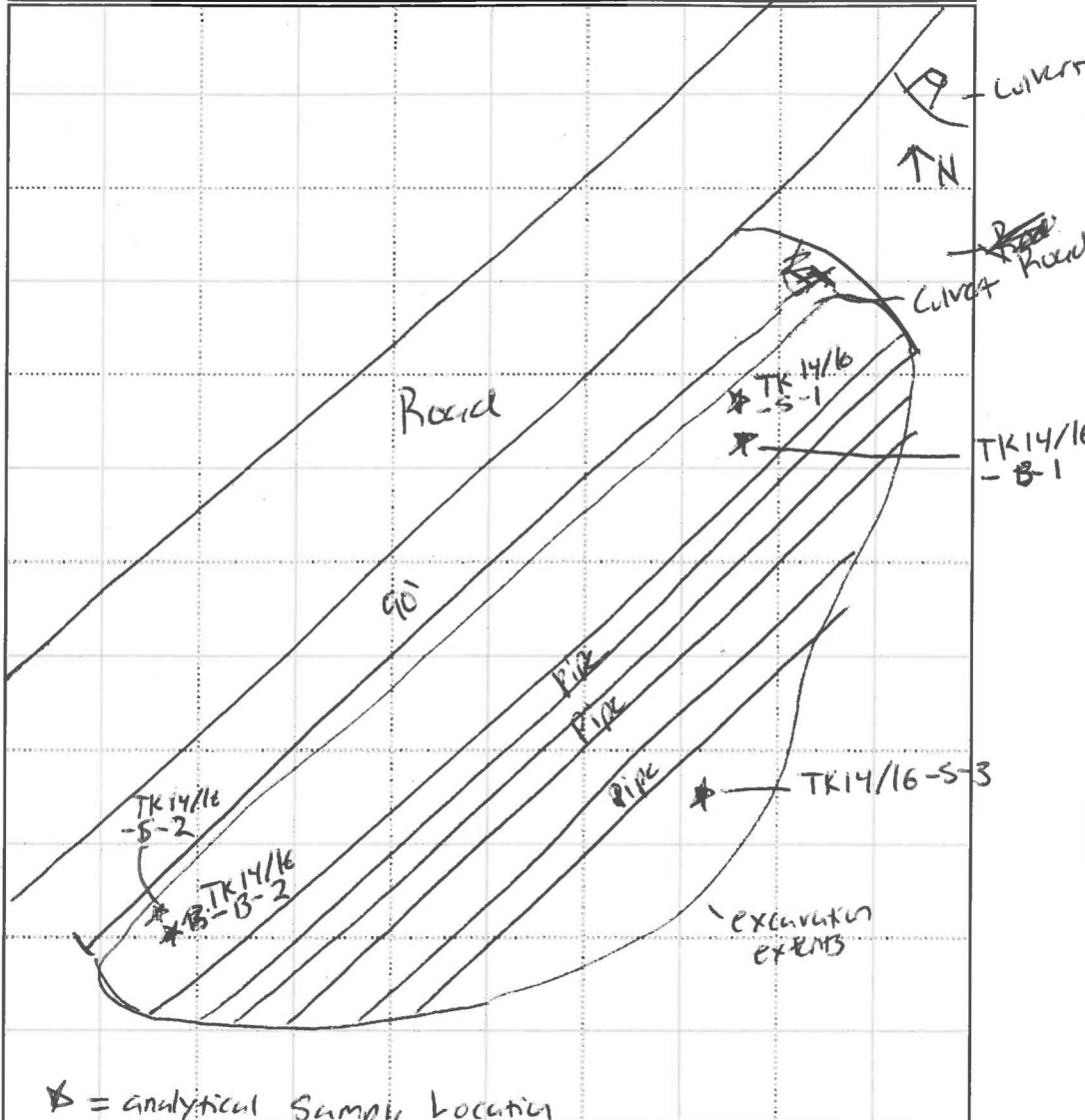


TABLE 1
SHEET 6 OF 11 (Tank 14/16 Excavation, 8/24/2015)
SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

All odors are petroleum odors

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility Tank 17 (N of Tank 17 along Rd outside Containment Berm)

Equipment used: Photo-ionization detector with 117 eV lamp Background Headspace: 0.0 ppm

Date: 12/16/15

Sampler: NR52

Calibration Time: 10:30

Nomenclature (Location - sample type - #): _____

Soil Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample



Sample ID	Depth (FT)	Time (Military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
-1	2	10:10	CL	Reddish brown	non/none	0.0
-2	6					0.0
-3	5'					0.0
-4	15'					0.0
-5	2	10:20				0.0
-6	6					0.0
-7	15					0.0
-8	8					0.0
-1	75	10:30				0.0
-2	8					0.0

SITE SKETCH: north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features... 1 inch/grid = 20 FEET

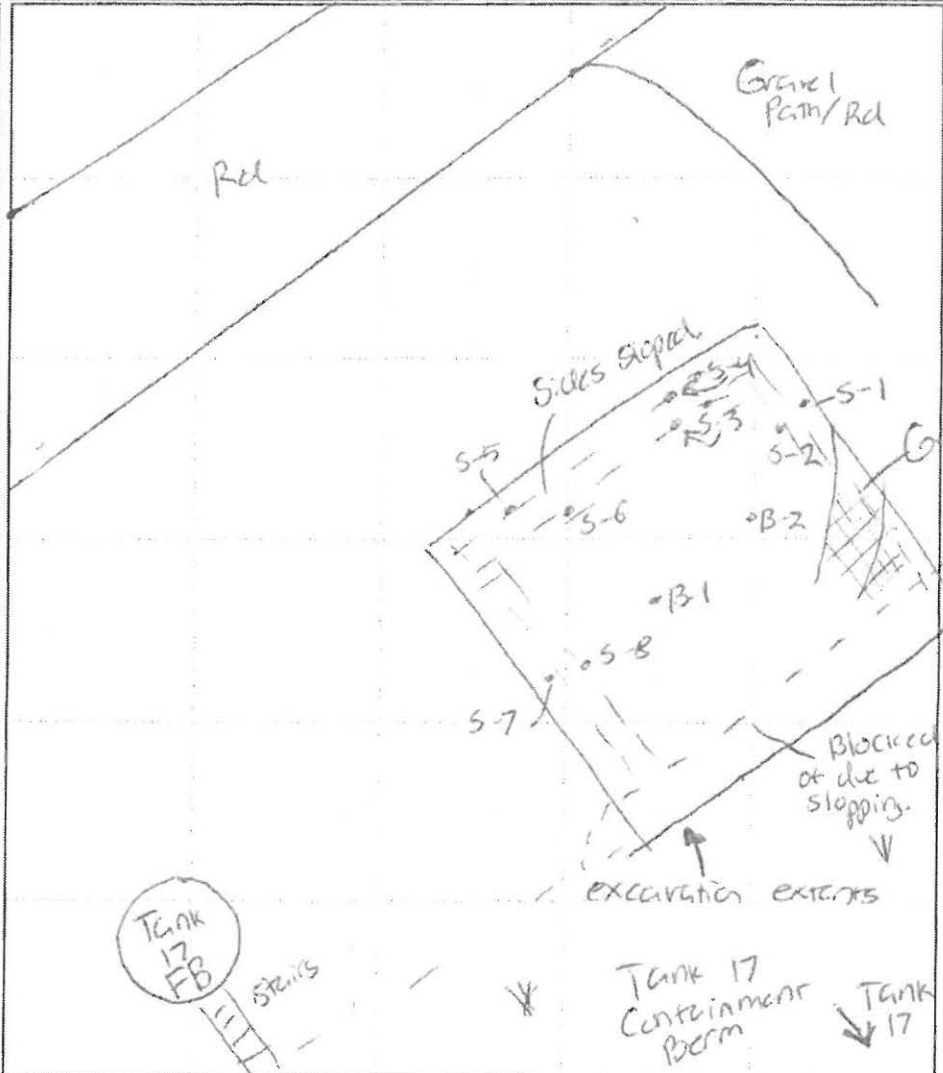


TABLE 1
SHEET 8 OF 11 (Field Booster 17 (excavation), 12/16/2015)
SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Excavation 40' x 40' x 7-8' deep.

o = Location screened
No analytical Sample Collected.

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility Tank 17

Equipment used: photo-ionization detector with 11.7 eV lamp

Background Headspace: 0.0 ppm

Date: 12-17-15

Sample Nomenclature (Location - sample type - #): _____

Sampler: BJL2

Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Calibration Time: 1020



Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/Discolor	Odor/Sheen	Headspace Reading (ppm)
TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
1	6	1035	SP	brown	Y/N	84+
2	3	1037	CL	red brown	N/N	5.0
3	2	1039	CL	red brown	Y/N	69+
4	6	1041	CL/SP	brown	N/N	3-8
-S-1	3	1100	CL	red brown	N/N	~5
7-S-2	6	1110	CL/SP	red brown	Y/N	~84+

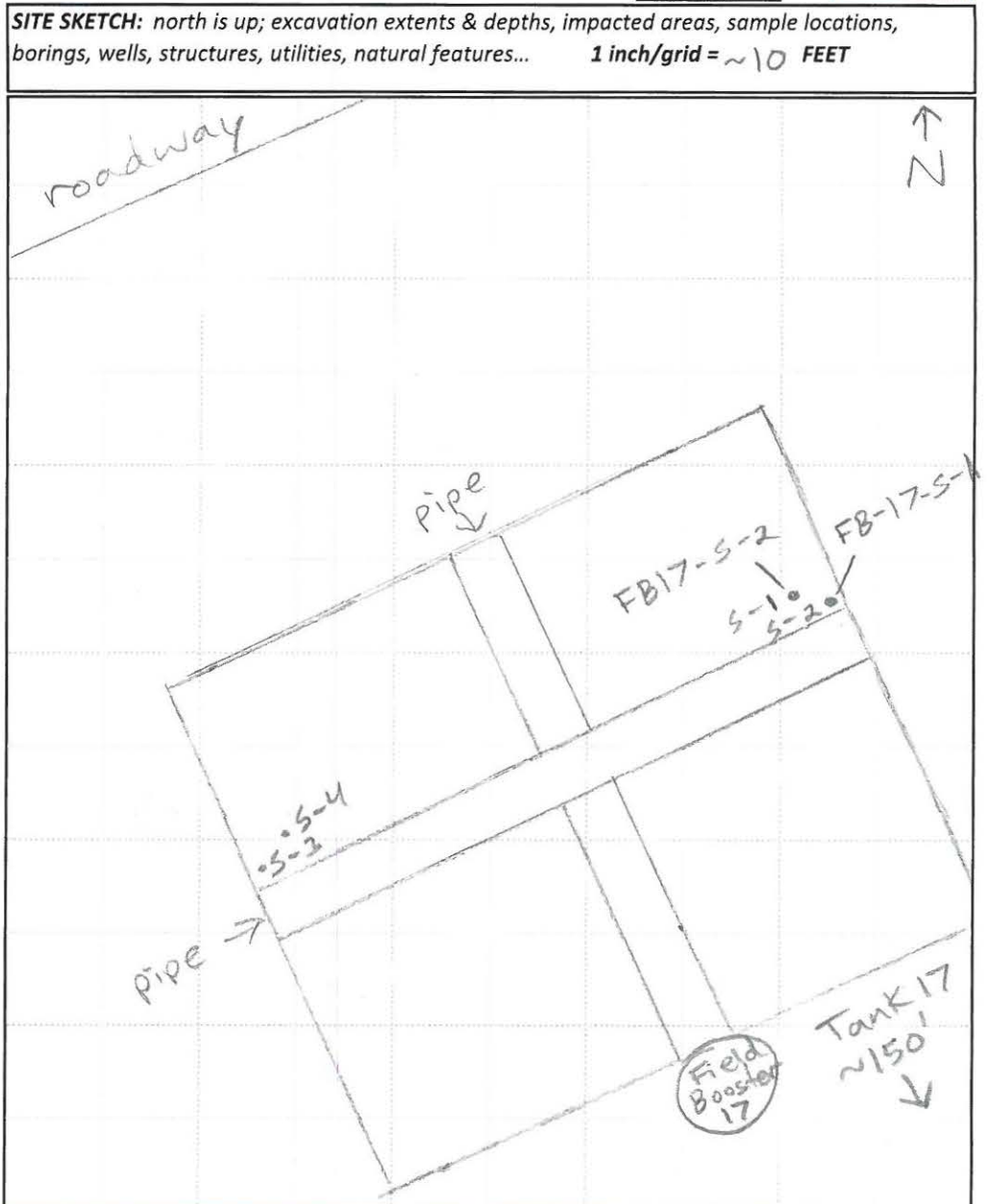


TABLE 1 SHEET 9 OF 11 (Field Booster 17 (excavation); 12/17/2015) SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility FB 216

Date: 4/8/16

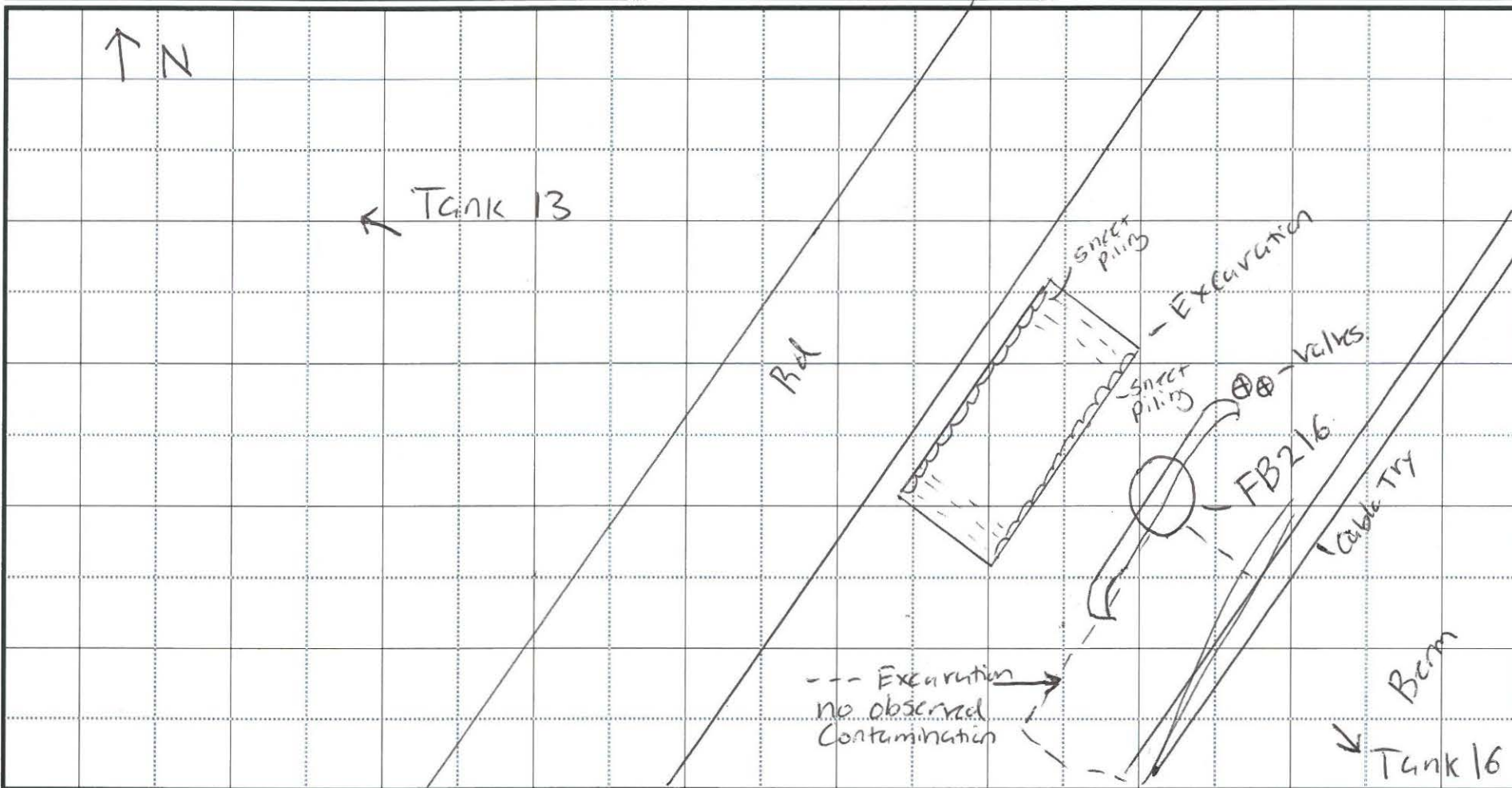
Barr Personnel: NR52

Was a GPS used to document the location of site features? YES or NO

Identify the GPS unit: _____



SITE SKETCH: north is up; DRAW (to scale) AND LABEL THE LOCATION OF THE FOLLOWING SITE FEATURES, if applicable: release location, maximum extent of release impacts, roads, structures, pipelines and pipeline infrastructure, excavations, stockpiles, borings, wells, water tankers/frac tanks, roll-off containers, equipment staging areas, municipal utilities (electric, water, sewer...), culverts, natural features (water bodies, forested areas...), surface water drainage pathways/direction, other site features **1 inch/grid = 20 FEET**



SITE NOTES/LEGEND: Excavation ~ 15' wide x 35' long x 10' deep
 Sheet piling on NE and SW sides. Gravel in base and NW and SE sides
 - NW and SE sides sloped. vertical.

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: Milepost or Facility TK16-13
 Equipment used: PID -ionization detector with 10.6 eV lamp Background Headspace: ___ ppm
 Sample Nomenclature (Location - sample type - #): _____
 Sample Types: R = Removed Sample ; S = Sidewall Sample ; B = Bottom Sample ; Stockpile = Stockpile Sample

Date: 10/15/18
 Sampler: MAG
 Calibration Time: _____



Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/ Discolor	Odor/ Sheen	Headspace Reading (ppm)
File: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/Rainbow	275
13-B-1	14	1440	CL	red-brown	N/N	0.2
B-2						0.4
B-3						0.6
B-4						0.6
B-S-1	2	1450				1.8
S-2						0.2
S-3						0.4
S-4						0.5

SITE SKETCH: north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features... 1 inch/grid = 10 FEET

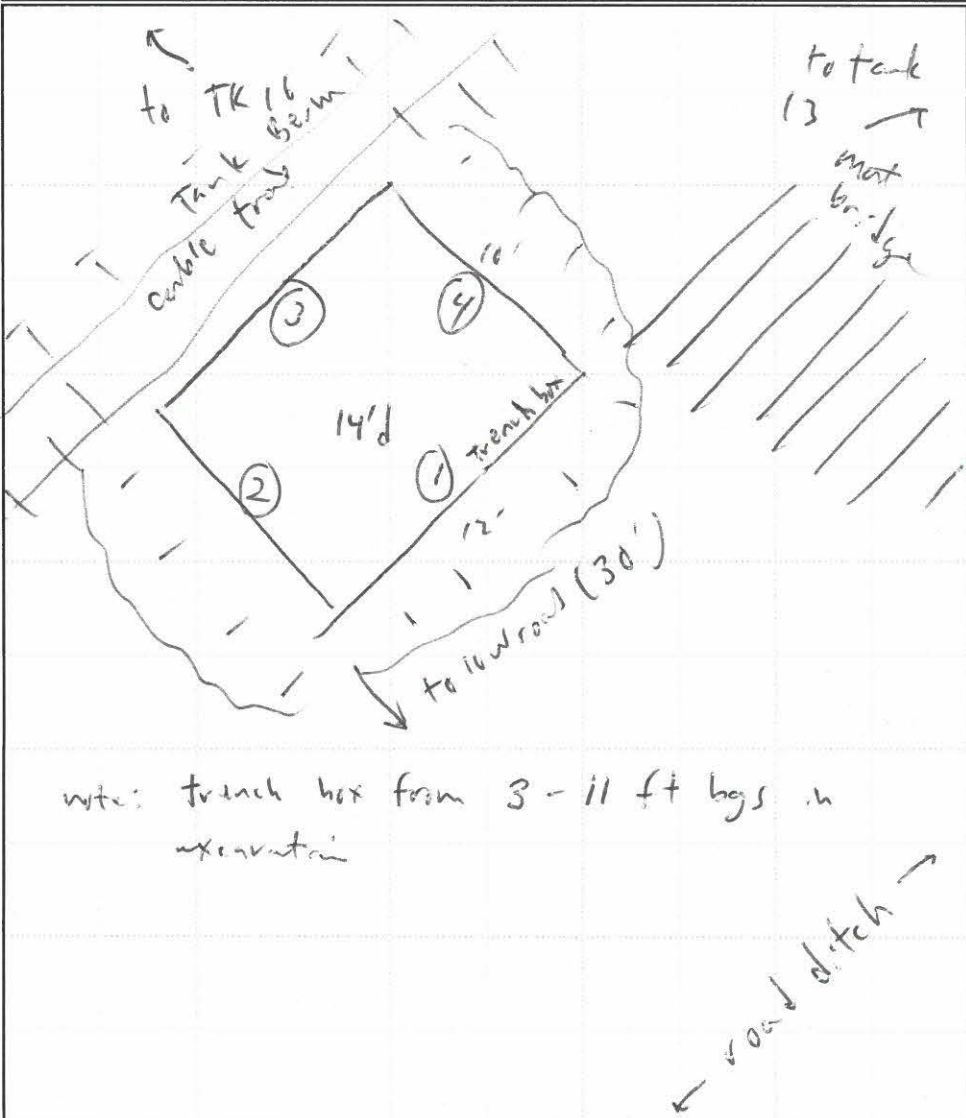


TABLE 1
 SHEET 11 OF 11 (2018 Tank 13/16 Pipeline Excavation; 10/15/2018)
 SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

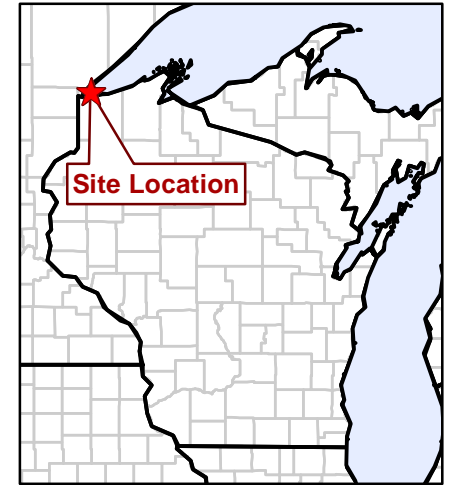
Table 2
Soil Analytical Data Summary
Enbridge Nemdji Corridor Historical Impacts
BRRTS#02-16-513788
Superior, Wisconsin



Parameter		1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Ethyl benzene	Toluene	Xylene, total	Naphthalene	
Effective Date	Exceedance Key								
Wisconsin Groundwater RCLs	06/01/2014	Bold	1.3793 TR mg/kg	1.3793 TR mg/kg	0.0051 mg/kg	0.785 mg/kg	0.5536 mg/kg	1.97 XYL mg/kg	0.3294 mg/kg
Wisconsin Industrial DC RCLs	06/01/2014	No Exceed	219 mg/kg	182 mg/kg	7.41 mg/kg	37 mg/kg	818 mg/kg	258 mg/kg	26 mg/kg
Location	Date	Depth (ft)							
<i>Field Booster 16</i>									
FB16-B-1	3/31/2015	10 ft	0.17 mg/kg	0.095 mg/kg	0.018 j mg/kg	0.032 j mg/kg	< 0.0054 mg/kg	0.16 mg/kg	0.30 mg/kg
FB16-S-1	3/31/2015	3 ft	< 0.0099 mg/kg	3.0 mg/kg	0.0073 j mg/kg	0.46 mg/kg	0.29 mg/kg	0.65 mg/kg	7.1 mg/kg
FB16-S-2	3/31/2015	6 ft	8.1 mg/kg	5.8 mg/kg	0.81 mg/kg	0.35 mg/kg	0.39 mg/kg	7.3 mg/kg	9.9 mg/kg
FB16-S-3	3/31/2015	3 ft	0.012 j mg/kg	0.0080 j mg/kg	< 0.00096 mg/kg	0.014 j mg/kg	< 0.0048 mg/kg	< 0.017 mg/kg	< 0.026 mg/kg
<i>Tank 14/16 Excavation</i>									
TK 14/16-B-1	8/24/2015	6 ft	0.19 mg/kg	< 0.018 mg/kg	0.21 mg/kg	0.24 mg/kg	< 0.017 mg/kg	0.87 mg/kg	0.19 mg/kg
TK 14/16-B-2	8/24/2015	8 ft	1 mg/kg	0.25 mg/kg	0.086 mg/kg	< 0.016 mg/kg	< 0.016 mg/kg	0.36 mg/kg	0.28 mg/kg
TK 14/16-S-1	8/24/2015	1.5 ft	< 0.015 mg/kg	< 0.015 mg/kg	< 0.015 mg/kg	< 0.014 mg/kg	< 0.014 mg/kg	< 0.045 mg/kg	< 0.017 mg/kg
TK 14/16-S-2	8/24/2015	1.5 ft	< 0.015 mg/kg	< 0.016 mg/kg	< 0.015 mg/kg	< 0.014 mg/kg	< 0.014 mg/kg	< 0.046 mg/kg	< 0.017 mg/kg
TK 14/16-S-3	8/24/2015	1 ft	< 0.016 mg/kg	< 0.017 mg/kg	< 0.017 mg/kg	< 0.016 mg/kg	< 0.016 mg/kg	< 0.05 mg/kg	< 0.019 mg/kg
<i>Field Booster 17</i>									
FB17-S-1_3	12/17/2015	3 ft	< 0.011 mg/kg	< 0.023 mg/kg	< 0.012 mg/kg	< 0.012 mg/kg	< 0.017 mg/kg	< 0.041mg/kg	0.100 mg/kg
FB17-S-2_6	12/17/2015	6 ft	0.039 mg/kg	< 0.023 mg/kg	0.024 mg/kg	0.042 mg/kg	< 0.017 mg/kg	< 0.041mg/kg	0.039 mg/kg

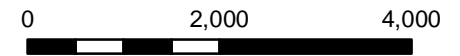
Notes:

RCL = Residual Contaminant Level

DC = Direct Contact



-  Site Location
-  Terminal Property Boundary



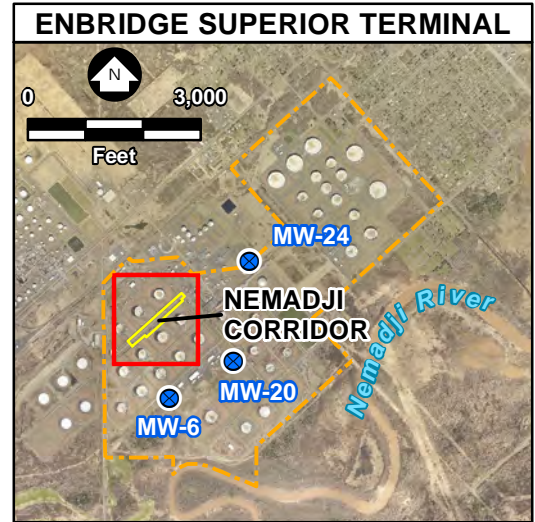
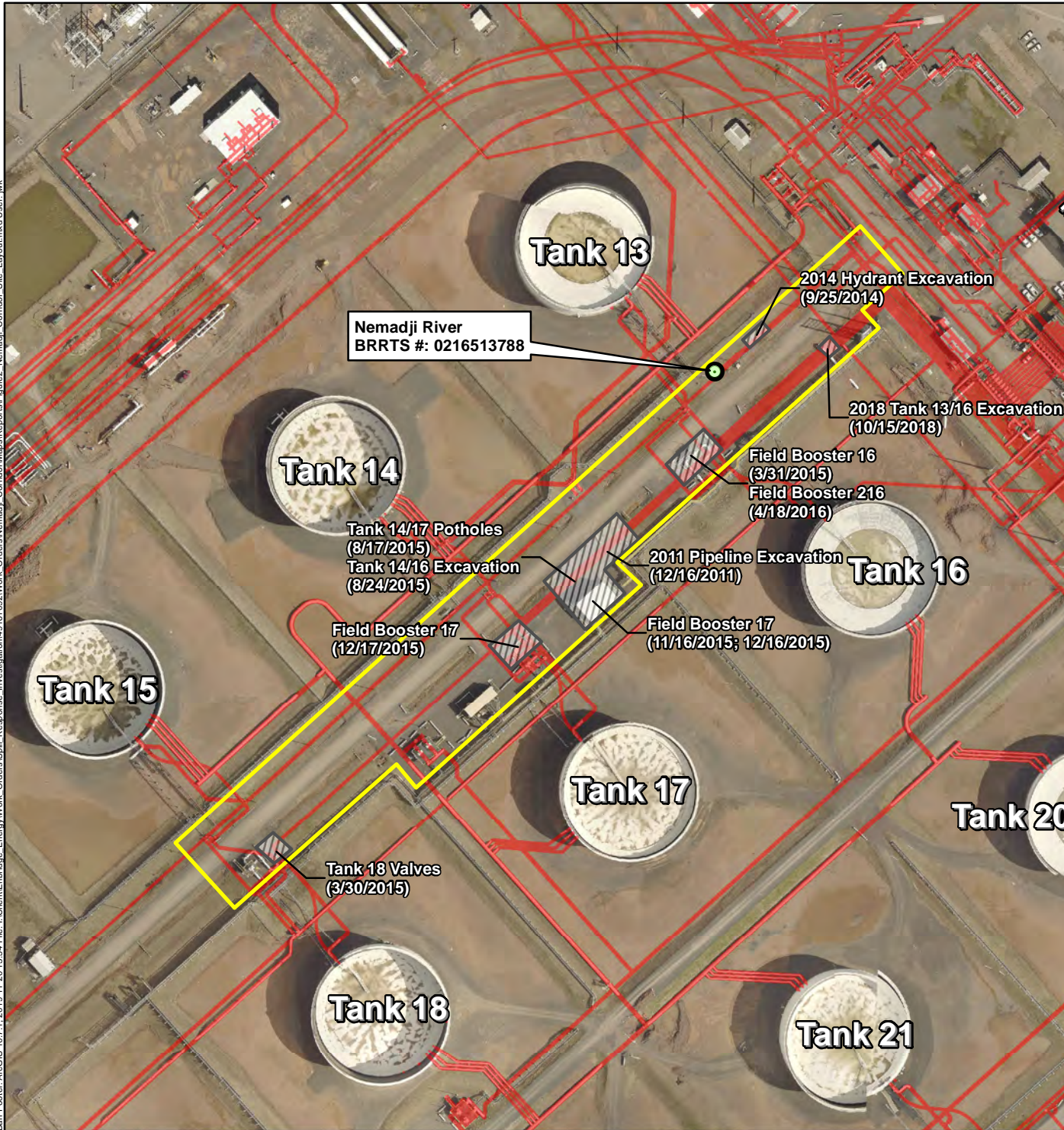
Feet
1 Inch = 2,000 Feet

Figure 1

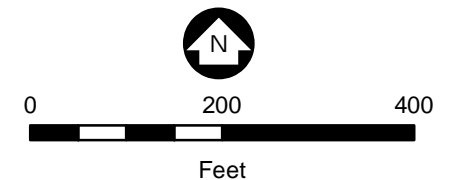
SITE LOCATION
NEMADJI CORRIDOR EXCAVATIONS
SUPERIOR TERMINAL
 Enbridge Energy, L.P.
 Superior, Wisconsin



Barr Footer: ArcGIS 10.7.1, 2019-11-20 13:54 File: I:\Client\Enbridge_Energy\Work_Orders\Spill_Response_Investigation\49161092\Work_Orders\Nemadji_Corridor_Maps\Reports\Figure2_Nemadji_Corridor_Site_Layout.mxd User: jmk



- Closed BRRS Site with continuing obligations
- Excavations with Identified Impacts
- Nemadji Corridor Area
- Monitoring Wells
- Pipeline Infrastructure
- Terminal Property Boundary



1 Inch = 200 Feet
 Douglas County Imagery Circa May, 2019

Figure 2

**SITE LAYOUT
 NEMADJI CORRIDOR EXCAVATIONS
 SUPERIOR TERMINAL**
 Enbridge Energy, L.P.
 Superior, Wisconsin

