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engineering and environmental consultants

BARR

Enbridge Historical Release Technical Memorandum Addendum

To: Alex Smith, Enbridge Energy
From: Ryan Erickson, Barr
Subject: Superior Terminal Historical Release Addendum: Booster Pump 4 / Power Pole Boring Environmental Response
Date: March 22, 2017
Barr Project #: 49161092

<table>
<tr><th colspan="3">Historical Release Site Info</th></tr>
<tr><td rowspan="5">Release Name and Description</td><td colspan="2">Lakehead Pipe Line Co: In April of 1994, approximately 140 barrels of crude oil were released from the Line 4 Booster Pump after a small diameter pipe broke. Approximately 40 barrels reached the ground surface and ran into nearby ditches. The product was recovered with vacuum trucks, skimmers, and remedial excavation and remediation activities were conducted.

MJ Environmental conducted site investigation activities in 1994 and 1997 and, based on those results, the WDNR closed the site in December 1997.

In 2015, residual contamination was also encountered in this location during pipeline construction activity. A summary report was prepared and submitted to the WDNR as a BRRTS addendum to document the conditions that were encountered.</td></tr>
<tr><td>WDNR SERTS Spill ID #</td><td>54880-4601-00</td></tr>
<tr><td>WDNR BRRTS #</td><td>02-16-000512</td></tr>
<tr><td>Release Date</td><td>4/1/1994</td></tr>
<tr><td>WDNR Closure Date</td><td>12/1/1997</td></tr>
<tr><td>Previous Report / Memorandum Names, Consultant, Date</td><td colspan="2">1. Release Initial Response and Investigation Report, Lakehead Pipe Line Company, Superior Terminal, MJ Environmental, June 1994.
2. Site case summary and WDNR close out form, MJ Environmental, August 1997.
3. Superior Terminal Pipeline Enhancement Project Environmental Oversight - Addendum F: Superior Terminal Tank 20 Historical Contamination, Barr Engineering, January 2017.</td></tr>
<tr><td>GIS Registry Update included?</td><td colspan="2">Not applicable</td></tr>
</table>

Historical Release Documentation provided in Attachment A.

Updated Project Info			
Project Name and Description	**Power Pole Boring Environmental Response:** In February of 2017, Enbridge conducted a power line construction project. In order to install the power line poles, 6 foot wide, 45 foot deep auger borings were advanced in each pole location for its footing. Upon completion of each boring, the concrete and steel footing structure was constructed the same day. On February 18 and February 20, 2017, the boring contractor encountered soil with a hydrocarbon odor in soil borings (SB) #14 (Photo 1) and #15, respectively. These borings are located within the Tank 20 containment berm and in the vicinity of the historical Booster Pump 4 release. Enbridge Environment notified Barr about the potential impacts and Barr first responded to the site on February 20, 2017.		
SERTS / BRRTS # ***(if applicable)***	02-16-000512 (Historical)		
Date Historical Contamination was Encountered	February 18, 2017	**Date Work Completed**	February 20, 2017
WTM Coordinates of Current Activity	362750.0296	692429.6967	
Description of Remedial Actions, Site Assessment, and Historical Site Correlation	Barr was on site on February 20, 22, and 23, 2017 to assess the environmental conditions encountered in soil borings 14, 15, 16, and 21 (Figure 2; Attachment B), as described below. Barr field screened soil with a photoionization detector (PID) with an 11.7 eV bulb and documented other evidence of contamination (discoloration, odor, sheen). Analytical samples were collected from the identified contaminated soil for waste characterization and contaminant confirmation purposes and were sent to the ALS Environmental Laboratory in Holland, MI for analysis. Analytical results are summarized in Table 1 and the laboratory reports are in Attachments C and D. - *Soil Boring 14:* The boring was advanced on February 18, 2017 (Photo 1). The contractor segregated soil cuttings with evidence of contamination (hydrocarbon odor) in a plastic-lined and covered stockpile (Photos 3 and 4) within the Tank 20 containment basin. Based on field observations, there was approximately 39 cubic yards of soil in the stockpile. On February 20, 2017, Barr collected 14 field screening samples (SP-1 through SP-14) from the contaminated stockpile and three of the samples (*SP-3*, *SP-4*, *SP-10*) had headspace readings greater than 10 parts per million (ppm). *SP-4* had the highest headspace reading of 32.8 ppm. Waste characterization samples *TK20-Stockpile-1* and *TK20-Stockpile-2* were collected from the stockpile and were analyzed for diesel range organics (DRO) and benzene, toluene, ethyl benzene, and xylenes		

	(BTEX). The original depth of the soil samples could not be verified because the soil was in stockpile; however, the analytical sample results have been included in Table 1 for reference. The detected analyte concentrations were below WDNR groundwater and direct contact residual contaminant levels (RCLs) except for the benzene detection in *TK20-Stockpile-1;* which exceeded the groundwater RCL but not the direct contact RCL. - *Soil Boring 15:* The boring was advanced on February 22, 2017. Barr was onsite during the boring activity to field screen the soil cuttings as they were removed from the boring. Soil with an elevated headspace detections (25.3 to 1,323 ppm) was encountered from approximately 5 feet below ground surface (bgs) to 18 feet bgs. The highest headspace detection (1,323 ppm) was from screening sample *SB-5*; which was collected from soil at approximately 10-12.5 bgs. Soil from approximately 18 feet bgs to 45 feet bgs had headspace detections between 0.6 and 1.5 ppm. Analytical soil sample *TK20-SB15-1* was collected from boring cuttings from the 5 to 10 foot bgs interval. The sample was analyzed for petroleum volatile organic compounds (PVOC's) + naphthalene. Each of the analytes was detected at concentrations below WDNR direct contact RCLs. Analyte concentrations exceeded WDNR groundwater RCLs for 1,2,4-trimethyl benzene, 1,3,5-trimethyl benzene, benzene, and total xylenes. - *Soil Borings 16 and 21:* The borings were advanced on February 23, 2017. Barr was onsite during boring activity due to *SB-16*'s proximity to the historical release site. Soil boring *SB-16* soil was field screened from 0 to 25 feet bgs and headspace detections were between 0.1 and 0.2 ppm and no evidence of hydrocarbon contamination was identified by Barr or the contractor. Soil boring *SB-21* soil was field screened from 10 to 15 feet bgs and headspace detection was 0.2 ppm and no evidence of hydrocarbon contamination was identified by Barr or the contractor. Additional borings were advanced to the north and the south of the borings listed above (Figure 2) and no evidence of hydrocarbon contamination was reported by the contractor. Clean fill was used to backfill any void space around the power pole structures. No evidence of contaminated soil in the direct contact zone was identified by Barr or the contractors. Contractors working at the Superior Terminal are aware of and are trained to manage soil with potential contamination. The contaminated soil was located within the Tank 20 containment basin; therefore, there is little to no risk to surface water receptors. There are no nearby groundwater receptors and the Superior Terminal monitoring well network is sampled on a semi-annual basis and the data is provided to WDNR. There are no vapor receptors within 100 feet of the site.

Waste Management Summary	Soil with evidence of hydrocarbon contamination (headspace > 10 ppm, hydrocarbon odor) was segregated for offsite management. Barr collected waste characterization soil samples *TK20-Stockpile-1* and *TK20-Stockpile-2* on February 20, 2017 and submitted them to the ALS Laboratory for analysis of DRO and BTEX. The laboratory results and a waste profile application were submitted to the VONCO V landfill in Duluth, Minnesota. The profile (#17-019-I) was approved and 80.93 tons of soil were transported to the landfill on March 14, 2017. Waste management documentation is provided in Attachment D.
Discussion / Conclusion	Enbridge believes that the contaminated soil encountered in the borings should be attributed to the historical 1994 crude oil release based on the following information: 1. No new or active releases were identified in this area. 2. The borings are in the proximity (~100-250 feet north) of a large (140 bbl) historical release (1994) where residual impacts were left in place at the time of site closure. Buried pipeline infrastructure also connects the release and boring areas. 3. The physical characteristics of the contaminated soil cuttings (elevated headspace, strong hydrocarbon odor, no discoloration) are consistent with the contaminated soil that was observed in the 2015 Pipeline Enhancement Project Excavations (Barr, 2017) approximately 75 feet to the south. The Pipeline Enhancement contamination was also attributed to the 1994 release. No contamination was identified in the direct contact zone and no analyte concentrations exceeded WDNR direct contact criteria. Analyte concentrations did exceed WDNR groundwater criteria; however, no receptors were identified and the groundwater conditions at the Terminal are regularly monitored. No surface water or vapor receptors were identified as being at risk. Based on field observations and the above information, Barr believes that no additional remediation or investigation work is required at this site and that this document can serve as an addendum to the existing BRRTS file #02-16-000512.

Attachments:

Site Photos	1 through 5
Table 1	Soil Sample Analytical Summary
Figure 1	Site Location
Figure 2	Site Layout
Attachment A	Historical Release Documentation
Attachment B	Site Investigation Field Sampling and Screening Logs
Attachment C	Soil Sample Laboratory Report
Attachment D	Waste Management Documentation

Site Photos

Photo 1

Photo 2

Photo 1: Auger rig working on soil boring 14. Photo taken facing west on February 18, 2017.
Photo 2: Soil boring 15. Photo taken facing southwest on February 22, 2017.

Photo 3

Photo 4

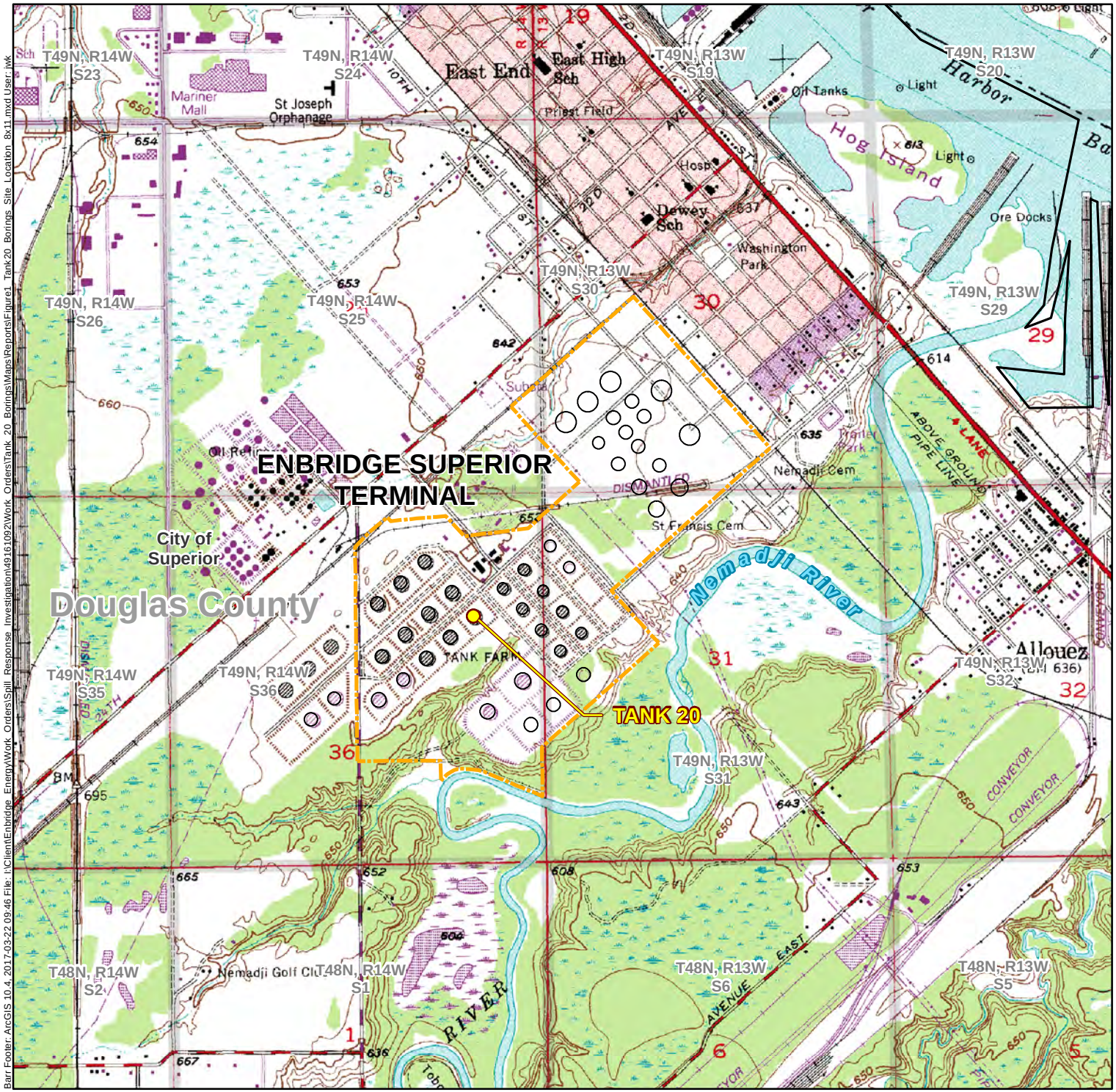
Photo 3: Soil boring 14 auger cuttings. Photo taken on February 18, 2017.
Photo 4: Contaminated soil stockpile in the Tank 20 basin. Photo taken on February 20, 2017.

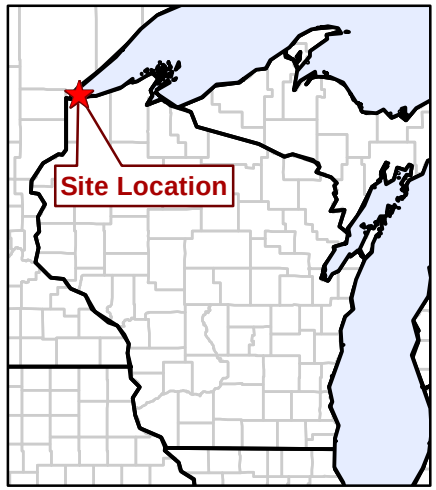
Photo 5: Contaminated soil in stockpile on February 20, 2017.

TABLE 1: Analytical Soil Sample Results *(all analyte concentrations in mg/kg)*

Sample ID	Sample Date	Boring/ Sample Depth (feet)	1,2,4-Trimethyl benzene	1,3,5-Trimethyl benzene	Benzene	Ethyl benzene	Toluene	Total Xylenes	Naphthalene	DRO
Groundwater RCLs			***1.3821***	***1.3821***	***0.0051***	***1.57***	***1.1072***	***3.96***	***0.6582***	
Industrial DC RCLs			*219*	*182*	*7.41*	*37*	*818*	*260*	*26*	
TK20-SB15-1	2/22/2017	SB-15 5-10	**5.3**	**2.6**	**2.2**	**1.3**	**0.035**	**30**	**0.230**	NS
TK20-Stockpile-1	2/20/2017	SB-14 NA	NS	NS	**0.054**	**0.058**	**0.027**	**1.2**	NS	**19**
TK20-Stockpile-2	2/20/2017	SB-14 NA	NS	NS	<0.012	<0.012	<0.017	<0.150	NS	**7.9**

BOLD = Analyte detections
Underlined = Analyte detections exceeding WDNR Groundwater RCLs.
NS = Analysis not conducted





Site Location

Tank 20

Terminal Property Boundary

N

0 2,000 4,000

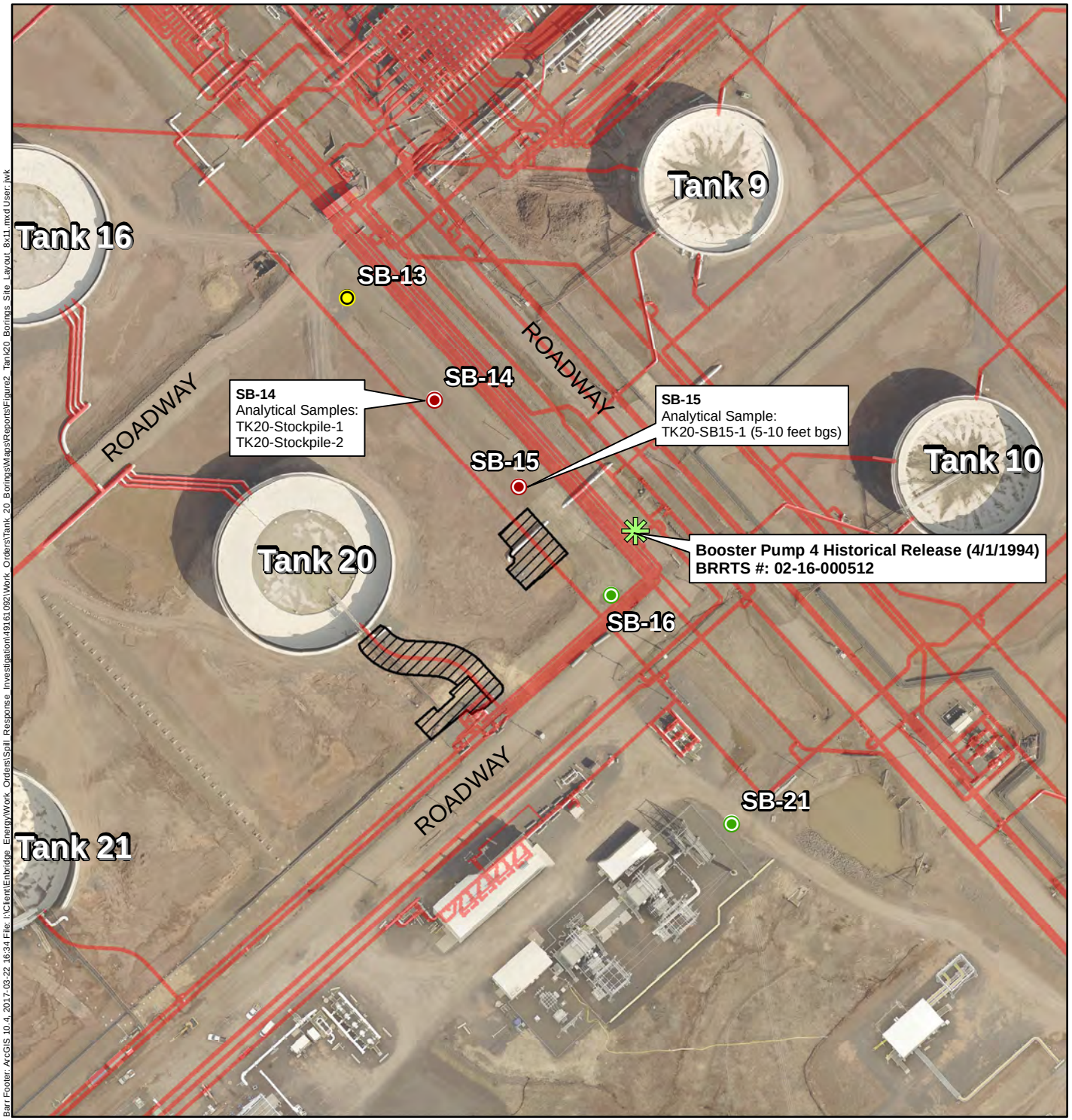
Feet

1 Inch = 2,000 Feet

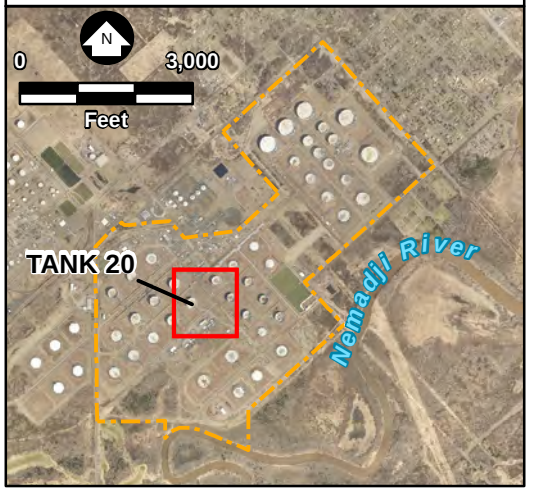
Figure 1

SITE LOCATION
TANK 20 POWER POLE BORINGS
SUPERIOR TERMINAL
Enbridge Energy, L.P.
Superior, Wisconsin

ENBRIDGE



ENBRIDGE SUPERIOR TERMINAL



Historical Release Location

Power Pole Borings

- Boring with identified contamination (Barr)
- Boring with no identified contamination (Barr)
- Boring with no contractor reported contamination

2015 Terminal Enhancment Project Excavations

Pipeline Infrastructure

Terminal Property Boundary

N

0 150 300

Feet

1 Inch = 150 Feet

Douglas County Imagery Circa May, 2016

Figure 2

SITE LAYOUT
TANK 20 POWER POLE BORINGS
SUPERIOR TERMINAL
Enbridge Energy, L.P.
Superior, Wisconsin

ENBRIDGE

Attachment A

Historical Release Documentation

Wisconsin
Department of Commerce

ENVIRONMENTAL & REGULATORY SERVICES DIVISION
P. O. Box 530
Park Falls, Wisconsin 54552

Tommy G. Thompson, Governor
William J. McCoshen, Secretary

September 29, 1997

Ms. Dana Slade
Lakehead Pipe Line Company, Inc.
21 West Superior Street
Duluth, MN 55802-2097

Subject: **Close-out of Case # 02-16-000512**
Lakehead Pipe Line Company
2800 East 21st Street
Superior, WI 54880

Dear Ms. Slade:

On September 22, 1997 the above site was reviewed for closure by the Site Review staff of the PECFA Bureau. Because the site involved only soil contamination, without a threat to groundwater, all issues relating to this site are administered by the staff within the Department of Commerce's PECFA Bureau. Using the standards established in NR 700, the Department has determined that this site has been remediated to a level protective of the environment and human health. The Department considers this site to meet environmental standards, and no further action is necessary other than putting a notice of the remaining contamination on the deed for this property..

This is based upon the information provided to us by your consultant. If, in the future, site conditions indicate that any contamination that might remain poses a threat, the need for further remediation would be determined and required if necessary.

I have included an example of a deed notice and once you or your consultant have the draft written up please send it to me. After I approve the draft then all you have to do is send me a copy of the final notice and a copy of the receipt that it has been placed on the deed.

Thank you for your efforts in the protection of the environment. If you have any additional questions, please call me at 715-762-5557.

Sincerely,

Shanna L. Laube
Hydrogeologist
PECFA Program

cc:

ENVIRONMENTAL & REGULATORY SERVICES DIVISION
P. O. Box 530
Park Falls, Wisconsin 54552

Wisconsin
Department of Commerce

Tommy G. Thompson, Governor
William J. McCoshen, Secretary

December 1, 1997

Ms. Janice Pufall
Lakehead Pipe Line Company Inc
Lake Superior Place
21 West Superior Street
Duluth MN 55802-2067

Subject: **Close-out of Case #54880-4601-00 / BRRTS # 02-16-000512**
Lakehead Pipe Line Company
2800 E 21 Street
Superior, WI 54880

Dear Ms. Pufall:

On December 1, 1997 the final copy of the deed notice was received by this office of the Department of Commerce. The Department considers this site to meet environmental standards, and no further action is necessary.

This is based upon the information provided to us by your consultant. If, in the future, site conditions indicate that any contamination that might remain poses a threat, the need for further remediation would be determined and required if necessary.

Thank you for your efforts in the protection of the environment. If you have any additional questions, please call me at 715-762-5557.

Sincerely,

Shanna L. Laube
Hydrogeologist
PECFA Program

cc:

OMB No. 2137-0047

ACCIDENT REPORT-HAZARDOUS LIQUID PIPELINE

Report Date 4/25/94

No. 7000-1 (DOT)

PART A—OPERATOR INFORMATION

1.) Name of operator Lakehead Pipe Line Company

2.) Principal business address 21 W. Superior St., Lake Superior Place, Suite 400

Duluth (city) MN (state) 55802 (zip code)

3.) Is pipeline interstate? ☒ yes ☐ no

PART B—TIME AND LOCATION OF ACCIDENT

1.) Date: (month) April (day) 1 (year) 1994

2.) Hour (24 hour clock) 07:40 MST

3.) If onshore give state *(including Puerto Rico and Washington, D.C.)*, and county or city. Wisconsin, Douglas County, Superior

4.) If offshore, give offshore coordinates

5.) Did accident occur on Federál Land? ☐ yes ☒ no
(See instructions for definition of Federal Land.)

6.) Specific location *(If location is near offshore platforms, buildings, or other landmarks, such as highways, waterways, or railroads, attach a sketch or drawing showing relationshp of accident location to these landmarks)*
Lakehead's Superior, Wisconsin Terminal located within the City of Superior, Wisconsin, 2800 E. 21st St.

PART C—ORIGIN OF RELEASE OF LIQUID OR VAPOR.

(Check all applicable items)

1.) Part of system involved:
☐ line pipe ☒ tank farm ☐ pump station

2.) Item Involved: ☐ pipe ☐ valve ☐ scraper trap ☐ pump
☒ welding fitting ☐ girth weld ☐ tank
☐ bolted fitting ☐ longitudial weld

Other *(specify)*

3.) Year item installed 1952 (Booster pumps & assoc. piping)

PART D—CAUSE OF ACCIDENT

☐ corrosion ☐ failed weld ☐ incorrect operation by operator personnel
☐ failed pipe ☒ outside force damage
☐ malfunction of control or relief equipment.
☐ other *(specify)*

PART E—DEATH OR INJURY

1.) Number of persons killed. 0
____ Operator employees ____ Non-employees

2.) Number of persons injured. 0
____ Operator employees ____ Non-employees

PART F—ESTIMATED TOTAL PROPERTY DAMAGE

$ 25,000

PART G—COMMODITY SPILLED

1.(Name of commodity spilled: Crude oil

2.) Classification of commodity spilled:
☒ Petroleum Petroleum product ☐ HVL or ☐ Non-HVL

3.) Estimated amount of commodity involved
140 Barrels spilled 140 Barrels recoverd

4.) Was there an explosion?
☐ yes ☒ no

5.) Was there a Fire?
☐ yes ☒ no

INSTRUCTIONS: Answer sections H, I, or J only if it applies to the particular accident being reported.

PART H—OCCURRED IN LINE PIPE N/A

1.) Nominal diameter *(inches)* _____ 2.) Wall thickness *(inches)* _____
3.) SMYS *(psi)* _____ 4.) Type of joint: ☐ welded ☐ flanged ☐ threaded ☐ coupled ☐ other
5.) Pipe was ☐ Below ground ☐ Above ground
6.) Maximum operating pressure *(psig)* _____
7. Pressure at time and location of accident *(psig)* _____
8.) Had there been a pressure test on system?
☐ yes ☐ no
9.) Duration of test *(hrs)* _____
10.) Maximum test pressure *(psig)* _____
11.) Date of latest test _____

PART I—CAUSED BY CORROSION N/A

1. Location of corrosion
☐ internal ☐ external
2. Facilty coated?
☐ yes ☐ no
3. Facilty under cathodic protection?
☐ yes ☐ no
4. Type of corrosion
☐ galvanic ☐ other *(Specify)*

_____

PART J—CAUSED BY OUTSIDE FORCE (2-5 not applicable)

1. ☐ Damage by operator or its contractor
☐ Damage by others
☒ Damage by natural forces
☐ Landslide
☐ Subsidence
☐ Washout
☐ Frostheave
☐ Earthquake
☐ Ship anchor
☐ Mudslide
☐ Fishing Operations
Other _____
2. Was a damage prevention program in effect
☐ yes ☐ no
3. If yes, was the program
☐ "one-call" ☐ other _____
4. Did excavator call?
☐ yes ☐ no
5. Was pipeline location temporarily marked for the excavator?
☐ yes ☐ no

PART K—ACCOUNT OF ACCIDENT

Following pump-out of water accumulated in operator's field booster pumphouse on 3/31/94, an ice layer formed on inside concrete walls. On 4/1/94 ice apparently broke loose and struck a 1/2 inch nipple, breaking it from the booster pump piping. Oil filled the building sump, and approximately 40 barrels overflowed into the nearby ditch/flume system and was confined to company property. The pump and line were not being used at the time so no shutdown was necessary, however, booster pump valves were closed to isolate the section.

Oil in the building sump was recovered and oil in the ditch was intentionally flushed into the flume basin and recovered with a skimmer. The release was telephonically reported to the WI Dept. of Natural Resources.

NAME AND TITLE OF OPERATOR OFFICIAL FILING THIS REPORT.

[signature], Jon E. Staudohar, Director Corporate Services

(218) 725-0103
Telephone no. *(Including area code)*

April 25, 1994
Date

Case Summary:

Lakehead Pipe Line Company's Booster Pump #4 Release, Terminal, Superior, WI

- April 1, 1994- Release of crude oil from Booster Pump #4 at Lakehead Pipe Line Company's (LPL) Terminal in Superior, WI occurs. LPL personnel halt release, recover product, repair faulty valve and report to the Wisconsin Department of Natural Resources (DNR).

- April 8, 11, 12, 13, and 14, 1994- MJ Environmental Consultants, Inc. (MJ) of Duluth, MN is retained by LPL to monitor the excavation of crude impacted soils. Approximately 325 cubic yards of soil is excavated. MJ installed one test pit and 69 hand auger borings to determine if excavation removed impacted soil. Based on the results of their investigation, MJ determined that excavation adequately addressed the impacted soils in the downstream portions of the release area. However, in the area closest to the point of release residual crude impacts remained.

- June 1, 1994- MJ is granted approval by the DNR to thermally treat the excavated soil at Lakehead Blacktop & Material of Superior, Inc. The 455 tons of excavated soils were subsequently treated.

- June 29, 1994- The results of MJ's investigation were submitted to Mr. Steve LaValley of the DNR in a report entitled "*Release Initial Response and Investigation report, Lakehead Pipe Line Company, Superior Terminal, June 1994 (MJ report)*".
- August 5, 1994- Revisions to the MJ report are submitted to Mr. Steve LaValley of the DNR.

- November 1996- Mr. Steve LaValley requests that LPL further evaluate the extent of impacted soils in the vicinity of the April 1, 1994 release adjacent to the pump house for booster pump #4.

- July 1997- In response to the request by Mr. Steve LaValley, LPL conducted 9 additional hand auger borings in the vicinity of the pump house for booster pump #4 and defined the horizontal and vertical extent of the impacted soil. The results of this additional investigation are presented in this report.

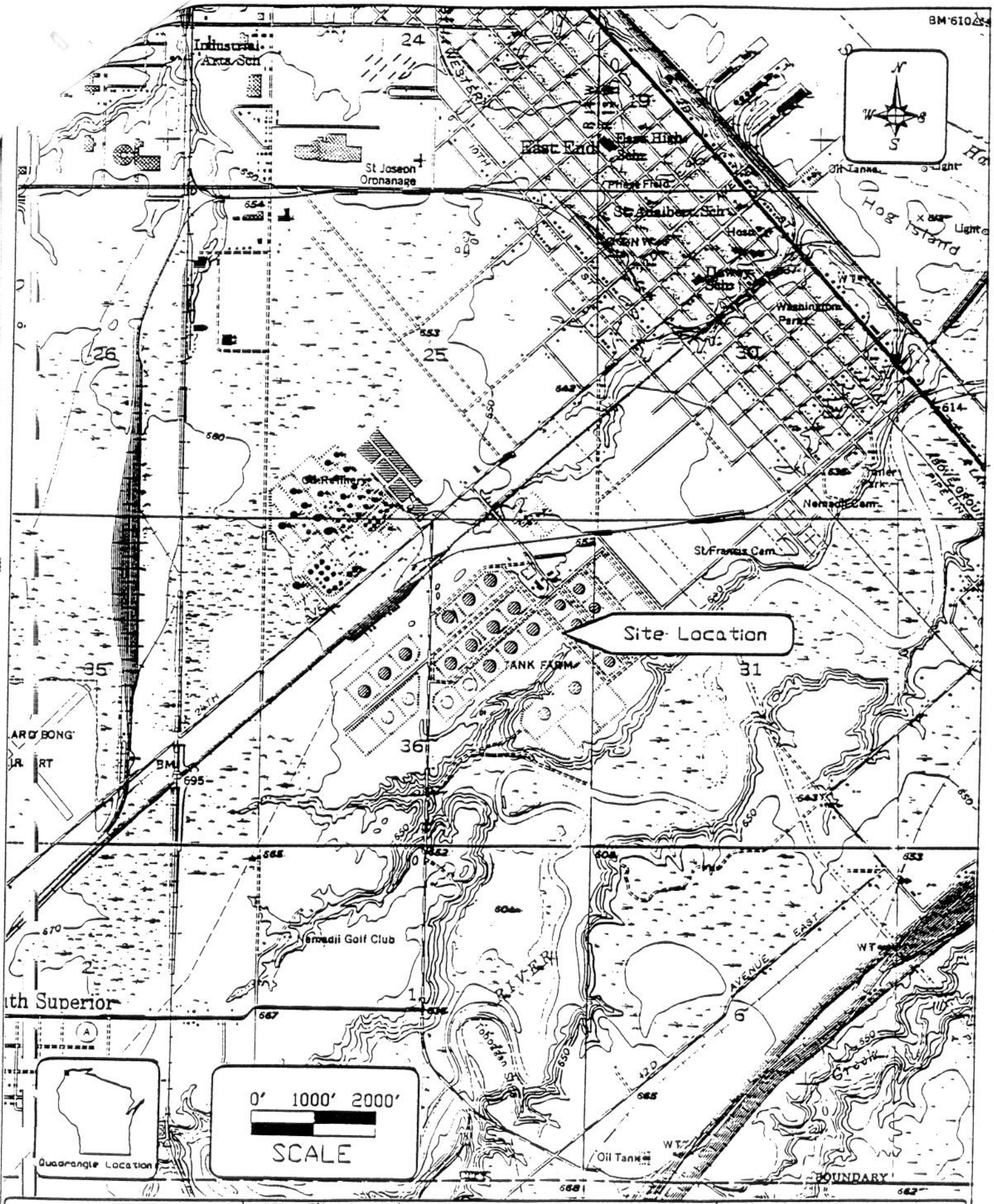
- August 1997- LPL submits Case Summary and Close Out Form with supporting documentation to the DNR. LPL requests leaksite closure.

Justification For Closure:

Lakehead Pipe Line Company's Booster Pump #4 Release, Terminal, Superior, WI

The results of the additional investigation indicate that a limited volume of petroleum impacted soils remain in the vicinity of the pump house for booster pump #4 at the site. The impacted soils are in close proximity (within 4 feet) of the existing pump house. Therefore excavation of these soils is not practical at this time. Analytical laboratory results of samples collected from areas of elevated field screening results indicate that minor concentrations (less than the respective generic cleanup criteria) of petroleum volatile organic compounds (PVOCs) and minor concentrations (less than 100 milligrams per kilogram each) of polyaromatic hydrocarbons (PAHs) were detected. Furthermore, the release occurred in the geographic center of the LPL terminal on horizontally (>10 square miles) and vertically (>50 feet) extensive lean clay that is at least 20 feet above the shallow aquifer in the vicinity of the site. Public access to the release location is restricted (the release occurred within the restricted access fenceline of the terminal property), so public exposure to the impacted soils would be unlikely. In addition, as indicated in the Case Summary and Close Out Form, no known wells were identified within 1,200 feet of the release. Therefore, it is the opinion of LPL that impacts from this release to off-site entities and/or to the shallow aquifer appear to be unlikely.

Based on the results of the additional investigation conducted by LPL at the request of Mr. Steve LaValley of the DNR, LPL believes that the material presented in this report and previous reports submitted by MJ, LPL's consultant, illustrate that the release of April 1, 1994 has been adequately addressed. Therefore, LPL requests that you consider this release for closure with deed restrictions, and allow the remaining petroleum impacted soil to naturally attenuate and biodegrade.



MJ
ENVIRONMENTAL CONSULTANTS INC.

TITLE: Site Location Map
USGS Superior, WI.
Lakehead Pipe Line Superior Terminal
Superior, Wisconsin

REVISED	
DATE	BY

DWN E
APPROVED KS
DATE 06/12/94

FIGURE # 1

TABLE 2
SUMMARY OF ANALYTICAL SOIL CHEMISTRY RESULTS
[Milligrams per kilogram (mg/kg)]

PARAMETER	SAMPLE LOCATION/DEPTH			REGULATORY CRITERIA*
	HA-101 2.5 FT.	HA-104 2.5 FT.	HA-108 2.5 FT.	
Fluorene	58	41	<22	NE
2-methylnaphthalene	19	61	<20	NE
Acenaphthylene	43	30	<18	NE
Anthracene	26	42	<17	NE
Benzo(a)anthracene	51	<15	<16	NE
Benzo(a)pyrene	50	<15	<15	NE
Benzo(b)fluoranthrene	47	<18	<19	NE
Benzo(g,h,i)perlene	23	<17	<18	NE
Benzo(k)fluoranthene	37	<17	<17	NE
Chrysene	45	<16	<17	NE
1-methylnaphthalene	<20	47	<22	NE
Fluoranthene	89	72	<18	NE
Naphthalene	48	48	<19	NE
Phenathrene	66	230	<20	NE
Pyrene	77	44	<18	NE
Indeno(1,2,3-cd)pyrene	28	<17	<17	NE
Toluene	<25	52	<25	1500
1,3,5-trimethylbenzene	<25	520	<25	NE
Total xylenes	<25	620	<25	4100

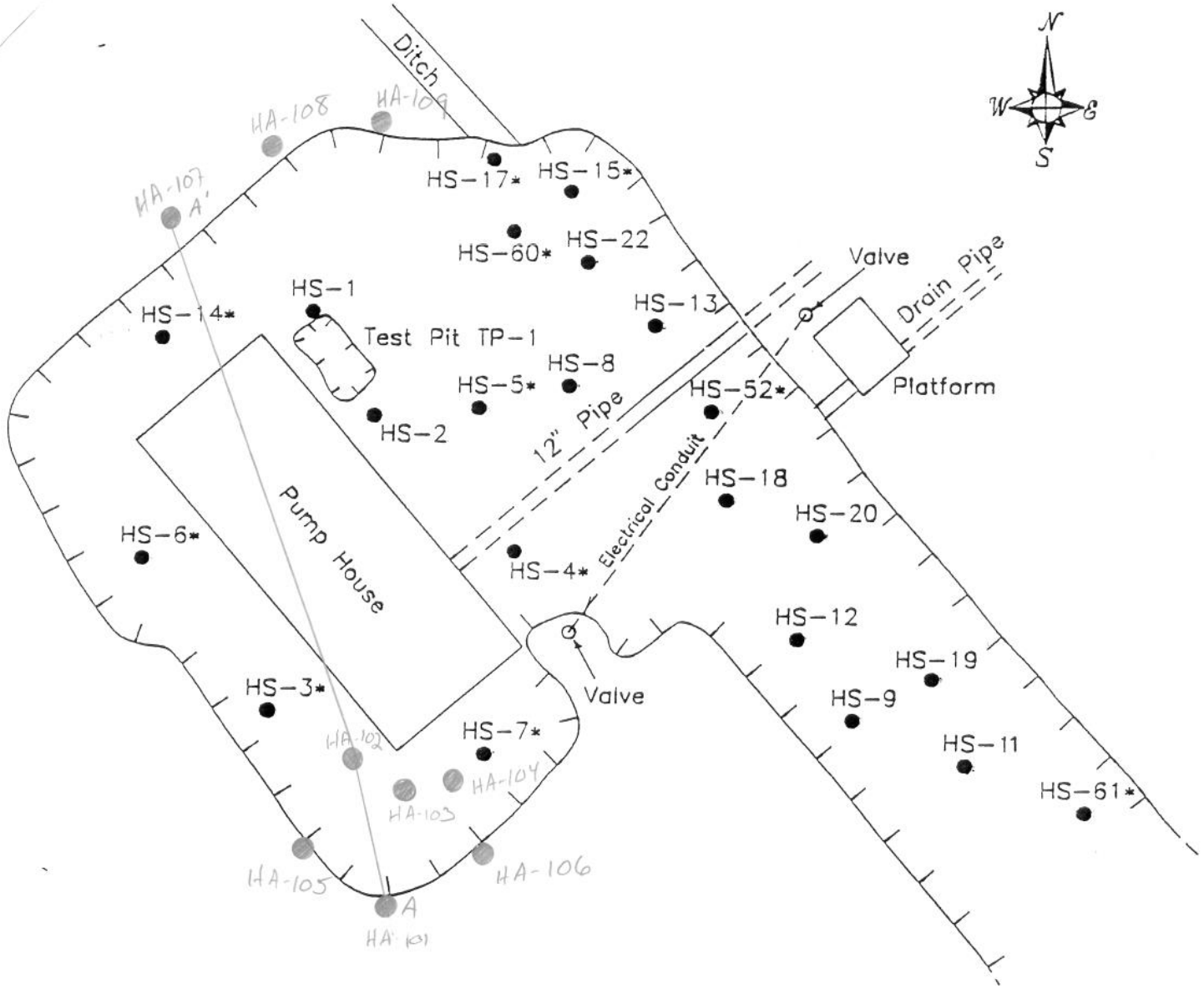
* Generic criteria for assessing petroleum impacted soils.
Only those compounds detected at or above the laboratory method detection limit are included in this table.
NE indicates that no regulatory criteria established for this compound.

TABLE 1
HEADSPACE RESULTS SUMMARY

LOCATION	DEPTH (FEET)	RESULTS (PPM)
HA-101	1.0-1.5	130*
	2.0-2.5 **STL**	361*
HA-102	1.0-1.5	152*
	2.0-2.5	165*
HA-103	1.0-1.5	1.8*
	2.0-2.5	219*
HA-104	1.0-1.5	345*
	2.0-2.5 **STL**	203*
HA-105	1.0-1.5	226*
	2.0-2.5	1.9
HA-106	1.0-1.5	0.0
	2.0-2.5	0.0
HA-107	1.0-1.5	6.2
	2.0-2.5	6.2
HA-108	1.0-1.5	1.2
	2.0-2.5 **STL**	1.2
HA-109	1.0-1.5	0.0
	2.0-2.5	0.3

STL means submitted to laboratory for PAH and PVOC analysis.

* Results from PID with old dirty lamp. Remainder of results are from PID with new lamp. Therefore, it is the opinion of LPL that these results are not truly indicative of the chemical composition of the soil samples.



Legend

HS-1

HA-101

Cross Section Location A(HA-101) to A'(HA-107)

0' 5.0' 10'

SCALE

MJ

ENVIRONMENTAL CONSULTANTS INC.

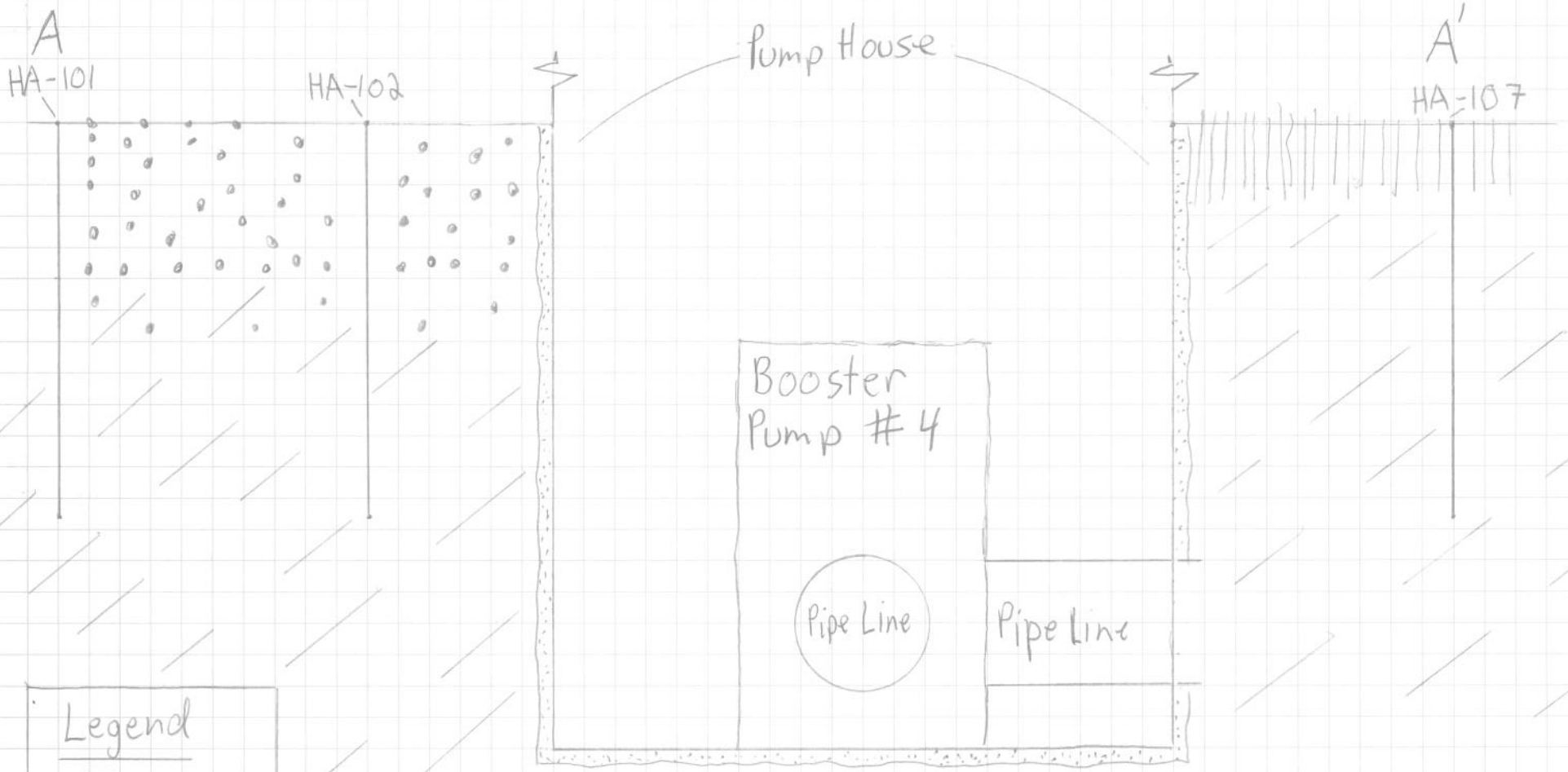
TITLE: Detail of Excavated Area in Pump House Vicinity, Showing Locations of Soil Vapor Headspace Samples (* indicates in-situ sample) Superior, Wisconsin

REVISED		DWG.
DATE	BY	E
		LAYOUT BY
		KS

DATE 06/12/94

FIGURE # 3

Cross Section A-A'
Lakehead Pipe Line, Superior Terminal, Booster Pump # 4
Superior, WI



Legend
- Concrete
- Gravel
- Topsoil
- Clay

Scale
1" Horizontal = 5'
1" Vertical = 1'

Hand Auger Width = 0.5 feet

PREVIOUSLY SUBMITTED DOCUMENTATION
APRIL 1, 1994 RELEASE
BOOSTER PUMP #4
LAKEHEAD PIPE LINE TERMINAL
SUPERIOR, WISCONSIN

Information originally submitted by MJ Environmental in June and August 1994.

Table 1

April 1994 Excavation Activity
Soil Headspace Vapor Readings

Sample No.	Depth Below Original Surface Contour, feet	Soil Type	Soil Headspace Vapor Reading, ppm
HS-1	1	lean clay	17
HS-2	1	lean clay	445
HS-3*	1.5	lean clay	4
HS-4*	1.5	lean clay	160
HS-5*	1.5	lean clay	358
HS-6*	1	lean clay	37
HS-7*	1	lean clay	470
HS-8	1.5	lean clay	533
HS-9	1	lean clay	506
HS-10	1.5	lean clay	16
HS-11	2	lean clay	7
HS-12	2	lean clay	2
HS-13	2	lean clay	24
HS-14*	0.5	lean clay	13
HS-15*	2	lean clay	1
HS-16	2	lean clay	344
HS-17*	2	lean clay	32
HS-18	2	lean clay	265
HS-19	3.5	lean clay	7
HS-20	2.5	lean clay	24
HS-21*	3.5	lean clay	1
HS-22*	1	lean clay	0

cont'd

Table 1 cont'd

Sample No.	Depth Below Original Surface Contour, feet	Soil Type	Soil Headspace Vapor Reading, ppm
HS-23	1.5	lean clay	22
HS-24	2	lean clay	8
HS-25*	1	lean clay	3
HS-26	1	lean clay	22
HS-27	1	lean clay	10
HS-28	1.5	lean clay	6
HS-29	surface	lean clay	14
HS-30*	1.5	lean clay	0
HS-31	surface	lean clay	5
HS-32*	1.5	lean clay	3
HS-33	surface	lean clay	114
HS-34	1.5	lean clay	7
HS-35	surface	lean clay	49
HS-36*	1.5	lean clay	3
HS-37	surface	lean clay	25
HS-38	0.5	lean clay	8
HS-39	surface	lean clay	102
HS-40	surface	lean clay	38
HS-41	surface	lean clay	21
HS-42	surface	lean clay	40
HS-43	0.5	lean clay	32
HS-44	surface	lean clay	61
HS-45	surface	lean clay	38
HS-46	surface	lean clay	10

cont'd

Table 1 cont'd

Sample No.	Depth Below Original Surface Contour, feet	Soil Type	Soil Headspace Vapor Reading, ppm
HS-47*	1.5	lean clay	0
HS-48	surface	lean clay	8
HS-49	surface	lean clay	7
HS-50*	3	lean clay	0
HS-51*	3.5	lean clay	0
HS-52*	2.5	lean clay	3
HS-53	surface	lean clay	12
HS-54*	3.5	lean clay	0
HS-55	surface	lean clay	88
HS-56	1	lean clay	53
HS-57*	1	lean clay	0
HS-58	2	lean clay	1
HS-59	1	lean clay	1.5
HS-60*	3.5	lean clay	35
HS-61*	3	lean clay	1
HS-62*	2	lean clay	0
HS-63*	2	lean clay	0
HS-64*	2	lean clay	0
HS-65*	2	lean clay	0
HS-66*	2	lean clay	0
HS-67*	2	lean clay	0
HS-68*	2	lean clay	0
HS-69*	2	lean clay	0
HS-70	stockpile	lean clay	258

* indicates in-situ sample

Table 2

April 1994 Excavation Activity
Laboratory Sample Analytical Results

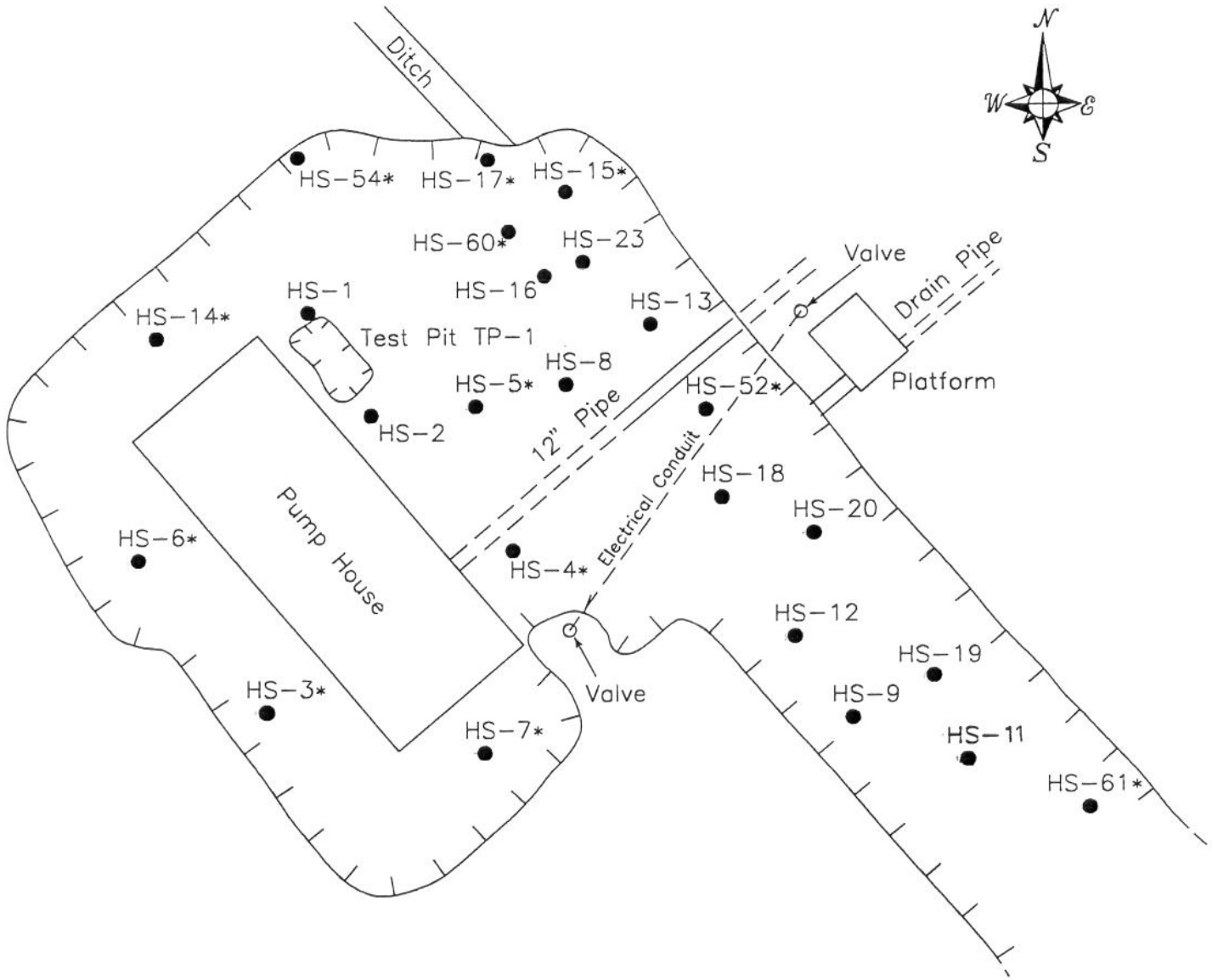
Sample Number	Depth Below Original Surface Contour, ft.	Correlative Soil Headspace Vapor Sample	Soil Headspace Vapor Reading, ppm+	Diesel Range Organics, mg/kg	Benzene, µg/kg	Ethyl-benzene, µg/kg	Toluene, µg/kg	Xylenes, µg/kg	Methyl Tertiary Butyl Ether, µg/kg	Tri-methyl-benzenes, µg/kg
SC-1 (SS-1)	2.5	HS-52	3	<	<	<	3.21	<	<	<
SC-2	excavated (stockpile)	HS-53	12	100	<	<	3.46	<	<	6.37
SS-2	3	HS-60	35	230	<	21.8	20.8	95.9	<	86.9
SS-3	2	HS-61	1	<	<	<	<	<	<	<
SS-4	2	HS-62	0	<	<	<	<	<	<	<
SS-5	2	HS-63	0	<	<	<	<	<	<	<
SS-6	2	HS-64	0	<	<	<	<	<	<	<
SS-7	2	HS-65	0	27	15.6	<	16.4	25.9	<	<
SS-8	2	HS-66	0	<	<	<	<	<	<	<
SS-9	2	HS-67	0	<	<	<	<	<	<	<
SS-10	2	HS-68	0	<	<	<	<	<	<	<
SS-11	2	HS-69	0	<	<	<	<	<	<	<

cont'd

Table 2 (cont'd)

Sample Number	Depth Below Original Surface Contour, ft.	Correlative Soil Headspace Vapor Sample	Soil Headspace Vapor Reading, ppm+	Diesel Range Organics, mg/kg	Benzene, µg/kg	Ethyl-benzene, µg/kg	Toluene, µg/kg	Xylenes, µg/kg	Methyl Tertiary Butyl Ether, µg/kg	Tri-methyl-benzenes, µg/kg
SS-12	excavated (stockpile)	HS-70	258	1100	38.1	70.3	217	512	20.9	397.5
laboratory method detection limit				10.0	5.0	5.0	5.0	5.0	5.0	5.0
WDNR interim soil cleanup guidelines (NR 720)				250	5.5	2900	1500	4100	N	N

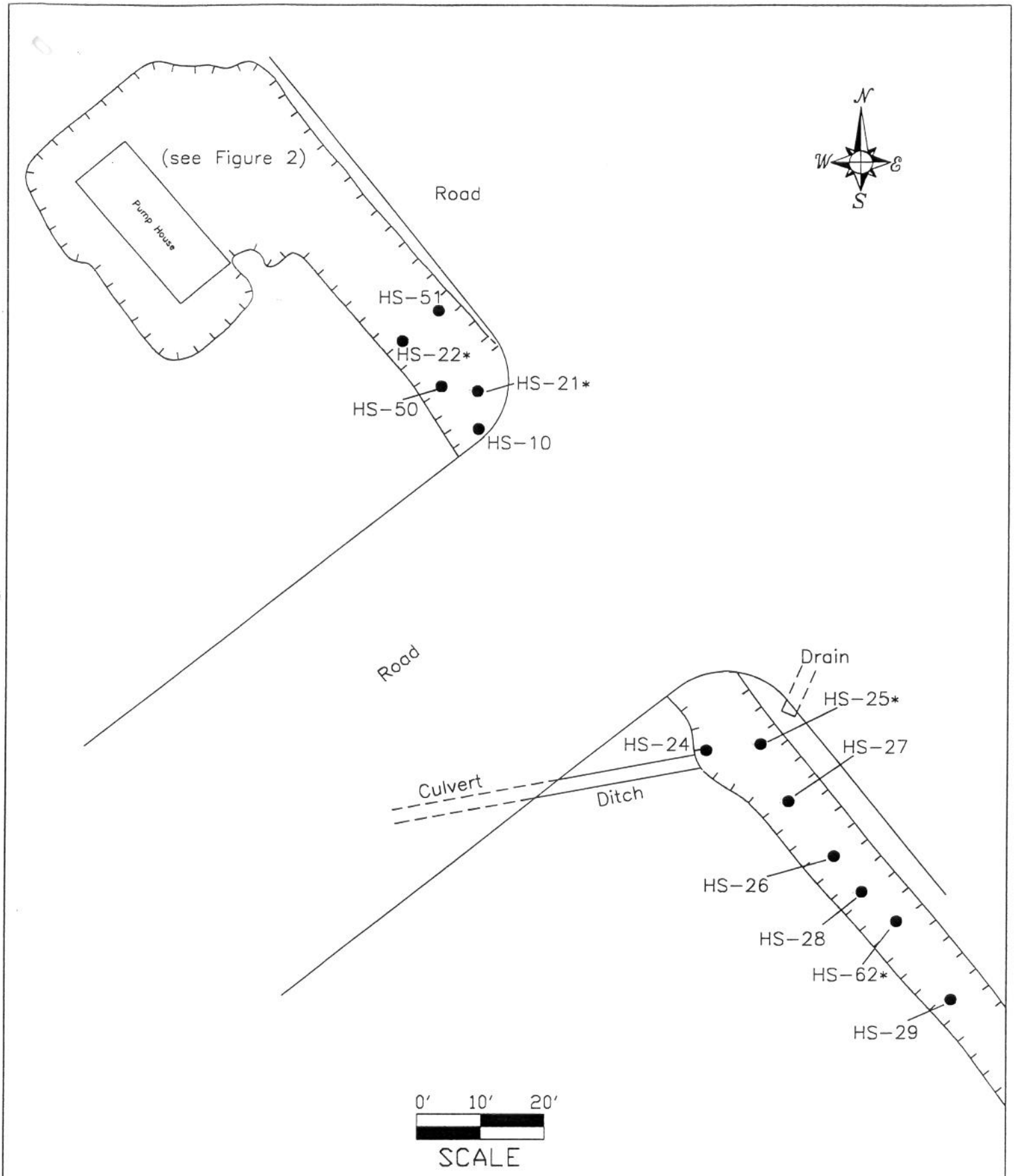
mg/kg - concentration in milligrams per kilogram
µg/kg - concentration in micrograms per kilogram
< - below method detection limits
N - soil cleanup guidelines not established
+ - instrument units as equivalent ppm isobutylene



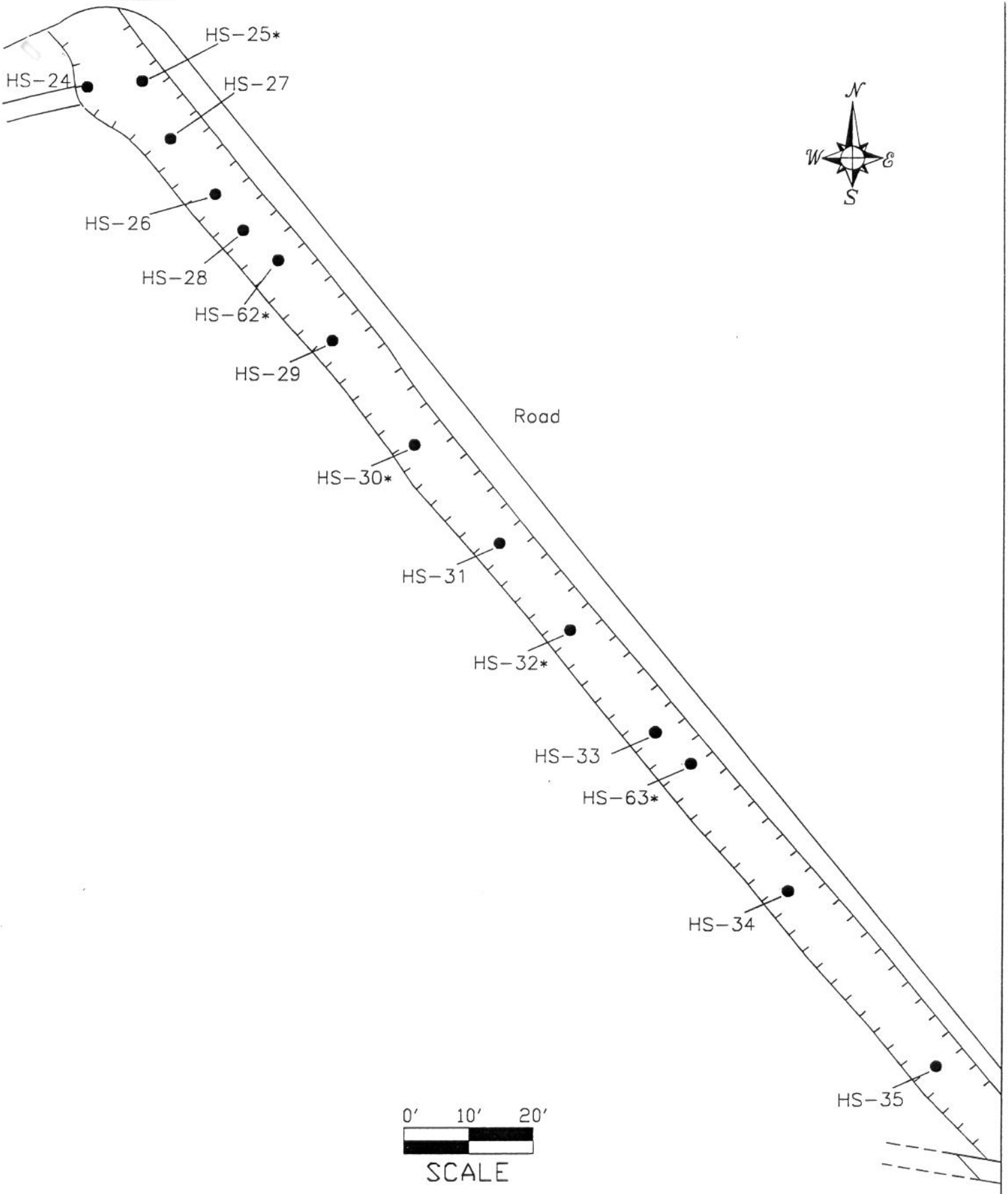
0′ 5.0′ 10′

SCALE

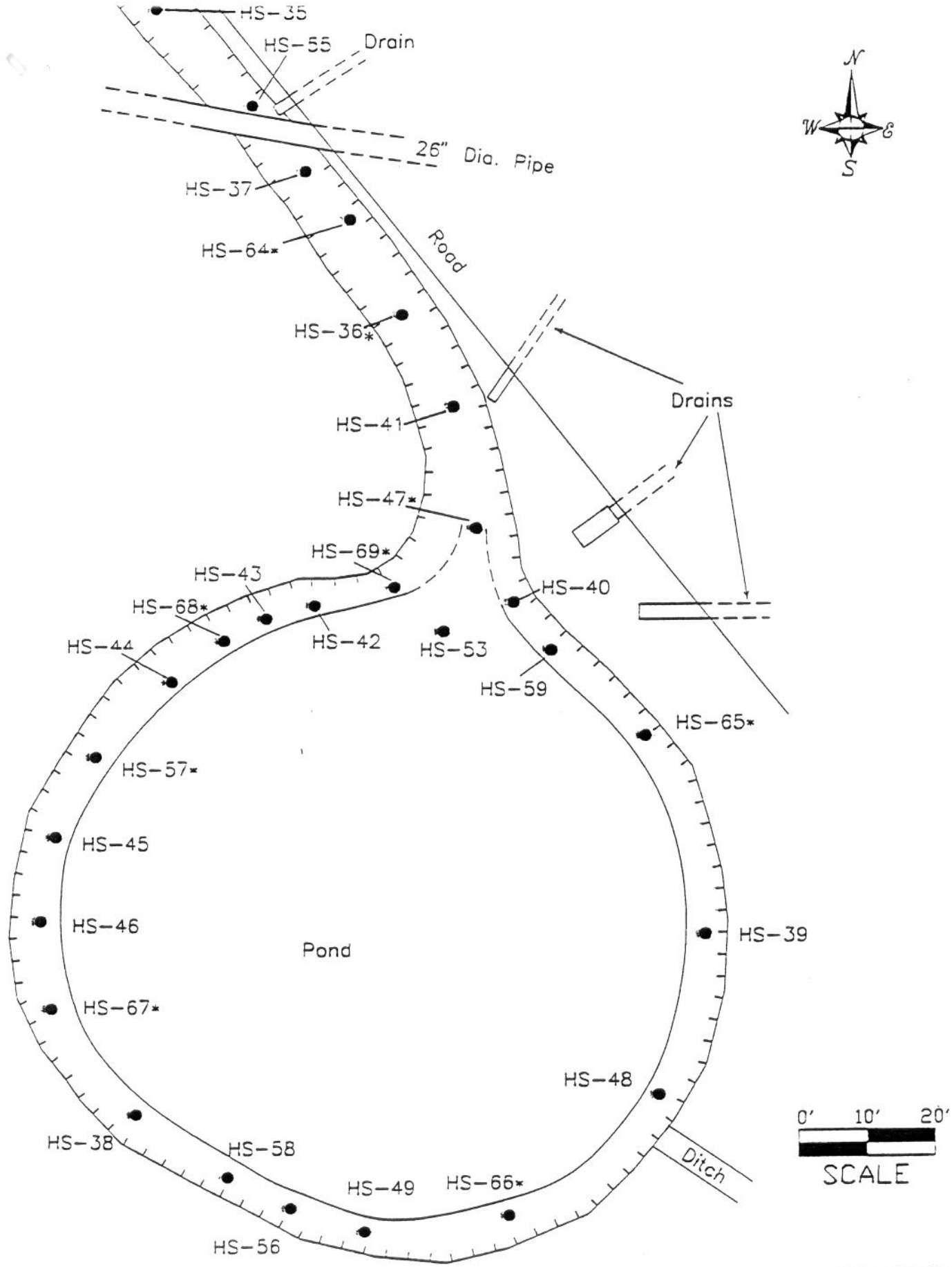
MJ ENVIRONMENTAL CONSULTANTS INC.	TITLE: Detail of Excavated Area in Pump House Vicinity, Showing Locations of Soil Vapor Headspace Samples (* indicates in-situ sample) Superior, Wisconsin	REVISED DATE / BY	DEPT. E
	DRAWN BY: RMH SET# 94.406 PLOT 1 = 10	DATE 06/12/94	APPROVED BY: KS
			FIGURE #3



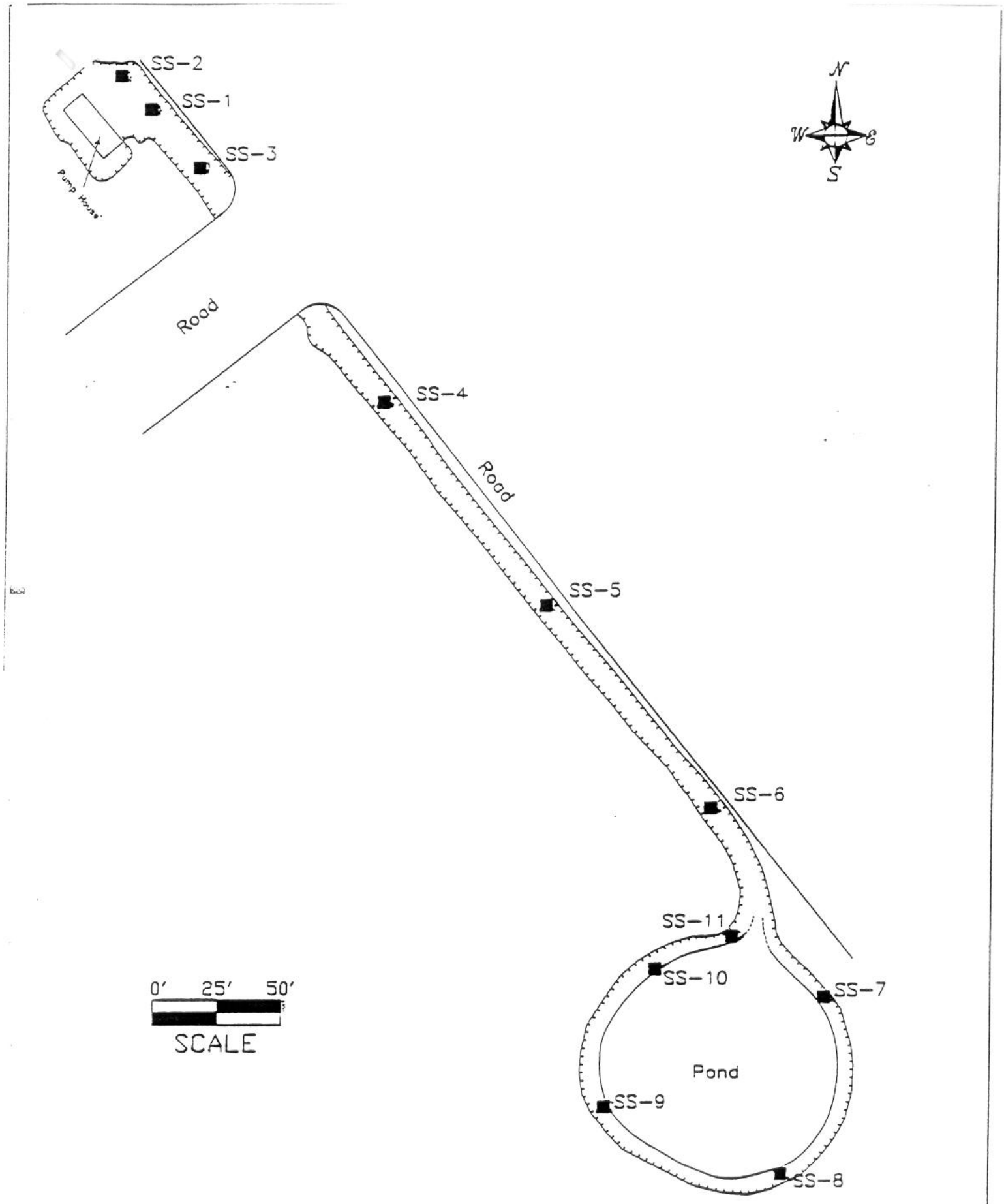
MJ ENVIRONMENTAL CONSULTANTS INC.	TITLE: Northweatern Portion of Excavated Area Showing Locations of Soil Vapor Headspace Samples (* indicates in-situ sample) Superior, Wisconsin	REVISED DATE / BY	DEPT. E
	DRAWN BY: RMH | SET# 94.406 | PLOT 1 = 10	DATE 06/12/94	APPROVED BY: KS
		FIGURE # 4	



MJ ENVIRONMENTAL CONSULTANTS INC.	TITLE: Central Portion of Excavated Area Showing Locations of Soil Vapor Headspace Samples (* indicates in-situ sample) Superior, Wisconsin	REVISED DATE / BY	DEPT. E
	DRAWN BY: RMH | SET# 94.406 | PLOT 1 = 10	DATE 06/12/94	APPROVED BY: KS
		FIGURE #5	



MJ ENVIRONMENTAL CONSULTANTS INC.	TITLE: Southeastern Portion of Excavated Area Showing Locations of Soil Vapor Headspace Samples (* indicates in-situ sample) Superior, Wisconsin	REVISED DATE / BY	SCALE: E
	RMF SET# 94 406 PLOT 1 = 10		DRAWN BY: KS
		DATE 06/12/94	FIGURE # 6



MJ
ENVIRONMENTAL CONSULTANTS INC.

TITLE: Location of In-situ Analytical Soil Samples
Lakehead Pipe Line
Superior Terminal
Superior, Wisconsin

RMH SET# 94-106 PLOT 1" = 50'

REVISED		SCALE:
DATE	BY	E
		APPROVED BY: KS
DATE 06/12/94		FIGURE #7

Attachment B

Site Investigation Field Sampling and Screening Logs

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: *Milepost or Facility* Tank 20 Soil Borings

Equipment used: PID *-ionization detector with* 11.7 *eV lamp* Background Headspace: 0.0 ppm

Sample Nomenclature *(Location - sample type - #):* TK20-Stockpile-XX

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

Date: 2/20/17

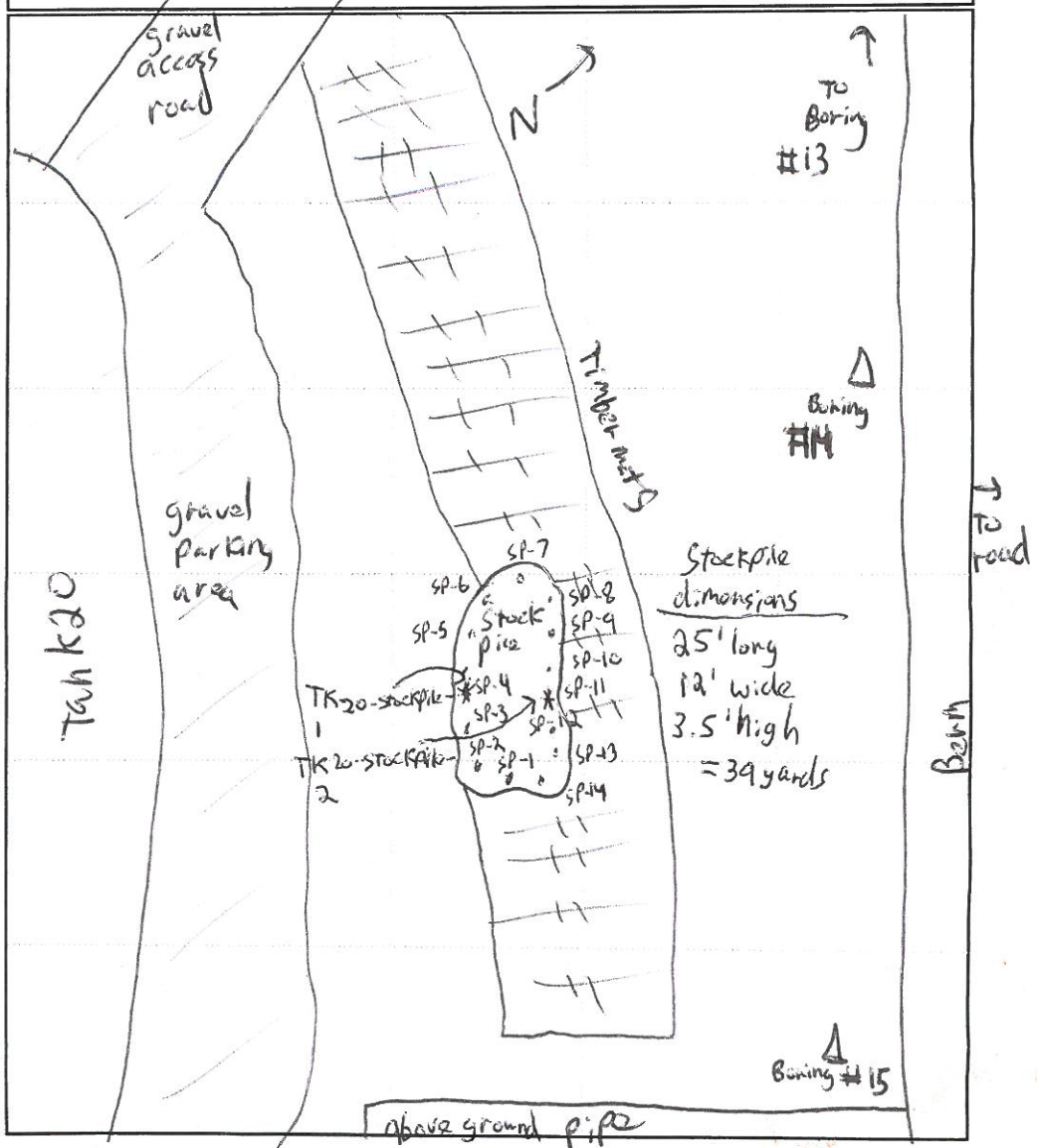
Sampler: MJP

Calibration Time: 9:30

BARR

Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/ Discolor	Odor/ Sheen	Headspace Reading (ppm)
Example: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/ Rainbow	275
SP-1	N/A	11:35	CH	Reddish Brown	N/N	1.4
SP-2						0.8
SP-3						27.8
SP-4					N/trace Pet.	32.8
SP-5					N/N	2.4
SP-6						1.0
SP-7						0.4
SP-8		11:55				0.8
SP-9						1.1
SP-10						15.7
SP-11						0.9
SP-12						0.4
SP-13						1.1
SP-14						3.0
* TK20-Stockpile-1		12:15		(sampled at SP-4)		
* TK20-Stockpile-2		13:20		(sampled at SP-11)		

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



SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Boring #15

Page 1 of 1

Location: Milepost or Facility Tank 20 Borings

Equipment used: PID -ionization detector with 11.7 eV lamp

Background Headspace: 3.3 ppm

Sample Nomenclature *(Location - sample type - #)*: TK20-SB15-1

Date: 2/22/17

Sampler: MJP

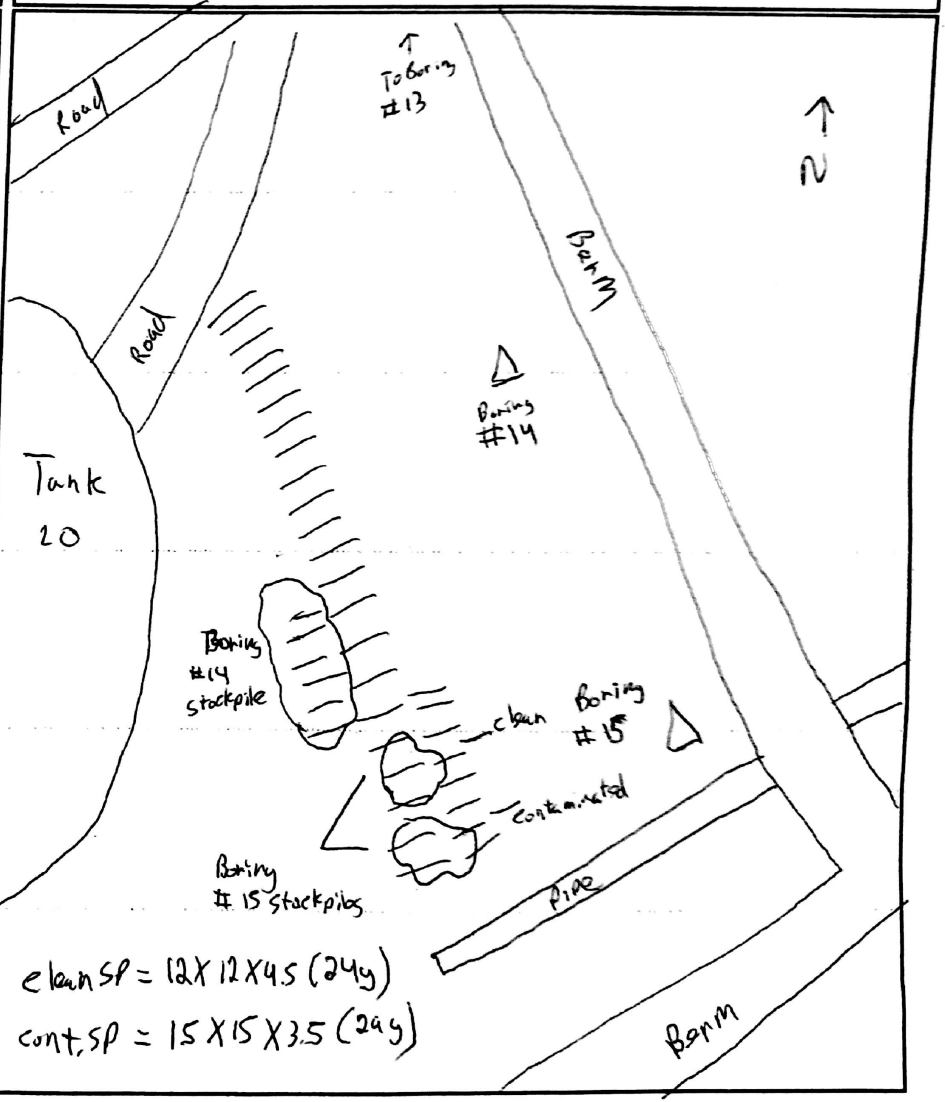
Calibration Time: 6:42

Soil 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)
Example: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/ Rainbow	275
SB-1	0-5	8:20	SC	Reddish brown to tan	N/N	1.9
SB-2	5-10S	8:27	CH w/trace SC	Reddish Brown	Med. Pet / N	335
SB-3	5-10D	8:30	CH	Reddish Brown w/ Black streaking	" / trace sheen	218
SB-4	10-15	8:32		Reddish Brown	" / N	1323
SB-5	10-15D	8:56			" / N	111
SB-6	15-20S	8:57			" / N	25.3
SB-7	15-20M	9:00			N / N	1.5
SB-8	15-20	9:00			N / N	1.2
SB-9	20-25S	9:08			N / N	1.4
SB-10	25-30D	9:13			N / N	1.0
SB-11	30-35	9:19			N / N	0.6
SB-12	40-45	9:22			N / N	0.6
SB-13	44.5	9:29			N / N	0.7
SB-14	47	9:35			N / N	0.9
TK20-SB15-1	5-10	8:45				

Bottom of boring →

SITE SKETCH: *north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features...* **1 inch/grid = 25 FEET**



S = Shallow
D = Deep
M = mid

** This boring was hydrovac'd to around 5-7' deep and back filled w/ sand

* all readings taken from Boring #15

Boring started @ 8:45

MJP

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: *Milepost or Facility* Tank R 20 Boring 5 / Boring ~~11~~ 16

Equipment used: PID *-ionization detector with* 10.7 *eV lamp*

Sample Nomenclature *(Location - sample type - #):* ~~TK20-SB~~ MJP No sample taken

Background Headspace: 0.1 ppm

Date: 2/23/17

Sampler: MJP

Calibration Time: 6:36

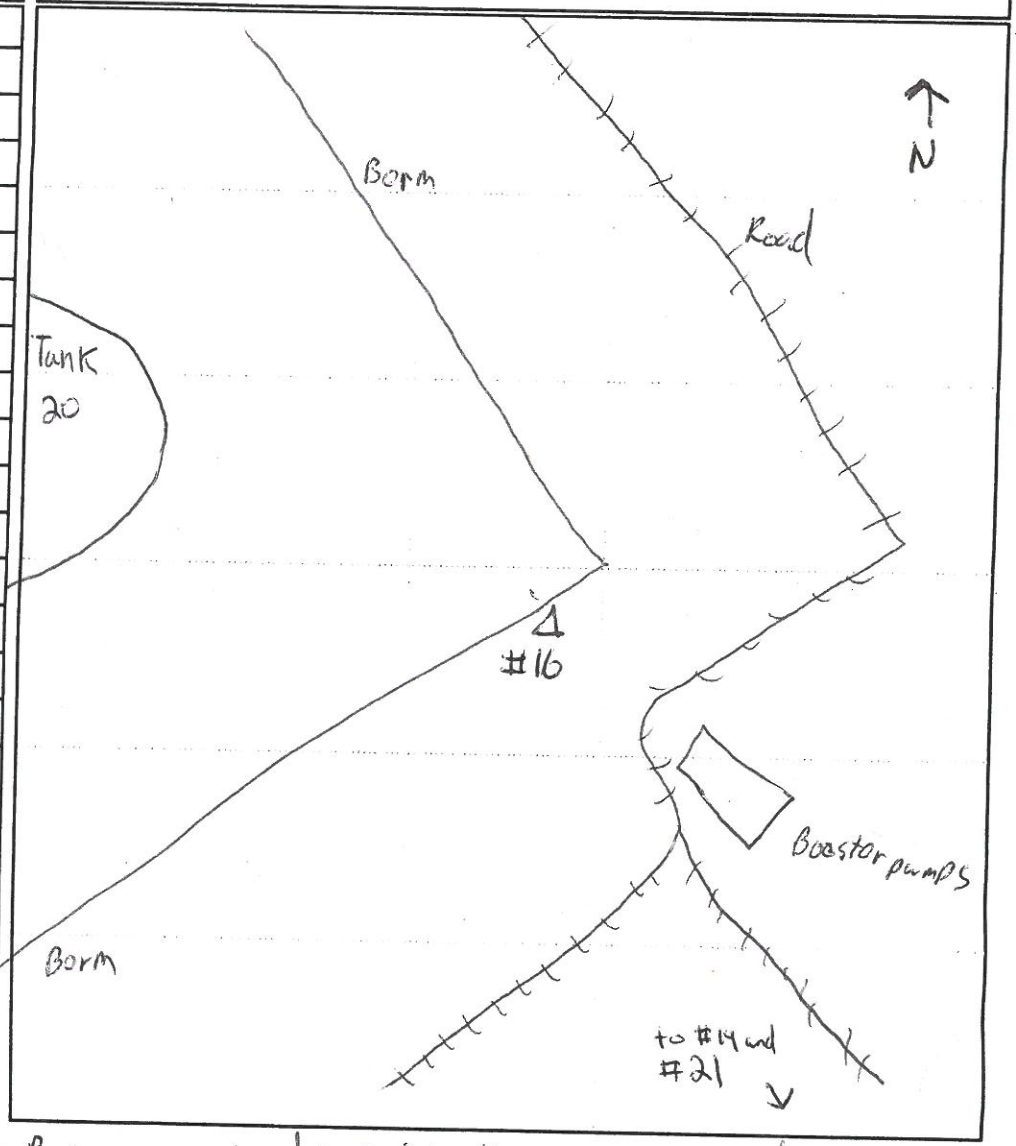
Page 1 of 2

BARR

Soil 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)
Example: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/ Rainbow	275
SB-1	0-5	9:05	CH w/SC	Reddish Brown	N/N	0.2
SB-2	5-10	9:05	CH w/SC	" w/black inclu.	N/N	0.1
SB-3	10-15	9:20	CH w/gr.	" / "	N/N	0.2
SB-4	15-20	9:33	CH	Reddish Brown	N/N	0.2
SB-5	20-25	9:36	CH	"	N/N	0.2

SITE SKETCH: *north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features...* ***1 inch/grid*** = 150 ***FEET***



*depths estimated by drillers

- Boring was continued to final depth >40' with no visual sign of contamination and no odor observed

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: *Milepost or Facility* Tank 20 Borings / Boring # 21

Equipment used: Photo -*ionization detector with* 11.7 *eV lamp* Background Headspace: 0.7 ppm

Sample Nomenclature *(Location - sample type - #):* N/A No sample taken

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

Date: 2/23/17

Sampler: MJP

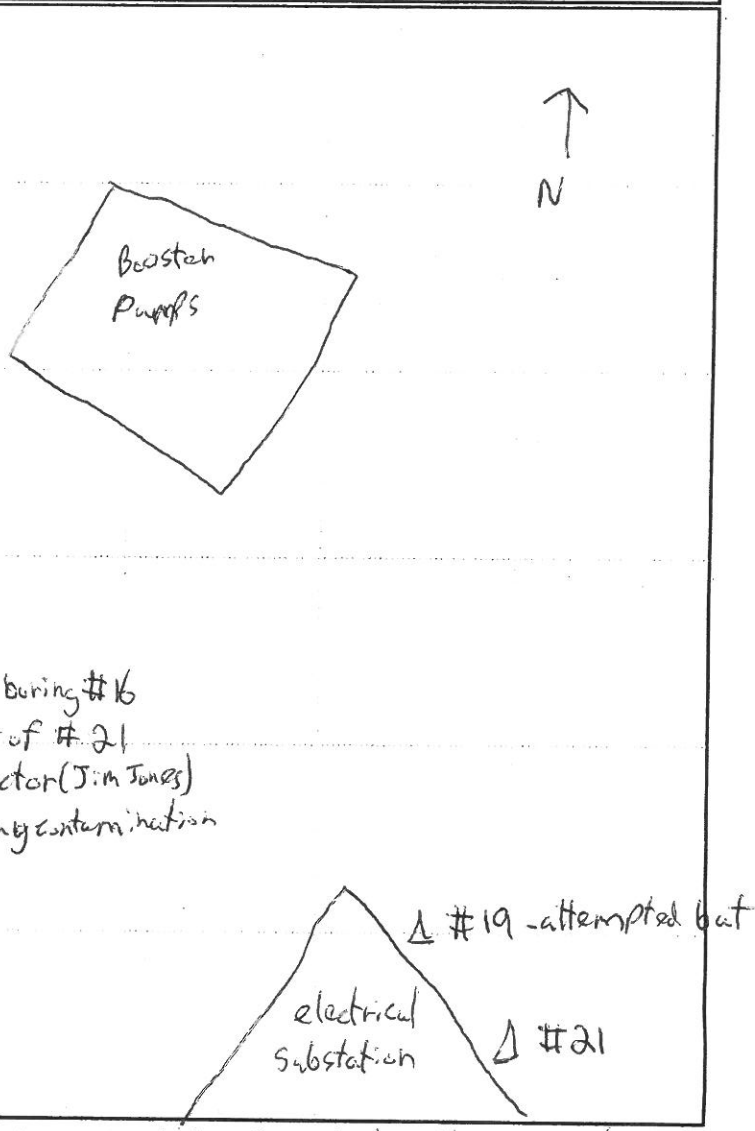
Calibration Time: 6:36

BARR

Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/ Discolor	Odor/ Sheen	Headspace Reading (ppm)
Example: TK99-S-1	*4*	*16:30*	*CL*	*Reddish brown*	*Petroleum/ Rainbow*	*275*
SB-1	10-15	10:00	CH	Reddish Brown	N/N	0.2

*depth estimated by driller

SITE SKETCH: *north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features...* ***1 inch/grid =*** 100 ***FEET***



- MJP monitoring boring #16 during the start of #21 but driller inspector (Jim Jones) never detected any contamination

- Boring was drilled to a final depth > 40' with no visual sign of contamination and no odor

Attachment C

Soil Sample Laboratory Report

28-Feb-2017

Ryan Erickson
Barr Engineering Company
4300 Market Pointe Drive
Suite 200
Minneapolis, MN 55435

Re: **Tank 20 Borings (49161092.02)** Work Order: **17021209**

Dear Ryan,

ALS Environmental received 2 samples on 23-Feb-2017 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 13.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Electronically approved by: Tom Beamish

Tom Beamish
Client Services Coordinator

Certificate No: WI: 399084510

ADDRESS 3352 128th Ave Holland, Michigan 49424 | PHONE (616) 399-6070 | FAX (616) 399-6185
ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group, USA

Date: 28-Feb-17

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.02)
Work Order: **17021209**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
17021209-01	TK20-SB15-1_5-10	Soil		02/22/17 08:45	02/23/17 09:30	☐
17021209-02	Trip Blank	Soil		02/22/17	02/23/17 09:30	☐

ALS Group, USA

Date: 28-Feb-17

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.02)
WorkOrder: **17021209**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample
µg/Kg-dry	Micrograms per Kilogram Dry Weight

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.02)
Work Order: 17021209

Case Narrative

Samples for the above noted Work Order were received on 02/23/17. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Volatile Organics:
No deviations or anomalies were noted.

Wet Chemistry:
No deviations or anomalies were noted.

ALS Group, USA

Date: *28-Feb-17*

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.02)
Sample ID: TK20-SB15-1_5-10
Collection Date: 02/22/17 08:45 AM

Work Order: 17021209
Lab ID: 17021209-01
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260B**			Prep: SW5035 / 2/23/17		Analyst: **BJB**
1,2,4-Trimethylbenzene	**5,300**		**10**	**50**	**µg/Kg-dry**	1	02/24/17 19:38
1,3,5-Trimethylbenzene	**2,600**		**22**	**50**	**µg/Kg-dry**	1	02/24/17 19:38
Benzene	**2,200**		**11**	**50**	**µg/Kg-dry**	1	02/24/17 19:38
Ethylbenzene	**1,300**		**12**	**50**	**µg/Kg-dry**	1	02/24/17 19:38
m,p-Xylene	**30,000**		**110**	**500**	**µg/Kg-dry**	5	02/27/17 18:23
Naphthalene	230		8.5	170	µg/Kg-dry	1	02/24/17 19:38
o-Xylene	U		16	50	µg/Kg-dry	1	02/24/17 19:38
Toluene	35	J	17	50	µg/Kg-dry	1	02/24/17 19:38
Xylenes, Total	**30,000**		**190**	**750**	**µg/Kg-dry**	5	02/27/17 18:23
Surr: 1,2-Dichloroethane-d4	*112*			*70-130*	*%REC*	1	02/24/17 19:38
Surr: 1,2-Dichloroethane-d4	*91.8*			*70-130*	*%REC*	5	02/27/17 18:23
Surr: 4-Bromofluorobenzene	*101*			*70-130*	*%REC*	1	02/24/17 19:38
Surr: 4-Bromofluorobenzene	*103*			*70-130*	*%REC*	5	02/27/17 18:23
Surr: Dibromofluoromethane	*84.0*			*70-130*	*%REC*	1	02/24/17 19:38
Surr: Dibromofluoromethane	*90.2*			*70-130*	*%REC*	5	02/27/17 18:23
Surr: Toluene-d8	*116*			*70-130*	*%REC*	1	02/24/17 19:38
Surr: Toluene-d8	*101*			*70-130*	*%REC*	5	02/27/17 18:23
MOISTURE		Method: **SW3550C**					Analyst: **EDL**
Moisture	**25**		**0.025**	**0.050**	**% of sample**	1	02/23/17 13:52

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *28-Feb-17*

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.02)
Sample ID: Trip Blank
Collection Date: 02/22/17

Work Order: 17021209
Lab ID: 17021209-02
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260B**			Prep: SW5035 / 2/23/17		Analyst: **BG**
1,2,4-Trimethylbenzene	U		6.0	30	µg/Kg-dry	1	02/24/17 06:43
1,3,5-Trimethylbenzene	U		13	30	µg/Kg-dry	1	02/24/17 06:43
Benzene	U		6.8	30	µg/Kg-dry	1	02/24/17 06:43
Ethylbenzene	U		7.0	30	µg/Kg-dry	1	02/24/17 06:43
m,p-Xylene	U		13	60	µg/Kg-dry	1	02/24/17 06:43
Naphthalene	U		5.1	100	µg/Kg-dry	1	02/24/17 06:43
o-Xylene	U		9.7	30	µg/Kg-dry	1	02/24/17 06:43
Toluene	U		9.9	30	µg/Kg-dry	1	02/24/17 06:43
Xylenes, Total	U		23	90	µg/Kg-dry	1	02/24/17 06:43
Surr: 1,2-Dichloroethane-d4	*110*			*70-130*	*%REC*	1	02/24/17 06:43
Surr: 4-Bromofluorobenzene	*96.8*			*70-130*	*%REC*	1	02/24/17 06:43
Surr: Dibromofluoromethane	*98.6*			*70-130*	*%REC*	1	02/24/17 06:43
Surr: Toluene-d8	*98.4*			*70-130*	*%REC*	1	02/24/17 06:43

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 28-Feb-17

Client: Barr Engineering Company

QC BATCH REPORT

Work Order: 17021209

Project: Tank 20 Borings (49161092.02)

Batch ID: **98545** Instrument ID **VMS5** Method: **SW8260B**

MBLK Sample ID: **MBLK-98545-98545** Units: **µg/Kg-dry** Analysis Date: **02/23/17 05:40 PM**

Client ID: Run ID: **VMS5_170223A** SeqNo: **4300118** Prep Date: **02/23/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	U	6	30								
1,3,5-Trimethylbenzene	U	13	30								
Benzene	U	6.8	30								
Ethylbenzene	U	7	30								
m,p-Xylene	U	13	60								
Naphthalene	U	5.1	100								
o-Xylene	U	9.7	30								
Toluene	U	9.9	30								
Xylenes, Total	U	23	90								
Surr: 1,2-Dichloroethane-d4	*1116*	0	0	*1000*	0	*112*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*980*	0	0	*1000*	0	*98*	*70-130*	0			
Surr: Dibromofluoromethane	*978.5*	0	0	*1000*	0	*97.8*	*70-130*	0			
Surr: Toluene-d8	*982*	0	0	*1000*	0	*98.2*	*70-130*	0			

LCS Sample ID: **LCS-98545-98545** Units: **µg/Kg-dry** Analysis Date: **02/23/17 04:21 PM**

Client ID: Run ID: **VMS5_170223A** SeqNo: **4300117** Prep Date: **02/23/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	1022	6	30	1000	0	102	65-135	0			
1,3,5-Trimethylbenzene	1054	13	30	1000	0	105	65-135	0			
Benzene	1156	6.8	30	1000	0	116	75-125	0			
Ethylbenzene	1042	7	30	1000	0	104	75-125	0			
m,p-Xylene	2087	13	60	2000	0	104	80-125	0			
Naphthalene	1005	5.1	100	1000	0	100	40-140	0			
o-Xylene	1044	9.7	30	1000	0	104	75-125	0			
Toluene	1071	9.9	30	1000	0	107	70-125	0			
Xylenes, Total	3131	23	90	3000	0	104	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1072*	0	0	*1000*	0	*107*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1010*	0	0	*1000*	0	*101*	*70-130*	0			
Surr: Dibromofluoromethane	*1028*	0	0	*1000*	0	*103*	*70-130*	0			
Surr: Toluene-d8	*985.5*	0	0	*1000*	0	*98.6*	*70-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Barr Engineering Company
Work Order: 17021209
Project: Tank 20 Borings (49161092.02)

QC BATCH REPORT

Batch ID: **98545** Instrument ID **VMS5** Method: **SW8260B**

MS Sample ID: **17021197-02A MS** Units: **µg/Kg-dry** Analysis Date: **02/24/17 02:07 PM**
Client ID: Run ID: **VMS5_170223B** SeqNo: **4301078** Prep Date: **02/23/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	1206	6.9	34	1146	0	105	65-135	0			
1,3,5-Trimethylbenzene	1232	15	34	1146	0	108	65-135	0			
Benzene	1349	7.8	34	1146	0	118	75-125	0			
Ethylbenzene	1230	8	34	1146	0	107	75-125	0			
m,p-Xylene	2476	15	69	2292	0	108	80-125	0			
Naphthalene	1126	5.9	110	1146	0	98.2	40-140	0			
o-Xylene	1219	11	34	1146	0	106	75-125	0			
Toluene	1273	11	34	1146	0	111	70-125	0			
Xylenes, Total	3696	27	100	3438	0	108	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1181*	0	0	*1146*	0	*103*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1148*	0	0	*1146*	0	*100*	*70-130*	0			
Surr: Dibromofluoromethane	*1169*	0	0	*1146*	0	*102*	*70-130*	0			
Surr: Toluene-d8	*1130*	0	0	*1146*	0	*98.6*	*70-130*	0			

MSD Sample ID: **17021197-02A MSD** Units: **µg/Kg-dry** Analysis Date: **02/24/17 02:33 PM**
Client ID: Run ID: **VMS5_170223B** SeqNo: **4301079** Prep Date: **02/23/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	1188	6.9	34	1146	0	104	65-135	1206	1.48	30	
1,3,5-Trimethylbenzene	1234	15	34	1146	0	108	65-135	1232	0.0929	30	
Benzene	1346	7.8	34	1146	0	118	75-125	1349	0.213	30	
Ethylbenzene	1221	8	34	1146	0	107	75-125	1230	0.748	30	
m,p-Xylene	2487	15	69	2292	0	108	80-125	2476	0.416	30	
Naphthalene	1105	5.9	110	1146	0	96.4	40-140	1126	1.9	30	
o-Xylene	1216	11	34	1146	0	106	75-125	1219	0.235	30	
Toluene	1273	11	34	1146	0	111	70-125	1273	0	30	
Xylenes, Total	3703	27	100	3438	0	108	75-125	3696	0.201	30	
Surr: 1,2-Dichloroethane-d4	*1213*	0	0	*1146*	0	*106*	*70-130*	1181	*2.63*	*30*	
Surr: 4-Bromofluorobenzene	*1155*	0	0	*1146*	0	*101*	*70-130*	1148	*0.547*	*30*	
Surr: Dibromofluoromethane	*1137*	0	0	*1146*	0	*99.2*	*70-130*	1169	*2.83*	*30*	
Surr: Toluene-d8	*1123*	0	0	*1146*	0	*98*	*70-130*	1130	*0.661*	*30*	

The following samples were analyzed in this batch:

17021209-01A	17021209-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Barr Engineering Company
Work Order: 17021209
Project: Tank 20 Borings (49161092.02)

QC BATCH REPORT

Batch ID: **R206616** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R206616** Units: **% of sample** Analysis Date: **02/23/17 01:52 PM**
Client ID: Run ID: **MOIST_170223A** SeqNo: **4300174** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	U	0.025	0.050								

LCS Sample ID: **LCS-R206616** Units: **% of sample** Analysis Date: **02/23/17 01:52 PM**
Client ID: Run ID: **MOIST_170223A** SeqNo: **4300173** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.025	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **17021210-01B DUP** Units: **% of sample** Analysis Date: **02/23/17 01:52 PM**
Client ID: Run ID: **MOIST_170223A** SeqNo: **4300159** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	30.73	0.025	0.050	0	0	0		31.18	1.45	5	

DUP Sample ID: **17021224-01B DUP** Units: **% of sample** Analysis Date: **02/23/17 01:52 PM**
Client ID: Run ID: **MOIST_170223A** SeqNo: **4300163** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	15.78	0.025	0.050	0	0	0		16.11	2.07	5	

The following samples were analyzed in this batch: 17021209-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

17021209

Barr Engineering Co. Chain of Custody

Sample Origination State: ☐ KS ☐ MO ☒ WI ☐ MI ☐ ND Other: ☐ MN ☐ SD

BARR ☐ Ann Arbor ☒ Duluth ☐ Jefferson City ☐ Bismarck ☐ Hibbing ☐ Minneapolis

COC Number: 53631

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Eng.	Company:
Address: 325 S. Lake Ave - Duluth, MN	Address: Same as "report to"
Name: Ryan Erickson	Name:
email: rerickson@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: Tank 20 Borings	Barr Project No: 49161092.05003 005

Matrix Code: GW = Groundwater, SW = Surface Water, WW = Waste Water, DW = Drinking Water, S = Soil/Solid, SD = Sediment, O = Other

Preservative Code: A = None, B = HCl, C = HNO_3, D = H_2SO_4, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, I = Ascorbic Acid, J = NH_4Cl, K = Zn Acetate, O = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water	Soil: PVOC + naphthalene	Soil: % Solids	Preservative Code / Field Filtered Y/N
1. TK20-SB15-1	5	10	ft.	02/22/2017	08:45	S	N	3		2	1	PVOC + naphthalene, % solids
2. Trip Blank	—	—	—	02/22/2017	—	QC	N	2		2		PVOC + naphthalene
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												

Rush TAT

BARR USE ONLY	Relinquished by	On Ice?	Date	Time	Received by	Date	Time
Sampled by: MJP	Michael Bowey	(Y) N	2/22/17	15:00			
Barr Proj. Manager: REE	Relinquished by:	On Ice? Y N	Date	Time	Received by:	Date 2/23/17	Time 0930
Barr DQ Manager: JET	Samples Shipped VIA: ☐ Courier ☒ Federal Express ☐ Sampler ☐ Other:				Air Bill Number:	Requested Due Date: ☒ Standard Turn Around Time (TAT) ☒ Rush (mm/dd/yyyy)	
Lab Name: ALS	Lab WO:	Temperature on Receipt (°C):			Custody Seal Intact? ☐ Y ☐ N ☐ None		
Lab Location: Holland, MI							

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

SR2 3.8°C

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H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

Tom Beamish

From: Ryan E. Erickson <RErickson@barr.com>
Sent: Thursday, February 23, 2017 11:30 AM
To: Tom Beamish; James E. Taraldsen
Subject: RE: 17021209 Tank 20 Borings (49161092.02)
Attachments: 17021209 (Barr - Tank 20 Borings (49161092.02)) WOA.PDF

Tom,
This sample should be standard TAT. Sorry about the incorrect previous confirmation.

Ryan E. Erickson, PG

Geologist
Duluth, MN office: 218.529.7112
fax: 218.529.8202
cell: 612.418.0166
rerickson@barr.com
www.barr.com

From: Tom Beamish [mailto:Tom.Beamish@ALSGlobal.com]
Sent: Thursday, February 23, 2017 10:22 AM
To: Ryan E. Erickson <RErickson@barr.com>; James E. Taraldsen <JTaraldsen@barr.com>
Subject: 17021209 Tank 20 Borings (49161092.02)

A summary for the referenced workorder / project is attached. Unless promptly notified otherwise, we will proceed as indicated.

Please contact us if we can be of any further assistance. Thanks!

Regards,

Tom Beamish
Client Services Coordinator, Environmental
Holland, MI Laboratory

T +1 616 399 6070 D +1 616 738 7318
F +1 616 399 6185 M +1 616 836 5844
tom.beamish@alsglobal.com
3352 128th Avenue
Holland, MI 49424 USA

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****

ALS Group, USA

Sample Receipt Checklist

Client Name: **BARRENG-MN** Date/Time Received: **23-Feb-17 09:30**

Work Order: **17021209** Received by: **DS**

Checklist completed by Diane Shaw (eSignature) 23-Feb-17 (Date) Reviewed by: Tom Bramish (eSignature) 23-Feb-17 (Date)

Matrices: Soil

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.8/3.8 c	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	2/23/2017 9:58:14 AM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

Attachment D

Waste Management Documentation

VONCO
Waste Management Campus

VONCO V, LLC
1100 West Gary Street
Duluth, MN 55808

VONCOUSA.com
Office: 218.626.3830
Fax: 218.626.4874

March 2, 2017

Enbridge Energy
Attention: Alex Smith
1100 Louisiana Ave Suite 3300
Houston, TX 77002

RE: Profile # 17-019-I - SUP Tank 20
Generator: Enbridge Superior Wi Terminal
Waste Stream: contaminated soil

Alex,

Please be advised that the above described waste material is acceptable for disposal at the Vonco V Waste Management Campus Facility in Duluth, MN. The waste material is acceptable per Vonco V (SW-560) Minnesota Pollution Control Agency Industrial Solid Waste Management Plan. The profile is approved for **1000** CY for disposal.

The referenced waste must maintain consistency with what was originally submitted on the waste profile. Vonco V Waste Management Campus must be contacted immediately for any changes in material composition or process generation as further testing and analysis may apply.

Additionally, acceptance is subject to the following conditions:

- The material will be absent of free liquids and must meet the paint filter test.
- A signed waste manifest with the correct profile number shall accompany each load delivered to Vonco V Waste Management Campus.
- All hauling will be in compliance with the Federal and State D.O.T regulations.

Thank you for choosing Vonco V Waste Management Campus. We appreciate your business. If you have any questions or concerns please feel free to contact me @ (218) 730-6361.

Have a great day,

Joe Pesante
Vonco V, LLC

VONCO V, LLC.

Industrial Waste Profile Sheet

PROFILE# _____

Designated Facility: Vonco V, LLC.

Permit #536

A. Generator, Waste Site Location

Name	Enbridge Energy Superior Terminal
Site Address	2800 E 21st St
City, State, Zip	Superior, WI, 54880
Contact	Alex Smith
Phone	715-398-4795
Fax	832-325-5511
County	Douglas

B. Billing

Name	Enbridge Energy
Site Address	1100 Louisiana Ave, Ste 3300
City, State, Zip	Houston, TX, 77002
Contact	Alex Smith
Phone	715-398-4795
Fax	832-325-5511

C. Description of Waste

Name of Waste: Contaminated Soil - Tank 20

Process Generating Waste: Historically contaminated soil encountered in soil borings.

Estimated Volume: _____

Frequency: One time

Physical State: Solid (soil) Color: Reddish brown Free Liquids: no

Flash Point (°F): N/A pH: _____ Total Solids: _____

D. Other Comments

E. Sample Information

Check all that apply:

■ Laboratory Analysis submitted ☐ Material Safety Data Sheet submitted

Laboratory Name: ALS Environmental Sample Date: 2/20/2017 Sample I.D.: TK20-Stockpile-1, -2

F. Generator Certifications

1. This waste is not a hazardous waste as defined in Minnesota Rules Chapter 7045 or 40 CFR 261.
2. This waste does not contain regulated quantities of PCBs.
3. This waste does not contain regulated quantities of herbicides or pesticides.
4. This waste does not contain infectious wastes as defined in Minnesota Rules Chapter.
5. All information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261 Appendix 1 and was obtained by using this or an equivalent sampling method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed.

Generator's Signature _____ Title: Environmental Analyst

Print Name: Alex Smith Date: 3/2/2017

G. Landfill Approval

My approval is based upon the laboratory analysis of a representative sample and/or material safety data sheets submitted by the generator.

Landfill Signature _____ Date _____

Recertification Date _____

23-Feb-2017

Ryan Erickson
Barr Engineering Company
4300 Market Pointe Drive
Suite 200
Minneapolis, MN 55435

Re: **Tank 20 Borings (49161092.05)** Work Order: **17021085**

Dear Ryan,

ALS Environmental received 3 samples on 21-Feb-2017 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 14.

If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Electronically approved by: Tom Beamish

Tom Beamish
Client Services Coordinator

Certificate No: WI: 399084510

ADDRESS 3352 128th Ave Holland, Michigan 49424 | PHONE (616) 399-6070 | FAX (616) 399-6185
ALS GROUP USA, CORP Part of the ALS Laboratory Group A Campbell Brothers Limited Company

ALS Group, USA

Date: 23-Feb-17

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.05)
Work Order: **17021085**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
17021085-01	TK20-Stockpile-1	Soil		02/20/17 12:15	02/21/17 09:30	☐
17021085-02	TK20-Stockpile-2	Soil		02/20/17 13:20	02/21/17 09:30	☐
17021085-03	Trip Blank	Soil		02/20/17	02/21/17 09:30	☐

ALS Group, USA

Date: 23-Feb-17

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.05)
WorkOrder: **17021085**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
% of sample	Percent of Sample
µg/Kg-dry	Micrograms per Kilogram Dry Weight
mg/Kg-dry	Milligrams per Kilogram Dry Weight

ALS Group, USA

Date: 23-Feb-17

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.05)
Work Order: 17021085

Case Narrative

Samples for the above noted Work Order were received on 02/21/17. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Volatile Organics:
No deviations or anomalies were noted.

Extractable Organics:
No deviations or anomalies were noted.

Wet Chemistry:
Batch R206466, Method MOISTURE, Sample 17021085-01C DUP: The RPD is outside of test-defined limits. The reported Moisture result should be considered estimated.

No other deviations or anomalies were noted.

ALS Group, USA

Date: *23-Feb-17*

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.05)
Sample ID: TK20-Stockpile-1
Collection Date: 02/20/17 12:15 PM

Work Order: 17021085
Lab ID: 17021085-01
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID		Method: **PUBL-SW-141**			Prep: PUBL-SW-141 / 2/22/17		Analyst: **IT**
DRO (C10-C28)	**19**		**0.64**	**6.4**	**mg/Kg-dry**	1	02/23/17 13:30
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260B**			Prep: SW5035 / 2/21/17		Analyst: **EMR**
Benzene	**54**		**12**	**52**	**µg/Kg-dry**	1	02/22/17 06:40
Ethylbenzene	**58**		**12**	**52**	**µg/Kg-dry**	1	02/22/17 06:40
m,p-Xylene	**1,000**		**24**	**100**	**µg/Kg-dry**	1	02/22/17 06:40
o-Xylene	**180**		**17**	**52**	**µg/Kg-dry**	1	02/22/17 06:40
Toluene	**27**	J	**17**	**52**	**µg/Kg-dry**	1	02/22/17 06:40
Xylenes, Total	**1,200**		**41**	**160**	**µg/Kg-dry**	1	02/22/17 06:40
Surr: 1,2-Dichloroethane-d4	*99.0*			*70-130*	*%REC*	1	02/22/17 06:40
Surr: 4-Bromofluorobenzene	*97.4*			*70-130*	*%REC*	1	02/22/17 06:40
Surr: Dibromofluoromethane	*84.6*			*70-130*	*%REC*	1	02/22/17 06:40
Surr: Toluene-d8	*102*			*70-130*	*%REC*	1	02/22/17 06:40
MOISTURE		Method: **SW3550C**					Analyst: **EDL**
Moisture	**23**		**0.025**	**0.050**	**% of sample**	1	02/21/17 12:44

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *23-Feb-17*

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.05)
Sample ID: TK20-Stockpile-2
Collection Date: 02/20/17 01:20 PM

Work Order: 17021085
Lab ID: 17021085-02
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID		Method: **PUBL-SW-141**			Prep: PUBL-SW-141 / 2/22/17		Analyst: **IT**
DRO (C10-C28)	**7.9**		**0.67**	**6.7**	**mg/Kg-dry**	1	02/23/17 14:00
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260B**			Prep: SW5035 / 2/21/17		Analyst: **EMR**
Benzene	U		12	51	µg/Kg-dry	1	02/22/17 07:04
Ethylbenzene	U		12	51	µg/Kg-dry	1	02/22/17 07:04
m,p-Xylene	U		23	100	µg/Kg-dry	1	02/22/17 07:04
o-Xylene	U		17	51	µg/Kg-dry	1	02/22/17 07:04
Toluene	U		17	51	µg/Kg-dry	1	02/22/17 07:04
Xylenes, Total	U		40	150	µg/Kg-dry	1	02/22/17 07:04
Surr: 1,2-Dichloroethane-d4	*101*			*70-130*	*%REC*	1	02/22/17 07:04
Surr: 4-Bromofluorobenzene	*96.3*			*70-130*	*%REC*	1	02/22/17 07:04
Surr: Dibromofluoromethane	*83.0*			*70-130*	*%REC*	1	02/22/17 07:04
Surr: Toluene-d8	*101*			*70-130*	*%REC*	1	02/22/17 07:04
MOISTURE		Method: **SW3550C**					Analyst: **EDL**
Moisture	**26**		**0.025**	**0.050**	**% of sample**	1	02/21/17 12:44

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *23-Feb-17*

Client: Barr Engineering Company
Project: Tank 20 Borings (49161092.05)
Sample ID: Trip Blank
Collection Date: 02/20/17

Work Order: 17021085
Lab ID: 17021085-03
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260B**			Prep: SW5035 / 2/21/17		Analyst: **EMR**
Benzene	U		6.8	30	µg/Kg-dry	1	02/22/17 01:08
Ethylbenzene	U		7.0	30	µg/Kg-dry	1	02/22/17 01:08
m,p-Xylene	U		13	60	µg/Kg-dry	1	02/22/17 01:08
o-Xylene	U		9.7	30	µg/Kg-dry	1	02/22/17 01:08
Toluene	U		9.9	30	µg/Kg-dry	1	02/22/17 01:08
Xylenes, Total	U		23	90	µg/Kg-dry	1	02/22/17 01:08
Surr: 1,2-Dichloroethane-d4	*99.4*			*70-130*	*%REC*	1	02/22/17 01:08
Surr: 4-Bromofluorobenzene	*92.8*			*70-130*	*%REC*	1	02/22/17 01:08
Surr: Dibromofluoromethane	*91.8*			*70-130*	*%REC*	1	02/22/17 01:08
Surr: Toluene-d8	*102*			*70-130*	*%REC*	1	02/22/17 01:08

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 23-Feb-17

Client: Barr Engineering Company

Work Order: 17021085

Project: Tank 20 Borings (49161092.05)

QC BATCH REPORT

Batch ID: **98481** Instrument ID **GC8** Method: **PUBL-SW-141**

MBLK	Sample ID: **DBLKS1-98481-98481**					Units: **mg/Kg**			Analysis Date: **02/23/17 01:00 PM**			
Client ID:		Run ID: **GC8_170223A**				SeqNo: **4299397**		Prep Date: **02/22/17**		DF: **1**		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	0.6184	0.5	5.0								J

LCS	Sample ID: **DLCSS1-98481-98481**					Units: **mg/Kg**			Analysis Date: **02/23/17 10:31 AM**			
Client ID:		Run ID: **GC8_170223A**				SeqNo: **4299396**		Prep Date: **02/22/17**		DF: **1**		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	7.66	0.5	5.0	10	0	76.6	70-120	0			

LCSD	Sample ID: **DLCSDS1-98481-98481**					Units: **mg/Kg**			Analysis Date: **02/23/17 02:59 PM**			
Client ID:		Run ID: **GC8_170223A**				SeqNo: **4299401**		Prep Date: **02/22/17**		DF: **1**		
Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	9.339	0.5	5.0	10	0	93.4	70-120	7.66	19.8	20	

The following samples were analyzed in this batch:

17021085-01A	17021085-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Barr Engineering Company
Work Order: 17021085
Project: Tank 20 Borings (49161092.05)

QC BATCH REPORT

Batch ID: **98446** Instrument ID **VMS7** Method: **SW8260B**

MBLK Sample ID: **MBLK-98446-98446** Units: **µg/Kg-dry** Analysis Date: **02/22/17 12:44 PM**
Client ID: Run ID: **VMS7_170221A** SeqNo: **4297264** Prep Date: **02/21/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	6.8	30	0	0	0	0-0	0			
Ethylbenzene	U	7	30	0	0	0	0-0	0			
m,p-Xylene	U	13	60	0	0	0	0-0	0			
o-Xylene	U	9.7	30	0	0	0	0-0	0			
Toluene	U	9.9	30	0	0	0	0-0	0			
Xylenes, Total	U	23	90	0	0	0	0-0	0			
Surr: 1,2-Dichloroethane-d4	*992.5*	0	0	*1000*	0	*99.2*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*974*	0	0	*1000*	0	*97.4*	*70-130*	0			
Surr: Dibromofluoromethane	*946.5*	0	0	*1000*	0	*94.6*	*70-130*	0			
Surr: Toluene-d8	*1002*	0	0	*1000*	0	*100*	*70-130*	0			

LCS Sample ID: **LCS-98446-98446** Units: **µg/Kg-dry** Analysis Date: **02/21/17 11:33 PM**
Client ID: Run ID: **VMS7_170221A** SeqNo: **4297249** Prep Date: **02/21/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1132	6.8	30	1000	0	113	75-125	0			
Ethylbenzene	1110	7	30	1000	0	111	75-125	0			
m,p-Xylene	2224	13	60	2000	0	111	80-125	0			
o-Xylene	1114	9.7	30	1000	0	111	75-125	0			
Toluene	1096	9.9	30	1000	0	110	70-125	0			
Xylenes, Total	3338	23	90	3000	0	111	75-125	0			
Surr: 1,2-Dichloroethane-d4	*995*	0	0	*1000*	0	*99.5*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1022*	0	0	*1000*	0	*102*	*70-130*	0			
Surr: Dibromofluoromethane	*1033*	0	0	*1000*	0	*103*	*70-130*	0			
Surr: Toluene-d8	*993*	0	0	*1000*	0	*99.3*	*70-130*	0			

MS Sample ID: **17021088-09A MS** Units: **µg/Kg-dry** Analysis Date: **02/22/17 09:02 AM**
Client ID: Run ID: **VMS7_170221A** SeqNo: **4297379** Prep Date: **02/21/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1568	9.6	42	1410	0	111	75-125	0			
Ethylbenzene	1501	9.9	42	1410	0	106	75-125	0			
m,p-Xylene	3024	19	85	2819	0	107	80-125	0			
o-Xylene	1473	14	42	1410	0	104	75-125	0			
Toluene	1511	14	42	1410	0	107	70-125	0			
Xylenes, Total	4497	33	130	4229	0	106	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1417*	0	0	*1410*	0	*101*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1426*	0	0	*1410*	0	*101*	*70-130*	0			
Surr: Dibromofluoromethane	*1392*	0	0	*1410*	0	*98.8*	*70-130*	0			
Surr: Toluene-d8	*1407*	0	0	*1410*	0	*99.8*	*70-130*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Barr Engineering Company
Work Order: 17021085
Project: Tank 20 Borings (49161092.05)

QC BATCH REPORT

Batch ID: **98446** Instrument ID **VMS7** Method: **SW8260B**

MSD Sample ID: **17021088-09A MSD** Units: **µg/Kg-dry** Analysis Date: **02/22/17 09:26 AM**

Client ID: Run ID: **VMS7_170221A** SeqNo: **4297380** Prep Date: **02/21/17** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1451	9.6	42	1410	0	103	75-125	1568	7.8	30	
Ethylbenzene	1472	9.9	42	1410	0	104	75-125	1501	1.94	30	
m,p-Xylene	2929	19	85	2819	0	104	80-125	3024	3.2	30	
o-Xylene	1431	14	42	1410	0	102	75-125	1473	2.86	30	
Toluene	1484	14	42	1410	0	105	70-125	1511	1.79	30	
Xylenes, Total	4360	33	130	4229	0	103	75-125	4497	3.09	30	
Surr: 1,2-Dichloroethane-d4	*1373*	0	0	*1410*	0	*97.4*	*70-130*	1417	*3.18*	*30*	
Surr: 4-Bromofluorobenzene	*1411*	0	0	*1410*	0	*100*	*70-130*	1426	*1.04*	*30*	
Surr: Dibromofluoromethane	*1368*	0	0	*1410*	0	*97*	*70-130*	1392	*1.74*	*30*	
Surr: Toluene-d8	*1430*	0	0	*1410*	0	*101*	*70-130*	1407	*1.64*	*30*	

The following samples were analyzed in this batch:

17021085-01B	17021085-02B	17021085-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Barr Engineering Company
Work Order: 17021085
Project: Tank 20 Borings (49161092.05)

QC BATCH REPORT

Batch ID: **R206466** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R206466** Units: **% of sample** Analysis Date: **02/21/17 12:44 PM**
Client ID: Run ID: **MOIST_170221A** SeqNo: **4296815** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	0.03	0.025	0.050								J

LCS Sample ID: **LCS-R206466** Units: **% of sample** Analysis Date: **02/21/17 12:44 PM**
Client ID: Run ID: **MOIST_170221A** SeqNo: **4296814** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.025	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **17021085-01C DUP** Units: **% of sample** Analysis Date: **02/21/17 12:44 PM**
Client ID: **TK20-Stockpile-1** Run ID: **MOIST_170221A** SeqNo: **4296793** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	24.88	0.025	0.050	0	0	0		23.2	6.99	5	R

DUP Sample ID: **1702729-04B DUP** Units: **% of sample** Analysis Date: **02/21/17 12:44 PM**
Client ID: Run ID: **MOIST_170221A** SeqNo: **4296806** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	16.31	0.025	0.050	0	0	0		15.56	4.71	5	

The following samples were analyzed in this batch: 17021085-01C 17021085-02C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

17021085

Barr Engineering Co. Chain of Custody

Sample Origination State: ☐ KS ☐ MO ☒ WI ☐ MI ☐ ND ☐ Other: ☐ MN ☐ SD

BARR ☐ Ann Arbor ☒ Duluth ☐ Jefferson City ☐ Bismarck ☐ Hibbing ☐ Minneapolis

COC Number: 53633

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Eng.	Company:
Address: 325 S. Lake Ave, Duluth, MN	Address: same as "report to"
Name: Ryan Erickson	Name:
email: rericksen@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: Tank 20 Borings	Barr Project No: 49161092.05 003

Matrix Code: GW = Groundwater, SW = Surface Water, WW = Waste Water, DW = Drinking Water, S = Soil/Solid, SD = Sediment, O = Other

Preservative Code: A = None, B = HCl, C = HNO_3, D = H_2SO_4, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, I = Ascorbic Acid, J = NH_4Cl, K = Zn Acetate, O = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers	Analysis Requested: Water	Soil: DRO	Soil: BTEX	Soil: % Solids	Preservative Code	Field Filtered Y/N	
										DRO	BTEX		A	N	
1. TK20-stockpile-1				02/20/2017	12:15	S	N	4		1	2	1			DRO, BTEX, % solids
2. TK20-stockpile-2				02/20/2017	13:20	S	N	4		1	2	1			"
3. Trip Blank				02/20/2017	—	QC	N	2			2				QC
4.															
5.															
6.															
7.															
8.															
9.															
10.															

ASAP TAT

BARR USE ONLY							
Sampled by: MJP	Relinquished by: Michael Powell	On Ice? Y N	Date 2/20/17	Time 16:30	Received by: M Breedlove	Date 2/21/17	Time 930
Barr Proj. Manager: REE	Relinquished by:	On Ice? Y N	Date	Time	Received by:	Date	Time
Barr DQ Manager: JET	Samples Shipped VIA: ☐ Courier ☒ Federal Express ☐ Sampler ☐ Other:		Air Bill Number: 4.2°C SR2		Requested Due Date: ☐ Standard Turn Around Time ☐ Rush (mm/dd/yyyy)		
Lab Name: ALS							
Lab Location: Holland, MI	Lab WO:	Temperature on Receipt (°C):			Custody Seal Intact? ☐ Y ☐ N ☐ None		

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

TBB

CUSTODY SEAL — BARR

Date: 2/26/17 Initials: MJP

Project Name: Tank 20 Borings

Project Number: 4916 1092.05 003

Signature: [signature]

Container # 1 of 1

FedEx Express US Airbill — Tracking Number 8107 0723 8109 — Form ID No. 0200 — Recipient's Copy

1 From [redacted]

Date 2/26/17

Sender's Name Michael Powers Phone 218 464-7334

Company Barr Eng.

Address 325 S. Lake Ave.

City Duluth State MN ZIP 55802

2 Your Internal Billing Reference 4916 1092.05 003

3 To

Recipient's Name ALS Environmental Rec. Phone 616 399-6070

Company

Address 3352 128th Ave

We cannot deliver to P.O. boxes or P.O. ZIP codes.

☐ Hold Weekday — FedEx location address REQUIRED. NOT available for FedEx First Overnight.

☐ Hold Saturday — FedEx location address REQUIRED. Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Address

Use this line for the HOLD location address or for continuation of your shipping address.

City Holland State MI ZIP 49424

8107 0723 8109

4 Express Package Service *To most locations. Packages up to 150 lbs.

Next Business Day:
- ☐ FedEx First Overnight
- ☒ FedEx Priority Overnight
- ☐ FedEx Standard Overnight

2 or 3 Business Days:
- ☐ FedEx 2Day A.M.
- ☐ FedEx 2Day
- ☐ FedEx Express Saver

5 Packaging ☐ FedEx Envelope ☐ FedEx Pak ☐ FedEx Box ☐ FedEx Tube ☒ Other

6 Special Handling and Delivery Signature Options

☐ Saturday Delivery

☒ No Signature Required ☐ Direct Signature ☐ Indirect Signature

Does this shipment contain dangerous goods?

☒ No ☐ Yes As per attached Shipper's Declaration ☐ Yes Shipper's Declaration not required ☐ Dry Ice ☐ Cargo Aircraft Only

7 Payment Bill to:

☒ Sender ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

[redacted]

Total Packages 1 Total Weight 27 lbs.

[redacted]

2/27/17 930

ALS Group, USA

Sample Receipt Checklist

Client Name: **BARRENG-MN** Date/Time Received: **21-Feb-17 09:30**

Work Order: **17021085** Received by: **MBB**

Checklist completed by Meghan Broadbent (eSignature) 21-Feb-17 (Date) Reviewed by: Tom Bramish (eSignature) 21-Feb-17 (Date)

Matrices: soil

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	4.2/4.2	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	2/21/2017 11:13:35 AM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

VONCO

Vonco V Waste Management Campus
100 West Gary Street
Duluth, MN 55808
Permit: SW 536

17-019-I Contaminated Soil Tank 20

Date	Ticket	Customer	Truck	Material	Tons
03/14/2017	284749	001342 - Enbridge Pipelines LLC	S98692W	Contaminated Soil Tons	15.57
03/14/2017	284756	001342 - Enbridge Pipelines LLC	S98692W	Contaminated Soil Tons	15.55
03/14/2017	284765	001342 - Enbridge Pipelines LLC	S98692W	Contaminated Soil Tons	12.39
03/14/2017	284768	001342 - Enbridge Pipelines LLC	S19589X	Contaminated Soil Tons	14.92
03/14/2017	284769	001342 - Enbridge Pipelines LLC	S98692W	Contaminated Soil Tons	9.72
03/14/2017	284776	001342 - Enbridge Pipelines LLC	S98692W	Contaminated Soil Tons	12.78
				Total Tons	***80.93***
				Total Loads	***6***