



**Gannett Fleming**

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July 3, 2019  
File #34265.003

Mr. John Sager  
Wisconsin Department of Natural Resources  
1701 North 4th Street  
Superior, WI 54880

Re: Facility-Wide ERP Database Packet Submittal  
Superior Refining Company LLC Refinery, Superior, WI  
WDNR BRRTS# 16-16-559511 and Facility ID: 816009590

Dear John:

On behalf of Superior Refining Company LLC (SRC), Gannett Fleming, Inc. (GF) is submitting the first facility-wide Environmental Repair Program (ERP) database packet for Wisconsin Department of Natural Resources (WDNR) Bureau for Remediation and Redevelopment Tracking System (BRRTS) # 16-16-559511 at the subject refinery in Superior. This cover letter to the packet and the cover letter's tables and figures provide general information associated with the property's facility-wide ERP database. In addition:

- Attachment A provides a list of open and closed BRRTS activities at the refinery.
- Attachments B through H provide summaries of the seven open WDNR ERP sites proposed for transfer to the facility-wide ERP site in conjunction with this first submittal.
- Attachment I includes zoning verification for the property.

A completed certification page and WDNR Form 4400-281 cover sheet for this submittal are also attached. Furthermore, a paper copy of the text of this cover letter (without figures, tables, or attachments) and a \$2,750 check to pay the WDNR's database for groundwater fee (\$350) and database for soil fee (\$2,400 = 8x\$300) are being sent to the WDNR regional environmental program associate, Ms. Kathleen Shafel in Antigo.

Pertinent reference documents on file with the WDNR include the:

- April 2014 final site investigation/remedial action plan (SI/RAP).
- May 2014 WDNR SI/RAP conditional approval letter.
- March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC.

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**Gannett Fleming, Inc.**

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Mr. John Sager  
Wisconsin Department of Natural Resources  
July 3, 2019

-2-

- Applicable investigation and remedial action documentation for all closed and currently open individual sites on the property.

### **General Site Information and Site History**

Figure 1 is a location map showing the refinery, its approximate property boundary, and the area around the refinery and was prepared using the most recent USGS topographic map. The refinery occupies portions of Sections 25, 26, 30, and 36; Township 49 North; Range 14 West; in Superior Township of Douglas County. In conjunction with the April 2014 SI/RAP, a network of 23 wells and 8 piezometers for monitoring overall groundwater quality has been established. Figure 2 shows the locations of the 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) in the network.

Additional required site information is summarized below.

BRRTS# 16-16-559511

BRRTS activity (site) name: Superior Refining Co Facility Wide

Facility ID: 816009590

WTM coordinates of the center of the property are X: 361766 m and Y: 693533 m

Site address: 2407 Stinson Avenue, Superior, WI 54880

Acres ready for use: approximately 600

Contact information for the responsible party (RP) and owner of the source property:

Matt Turner

Superior Refining Company LLC

2407 Stinson Avenue, Superior, WI 54880

(715) 398-8434

Contact information for the RP's environmental consultant:

Cliff Wright

Gannett Fleming, Inc.

8040 Excelsior Drive, Suite 303, Madison, WI 53717-1338

(608) 836-1500 ext. 6722

Mr. John Sager  
Wisconsin Department of Natural Resources  
July 3, 2019

-3-

## **Site Location**

The topography at the refinery slopes gently to the east. Surface elevations range from approximately 650 to 660 feet above mean sea level (MSL). The closest natural surface water body is Newton Creek, located approximately 850 feet east of the refinery's closest aboveground storage tank (AST), as shown on Figure 1. The creek flows about 1.5 miles to Hog Island Inlet, which connects to Lake Superior Bay. Storm water retention and fire water ponds, along with two artificial wetlands for wastewater treatment plant discharge polishing, are located just northwest of the Newton Creek headwaters, near the intersection of Stinson/24<sup>th</sup> Avenue and Bardon Avenue.

Other than the process areas, which are generally paved, most of the refinery property is unpaved. Depending on time of year and topography, the depth to groundwater in the network monitoring wells ranges from <1.0 to >5.9 feet below ground surface (bgs). The direction of shallow groundwater flow below the refinery is to the east (see Figure 2).

## **Prior and Current Site Use and Zoning**

The Superior refinery was constructed in 1951 by the Lake Superior Refinery Company and was sold to Murphy Oil USA, Inc. (Murphy) in 1958. Calumet Superior, LLC (Calumet) purchased the refinery from Murphy in October 2011. Effective November 8, 2107, Husky Superior Refining Holding Corp (Husky Superior) purchased Calumet and changed its legal name to Superior Refining Company LLC (SRC). The refinery continues to produce various grades of petroleum products when operating.

Stinson Avenue borders the refinery property to the south and east with Enbridge Energy's tank farm located further to the southeast. SRC also owns land within Enbridge's tank farm, with three ASTs located within this tract (aka SRC's South Tank Farm). See Section 1.2 of the April 2014 SI/RAP for additional details.

The current zoning for the site is M2, Manufacturing, verified on the City of Superior's website, as documented in Attachment I.

Mr. John Sager  
Wisconsin Department of Natural Resources  
July 3, 2019

-4-

### **General Site Conditions**

Based on the investigative data collected at the refinery, the entire property is underlain by a massive red-brown, lean to fat clay till. The red-brown clay till is relatively homogeneous and extends to approximately 100 feet bgs. Only traces of gravel and few relatively thin, discontinuous fine sand lenses (i.e., <0.5 foot) have been encountered in the clay unit in less than one percent of the borings drilled at the refinery to date. Sections 2.1 and 2.2 of the April 2014 SI/RAP provide additional detail.

### **Fill and Waste Deposits**

On-site ASTs, buildings, loading racks, pipelines, and access roads are founded on (and, for underground pipelines, surrounded by) structural fill, consisting primarily of sand and/or gravel. The depth of fill varies from <1 to 8 feet based on location. Solidified and capped waste deposits up to 8 feet bgs on site are limited to the refinery's closed wastewater treatment Ponds 1 and 6, located immediately northwest of existing Ponds 2 and 7.

### **Description of Bedrock and Current Surface Cover**

Bedrock was not encountered during the site investigation, and geotechnical borings advanced at the refinery did not encounter bedrock up to 140 feet bgs. According to the Douglas County - Depth to Bedrock website, the refinery is located where the depth to bedrock is >100 feet and the bedrock type is sandstone.

The active operating portion of the refinery is located on 7.54 acres, with the addition of all aboveground tanks, buildings, and parking lots consisting of approximately 213 acres – all owned by SRC. The total land owned by SRC, including the active refinery and adjacent vacant land, is about 600 acres. As shown on Figure 2, the area to the west consists of primarily open land with a railroad corridor and further west the Bong Airport. Land immediately to the north and east of the refinery is non-developed and owned by SRC. Open-land surface cover at the site typically includes natural vegetation (i.e., short grasses and weeds) and gravel, where access roads and footpaths are located. The natural vegetation has been altered by construction and operation of the refinery.

Mr. John Sager  
Wisconsin Department of Natural Resources  
July 3, 2019

-5-

### **Groundwater Occurrence and Potable/Municipal Wells Within 1,200 Feet**

In conjunction with the April 2014 SI/RAP, the network of 23 wells and 8 piezometers for monitoring overall groundwater quality was established, as described above. Twice a year, starting in 2015, all wells and piezometers in the network are gauged (to check for free product, track seasonal changes in water levels, and prepare groundwater contour maps), and the perimeter wells and all piezometers are purged and sampled. Table 1 provides a summary of ERP well locations, designations, and monitoring parameters for reference. Note that:

1. MW-1, MW-2, MW-3D, MW-8R, and MW-9B are also classified as “pond” wells. Once a year, samples from these wells are analyzed for volatile organic compounds (VOCs) using Method 8260 and select inorganics, in conjunction with wastewater treatment Ponds 1 and 6 post-closure monitoring. As stipulated by the WDNR Groundwater and Environmental Monitoring System (GEMS) program, MW-8R serves as an upgradient monitoring well, located approximately 2,500 feet southwest of the ponds.
2. MW-1/T67, MW-2/T66, MW-3/T50, MW-5/T40, and MW-5/T70 are gauged along with the perimeter wells and piezometers. However, they are not routinely purged and sampled as part of the ERP monitoring program. Consequently, these wells are not classified as perimeter wells and are designated as “other” wells in Table 1.
3. In April 2018, there was an explosion and fire at the refinery. During response activities, the 4-inch-diameter steel pipe that serves as a protective cover for MW-7 (constructed of 2-inch-diameter, Schedule 40 PVC) was bent. The PVC appeared undamaged, and recovery rates and water levels in MW-7 continued to track the other wells as before, but a standard-sized bailer (i.e., 1.6 inches in diameter and 3 feet long) wouldn't fit down the 2-inch-diameter well. Consequently, field staff used disposable silicone tubing and a peristaltic pump to purge and sample MW-7 in 2018. As a precautionary measure, SRC plans to abandon the well and install MW-7R to replace MW-7 in 2019.

Table 2 summarizes network water level elevation data for 2015-2018. All the monitoring wells and piezometers are screened in the native clay till, and no widespread fracture flow is present. As shown in Table 2:

- The depth to groundwater in the wells/piezometers ranged from 1.81 to 9.46 feet below top of casing (i.e., from approximately -0.5 to 6.9 feet bgs), and no free product was observed.
- Calculated vertical gradients were all negative/downward and ranged from 0.12 to 1.18. Negative vertical gradients are tabulated in parenthesis in red.

Mr. John Sager  
Wisconsin Department of Natural Resources  
July 3, 2019

-6-

The direction of shallow groundwater flow below the site is to the east. To date, there is insufficient data to define the flow direction deeper in the clay.

Permeameter tests conducted on soil samples collected from many locations and in-situ aquifer tests have documented the low permeability of the native clay at the refinery. Results from these tests confirm that the hydraulic conductivity of the native clay underlying the refinery is on the order of  $10^{-7}$  centimeters per second. Assuming a horizontal hydraulic gradient range of 0.003-0.009 and effective porosity of 0.06, the estimated horizontal groundwater flow velocity range is 0.0124-0.037 foot per year.

There are no known potable or municipal wells within 1,200 feet of the site. The City of Superior obtains its potable water from Lake Superior.

### **Facility-Wide Groundwater Analytical Data and Geologic Cross-Section**

Field staff sample the piezometers and perimeter wells twice a year. The samples are routinely analyzed for petroleum volatile organic compounds (PVOCs) and naphthalene using Method 8021 in the spring and fall. However, samples from the five pond wells (i.e., MW-1, MW-2, MW-3D, MW-8R, and MW-9B) are analyzed for VOCs and select inorganics once a year for the GEMS program, as described in the *Groundwater Occurrence* subsection (Note #1) above.

The PVOC/naphthalene analytical results for 2018 (with MW-1, MW-2, MW-3D, MW-8R, and MW-9B flagged as *ERP and GEMS* well locations) are summarized in Table 3. Only the PVOC/naphthalene data for 2018 are presented in this report; complete VOC and inorganic analytical results for the five pond wells are submitted to WDNR GEMS program staff annually. As shown in Table 3:

- The toluene concentration in the sample collected from MW-7 on October 9, 2018, was 1.9 micrograms per liter ( $\mu\text{g}/\ell$ ). This is nearly two orders of magnitude below toluene's NR 140 preventative action limit (PAL) of 160  $\mu\text{g}/\ell$ .
- All other analytical results were non-detect for PVOCs/naphthalene, and the detection limits for PVOCs/naphthalene were all below their respective PALs. PVOC/naphthalene analytical results were all non-detect as well in 2015, 2016, and 2017.

Mr. John Sager  
Wisconsin Department of Natural Resources  
July 3, 2019

-7-

Figure 2 serves as this submittal's monitoring well and groundwater flow direction maps for the site. Figure 3 provides a southwest-to-northeast geologic cross-section.

### **Method Used to Establish Soil Clean-up Standards**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial residual contaminant levels (RCLs). See the April 2014 SI/RAP and March 2018 Negotiated Agreement for additional details.

### **Remedial Actions Implemented**

Multiple remedial actions have been implemented and reported to the WDNR. Attachments B through H include summaries of the remedial actions completed for the seven open individual sites being transferred to the facility-wide ERP site in conjunction with this submittal, as outlined in Table 4.

If you have any questions or need additional information regarding this submittal, feel free to contact Matt Turner at SRC or me.

Sincerely,

GANNETT FLEMING, INC.



Clifford C. Wright, P.E., P.G.  
Project Engineer

CCW/jec/Enc.

ecc: Matt Turner (Superior Refining Company LLC)  
cc w/o attachments: Kathleen Shafel (WDNR)  
WDNR Satellite Center, 223 E Steinfest Rd, Antigo, WI 54501

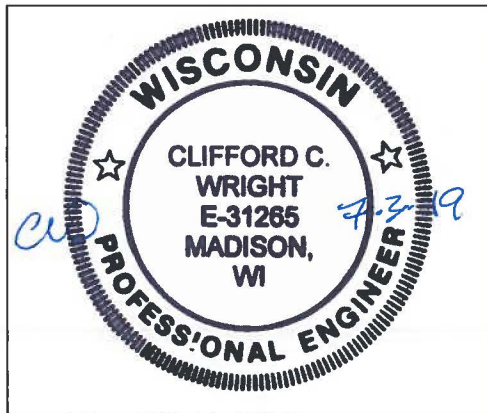


**ENGINEERING AND HYDROGEOLOGIST CERTIFICATIONS**

I hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Print Name Clifford C. Wright	Title Project Engineer
Signature <i>Clifford C. Wright</i>	Date 7.3.19

P.E. Seal for E-31265:



I hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Print Name Clifford C. Wright	Title Project Geologist
Signature <i>Clifford C. Wright</i>	Date 7.3.19



**Purpose**

This cover sheet summarizes continuing obligations regarding environmental conditions on this property. Continuing obligations are legal mechanisms that:

- 1) Require or restrict certain actions to protect human health or the environment.
- 2) Minimize human and natural resource exposure to contamination, and/or
- 3) Give notice of the **existence** of residual contamination

Learn more about continuing obligations at <http://dnr.wi.gov/topic/brownfields/residual.html>

**DNR Property Information:**

DNR Approval Date:

**BRRTS #:**  (No Dashes) FID #:

**ACTIVITY NAME:**

**PROPERTY ADDRESS:**

**MUNICIPALITY:**

**PARCEL ID #:**

**\*WTM COORDINATES:**

X:  Y:

*\* Coordinates are in WTM83, NAD83 (1991)*

**WTM COORDINATES REPRESENT:**

- Approximate Center Of Continuing Obligations
- Approximate Source Parcel Center

Please visit <http://dnr.wi.gov/topic/brownfields/wrrd.html> for additional DNR site information.

**EPA Superfund Information (if applicable):**

EPA ID:  *To view more information click on the EPA ID.*

SITE NAME:

**Requirements for all properties with Continuing Obligations**

- 1. Properly manage contaminated soil if it is excavated. Sample and arrange appropriate treatment or disposal.
- 2. DNR approval is required if a water supply well will be constructed or reconstructed.

**Site-Specific Requirement(s) - (BRRTS Action Code)**

- A "cap" over the contaminated area must be: (222)
  - Constructed & Maintained
  - Maintained
- A vapor mitigation system must be: (226)
  - Constructed & Maintained
  - Maintained
- The need for vapor control technology must be evaluated if a building will be constructed. (228)
- The approved soil cleanup level is suitable for industrial use of the property. (220)
- DNR has approved construction on an abandoned landfill and certain maintenance requirements apply. (402) or (404)
- A structural impediment (e.g. building) is present which inhibited investigation/cleanup. Further environment work may be required if the impediment is removed. (224)
- DNR has directed a local government unit (LGU) to take an action and a LGU liability exemption applies. This exemption does not transfer to future private owners. (230)
- Another type of continuing obligation has been established in DNR's remedial action plan approval. (228)  
*Explain:*

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and an existing monitoring well network is being used for field verification of the performance standard.

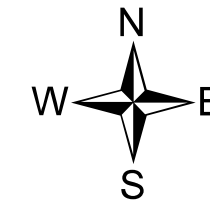
ATTACHMENT A

Site Name: Superior Refining Co Facility Wide  
BRRTS# 16-16-559511

A sequential list of the parcel identification (ID) numbers for the Superior refinery follows.

01-801-03055-00.  
01-801-03133-00.  
01-801-03136-00.  
01-801-03209-00.  
01-801-03246-00.  
01-801-03302-00.  
01-801-03304-00.  
01-801-03339-00.  
01-801-04051-00.  
01-801-04083-00.  
01-801-04149-00.  
01-801-04185-00.  
01-801-04218-00.  
01-801-04250-00.  
01-801-04412-00.  
01-801-04426-00.  
01-801-04442-00.  
01-801-04528-00.  
01-801-04551-00.  
01-801-04630-00.  
01-801-05132-00.  
02-802-00734-00.  
02-802-00736-00.  
02-802-00763-00.  
02-802-00815-00.  
02-802-00872-00.  
02-802-01054-00.  
02-802-01066-00.  
02-802-01105-00.  
02-802-06614-00.  
02-802-06749-00.  
08-808-09689-00.



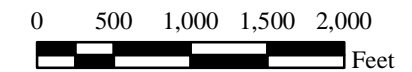



**Legend**

----- Approximate Refinery Property Boundary

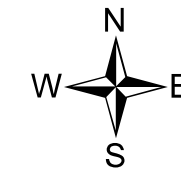
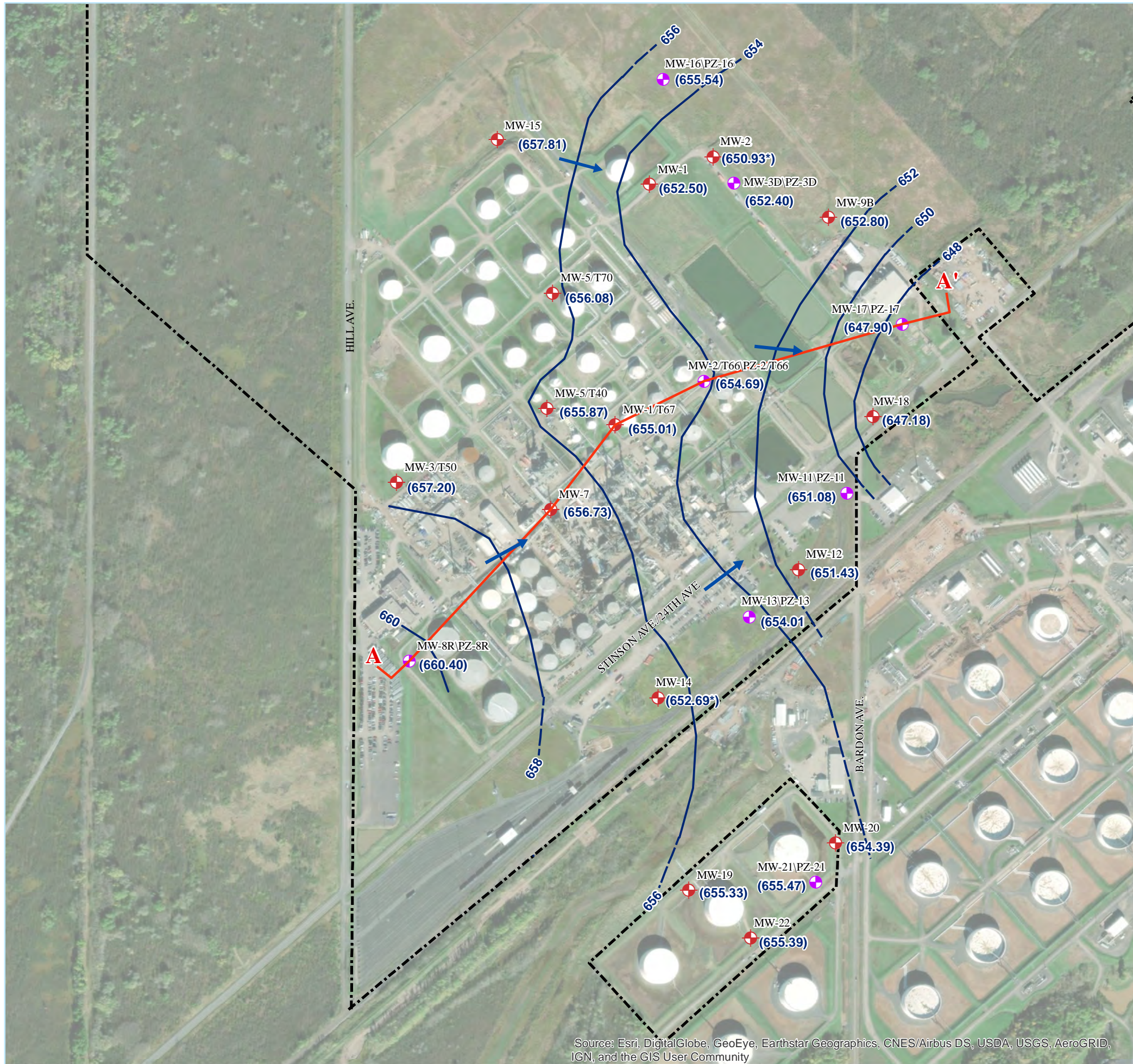
**Notes:**

1. Contour interval = 10ft.
2. Site datum = mean sea level (MSL).
3. Topographic map obtained from ArcGIS USA Topo Map Service. Service includes seamless, scanned image of USGS topographic maps.



<b>Site Location Map</b>			
SUPERIOR REFINING COMPANY LLC REFINERY SUPERIOR, WISCONSIN			
		Gannett Fleming, Inc. 8040 Excelsior Drive Madison WI 53717-1338 (608) 836-1500 www.gannettfleming.com	
Project No.	34265.003	Date	1/8/18 Figure <b>1</b>





### Legend

- 656** — Groundwater Contour (dashed where inferred)
- Groundwater Flow Direction
- (654.30)** Groundwater Elevation (ft MSL)
- Monitoring Well
- Monitoring Well/Piezometer Pair (groundwater elevation shown is for monitoring well)
- Approximate Facility Property Boundary

### Notes:

1. See Figure 3 for geologic cross section A-A'.
2. The data from MW-2 and MW-14 were not used to develop the contour map.
3. Site datum = mean sea level (MSL).
4. Well/Piezometer locations based on 02/06/15 survey by TKDA using a Trimble GNSS RTK GPS R8 Model 3.



## Groundwater Flow Map (May 2018)

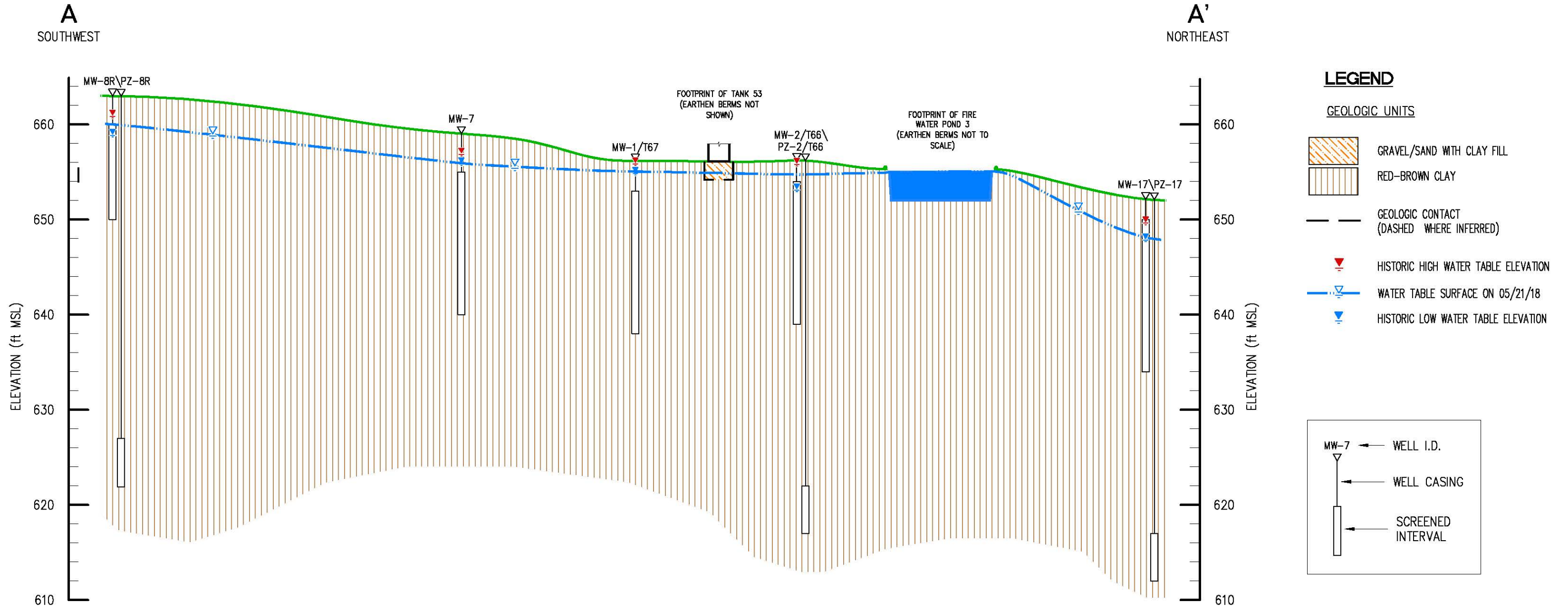
SUPERIOR REFINING COMPANY LLC REFINERY  
SUPERIOR, WISCONSIN



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





**NOTES:**

1. SEE FIGURE 2 FOR CROSS SECTION LOCATION.
2. SITE DATUM = MEAN SEA LEVEL (MSL).
3. LOW/HIGH WATER ELEVATION FROM MAY 2015–SEPTEMBER 2018.
4. GROUND SURFACE OF GEOLOGIC CROSS SECTION SHOWS GENERAL TOPOGRAPHY BUT DOES NOT INCLUDE ALL EARTHEN BERMS, ETC.

HORIZONTAL SCALE: 1" = 300'  
 VERTICAL SCALE: 1" = 10'  
 VERTICAL EXAGGERATION: 30x

**GEOLOGIC**  
**CROSS SECTION A–A'**  
 SUPERIOR REFINING COMPANY LLC  
 SUPERIOR, WISCONSIN

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE 1

ERP WELL LOCATION, DESIGNATION, AND MONITORING PARAMETER SUMMARY

Well ID	Well Location	Well Designation(s)			ERP Monitoring Parameter(s)	
		Perimeter	Pond/GEMS	Other	Water Level	PVOC/Naphthalene
MW-1	Northeast corner of refinery	X	X		X	X
MW-1/T67	Tank 67 basin			X	X	
MW-2	Northeast corner of refinery	X	X		X	X
MW-2/T66	Southeast of Tank 65 basin			X	X	
MW-3D	Northeast corner of refinery	X	X		X	X
MW-3/T50	Tank 50 basin			X	X	
MW-5/T40	Tank 40 basin			X	X	
MW-5/T70	Tank 70 basin			X	X	
MW-7	Central area of refinery	X			X	X
MW-8R	Tanks 106/112/114; SW corner of refinery	X	X		X	X
MW-9B	Northwest of wastewater treatment plant	X	X		X	X
MW-11	Near intersection of Stinson & Bardon Ave.	X			X	X
MW-12	South central property boundary	X			X	X
MW-13	South central property boundary	X			X	X
MW-14	South central property boundary	X			X	X
MW-15	North of refinery	X			X	X
MW-16	Northeast corner of refinery	X			X	X
MW-17	Southeast of wastewater treatment plant	X			X	X
MW-18	Near intersection of Stinson & Bardon Ave.	X			X	X
MW-19	South tank farm	X			X	X
MW-20	South tank farm	X			X	X
MW-21	South tank farm	X			X	X
MW-22	South tank farm	X			X	X

**NOTES:**

- Water Level = Measure depth to water, twice a year, for groundwater elevation.
- PVOC/Naphthalene = Sample, twice a year, for petroleum volatile organic compounds/naphthalene.
- ERP = Wisconsin Department of Natural Resources (WDNR) Environmental Repair Program.
- GEMS = WDNR Groundwater and Environmental Monitoring System.

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE 2

WATER LEVEL ELEVATION DATA FOR ERP WELLS AND PIEZOMETERS

Description	Monitoring Well ID and Reference Information													
	MW-1	MW-1/T67	MW-2	MW-2/T66	PZ-2/T66	MW-3D	PZ-3D	MW-3/T50	MW-5/T40	MW-5/T70	MW-7	MW-8R	PZ-8R	MW-9B
Top of casing (ft MSL)	659.46	657.75	658.03	659.51	659.07	655.53	656.29	663.73	660.62	660.37	661.12	663.75	664.19	655.82
Ground surface (ft MSL)	655.43	656.41	654.99	657.01	656.30	653.79	653.49	659.96	658.03	657.86	659.59	661.45	661.38	654.38
Top of screen (ft MSL)	649.0	653.4	648.5	654.4	621.6	650.3	618.8	659.2	655.2	655.4	654.7	659.8	626.7	651.1
Bottom of well (ft MSL)	633.8	638.4	633.5	639.4	616.6	635.3	613.8	649.2	645.2	645.4	639.5	649.8	621.7	636.1
Measurement Date	Depth to Water from Top of Casing (feet)													
05/28/15	7.65	2.00	4.62	4.10	13.72	2.72	15.30	4.72	3.23	2.52	4.27	3.30	10.75	3.53
09/03/15	7.66	2.15	7.12	3.88	19.66	3.01	20.68	4.81	3.44	4.85	3.78	3.39	13.94	3.16
05/04/16	6.61	2.54	5.21	4.41	12.88	3.32	14.31	6.04	3.75	3.81	4.25	4.91	9.69	3.19
09/07/16	8.24	2.15	7.71	6.06	16.20	3.65	17.15	4.75	3.51	3.69	5.09	4.91	11.17	6.58
04/26/17	6.91	2.08	4.59	3.17	12.66	1.81	13.77	4.30	3.20	3.43	4.11	2.58	6.56	2.62
09/27/17	6.31	1.84	4.28	3.23	14.31	1.99	15.50	4.37	3.15	3.74	3.95	2.72	10.35	3.75
05/21/18	6.96	2.74	7.10	4.82	12.20	3.13	13.19	6.53	4.75	4.29	4.39	3.35	9.20	3.02
09/10/18	8.21	2.29	5.28	4.35	17.30	3.18	18.18	6.48	3.45	2.83	4.62	3.78	12.44	7.87
	Water Elevation (ft MSL)													
05/28/15	651.81	655.75	653.41	655.41	645.35	652.81	640.99	659.01	657.39	657.85	656.85	660.45	653.44	652.29
09/03/15	651.80	655.60	650.91	655.63	639.41	652.52	635.61	658.92	657.18	655.52	657.34	660.36	650.25	652.66
05/04/16	652.85	655.21	652.82	655.10	646.19	652.21	641.98	657.69	656.87	656.56	656.87	658.84	654.50	652.63
09/07/16	651.22	655.60	650.32	653.45	642.87	651.88	639.14	658.98	657.11	656.68	656.03	658.84	653.02	649.24
04/26/17	652.55	655.67	653.44	656.34	646.41	653.72	642.52	659.43	657.42	656.94	657.01	661.17	657.63	653.20
09/27/17	653.15	655.91	653.75	656.28	644.76	653.54	640.79	659.36	657.47	656.63	657.17	661.03	653.84	652.07
05/21/18	652.50	655.01	650.93	654.69	646.87	652.40	643.10	657.20	655.87	656.08	656.73	660.40	654.99	652.80
09/10/18	651.25	655.46	652.75	655.16	641.77	652.35	638.11	657.25	657.17	657.54	656.50	659.97	651.75	647.95
	Calculated Vertical Gradient													
05/28/15	--	--	--	--	(0.36)	--	(0.45)	--	--	--	--	--	(0.23)	--
09/03/15	--	--	--	--	(0.58)	--	(0.64)	--	--	--	--	--	(0.33)	--
05/04/16	--	--	--	--	(0.32)	--	(0.39)	--	--	--	--	--	(0.14)	--
09/07/16	--	--	--	--	(0.39)	--	(0.48)	--	--	--	--	--	(0.19)	--
04/26/17	--	--	--	--	(0.36)	--	(0.42)	--	--	--	--	--	(0.12)	--
09/27/17	--	--	--	--	(0.41)	--	(0.48)	--	--	--	--	--	(0.24)	--
05/21/18	--	--	--	--	(0.28)	--	(0.35)	--	--	--	--	--	(0.18)	--
09/10/18	--	--	--	--	(0.48)	--	(0.54)	--	--	--	--	--	(0.27)	--



TABLE 2

WATER LEVEL ELEVATION DATA FOR ERP WELLS AND PIEZOMETERS

Description	Monitoring Well ID and Reference Information																
	MW-11	PZ-11	MW-12	MW-13	PZ-13	MW-14	MW-15	MW-16	PZ-16	MW-17	PZ-17	MW-18	MW-19	MW-20	MW-21	PZ-21	MW-22
Top of casing (ft MSL)	654.98	655.25	656.70	659.10	658.97	661.16	659.89	658.85	658.65	654.30	654.58	651.89	658.94	659.06	659.29	659.52	659.19
Ground surface (ft MSL)	652.44	652.61	653.92	656.08	656.13	658.14	657.55	655.86	655.79	651.47	651.79	649.36	656.85	655.99	656.73	656.72	657.07
Top of screen (ft MSL)	647.7	617.8	649.0	651.3	621.5	653.1	654.4	653.4	621.2	648.8	617.1	646.4	653.4	653.6	653.8	622.0	653.7
Bottom of well (ft MSL)	632.7	612.8	634.0	636.3	616.5	638.1	639.4	638.4	616.2	633.8	612.1	631.4	638.4	638.6	638.8	617.0	638.7
Measurement Date	Depth to Water from Top of Casing (feet)																
05/28/15	5.51	10.75	6.90	5.10	12.40	4.72	3.22	4.55	36.32	6.23	14.73	4.15	2.75	3.98	3.80	12.45	3.52
09/03/15	9.09	14.95	6.23	4.57	14.66	3.69	3.37	3.79	25.86	5.31	19.39	3.61	4.31	3.91	4.89	16.18	6.40
05/04/16	4.42	12.01	4.30	4.46	11.70	4.39	3.65	3.40	16.96	5.09	13.91	4.72	3.65	4.49	3.76	11.62	4.26
09/07/16	7.51	12.55	9.05	9.02	12.48	4.57	3.44	5.56	20.57	5.40	16.86	5.98	4.59	4.60	4.80	12.96	5.91
04/26/17	3.16	11.49	4.78	3.71	11.42	2.48	2.88	3.31	16.43	4.91	13.75	2.85	2.36	3.78	4.49	11.25	2.62
09/27/17	3.70	11.71	4.22	3.53	11.55	3.52	3.00	3.31	18.98	4.93	15.69	3.10	2.31	3.41	3.11	12.02	2.69
05/21/18	3.90	11.22	5.27	5.09	11.08	8.47	2.08	3.31	16.22	6.40	13.30	4.71	3.61	4.67	3.82	11.15	3.80
09/10/18	9.46	12.45	5.43	3.95	12.91	3.81	3.46	5.05	22.96	4.60	18.85	4.91	4.30	4.76	7.05	13.29	4.95
	Water Elevation (ft MSL)																
05/28/15	649.47	644.50	649.80	654.00	646.57	656.44	656.67	654.30	622.33	648.07	639.85	647.74	656.19	655.08	655.49	647.07	655.67
09/03/15	645.89	640.30	650.47	654.53	644.31	657.47	656.52	655.06	632.79	648.99	635.19	648.28	654.63	655.15	654.40	643.34	652.79
05/04/16	650.56	643.24	652.40	654.64	647.27	656.77	656.24	655.45	641.69	649.21	640.67	647.17	655.29	654.57	655.53	647.90	654.93
09/07/16	647.47	642.70	647.65	650.08	646.49	656.59	656.45	653.29	638.08	648.90	637.72	645.91	654.35	654.46	654.49	646.56	653.28
04/26/17	651.82	643.76	651.92	655.39	647.55	658.68	657.01	655.54	642.22	649.39	640.83	649.04	656.58	655.28	654.80	648.27	656.57
09/27/17	651.28	643.54	652.48	655.57	647.42	657.64	656.89	655.54	639.67	649.37	638.89	648.79	656.63	655.65	656.18	647.50	656.50
05/21/18	651.08	644.03	651.43	654.01	647.89	652.69	657.81	655.54	642.43	647.90	641.28	647.18	655.33	654.39	655.47	648.37	655.39
09/10/18	645.52	642.80	651.27	655.15	646.06	657.35	656.43	653.80	635.69	649.70	635.73	646.98	654.64	654.30	652.24	646.23	654.24
	Calculated Vertical Gradient																
05/28/15	--	(0.20)	--	--	(0.30)	--	--	--	(1.18)	--	(0.31)	--	--	--	--	(0.31)	--
09/03/15	--	(0.23)	--	--	(0.41)	--	--	--	(0.82)	--	(0.52)	--	--	--	--	(0.41)	--
05/04/16	--	(0.29)	--	--	(0.30)	--	--	--	(0.51)	--	(0.32)	--	--	--	--	(0.29)	--
09/07/16	--	(0.19)	--	--	(0.15)	--	--	--	(0.56)	--	(0.42)	--	--	--	--	(0.30)	--
04/26/17	--	(0.32)	--	--	(0.32)	--	--	--	(0.49)	--	(0.32)	--	--	--	--	(0.24)	--
09/27/17	--	(0.31)	--	--	(0.33)	--	--	--	(0.58)	--	(0.39)	--	--	--	--	(0.32)	--
05/21/18	--	(0.28)	--	--	(0.25)	--	--	--	(0.48)	--	(0.25)	--	--	--	--	(0.27)	--
09/10/18	--	(0.11)	--	--	(0.37)	--	--	--	(0.67)	--	(0.52)	--	--	--	--	(0.23)	--

NOTES:

Site datum = feet above mean sea level (ft MSL). No measurable thickness of free product observed in any of the monitoring wells.

Negative/downward calculated vertical gradients are enclosed in parenthesis and (red).

-- = Not applicable.

nm = Not measured as part of perimeter monitoring well network.

ns = Not surveyed.

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE 3

PVOC/NAPHTHALENE DATA FOR ERP PIEZOMETERS AND PERIMETER WELLS (2018)

Compound	Benzene	Ethylbenzene	Methyl tert butyl ether	Naphthalene	Toluene	Trimethylbenzenes	Xylenes		
NR 140 PAL	0.5	140	12	10	160	96	400		
NR 140 ES	5.0	700	60	100	800	480	2,000	RQ	RQ
MW-1 (ERP and GEMS)									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/10/18	<0.25	<0.22	<1.2	<1.2	<0.17	1.71	0.73	U	U
MW-2 (ERP and GEMS)									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/10/18	<0.25	<0.22	<1.2	<1.2	<0.17	1.71	0.73	U	U
PZ-2/T66									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
MW-3D (ERP and GEMS) <sup>(1)</sup>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/10/18	<0.25	<0.22	<1.2	<1.2	<0.17	1.71	0.73	U	U
PZ-3D									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
MW-7									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	1.9	0.67	0.98	U	U
MW-8R (ERP and GEMS)									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/10/18	<0.25	<0.22	<1.2	<1.2	<0.17	1.71	0.73	U	U
PZ-8R									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
MW-9B (ERP and GEMS) <sup>(2)</sup>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/10/18	<0.25	<0.22	<1.2	<1.2	<0.17	1.71	0.73	U	U
MW-11									
06/12/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
PZ-11									
06/12/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
MW-12									
06/12/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
MW-13									
06/12/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
PZ-13									
06/12/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
MW-14									
06/12/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
MW-15									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U

TABLE 3

## PVOC/NAPHTHALENE DATA FOR ERP PIEZOMETERS AND PERIMETER WELLS (2018)

Compound	Benzene	Ethylbenzene	Methyl tert butyl ether	Naphthalene	Toluene	Trimethylbenzenes	Xylenes		
NR 140 PAL	0.5	140	12	10	160	96	400		
NR 140 ES	5.0	700	60	100	800	480	2,000	RQ	RQ
<b>MW-16</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>PZ-16</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>MW-17</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>PZ-17</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>MW-18</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>MW-19</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>MW-20</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>MW-21</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>PZ-21</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
<b>MW-22</b>									
06/11/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U
10/09/18	<0.31	<0.33	<0.32	<0.51	<0.49	0.67	0.98	U	U

**NOTES:**

Concentrations are in micrograms per liter ( $\mu\text{g}/\ell$ ). No results are at or above an NR 140 ES or PAL.

NR 140 ES = Wisconsin Administrative Code NR 140 Enforcement Standard (February 2017).

NR 140 PAL = Wisconsin Administrative Code NR 140 Preventative Action Limit (February 2017).

RQ = Results qualifier.

U = Compound not detected at or above the detection limit, which is the value shown.

**FOOTNOTES:**

(1) MW-3D is a replacement for MW-3B.

(2) MW-9B is a replacement for MW-9.

SUPERIOR REFINING COMPANY LLC  
 SUPERIOR, WISCONSIN

TABLE 4

SITES PROPOSED FOR TRANSFER<sup>(1)</sup>

<b>BRRTS #</b>	<b>Site/Activity Name</b>	<b>Comment/Description</b>	<b>Attachment</b>
02-16-557992	Murphy Oil - Tank #30	January 2011 release	B
02-16-557994	Calumet Superior LLC - Tank #50	October 2011 release	C
02-16-562123	Calumet Superior LLC - Spill 04-16-562147	East of Cooling Tower 2	D
02-16-577285	Murphy Oil - Tank 27 Basin	Historical contamination site	E
02-16-580745	Calumet Superior LLC - Spill 04-16-580744	100-gal slop oil release	F
02-16-580790	Calumet Superior LLC - Spill 04-16-580792	Tank 116, 400-gal fuel oil release	G
02-16-583029	Superior Refining - Spill 04-16-583035	Tank 30, February 2018 fill line release	H

FOOTNOTE:

(1) Open individual sites proposed for transfer to the facility-wide ERP site (BRRTS# 16-16-559511).

**ATTACHMENT A**

**OPEN AND CLOSED BRRTS ACTIVITIES AT THE FACILITY-WIDE ERP SITE**

ATTACHMENT A

Site Name: Superior Refining Co Facility Wide  
BRRTS# 16-16-559511

A sequential list of BRRTS site activities (by number and site name, including closed cases) at the property follows.

02-16-000161 MURPHY OIL - LAKEHEAD TANK FAC, Closed.  
02-16-000507 MURPHY OIL - 24TH, Closed.  
02-16-000522 MURPHY OIL - TANK #34, Closed.  
02-16-000523 MURPHY OIL - TANK #67, Closed.  
02-16-000563 MURPHY OIL - TANK #102, Closed.  
02-16-000571 MURPHY OIL - TANK #34 & 35, Closed.  
02-16-118396 MURPHY OIL USA, Closed.  
02-16-190549 MURPHY OIL - TANK #1 & 2 (FORMER), Closed.  
02-16-221525 MURPHY OIL - TANK #59, Closed.  
02-16-221534 MURPHY OIL - TANK #29 & 30, Closed.  
02-16-221811 MURPHY OIL - UNDERGROUND PIPELINE, Closed.  
02-16-221908 MURPHY OIL - TANK #79, Closed.  
02-16-221920 MURPHY OIL - TANK #47, Closed.  
02-16-221933 MURPHY OIL - TANK #31, Closed.  
02-16-221941 MURPHY OIL - TANK #39, Closed.  
02-16-221947 MURPHY OIL - TANK #8, Closed.  
02-16-221988 MURPHY OIL - TANK #81, Closed.  
02-16-222617 MURPHY OIL - TANK #65 & 66, Closed.  
02-16-222628 MURPHY OIL - PROPANE/BUTANE LOADING AREA, Closed.  
02-16-222638 MURPHY OIL - CRUDE UNIT PROCESS AREA, Closed.  
02-16-222650 MURPHY OIL - FUEL LOADING AREA, Closed.  
02-16-222670 MURPHY OIL - TANK S-1, S-2, Closed.  
02-16-222701 MURPHY OIL - TANK BASIN #51 & 52, Closed.  
02-16-222712 MURPHY OIL - TANK #40, Open.  
02-16-222721 MURPHY OIL - TANK #32 & 33, Closed.  
02-16-223154 MURPHY OIL - TANK #70, Open.  
02-16-226861 MURPHY OIL - CONTAMINATED SOIL UNDER ROADWAY, Closed.  
02-16-242301 MURPHY OIL - VAPOR RECOVERY UNIT, Closed.  
02-16-246715 MURPHY OIL - SLOP OIL MANIFOLD AREA, Closed.  
02-16-515749 MURPHY OIL - LOADING DOCK AREA, Open.  
02-16-526812 MURPHY OIL - TANK BASIN #68, Open.  
02-16-534621 MURPHY OIL - MIXER TANK #50, Open.  
02-16-550859 MURPHY OIL - S OF GREEN GAS UNIT, Closed.  
02-16-557992 MURPHY OIL - TANK #30, Open.

ATTACHMENT A

Site Name: Superior Refining Co Facility Wide  
BRRTS# 16-16-559511

02-16-557994 CALUMET SUPERIOR LLC - TANK #50, Open.  
02-16-562123 CALUMET SUPERIOR LLC – SPILL 04-16-562147, Open.  
02-16-577285 MURPHY OIL - TANK 27 BASIN, Open.  
02-16-580745 CALUMET SUPERIOR LLC – SPILL 04-16-580744, Open.  
02-16-580790 CALUMET SUPERIOR LLC – SPILL 04-16-580792, Open.  
02-16-580801 CALUMET SUPERIOR LLC – SPILL 04-16-580804, Open.  
02-16-583029 SUPERIOR REFINING – SPILL 04-16-583035, Open.  
03-16-000736 MURPHY OIL - WAREHOUSE, Closed.  
16-16-559511 SUPERIOR REFIINING CO FACILITY WIDE, Open.



**ATTACHMENT B**

**SUMMARY OF BRRTS# 02-16-557992 MURPHY OIL – TANK #30**  
**PROPOSED FOR TRANSFER TO BRRTS# 16-16-559511**

## ATTACHMENT B

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

July 3, 2019

Re: Individual Site Summary for Transfer to the Referenced Facility-Wide ERP Site  
RELEASE OR ACTIVITY NAME: Murphy Oil – Tank #30  
ORIGINAL BRRTS/SRRTS# (if applicable): 02-16-557992

### **General Site Information and How and When Site Contamination was Discovered**

During routine inspections, refinery staff observed ponding of product on ice/frozen ground in the basin southeast of Tank 30, and the release was reported to the Wisconsin Department of Natural Resources (WDNR) on January 13, 2011. Approximately 2,000 gallons of naphtha were released from aboveground piping located about 40 feet southeast of Tank 30, because ice accumulation caused a drain valve to break off. Additional required site information and attachments are summarized below.

WTM coordinates of the subject activity are X: 361514 m and Y: 693119 m

Pertinent individual site reference documents on file with the WDNR include the:

- February 2012 *Site Investigation Work Plan*.
- March 2014 *Remediation Progress Report*.
- April 2019 *Tank 30 Basin Water Analytical Results* report, which pertains to both this (January 2011, BRRTS# 02-16-557992) and the February 2018 (BRRTS# 02-16-583029) Tank 30 basin release sites.

SRC contact information:

Matt Turner, (715) 398-8434, [Matthew.Turner@huskyenergy.com](mailto:Matthew.Turner@huskyenergy.com)

Environmental consultant contact information:

Cliff Wright; Gannett Fleming, Inc.; (608) 836-1500 x6722, [cwright@gfnet.com](mailto:cwright@gfnet.com)

Attachments include:

- Engineering Certification provided with the facility-wide ERP database submittal
- Figure B-1 Detailed Site Map and Soil Contamination
- Figure B-2 Residual Soil Contamination
- Table B-1 Soil Analytical Results
- Table B-2 Residual Soil Contamination

## ATTACHMENT B

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

- Table B-3 Continuing Obligations Checklist

### **Site Investigation Summary**

Investigation work completed at the BRRTS# 02-16-557992 site includes:

- Surface water sampling in April 2011.
- Soil sampling in May 2011.
- Soil and groundwater sampling in April/May 2012.
- Surface water sampling in March, August, and October 2018, following a February 2018 release of naphtha and associated clean-up activity related to the BRRTS# 02-16-583029 site, in the same general area of the Tank 30 basin as the subject site.

Results from the surface water samples collected in 2018 document the improvement in Tank 30 basin water quality over time. Given the documented improvement in water quality, the WDNR agreed that SRC could submit this request to transfer BRRTS# 02-16-557992 to BRRTS# 16-16-559511 based on the BRRTS# 02-16-557992 site soil data. See the April 2019 *Tank 30 Basin Water Analytical Results* report for additional details.

### **Description of Any Structural Impediments**

Not applicable.

### **Nature, Degree, and Extent of Soil Contamination**

Investigation results document that the estimated extent of impacted soil was limited to the area shown on Figure B-1. Compounds of concern are the petroleum volatile organic compounds (PVOCs), naphthalene, and other select VOCs. A total of 16 soil samples were submitted for analysis. Table B-1 includes a summary of the analytical results.

### **Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

Lab results confirm that the concentrations of VOCs in the soil were below generic NR 720 industrial direct contact residual concentration levels (RCLs).

## ATTACHMENT B

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Vapor Migration Pathway**

The vapor migration pathway was ruled out, as allowed by the WDNR, because a) Tanks 29 and 30 are the only structures in the basin, b) the closest occupied buildings are field office trailers approximately 850 feet to the southwest, c) there are no underground utilities in the basin, d) the basin currently is and will continue to be a petroleum storage area, and e) SRC has no plans to construct any other structures or buildings in the basin.

### **Remedial Actions Implemented and Residual Contamination Levels**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial RCLs.

### **Immediate or Interim Actions Under NR 708, Wis. Adm. Code**

The degree and extent of soil contamination was limited because the release occurred in January on ice/frozen ground, which caused the product to pond on the surface in a topographically low area and allowed field personnel time to vacuum up most of the product immediately after the release occurred. Residual soil contamination extended from the source location to the contiguous low area in the southeast corner of the tank basin where naphtha-impacted melt water accumulated prior to being removed between February 18 and March 31, 2011, using vacuum trucks.

### **Active Remedial Actions**

Other than the immediate and interim action(s) described in the previous paragraph, no active remediation was conducted at the site.

### **Nature, Degree, and Extent of Residual Contamination**

Based on soil sampling conducted in May 2011 and April/May 2012 and summarized in Table B-2, maximum VOC concentrations found in the upper 4 feet of soil include benzene at 1.2 milligrams per kilogram (mg/kg), toluene at 2.9 mg/kg, ethylbenzene at 0.74 mg/kg, and xylenes at 3.0 mg/kg; all from soil sample SS-4 collected at 0.5 foot below ground surface (ft bgs). The estimated extent of residual contamination is limited to an irregularly shaped area approximately 140 feet long and up to 80 feet wide, as shown on Figure B-2.

## ATTACHMENT B

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Residual Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

See the previous paragraph.

### **Residual Soil Contamination Above the Observed Low Water Table**

Same as above.

### **Description of How Residual Contamination Will be Addressed**

The residual contamination will be addressed by remediation through natural attenuation.

### **Soil, Groundwater, and Vapor Exposure Pathway Mitigation**

The soil and groundwater exposure pathways were adequately addressed because the immediate/interim action met the direct contact soil clean-up standards, and the existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater. The vapor exposure pathway was ruled out.

### **Continuing Obligations**

SRC will continue to utilize its network of 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) for field verification of the performance standard for the protection of groundwater. See Table B-3 for additional details.

### **Maintenance Plan(s) and Location Map(s)**

The April 2014 final site investigation/remedial action plan for SRC's facility-wide ERP site (BRRTS# 16-16-559511) and March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC provide the maintenance plan(s) and location map(s) detailing SRC's continuing obligation to field verify groundwater quality, per the previous paragraph.

### **Photograph(s) of Structural Impediment(s)**

Not applicable.

## ATTACHMENT B

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Inspection Log(s)**

Not applicable.

### **Documentation of Investigative Waste Disposal**

The investigative waste was temporarily stockpiled at the refinery's on-site soil storage facility and then transported to and properly disposed of at a landfill, as reported to the WDNR previously. No leftover drums with investigative waste remain on site.

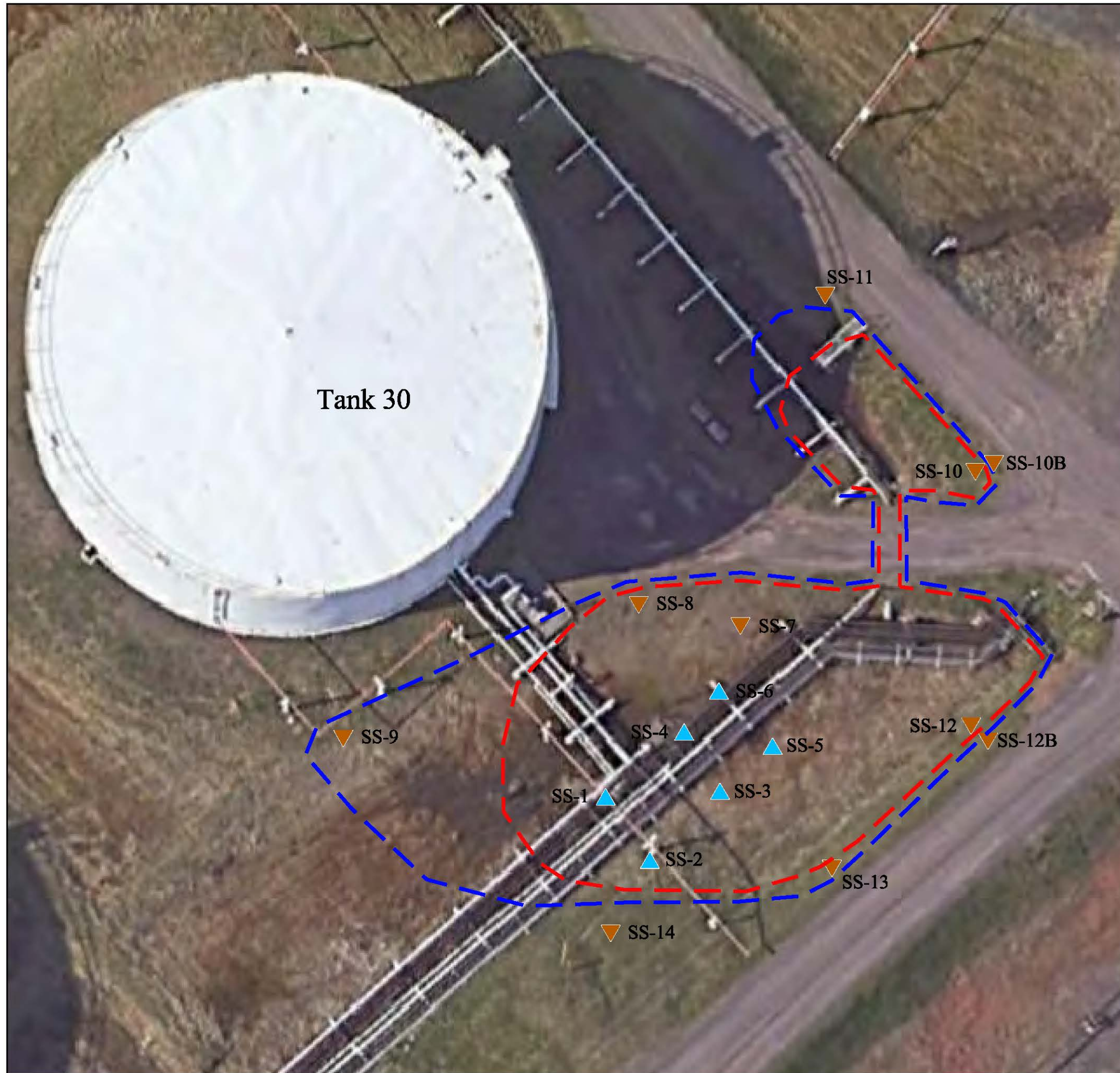
### **Documentation of Any Remedial Action Construction**

Not applicable.

### **Plans for Decommissioning of Remedial Systems**

Not applicable.



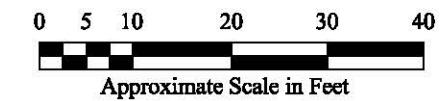


**Legend**

- - Estimated extent of unsaturated soil with one or more substances  $\geq$  a generic NR 720 soil to groundwater pathway RCL for PVOCs/Naphthalene
- - Estimated extent of unsaturated soil with one or more substances  $\geq$  a generic NR 720 soil to groundwater pathway residual contaminant level (RCL)
- ▲ Soil Sample Location (May 2011)
- ▼ Sample Location (April/May 2012)

**Notes**

- 1) No results  $\geq$  a generic NR720 industrial direct contact RCL.
- 2) WDNR BRRTS # 02-16-557992 Muphy Oil -Tank #30 site.
- 3) Parcel # 01-801-03339-00.



**Detailed Site Map and Soil Contamination  
(April/May 2012)**

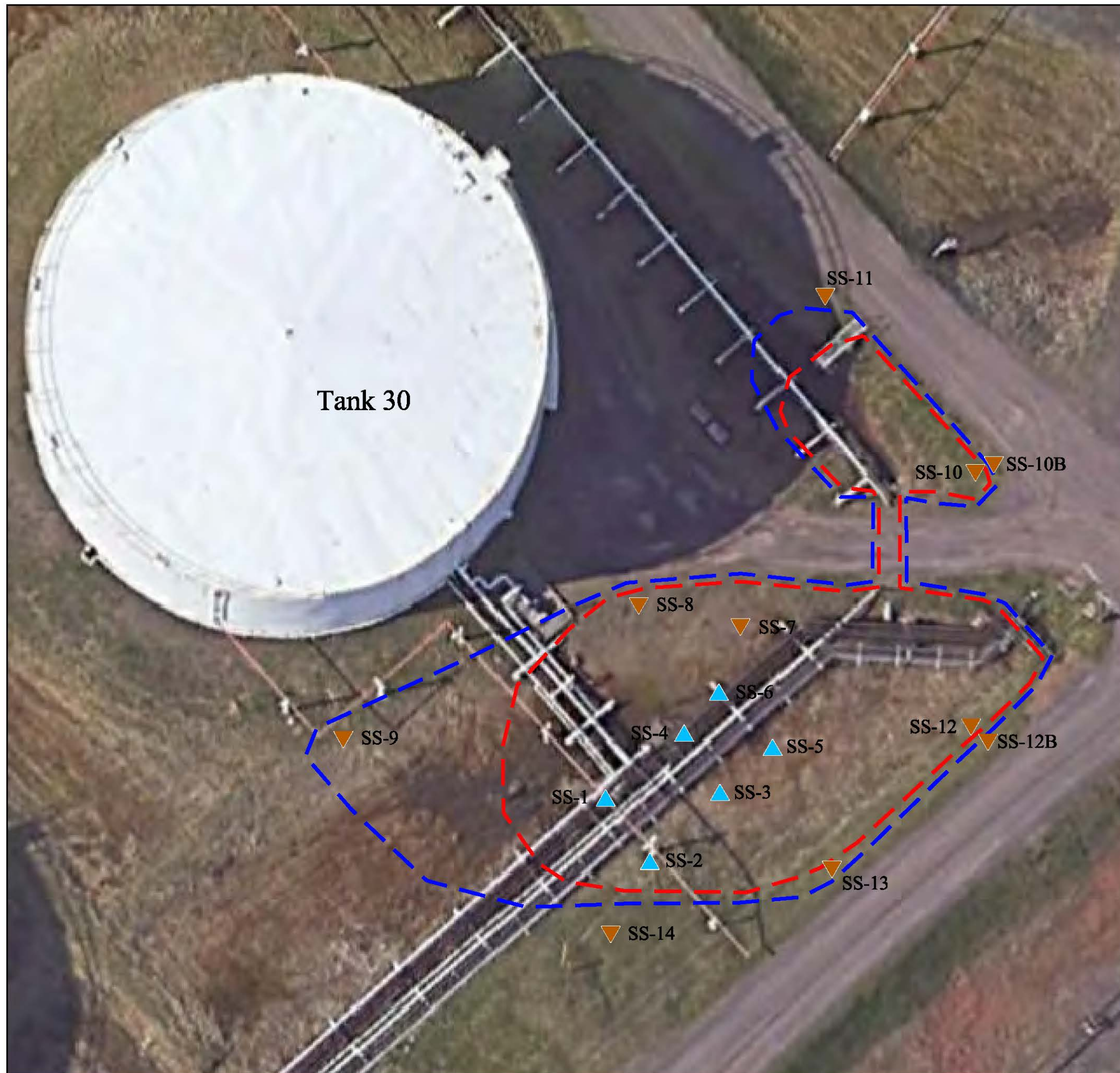
SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN



Gannett Fleming, Inc.  
8040 Excelsior Drive  
Madison WI 53717-1338  
(608) 836-1500  
www.gannettfleming.com

Project No.	34265.003	Date	06/19/19	Figure	B-1
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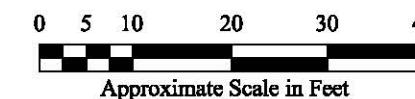


**Legend**

- - Estimated extent of unsaturated soil with one or more substances  $\geq$  a generic NR 720 soil to groundwater pathway RCL for PVOCs/Naphthalene
- - Estimated extent of unsaturated soil with one or more substances  $\geq$  a generic NR 720 soil to groundwater pathway residual contaminant level (RCL)
- ▲ Soil Sample Location (May 2011)
- ▼ Sample Location (April/May 2012)

**Notes**

- 1) No results  $\geq$  a generic NR720 industrial direct contact RCL.
- 2) WDNR BRRTS # 02-16-557992 Muphy Oil -Tank #30 site.
- 3) Parcel # 01-801-03339-00.



**Residual Soil Contamination  
(April/May 2012)**

SUPERIOR REFINING COMPANY LLC  
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Project No.	34265.003	Date	06/19/19	Figure	B-2
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SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE B-1

SOIL ANALYTICAL RESULTS (TANK 30 BASIN, JANUARY 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values						NR 720 RCL (mg/kg)		
	Sample ID	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	Soil to Groundwater Pathway	Industrial Direct Contact
Sample Date	05/03/11	05/03/11	05/03/11	05/03/11	05/03/11	05/03/11	05/03/11		
Sample Depth (ft bgs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.		
Gasoline range organics (GRO)	28	47	20	32	7.6 J	23		NS	NS
Diesel range organics (DRO)	<0.77	1.4 J	<0.77	1.4 J	<0.77	<0.77		NS	NS
Petroleum volatile organic compounds (PVOCs) and naphthalene									
Benzene	<i>0.37</i>	<i>0.15</i>	<i>0.13</i>	<i>1.2</i>	<i>0.054</i>	<i>0.070</i>		<i>0.0051</i>	<b>7.07</b>
Ethylbenzene	0.16	0.24	0.22	0.74	0.12	0.19		<i>1.57</i>	<b>35.4</b>
Toluene	0.12 J	0.20 J	0.076 J	<i>2.9</i>	0.078 J	0.12 J		<i>1.1072</i>	<b>818</b>
Xylenes	0.71	1.28	0.73	3.0	0.35	0.66		<i>3.96</i>	<b>260</b>
Methyl tert butyl ether	<0.0097	<0.0083	<0.011	<0.010	<0.0090	<0.0084		<i>0.027</i>	<b>282</b>
1,2,4-TMB	0.42	1.0	0.33	0.54	0.11	0.38		NS	<b>219</b>
1,3,5-TMB	0.20	0.55	0.19	0.26	0.06 J	0.21		NS	<b>182</b>
TMBs (combined)	0.62	<i>1.55</i>	0.52	0.80	0.17 J	0.59		<i>1.3787</i>	NS
Naphthalene	0.018 J	0.047 J	0.066 J	0.024 J	<0.012	0.026 J		<i>0.6582</i>	<b>24.1</b>
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>									
Cancer Risk (CCR)	5.8E-08	3.0E-08	2.7E-08	1.9E-07	1.1E-08	1.6E-08		NR 720 threshold = 1E-5	
Hazard Index (HI)	0.0011	0.0014	0.0007	0.0033	0.0003	0.0006		NR 720 threshold = 1	

**NOTES:**

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

Samples analyzed for gasoline range organics, diesel range organics, PVOCs, and naphthalene.

Sample and water table depths are in feet below ground surface (ft bgs).

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

NS = No standard.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

**FOOTNOTES:**

(1) Soil sample type based on the observed low water table in closest surveyed monitoring well, MW-5/T70 (2.34 ft bgs on 9/3/15).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

TABLE B-1

## SOIL ANALYTICAL RESULTS (TANK 30 BASIN, JANUARY 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values						NR 720 RCL (mg/kg)		
	Sample ID	SS-7	SS-7	SS-8	SS-8	SS-9	SS-9	Soil to	Industrial
Sample Date	04/24/12	04/24/12	04/24/12	04/24/12	04/24/12	04/24/12	04/24/12	Groundwater	Direct
Sample Depth (ft bgs)	0-2	4-6	0-2	6-8	0-2	6-8	Pathway	Contact	
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Saturated	Unsat.	Saturated	Unsat.	Saturated			
Total organic carbon (TOC)	40,000	2,600	na	na	2,000	1,300	NS	NS	
GRO	20.1	274	<5.00	154	19.7	272	NS	NS	
DRO	<5.09	214	6.08	60.9	33.3	38.3	NS	NS	
Detected volatile organic compounds (VOCs)									
Benzene	<0.0255	<0.0260	<0.0252	<0.0254	<0.0248	<0.0240	<i>0.0051</i>	<b>7.07</b>	
Ethylbenzene	<0.0262	<0.0267	<0.0259	<0.0261	<0.0255	<i>3.850</i>	<i>1.57</i>	<b>35.4</b>	
Toluene	<0.0290	<0.0296	<0.0287	<0.0289	<0.0282	<0.0273	<i>1.1072</i>	<b>818</b>	
Xylenes	<0.0843	<0.0860	<0.0833	<0.0838	<0.0819	3.663	<i>3.96</i>	<b>260</b>	
Methyl tert butyl ether	<0.0595	<0.0607	<0.0587	<0.0592	<0.0579	<0.0559	<i>0.027</i>	<b>282</b>	
cis-1,2-Dichloroethylene	<0.0290	<0.0296	<0.0287	0.0400	<0.0282	<0.0273	<i>0.0412</i>	<b>2340</b>	
1,2,4-TMB	<0.0255	1.730	<0.0252	1.790	0.0372	3.430	NS	<b>219</b>	
1,3,5-TMB	<0.0255	0.214	<0.0252	<0.0254	<0.0248	0.747	NS	<b>182</b>	
TMBs (combined)	<0.0510	<i>1.944</i>	<0.0504	<1.815	<0.0620	<i>4.177</i>	<i>1.3787</i>	NS	
Naphthalene	<0.0305	0.241	<0.0301	0.469	<0.0296	0.0873	<i>0.6582</i>	<b>24.1</b>	
Bromobenzene	<0.0248	<0.0253	<0.0245	0.0391	<0.0241	<0.0233	NS	<b>679</b>	
Bromodichloromethane	<0.0269	<i>0.0276</i>	<0.0266	<0.0268	<0.0262	<i>0.0637</i>	<i>0.0003</i>	<b>1.83</b>	
Bromomethane	<i>0.158</i>	<0.145	<i>0.147</i>	<0.141	<0.138	<0.133	<i>0.0051</i>	<b>43</b>	
tert-Butylbenzene	<0.0262	<0.0267	<0.0259	0.0454	<0.0255	<0.0246	NS	<b>183</b>	
Isopropylbenzene (Cumene)	<0.0255	0.0474	<0.0252	0.0396	<0.0248	0.768	NS	<b>268</b>	
Dibromochloromethane	<0.0234	<0.0238	<0.0231	<0.0232	<0.0227	<i>0.0637</i>	<i>0.032</i>	<b>38.9</b>	
4-Isopropyltoluene	<0.0248	0.185	<0.0245	<0.0246	<0.0241	<0.0233	NS	<b>162</b>	
Propylbenzene	<0.0255	0.112	<0.0252	0.134	<0.0248	<0.0240	NS	<b>264</b>	
1,1,1,2-Tetrachloroethane	<0.0255	<0.0260	<0.0252	0.0409	<0.0248	<0.0240	<i>0.0534</i>	<b>12.3</b>	
1,1,2,2-Tetrachloroethane	<i>0.164</i>	<0.0260	<0.0252	<0.0254	<0.0248	<0.0240	<i>0.0002</i>	<b>3.6</b>	
1,1,2-Trichloroethane	<0.029	<0.0296	<0.0287	<0.0289	<i>0.0545</i>	<0.0273	<i>0.0032</i>	<b>7.01</b>	
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>									
Cancer Risk (CCR)	4.6E-08	2.5E-08	--	2.3E-08	7.8E-09	1.5E-07	NR 720 threshold = 1E-5		
Hazard Index (HI)	0.0037	0.0011	--	0.0014	0.006	0.0031	NR 720 threshold = 1		

## NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

Samples analyzed for TOC, GRO, DRO, and VOCs (Method 8260B); only detected compounds are summarized in table.

na = Not analyzed.

NS = No standard.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

-- = Not applicable.

## FOOTNOTES:

(1) Soil sample type based on the observed low water table in closest surveyed monitoring well, MW-5/T70 (2.34 ft bgs on 9/3/15).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable. Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

TABLE B-1

SOIL ANALYTICAL RESULTS (TANK 30 BASIN, JANUARY 2011 RELEASE)

Group/Substance/etc.	Concentration (mg/kg) except for CCR and HI values							NR 720 RCL (mg/kg)		
	Sample ID	SS-10	SS-10B	SS-11	SS-12	SS-12B	SS-13	SS-14	Soil to Groundwater Pathway	Industrial Direct Contact
Sample Date	04/25/12	05/17/12	04/25/12	04/25/12	05/17/12	04/25/12	04/25/12			
Sample Depth (ft bgs)	0-2	0-2	0-2	0-2	0-2	0-2	0-2			
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.			
GRO	<5.22	na	<5.32	<5.00	na	26.0	<5.18	NS	NS	
DRO	<5.06	na	<4.91	<5.09	na	7.61	<5.00	NS	NS	
Detected volatile organic compounds (VOCs)										
Benzene	<i>0.0356</i>	<0.0250	<0.0296	<i>0.0299</i>	<0.0250	<0.0267	<0.0239	<i>0.0051</i>	<b>7.07</b>	
Ethylbenzene	<0.0243	<0.0250	<0.0304	<0.0273	0.0371 J	<0.0274	<0.0246	<i>1.57</i>	<b>35.4</b>	
Toluene	0.0379	0.0518 J	0.0654	<0.0303	0.119	<0.0304	<0.0273	<i>1.1072</i>	<b>818</b>	
Xylenes	<0.0782	<0.0750	0.1038	<0.0879	0.1922 J	0.0924	<0.0791	<i>3.96</i>	<b>260</b>	
Methyl tert butyl ether	<0.0552	<0.0250	<0.0691	<0.0620	<0.0250	<0.0623	<0.0420	<i>0.027</i>	<b>282</b>	
cis-1,2-Dichloroethylene	<0.0269	na	<0.0337	<0.0303	na	<0.0304	<0.0273	<i>0.0412</i>	<b>2340</b>	
1,2,4-TMB	<0.0237	<0.0250	0.0475	<0.0266	0.128	0.0570	<0.0239	NS	<b>219</b>	
1,3,5-TMB	<0.0237	<0.0250	0.0346	<0.0266	0.0971	0.0689	<0.0239	NS	<b>182</b>	
TMBs (combined)	<0.0474	<0.0500	0.0821	<0.0532	0.2251	0.1259	<0.0478	<i>1.3787</i>	NS	
Naphthalene	<0.0283	na	<0.0354	<0.0318	na	<0.0319	<0.0286	<i>0.6582</i>	<b>24.1</b>	
Bromobenzene	<0.0230	na	<0.0288	<0.0258	na	<0.0260	<0.0233	NS	<b>679</b>	
Bromodichloromethane	<0.0250	na	<0.0312	<0.0281	na	<0.0282	<0.0253	<i>0.0003</i>	<b>1.83</b>	
Bromomethane	<i>0.217</i>	na	<0.164	<0.148	na	<0.148	<0.133	<i>0.0051</i>	<b>43</b>	
tert-Butylbenzene	<0.0243	na	<0.0304	<0.0273	na	<0.0274	<0.0246	NS	<b>183</b>	
Isopropylbenzene	<0.0237	na	<0.0296	<0.0266	na	<0.0267	<0.0239	NS	<b>268</b>	
Dibromochloromethane	<0.0217	na	<0.0271	<0.0244	na	<0.0245	<0.0165	<i>0.032</i>	<b>38.9</b>	
4-Isopropyltoluene	<0.0230	na	<0.0288	<0.0258	na	<0.0260	<0.0233	NS	<b>162</b>	
Propylbenzene	<0.0237	na	<0.0296	<0.0266	na	<0.0267	<0.0239	NS	<b>264</b>	
1,1,1,2-Tetrachloroethane	<0.0237	na	<0.0296	<0.0266	na	<0.0267	<0.0239	<i>0.0534</i>	<b>12.3</b>	
1,1,2,2-Tetrachloroethane	<0.0237	na	<0.0296	<0.0266	na	<i>0.218</i>	<0.0239	<i>0.0002</i>	<b>3.6</b>	
1,1,2-Trichloroethane	<0.0269	na	<0.0337	<0.0303	na	<0.0304	<0.0273	<i>0.0032</i>	<b>7.01</b>	
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>										
Cancer Risk (CCR)	5.0E-09	--	0.0E+00	--	1.0E-09	6.1E-08	--	NR 720 threshold = 1E-5		
Hazard Index (HI)	0.0051	--	0.0001	--	0.0002	0.0001	--	NR 720 threshold = 1		

NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.  
 No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.  
 Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.  
 NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.  
 Samples analyzed for GRO, DRO, and VOCs (Method 8260B); only detected compounds are summarized in table.  
 J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.  
 na = Not analyzed.  
 NS = No standard.  
 TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).  
 -- = Not applicable.

FOOTNOTES:

(1) Soil sample type based on the observed low water table in closest surveyed monitoring well, MW-5/T70 (2.34 ft bgs on 9/3/15).  
 (2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable. Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

SUPERIOR REFINING COMPANY LLC  
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TABLE B-2

RESIDUAL SOIL CONTAMINATION (TANK 30 BASIN, JANUARY 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values						NR 720 RCL (mg/kg)		
	Sample ID	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	Soil to Groundwater Pathway	Industrial Direct Contact
Sample Date	05/03/11	05/03/11	05/03/11	05/03/11	05/03/11	05/03/11	05/03/11		
Sample Depth (ft bgs)	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.		
Gasoline range organics (GRO)	28	47	20	32	7.6 J	23		NS	NS
Diesel range organics (DRO)	<0.77	1.4 J	<0.77	1.4 J	<0.77	<0.77		NS	NS
Petroleum volatile organic compounds (PVOCs) and naphthalene									
Benzene	<i>0.37</i>	<i>0.15</i>	<i>0.13</i>	<i>1.2</i>	<i>0.054</i>	<i>0.070</i>		<i>0.0051</i>	<i>7.07</i>
Ethylbenzene	0.16	0.24	0.22	0.74	0.12	0.19		<i>1.57</i>	<i>35.4</i>
Toluene	0.12 J	0.20 J	0.076 J	<i>2.9</i>	0.078 J	0.12 J		<i>1.1072</i>	<i>818</i>
Xylenes	0.71	1.28	0.73	3.0	0.35	0.66		<i>3.96</i>	<i>260</i>
Methyl tert butyl ether	<0.0097	<0.0083	<0.011	<0.010	<0.0090	<0.0084		<i>0.027</i>	<i>282</i>
1,2,4-TMB	0.42	1.0	0.33	0.54	0.11	0.38		NS	<i>219</i>
1,3,5-TMB	0.20	0.55	0.19	0.26	0.06 J	0.21		NS	<i>182</i>
TMBs (combined)	0.62	<i>1.55</i>	0.52	0.80	0.17 J	0.59		<i>1.3787</i>	NS
Naphthalene	0.018 J	0.047 J	0.066 J	0.024 J	<0.012	0.026 J		<i>0.6582</i>	<i>24.1</i>
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>									
Cancer Risk (CCR)	5.8E-08	3.0E-08	2.7E-08	1.9E-07	1.1E-08	1.6E-08		NR 720 threshold = 1E-5	
Hazard Index (HI)	0.0011	0.0014	0.0007	0.0033	0.0003	0.0006		NR 720 threshold = 1	

**NOTES:**

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

Samples analyzed for GRO, DRO, PVOCs, and naphthalene.

Sample and water table depths are in feet below ground surface (ft bgs).

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

NS = No standard.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

**FOOTNOTES:**

(1) Soil sample type based on the observed low water table in closest surveyed monitoring well, MW-5/T70 (2.34 ft bgs on 9/3/15).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

TABLE B-2

## RESIDUAL SOIL CONTAMINATION (TANK 30 BASIN, JANUARY 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values						NR 720 RCL (mg/kg)		
	Sample ID	SS-7	SS-8	SS-9	SS-10	SS-12	SS-13	Soil to	Industrial
Sample Date	04/24/12	04/24/12	04/24/12	04/25/12	04/25/12	04/25/12		Groundwater	Direct
Sample Depth (ft bgs)	0-2	0-2	0-2	0-2	0-2	0-2		Pathway	Contact
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.			
Total organic carbon (TOC)	40,000	na	2,000	na	na	na	NS	NS	
GRO	20.1	<5.00	19.7	<5.22	<5.00	26.0	NS	NS	
DRO	<5.09	6.08	33.3	<5.06	<5.09	7.61	NS	NS	
Detected volatile organic compounds (VOCs)									
Benzene	<0.0255	<0.0252	<0.0248	<i>0.0356</i>	<i>0.0299</i>	<0.0267	<i>0.0051</i>	<b>7.07</b>	
Ethylbenzene	<0.0262	<0.0259	<0.0255	<0.0243	<0.0273	<0.0274	<i>1.57</i>	<b>35.4</b>	
Toluene	<0.0290	<0.0287	<0.0282	0.0379	<0.0303	<0.0304	<i>1.1072</i>	<b>818</b>	
Xylenes	<0.0843	<0.0833	<0.0819	<0.0782	<0.0879	0.0924	<i>3.96</i>	<b>260</b>	
Methyl tert butyl ether	<0.0595	<0.0587	<0.0579	<0.0552	<0.0620	<0.0623	<i>0.027</i>	<b>282</b>	
cis-1,2-Dichloroethylene	<0.0290	<0.0287	<0.0282	<0.0269	<0.0303	<0.0304	<i>0.0412</i>	<b>2340</b>	
1,2,4-TMB	<0.0255	<0.0252	0.0372	<0.0237	<0.0266	0.0570	NS	<b>219</b>	
1,3,5-TMB	<0.0255	<0.0252	<0.0248	<0.0237	<0.0266	0.0689	NS	<b>182</b>	
TMBs (combined)	<0.0510	<0.0504	<0.0620	<0.0474	<0.0532	0.1259	<i>1.3787</i>	NS	
Naphthalene	<0.0305	<0.0301	<0.0296	<0.0283	<0.0318	<0.0319	<i>0.6582</i>	<b>24.1</b>	
Bromobenzene	<0.0248	<0.0245	<0.0241	<0.0230	<0.0258	<0.0260	NS	<b>679</b>	
Bromodichloromethane	<0.0269	<0.0266	<0.0262	<0.0250	<0.0281	<0.0282	<i>0.0003</i>	<b>1.83</b>	
Bromomethane	<i>0.158</i>	<i>0.147</i>	<0.138	<i>0.217</i>	<0.148	<0.148	<i>0.0051</i>	<b>43</b>	
tert-Butylbenzene	<0.0262	<0.0259	<0.0255	<0.0243	<0.0273	<0.0274	NS	<b>183</b>	
Isopropylbenzene (Cumene)	<0.0255	<0.0252	<0.0248	<0.0237	<0.0266	<0.0267	NS	<b>268</b>	
Dibromochloromethane	<0.0234	<0.0231	<0.0227	<0.0217	<0.0244	<0.0245	<i>0.032</i>	<b>38.9</b>	
4-Isopropyltoluene	<0.0248	<0.0245	<0.0241	<0.0230	<0.0258	<0.0260	NS	<b>162</b>	
Propylbenzene	<0.0255	<0.0252	<0.0248	<0.0237	<0.0266	<0.0267	NS	<b>264</b>	
1,1,1,2-Tetrachloroethane	<0.0255	<0.0252	<0.0248	<0.0237	<0.0266	<0.0267	<i>0.0534</i>	<b>12.3</b>	
1,1,2,2-Tetrachloroethane	<i>0.164</i>	<0.0252	<0.0248	<0.0237	<0.0266	<i>0.218</i>	<i>0.0002</i>	<b>3.6</b>	
1,1,2-Trichloroethane	<0.029	<0.0287	<i>0.0545</i>	<0.0269	<0.0303	<0.0304	<i>0.0032</i>	<b>7.01</b>	
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>									
Cancer Risk (CCR)	4.6E-08	--	7.8E-09	5.0E-09	--	6.1E-08	NR 720 threshold = 1E-5		
Hazard Index (HI)	0.0037	--	0.006	0.0051	--	0.0001	NR 720 threshold = 1		

## NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

Samples analyzed for TOC, GRO, DRO, and VOCs (EPA Method 8260B); only detected compounds are summarized in table.

na = Not analyzed.

NS = No standard.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

-- = Not applicable.

## FOOTNOTES:

(1) Soil sample type based on the observed low water table in closest surveyed monitoring well, MW-5/T70 (2.34 ft bgs on 9/3/15).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable. Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

SUPERIOR REFINING COMPANY LLC  
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TABLE 3

CONTINUING OBLIGATIONS CHECKLIST

Ref. No.	This situation applies to the following property or right of way (ROW)			Site Transfer Situation - Continuing Obligation (database fees will apply, ii-xiv)	Maintenance Plan Required
	Property Type				
	Source Property	Affected Property (Off-Source)	ROW		
i				None of the following situations apply to this site transfer request	NA
ii				Residual groundwater contamination exceeds ch. NR 140 ESs	NA
iii	x			Residual soil contamination exceeds ch. NR 720 RCLs	NA
iv				Monitoring Wells Remain:	
				• Not abandoned (filled and sealed)	NA
	x			• Continued monitoring (requested or required)	Yes <sup>(1)</sup>
v				Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi				Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii				Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii	x			Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix			NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x			NA	Vapor: Dewatering system needed for VMS to work effectively	Yes
xi			NA	Vapor: Compounds of concern in use; full vapor assessment could not be completed	NA
xii			NA	Vapor: Commercial/Industrial exposure assumptions used	NA
xiii				Vapor: Residual VOCs pose future risk of vapor intrusion	NA
xiv				Site-specific situation (e.g., methane monitoring): discuss with WDNR project manager before submitting for transfer	Site specific

FOOTNOTE:

(1) Continued monitoring of groundwater will be conducted under the facility-wide ERP site (BRRTS# 16-16-559511), which includes the required maintenance plan, etc.

ATTACHMENT C

SUMMARY OF BRRTS# 02-16-557994 CALUMET SUPERIOR LLC – TANK #50  
PROPOSED FOR TRANSFER TO BRRTS# 16-16-559511



## ATTACHMENT C

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

July 3, 2019

Re: Individual Site Summary for Transfer to the Referenced Facility-Wide ERP Site  
RELEASE OR ACTIVITY NAME: Calumet Superior LLC – Tank #50  
ORIGINAL BRRTS/SRRTS# (if applicable): 02-16-557994

### **General Site Information and How and When Site Contamination was Discovered**

A release of approximately 100 gallons of crude oil occurred in the Tank 50 basin and was reported to the Wisconsin Department of Natural Resources (WDNR) on October 17, 2011. The release was the result of a leaking temporary transfer pump as identified by refinery staff. Additional required site information and attachments are summarized below.

WTM coordinates of the subject activity are X: 361276 m and Y: 692973 m

Pertinent individual site reference documents on file with the Wisconsin Department of Natural Resources (WDNR) include the:

- April 2012 *Site Investigation Work Plan*.
- April 2014 *Remediation Progress Report*.

SRC contact information:

Matt Turner, (715) 398-8434, [Matthew.Turner@huskyenergy.com](mailto:Matthew.Turner@huskyenergy.com)

Environmental consultant contact information:

Cliff Wright; Gannett Fleming, Inc.; (608) 836-1500 x6722, [cwright@gfnet.com](mailto:cwright@gfnet.com)

Attachments include:

- Engineering Certification provided with the facility-wide ERP database packet submittal
- Figure C-1 Detailed Site Map and Soil Contamination
- Figure C-2 Residual Soil Contamination
- Table C-1 Soil Analytical Results
- Table C-2 Residual Soil Contamination
- Table C-3 Continuing Obligations Checklist

### **Site Investigation Summary**

Investigation work completed at the site includes soil sampling in October 2011 and April 2012.

## ATTACHMENT C

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Description of Any Structural Impediments**

Not applicable.

### **Nature, Degree, and Extent of Soil Contamination**

Investigation results document that the estimated extent of impacted soil was limited to the area shown on Figure C-1. Compounds of concern are the petroleum volatile organic compounds (PVOCs) and one or more of the polycyclic aromatic hydrocarbons (PAHs), which includes naphthalene. A total of 18 soil samples were submitted for analysis. Table C-1 includes a summary of the analytical results.

### **Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

Lab results confirm that the concentrations of PVOCs/naphthalene or PVOCs/PAHs in the soil were below generic NR 720 industrial direct contact residual concentration levels (RCLs).

### **Vapor Migration Pathway**

The vapor migration pathway was ruled out, as allowed by the WDNR, because a) Tank 50 is the only structure in the basin, b) the closest occupied building is a field office trailer approximately 200 feet to the southeast, c) there are no underground utilities in the basin, d) the basin currently is and will continue to be a petroleum storage area, and e) SRC has no plans to construct any other structures or buildings in the basin.

### **Remedial Actions Implemented and Residual Contamination Levels**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial RCLs.

### **Immediate or Interim Actions Under NR 708, Wis. Adm. Code**

The degree and extent of soil contamination was limited because the 100-gallon release occurred in a topographically low area, where it ponded on the surface of storm water within the tank basin. Refinery staff were able to vacuum up most of the product, along with residual storm

## ATTACHMENT C

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

water, immediately after the spill occurred. The recovered product and storm water were placed in the refinery's No. 1 API separator.

In addition, approximately 60 cubic yards of crude oil-impacted soil were excavated on October 18, 2011.

### **Active Remedial Actions**

Other than the immediate and interim action(s) described in the previous paragraph, no active remediation was conducted at the site.

### **Nature, Degree, and Extent of Residual Contamination**

Based on soil sampling conducted and summarized in Table C-2, maximum PVOC concentrations found in the upper 4 feet of soil include benzene at 0.035 milligrams per kilogram (mg/kg) in SS-4 at 1.5 feet below ground surface (ft bgs), ethylbenzene at 0.054 mg/kg in SS-3 at 1.5 ft bgs, toluene at 0.05 mg/kg in SS-7 at 1.5 ft bgs, and xylenes at 0.29 mg/kg in SS-3 at 0.5 ft bgs. The estimated extent of residual contamination is limited to a rectangular shaped area approximately 70 feet long and up to 50 feet wide, as shown on Figure C-2.

### **Residual Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

See the previous paragraph.

### **Residual Soil Contamination Above the Observed Low Water Table**

Same as above.

### **Description of How Residual Contamination Will be Addressed**

The residual contamination will be addressed by remediation through natural attenuation.

### **Soil, Groundwater, and Vapor Exposure Pathway Mitigation**

The soil and groundwater exposure pathways were adequately addressed because the immediate/interim action met the direct contact soil clean-up standards and the existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater. The vapor exposure pathway was ruled out.

## ATTACHMENT C

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Continuing Obligations**

SRC will continue to utilize its network of 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) for field verification of the performance standard for the protection of groundwater. See Table C-3 for additional details.

### **Maintenance Plan(s) and Location Map(s)**

The April 2014 final site investigation/remedial action plan for SRC's facility-wide ERP site (BRRTS# 16-16-559511) and March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC provide the maintenance plan(s) and location map(s) detailing SRC's continuing obligation to field verify groundwater quality, per the previous paragraph.

### **Photograph(s) of Structural Impediment(s)**

Not applicable.

### **Inspection Log(s)**

Not applicable.

### **Documentation of Investigative Waste Disposal**

The investigative waste and excavated soil were temporarily stockpiled at the refinery's on-site soil storage facility and then transported to and properly disposed of at a landfill, as reported to the WDNR previously. No leftover drums with investigative waste remain on site.

### **Documentation of Any Remedial Action Construction**

Not applicable.

### **Plans for Decommissioning of Remedial Systems**

Not applicable.

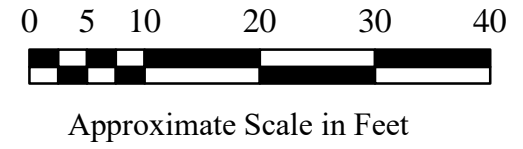


**Legend**

- Estimated Extent of Unsaturated Soil with One or More Substances  $\geq$  a Generic NR 720 Soil to Groundwater Pathway RCL
- Limits of October 2011 Soil Excavation
- ▲ Confirmation Soil Sample Location (October 2011)
- ▲ Supplemental Soil Sample Location (April 2012)

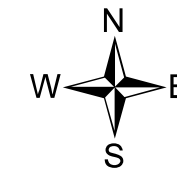
**Notes:**

- 1) No results  $\geq$  a generic NR720 industrial direct contact RCL.
- 2) WDNR BRRTS # 02-16-557994 Calumet Superior LLC - Tank #50.
- 3) Parcel # 01-801-03339-00.







<b>Detailed Site Map and Soil Contamination (April 2012)</b>			
SUPERIOR REFINING COMPANY LLC SUPERIOR, WISCONSIN			
<b>Gannett Fleming</b>		Gannett Fleming, Inc. 8040 Excelsior Drive Madison WI 53717-1338 (608) 836-1500 <a href="http://www.gannettfleming.com">www.gannettfleming.com</a>	
Project No.	34265.003	Date	06/19/19
			Figure <b>C-1</b>



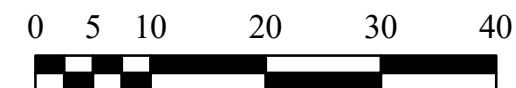


**Legend**

-  Estimated Extent of Unsaturated Soil with One or More Substances  $\geq$  a Generic NR 720 Soil to Groundwater Pathway RCL
-  Limits of October 2011 Soil Excavation
-  Confirmation Soil Sample Location (October 2011)
-  Supplemental Soil Sample Location (April 2012)

**Notes:**

- 1) No results  $\geq$  a generic NR720 industrial direct contact RCL.
- 2) WDNR BRRTS # 02-16-557994 Calumet Superior LLC - Tank #50.
- 3) Parcel # 01-801-03339-00.



Approximate Scale in Feet

**Residual Soil Contamination (April 2012)**

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN



Gannett Fleming, Inc.  
8040 Excelsior Drive  
Madison WI 53717-1338  
(608) 836-1500  
www.gannettfleming.com

SUPERIOR REFINING COMPANY LLC  
 SUPERIOR, WISCONSIN

TABLE C-1

SOIL ANALYTICAL RESULTS (TANK 50 BASIN, OCTOBER 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except as shown for PID, CCR, and HI						NR 720 RCL (mg/kg)	
	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	Soil to	Industrial
Sample ID	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	Groundwater	Direct
Sample Date	1.5	1.5	1.5	1.5	1.5	1.5		
Sample Depth (ft bgs)	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Pathway	Contact
Saturated/Unsaturated <sup>(1)</sup>								
PID (ppmv)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS	NS
Gasoline range organics	<2.5	9 J	<1.9	4.6 J	16	<2.2	NS	NS
Diesel range organics	<0.77	<0.77	42	72	61	<1.1	NS	NS
Petroleum volatile organic compounds (PVOCs) and naphthalene								
Benzene	0.025 J	0.031 J	0.02 J	0.035 J	0.029 J	0.03 J	0.0051	7.07
Ethylbenzene	0.021 J	0.02 J	0.054 J	0.027 J	0.016 J	0.022 J	1.57	35.4
Toluene	0.038 J	0.049 J	0.03 J	0.044 J	0.046 J	0.035 J	1.1072	818
Xylenes	0.102 J	0.149 J	0.29	0.14 J	0.117 J	0.104 J	3.96	260
Methyl tert butyl ether	<0.014	<0.014	<0.010	<0.012	<0.011	<0.012	0.027	282
1,2,4-TMB	0.039 J	0.08 J	0.052 J	0.049 J	0.07 J	0.052 J	NS	219
1,3,5-TMB	0.015 J	0.03 J	0.02 J	0.019 J	0.053 J	0.024 J	NS	182
TMBs (combined)	0.054	0.11	0.072	0.068	0.123	0.076	1.3787	NS
Naphthalene	0.13 J	0.49 J	0.14 J	0.3 J	0.48 J	0.096 J	0.6582	24.1
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>								
Cancer Risk (CCR)	9.5E-09	2.5E-08	1.0E-08	1.8E-08	2.4E-08	8.8E-09	NR 720 threshold = 1E-5	
Hazard Index (HI)	0.0003	0.0007	0.0003	0.0005	0.0007	0.0002	NR 720 threshold = 1	



TABLE C-1

## SOIL ANALYTICAL RESULTS (TANK 50 BASIN, OCTOBER 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except as shown for FID, PID, CCR, and HI						NR 720 RCL (mg/kg)	
	Sample ID	SS-7	SS-8	SS-9	SS-10	SS-11	Soil to Groundwater Pathway	Industrial Direct Contact
Sample Date	10/25/11	10/25/11	10/25/11	10/25/11	04/24/12	04/24/12		
Sample Depth (ft bgs)	1.5	1.5	2.0	2.0	0-2	6-8		
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Saturated		
FID (ppmv)	nm	nm	nm	nm	2.4	1.6		
PID (ppmv)	<0.1	<0.1	<0.1	<0.1	nm	nm	NS	NS
Gasoline range organics	<2.2	<2.0	<2.4	<2.1	<5.00	<5.00	NS	NS
Diesel range organics	<0.91	<1.0	<0.77	<0.77	<5.00	<5.07	NS	NS
PVOCs and Naphthalene or PVOCs								
Benzene	0.03 J	0.026 J	0.028 J	0.023 J	<0.016	<0.016	0.0051	7.07
Ethylbenzene	0.02 J	0.018 J	0.019 J	0.015 J	<0.018	<0.018	1.57	35.4
Toluene	0.05 J	0.028 J	0.033 J	0.025 J	<0.021	<0.021	1.1072	818
Xylenes	0.108 J	0.083 J	0.078 J	0.068 J	<0.038	<0.038	3.96	260
Methyl tert butyl ether	<0.012	<0.011	<0.013	<0.011	<0.024	<0.024	0.027	282
1,2,4-TMB	0.043 J	0.027 J	0.033 J	0.025 J	<0.013	<0.013	NS	219
1,3,5-TMB	0.018 J	0.01 J	0.012 J	0.0086 J	<0.018	<0.018	NS	182
TMBs (combined)	0.061	0.037	0.045	0.0336	<0.031	<0.031	1.3787	NS
Naphthalene	0.093 J	0.096 J	0.11 J	0.066 J	na	na	0.6582	24.1
Polycyclic aromatic hydrocarbons (PAHs)								
Acenaphthene	na	na	na	na	<0.0019	<0.0021	NS	45,200
Acenaphthylene	na	na	na	na	<0.0019	<0.0021	NS	NS
Anthracene	na	na	na	na	<0.0019	<0.0021	196.9492	100,000
Benzo[a]anthracene	na	na	na	na	<0.0019	<0.0021	NS	20.8
Benzo[a]pyrene	na	na	na	na	<0.0019	<0.0021	0.47	2.11
Benzo[b]fluoranthene	na	na	na	na	<0.0019	<0.0021	0.4781	21.1
Benzo[g,h,i]perylene	na	na	na	na	<0.0019	<0.0021	NS	NS
Benzo[k]fluoranthene	na	na	na	na	<0.0019	<0.0021	NS	211
Chrysene	na	na	na	na	<0.0019	<0.0021	0.1442	2,110
Dibenz[a,h]anthracene	na	na	na	na	<0.0019	<0.0021	NS	2.11
Fluoranthene	na	na	na	na	0.0038 J	<0.0021	88.8778	30,100
Fluorene	na	na	na	na	<0.0019	<0.0021	14.8299	30,100
Indeno[1,2,3-cd]pyrene	na	na	na	na	<0.0019	<0.0021	NS	21.1
1-Methylnaphthalene	na	na	na	na	<0.0019	<0.0021	NS	72.7
2-Methylnaphthalene	na	na	na	na	<0.0019	<0.0021	NS	3,010
Naphthalene	na	na	na	na	<0.0019	<0.0021	0.6582	24.1
Phenanthrene	na	na	na	na	<0.0019	<0.0021	NS	NS
Pyrene	na	na	na	na	0.0034 J	<0.0021	54.5455	22,600
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>								
Cancer Risk (CCR)	8.7E-09	8.2E-09	9.1E-09	6.4E-09	0.0E+00	--	NR 720 threshold = 1E-5	
Hazard Index (HI)	0.0002	0.0002	0.0002	0.0002	0	--	NR 720 threshold = 1	

TABLE C-1

## SOIL ANALYTICAL RESULTS (TANK 50 BASIN, OCTOBER 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except as shown for FID, PID, CCR, and HI						NR 720 RCL (mg/kg)	
	Sample ID	SS-12	SS-17		SS-23	SS-24	SS-25	Soil to
Sample Date	04/24/12	04/24/12	04/24/12	04/25/12	04/25/12	04/25/12	Groundwater	Direct
Sample Depth (ft bgs)	0-2	0-2	4-6	0-2	0-2	0-2	Pathway	Contact
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Saturated	Unsat.	Unsat.	Unsat.		
FID (ppmv)	nm	0.2	0.6	nm	nm	nm		
PID (ppmv)	nm	nm	nm	nm	nm	nm	NS	NS
Gasoline range organics	<5.00	<5.00	<5.00	<5.22	<5.56	<5.78	NS	NS
Diesel range organics	<4.90	<5.00	<4.90	7.29	<4.55	149	NS	NS
Petroleum volatile organic compounds (PVOCs)								
Benzene	<0.016	<0.016	<0.016	<0.017	<0.018	<0.019	0.0051	7.07
Ethylbenzene	<0.018	<0.018	<0.018	<0.019	<0.020	<0.021	1.57	35.4
Toluene	<0.021	<0.021	<0.021	<0.022	<0.023	<0.024	1.1072	818
Xylenes	<0.038	<0.038	<0.038	<0.040	<0.042	<0.044	3.96	260
Methyl tert butyl ether	<0.024	<0.024	<0.024	<0.025	<0.027	<0.028	0.027	282
1,2,4-TMB	<0.013	<0.013	<0.013	<0.014	<0.014	<0.015	NS	219
1,3,5-TMB	<0.018	<0.018	<0.018	<0.019	<0.020	0.07	NS	182
TMBs (combined)	<0.031	<0.031	<0.031	<0.031	<0.031	<0.085	1.3787	NS
Polycyclic aromatic hydrocarbons (PAHs)								
Acenaphthene	<0.0022	<0.0018	<0.0019	<0.0021	<0.0044	<0.0200	NS	45,200
Acenaphthylene	<0.0022	<0.0018	<0.0019	<0.0021	<0.0044	<0.0200	NS	NS
Anthracene	<0.0022	<0.0018	<0.0019	<0.0021	<0.0044	<0.0200	196.9492	100,000
Benzo[a]anthracene	0.0022 J	0.0028 J	<0.0019	0.0031 J	<0.0044	<0.0200	NS	20.8
Benzo[a]pyrene	0.0033 J	0.0025 J	<0.0019	0.003 J	0.006 J	0.0767 J	0.47	2.11
Benzo[b]fluoranthene	0.0031 J	0.0032 J	<0.0019	0.0033 J	0.0047 J	0.0757 J	0.4781	21.1
Benzo[g,h,i]perylene	<0.0022	0.0025 J	<0.0019	0.0028 J	0.0091 J	0.0489 J	NS	NS
Benzo[k]fluoranthene	0.0026 J	0.0032 J	<0.0019	0.0037 J	<0.0044	0.0743 J	NS	211
Chrysene	0.0039 J	0.0022 J	<0.0019	0.0032 J	<0.0044	<0.0200	0.1442	2,110
Dibenz[a,h]anthracene	<0.0022	<0.0018	<0.0019	<0.0021	<0.0044	0.0205 J	NS	2.11
Fluoranthene	0.0053 J	0.0062 J	<0.0019	0.0066 J	0.0051 J	<0.0200	88.8778	30,100
Fluorene	<0.0022	<0.0018	<0.0019	<0.0021	<0.0044	<0.0200	14.8299	30,100
Indeno[1,2,3-cd]pyrene	<0.0022	0.0024 J	<0.0019	0.0029 J	0.0057 J	0.0429 J	NS	21.1
1-Methylnaphthalene	<0.0022	<0.0018	<0.0019	<0.0021	<0.0044	<0.0200	NS	72.7
2-Methylnaphthalene	<0.0022	<0.0018	<0.0019	<0.0021	<0.0044	<0.0200	NS	3,010
Naphthalene	0.0025 J	<0.0018	<0.0019	<0.0021	<0.0044	<0.0200	0.6582	24.1
Phenanthrene	0.0035 J	0.0036 J	<0.0019	0.0041 J	<0.0044	<0.0200	NS	NS
Pyrene	0.0046 J	0.0047 J	<0.0019	0.0052 J	<0.0044	0.172	54.5455	22,600
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>								
Cancer Risk (CCR)	1.9E-09	1.6E-09	--	1.9E-09	3.3E-09	5.2E-08	NR 720 threshold = 1E-5	
Hazard Index (HI)	0	0	--	0	0	0.0004	NR 720 threshold = 1	

TABLE C-1

SOIL ANALYTICAL RESULTS (TANK 50 BASIN, OCTOBER 2011 RELEASE)

NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated Dec 2018.

Sample depth in feet below ground surface (ft bgs).

Confirmation soil samples SS-1 thru SS-10 collected in October 2011 following excavation of crude oil-impacted soil.

Supplemental soil samples SS-11, SS-12, SS-17, and SS-23 thru SS-25 collected in April 2012 as requested by the WDNR.

FID = Flame-ionization detector reading in parts per million, volume (ppmv).

J = Estimated concentration below laboratory quantification level.

na = Not analyzed.

nm = Not measured.

NS = No standard.

PID = Photo-ionization detector reading in ppmv.

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

-- = Not applicable.

FOOTNOTES:

(1) Soil sample type based on the observed low water table since Oct 2011 in monitoring well MW-3/T50 (2.76 ft bgs on 5/21/18).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

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TABLE C-2

RESIDUAL SOIL CONTAMINATION (TANK 50 BASIN, OCTOBER 2011 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except as shown for PID, CCR, and HI										NR 720 RCL (mg/kg)		
	Sample ID	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	SS-10	Soil to Groundwater Pathway	Industrial Direct Contact
Sample Date	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11	10/25/11		
Sample Depth (ft bgs)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0		
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.		
PID (ppmv)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NS	NS
Gasoline range organics	<2.5	9 J	<1.9	4.6 J	16	<2.2	<2.2	<2.0	<2.4	<2.1		NS	NS
Diesel range organics	<0.77	<0.77	42	72	61	<1.1	<0.91	<1.0	<0.77	<0.77		NS	NS
Petroleum volatile organic compounds (PVOCs) and naphthalene													
Benzene	0.025 J	0.031 J	0.02 J	0.035 J	0.029 J	0.03 J	0.03 J	0.026 J	0.028 J	0.023 J		0.0051	7.07
Ethylbenzene	0.021 J	0.02 J	0.054 J	0.027 J	0.016 J	0.022 J	0.02 J	0.018 J	0.019 J	0.015 J		1.57	35.4
Toluene	0.038 J	0.049 J	0.03 J	0.044 J	0.046 J	0.035 J	0.05 J	0.028 J	0.033 J	0.025 J		1.1072	818
Xylenes	0.102 J	0.149 J	0.29	0.14 J	0.117 J	0.104 J	0.108 J	0.083 J	0.078 J	0.068 J		3.96	260
Methyl tert butyl ether	<0.014	<0.014	<0.010	<0.012	<0.011	<0.012	<0.012	<0.011	<0.013	<0.011		0.027	282
1,2,4-Trimethylbenzene (TMB)	0.039 J	0.08 J	0.052 J	0.049 J	0.07 J	0.052 J	0.043 J	0.027 J	0.033 J	0.025 J		NS	219
1,3,5-TMB	0.015 J	0.03 J	0.02 J	0.019 J	0.053 J	0.024 J	0.018 J	0.01 J	0.012 J	0.0086 J		NS	182
TMBs (combined)	0.054	0.11	0.072	0.068	0.123	0.076	0.061	0.037	0.045	0.0336		1.3787	NS
Naphthalene	0.13 J	0.49 J	0.14 J	0.3 J	0.48 J	0.096 J	0.093 J	0.096 J	0.11 J	0.066 J		0.6582	24.1
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>													
Cancer Risk (CCR)	9.5E-09	2.5E-08	1.0E-08	1.8E-08	2.4E-08	8.8E-09	8.7E-09	8.2E-09	9.1E-09	6.4E-09		NR 720 threshold = 1E-5	
Hazard Index (HI)	0.0003	0.0007	0.0003	0.0005	0.0007	0.0002	0.0002	0.0002	0.0002	0.0002		NR 720 threshold = 1	

NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis. No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

Sample depth in feet below ground surface (ft bgs).

J = Estimated concentration below laboratory quantification level.

PID = Photo-ionization detector reading in parts per million, volume (ppmv).

NS = No standard.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

Sample depth in feet below ground surface (ft bgs).

FOOTNOTES:

(1) Soil sample type based on the observed low water table since Oct 2011 in monitoring well MW-3/T50 (2.76 ft bgs on 5/21/18).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only).

Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

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TABLE 3

CONTINUING OBLIGATIONS CHECKLIST

Ref. No.	This situation applies to the following property or right of way (ROW)			Site Transfer Situation - Continuing Obligation (database fees will apply, ii-xiv)	Maintenance Plan Required
	Property Type				
	Source Property	Affected Property (Off-Source)	ROW		
i				None of the following situations apply to this site transfer request	NA
ii				Residual groundwater contamination exceeds ch. NR 140 ESs	NA
iii	x			Residual soil contamination exceeds ch. NR 720 RCLs	NA
iv				Monitoring Wells Remain:	
	x			<ul style="list-style-type: none"> <li>● Not abandoned (filled and sealed)</li> <li>● Continued monitoring (requested or required)</li> </ul>	NA Yes <sup>(1)</sup>
v				Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi				Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii				Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii	x			Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix			NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x			NA	Vapor: Dewatering system needed for VMS to work effectively	Yes
xi			NA	Vapor: Compounds of concern in use; full vapor assessment could not be completed	NA
xii			NA	Vapor: Commercial/industrial exposure assumptions used	NA
xiii				Vapor: Residual VOCs pose future risk of vapor intrusion	NA
xiv				Site-specific situation (e.g., methane monitoring): discuss with WDNR project manager before submitting for transfer	Site specific

FOOTNOTE:

(1) Continued monitoring of groundwater will be conducted under the facility-wide ERP site (BRRTS# 16-16-559511), which includes the required maintenance plan, etc.

**ATTACHMENT D**

**SUMMARY OF BRRTS# 02-16-562123 CALUMET SUPERIOR LLC – SPILL 04-16-562147  
PROPOSED FOR TRANSFER TO BRRTS# 16-16-559511**

## ATTACHMENT D

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

July 3, 2019

Re: Individual Site Summary for Transfer to the Referenced Facility-Wide ERP Site  
RELEASE OR ACTIVITY NAME: Calumet Superior LLC – Spill 04-16-562147  
ORIGINAL BRRTS/SRRTS# (if applicable): 02-16-562123/SERTS ID 20131226NO16-1

### **General Site Information and How and When Site Contamination was Discovered**

A release of approximately 100 gallons of #6 fuel oil occurred within an earthen bermed area near Cooling Tower #2 (CT2) and was reported to the Wisconsin Department of Natural Resources (WDNR) on December 26, 2013. The release was the result of a leaking pipe as identified by refinery staff. Additional required site information and attachments are summarized below.

WTM coordinates of the subject activity are X: 361711 m and Y: 692928 m

Pertinent individual site reference documents on file with the Wisconsin Department of Natural Resources (WDNR) include the:

- February 2014 *NR708.05(6)(a) Immediate Action Report*.
- June 2014 *Immediate Response Action Report*.

SRC contact information:

Matt Turner, (715) 398-8434, [Matthew.Turner@huskyenergy.com](mailto:Matthew.Turner@huskyenergy.com)

Environmental consultant contact information:

Cliff Wright; Gannett Fleming, Inc.; (608) 836-1500 x6722, [cwright@gfnet.com](mailto:cwright@gfnet.com)

Attachments include:

- Engineering Certification provided with the facility-wide ERP database packet submittal
- Figure D-1 Detailed Site Map and Soil Contamination
- Figure D-2 Residual Soil Contamination
- Table D-1 Soil Analytical Results
- Table D-2 Residual Soil Contamination
- Table D-3 Continuing Obligations Checklist



## ATTACHMENT D

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Site Investigation Summary**

Investigation work completed at the site includes soil sampling in May and June 2014.

### **Description of Any Structural Impediments**

Structural impediments that limited the excavation of impacted soil include the foundations to a network of pipe racks and pair of pumps.

### **Nature, Degree, and Extent of Soil Contamination**

Investigation results document that the estimated extent of impacted soil was limited to the area shown on Figure D-1 based on visual observations, field screening with a photo-ionization detector (PID), and soil sampling. Compounds of concern are the petroleum volatile organic compounds (PVOCs) and one or more of the polycyclic aromatic hydrocarbons (PAHs), which includes naphthalene. A total of six soil samples were submitted for analysis. Table D-1 includes a summary of the analytical results and field screening data.

As noted in Tables D-1 and D-2, #6 fuel oil is black in color, and the December 2013 release occurred in an area of historical petroleum contamination. Consequently, visual observation was the most effective means to determine the extent of fuel oil contamination in the field. PID readings are in parts per million by volume (ppmv), and the standard facility-wide PID field screening guideline is 10 ppmv. At the CT2 site, locations with residual olfactory impacts (i.e., PID >10 ppmv) most likely from a conditionally closed release that occurred previously were identified.

### **Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

Lab results confirm that the concentrations of PVOCs/naphthalene in the soil were below generic NR 720 industrial direct contact residual concentration levels (RCLs), except the naphthalene concentration of 39 milligrams per kilogram (mg/kg) in S-5 at 0.5 foot below ground surface (ft bgs) was above its NR 720 industrial direct contact RCL of 24.1 mg/kg, as summarized in Table D-1. On June 3, 2014, 5 cubic yards of impacted soil were excavated to address the elevated naphthalene at S-5, and S-5-2 was collected at 5.5 ft bgs to confirm removal of the soil with elevated naphthalene.

## ATTACHMENT D

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Vapor Migration Pathway**

The vapor migration pathway was ruled out, as allowed by the WDNR, because a) there are no structures in the earthen bermed area where the release occurred; b) the closest occupied structure is the boiler house approximately 160 feet to the south-southeast; c) there are no underground utilities in the bermed area, although above-grade pipes do penetrate clay berms in several locations; d) the bermed area currently is and will continue to be used for petroleum transport via primarily above-grade pipes within the refinery complex; and e) SRC has no plans to construct any other structures or buildings in the bermed area.

### **Remedial Actions Implemented and Residual Contamination Levels**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial RCLs.

### **Immediate or Interim Actions Under NR 708, Wis. Adm. Code**

The degree and extent of soil contamination was limited because the 100-gallon release occurred in a topographically low area. Refinery staff were able to vacuum up some of the product immediately after the spill occurred. The recovered product was placed in the refinery's No. 1 API separator.

In addition, a total volume of approximately 65 cubic yards of fuel oil-impacted soil was excavated between December 27, 2013, and June 3, 2014.

### **Active Remedial Actions**

Other than the immediate and interim action(s) described in the previous paragraph, no active remediation was conducted at the site.

### **Nature, Degree, and Extent of Residual Contamination**

Based on the soil sampling conducted and summarized in Table D-2, maximum PVOC/naphthalene concentrations in the upper 4 feet of residual-impacted soil include benzene at 0.36 mg/kg in SS-1 at 0.5 ft bgs, ethylbenzene at 1.5 mg/kg in SS-2 at 0.5 ft bgs, and naphthalene at 24 mg/kg in SS-2 at 0.5 ft bgs. The limits of excavation (performed between December 27, 2013, and June 3, 2014, to remove all contaminated material impacted by the 100-

## ATTACHMENT D

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

gallon release of #6 fuel oil on December 26, 2013) cover an area approximately 80 feet long and up to 50 feet wide, as shown on Figure D-2.

### **Residual Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

See the previous paragraph.

### **Residual Soil Contamination Above the Observed Low Water Table**

Same as above.

### **Description of How Residual Contamination Will be Addressed**

The residual contamination will be addressed by remediation through natural attenuation.

### **Soil, Groundwater, and Vapor Exposure Pathway Mitigation**

The soil and groundwater exposure pathways were adequately addressed because the immediate/interim action met the direct contact soil clean-up standards, and the existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater. The vapor exposure pathway was ruled out.

### **Continuing Obligations**

SRC will continue to utilize its network of 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) for field verification of the performance standard for the protection of groundwater. See Table D-3 for additional details.

### **Maintenance Plan(s) and Location Map(s)**

The April 2014 final site investigation/remedial action plan for SRC's facility-wide ERP site (BRRTS# 16-16-559511) and March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC provide the maintenance plan(s) and location map(s) detailing SRC's continuing obligation to field verify groundwater quality, per the previous paragraph.

## ATTACHMENT D

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Photograph(s) of Structural Impediment(s)**

Figures D-1 and D-2 provide aerial photographs of the pipe rack network and pair of pumps. See the June 2014 *Immediate Response Action Report* for supplemental photos.

### **Inspection Log(s)**

Not applicable.

### **Documentation of Investigative Waste Disposal**

The investigative waste and excavated soil were temporarily stockpiled at the refinery's on-site soil storage facility and then transported to and properly disposed of at a local landfill, as reported to the WDNR previously. No leftover drums with investigative waste remain on site.

### **Documentation of Any Remedial Action Construction**

Not applicable.

### **Plans for Decommissioning of Remedial Systems**

Not applicable.





**Legend**

- Estimated extent of #6 fuel oil release (12/26/13)
- Limits of excavation (Dec. 2013 - May 2014)
- ▲ Soil Sample Location (5/22/14)

**Notes**

- 1) WDNR BRRTS #02-16-562123 Calumet Superior LLC – Spill 04-16-562147.
- 2) Parcel #01-801-03339-00.



**Detailed Site Map and Soil Contamination  
(May 2014)**

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN



**Gannett Fleming**

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Project No. 34265.003	Date 06/04/19	Figure D-1
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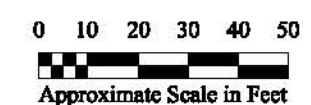


**Legend**

- Limits of excavation (Dec. 2013 - June 2014)
- ▲ Soil Sample Location (5/22/14)
- ▼ Soil Sample Location (6/3/14)
- ⊕ Geoprobe Boring Location (6/5/14)

**Notes**

- 1) No results  $\geq$  a generic NR 720 industrial direct contact RCL.
- 2) WDNR BRRTS #02-16-562123 Calumet Superior LLC – Spill 04-16-562147.
- 3) Parcel #01-801-03339-00.



**RESIDUAL SOIL CONTAMINATION  
(JUNE 2014)**

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

**Gannett Fleming**, Inc.  
 8040 Excelsior Drive, Suite 303  
 Madison WI 53717-1338  
 (608) 836-1500  
[www.gannettfleming.com](http://www.gannettfleming.com)

Project No.	34265.003	Date	06/19/19	Figure	D-2
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SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE D-1

SOIL ANALYTICAL RESULTS (AND FIELD SCREENING DATA/DECEMBER 2013 RELEASE NEAR COOLING TOWER #2)

Group/Substance/CCR-HI	Concentration (mg/kg) except as shown for PID, CCR, and HI						NR 720 RCL (mg/kg)		
	Sample ID	S-1	S-2	S-3	S-4	S-5 <sup>(1)</sup>	S-5-2	Soil to	Industrial
Sample Date	05/22/14	05/22/14	05/22/14	05/22/14	05/22/14	05/22/14	06/03/14	Groundwater	Direct
Sample Depth (ft bgs)	0.5	0.5	0.5	0.5	0.5	5.5			
Saturated/Unsaturated <sup>(2)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Saturated	Pathway	Contact	
PID (ppmv) <sup>(3)</sup>	nm	nm	nm	nm	nm	50	NS	NS	
Total petroleum hydrocarbons	120	620	6.5	9.8	980	130	NS	NS	
Petroleum volatile organic compounds (PVOCs) and naphthalene									
Benzene	0.36	<0.13	0.023	0.020	1.8	0.84	0.0051	7.07	
Ethylbenzene	<0.34	1.5	<0.021	0.020	5.4	1.2	1.57	35.4	
Toluene	<3.4	<1.3	<0.21	<0.20	<5.0	<0.37	1.1072	818	
Xylenes	<1.02	2.9	0.063 U	<0.060	2.8	0.39	3.96	260	
Methyl tert butyl ether	<0.68	<0.26	<0.041	<0.040	<1.0	0.17	0.027	282	
1,2,4-TMB	0.86	7.1	0.064	0.13	6.2	0.73	NS	219	
1,3,5-TMB	1.5	13	0.041 U	0.040 U	13	1.1	NS	182	
TMBs (combined)	2.36	20.1	0.105	0.170	19.2	1.83	1.3787	NS	
Naphthalene	9.5	24	<0.21	1.4	39	<0.37	0.6582	24.1	
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(4)</sup>									
Cancer Risk (CCR)	4.5E-07	1.0E-06	3.3E-09	6.1E-08	2.6E-06	1.5E-07	NR 720 threshold = 1E-5		
Hazard Index (HI)	0.0131	0.0391	0.0001	0.0018	0.0599	0.0024	NR 720 threshold = 1		

TABLE D-1

## SOIL ANALYTICAL RESULTS (AND FIELD SCREENING DATA/DECEMBER 2013 RELEASE NEAR COOLING TOWER #2)

June 5, 2014 Geoprobe Boring Sample ID	Photoionization Detector (PID) Reading (ppmv)				Comments
	Sample Interval (feet below ground surface)				
	0-2.5	2.5-5.0	5.0-7.5	7.5-10.0	
GP-1/CT2	51	82	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-2/CT2	97	120	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-3/CT2	72	11	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-4/CT2	118	274	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-5/CT2	0.7	1.9	--	--	Total depth = 5 feet
GP-6/CT2	125	422	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-7/CT2	1.6	1.2	--	--	Total depth = 5 feet
GP-8/CT2	0.8	15	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-9/CT2	1.0	1.2	132	409	On berm about 5 feet tall; total depth = 10 feet <sup>(3)</sup>
GP-10/CT2	286	206	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-11/CT2	873	894	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-12/CT2	830	891	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-13/CT2	1.4	33	--	--	Total depth = 5 feet <sup>(3)</sup>
GP-14/CT2	1.6	1.5	--	--	Total depth = 5 feet

NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis, except as noted.

Detected concentrations at or above an applicable NR 720 industrial direct contact RCL are in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated Dec 2018.

Readings in black font and bold exceed the standard facility-wide PID field screening guideline of 10 ppmv. However, #6 fuel oil is black in color and the 12/26/13 release occurred in an area of historical petroleum contamination. Consequently, visual observation was the most effective means to determine the extent of fuel oil contamination in the field.

Sample depth in feet below ground surface (ft bgs).

nm = Not measured.

NS = No standard.

PID = Photo-ionization detector reading in parts per million, volume (ppmv).

PID = Rae Systems MiniRAE 3000 PID with 11.7 electron volt (eV) lamp.

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above detection limit, which is the value shown for all VOCs except xylenes/TMBs (combined).

FOOTNOTES:

(1) On 6/3/14, five cubic yards of soil excavated to address elevated naphthalene at S-5 and S-5-2 collected to confirm removal.

(2) Soil sample type based on the observed low water table in closest ERP monitoring well MW-1/T67 (1.40 ft bgs on 5/21/18).

(3) Residual olfactory impact (i.e., PID >10 ppmv) most likely from a conditionally closed release that occurred previously.

(4) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

SUPERIOR REFINING COMPANY LLC  
 SUPERIOR, WISCONSIN

TABLE D-2

RESIDUAL SOIL CONTAMINATION (AND FIELD SCREENING DATA/DECEMBER 2013 RELEASE NEAR COOLING TOWER #2)

Group/Substance/CCR-HI	Concentration (mg/kg) except as shown for PID, CCR, and HI					NR 720 RCL (mg/kg)		
	Sample ID	S-1	S-2	S-3	S-4	S-5-2	Soil to	Industrial
Sample Date	05/22/14	05/22/14	05/22/14	05/22/14	05/22/14	06/03/14	Groundwater	Direct
Sample Depth (ft bgs)	0.5	0.5	0.5	0.5	0.5	5.5	Pathway	Contact
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Saturated		
PID (ppmv) <sup>(2)</sup>	nm	nm	nm	nm	nm	50	NS	NS
Total petroleum hydrocarbons	120	620	6.5	9.8	130		NS	NS
Petroleum volatile organic compounds (PVOCs) and naphthalene								
Benzene	0.36	<0.13	0.023	0.020	0.84	0.0051	7.07	
Ethylbenzene	<0.34	1.5	<0.021	0.020	1.2	1.57	35.4	
Toluene	<3.4	<1.3	<0.21	<0.20	<0.37	1.1072	818	
Xylenes	<1.02	2.9	0.063 U	<0.060	0.39	3.96	260	
Methyl tert butyl ether	<0.68	<0.26	<0.041	<0.040	0.17	0.027	282	
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TMBs (combined)	2.36	20.1	0.105	0.170	1.83	1.3787	NS	
Naphthalene	9.5	24	<0.21	1.4	<0.37	0.6582	24.1	
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(3)</sup>								
Cancer Risk (CCR)	4.5E-07	1.0E-06	3.30E-09	6.10E-08	1.50E-07	NR 720 threshold = 1E-5		
Hazard Index (HI)	0.0131	0.0391	0.0001	0.0018	0.0024	NR 720 threshold = 1		

TABLE D-2

RESIDUAL SOIL CONTAMINATION (AND FIELD SCREENING DATA/DECEMBER 2013 RELEASE NEAR COOLING TOWER #2)

June 5, 2014 Geoprobe Boring Sample ID	Photoionization Detector (PID) Reading (ppmv)				Comments
	Sample Interval (feet below ground surface)				
	0-2.5	2.5-5.0	5.0-7.5	7.5-10.0	
GP-1/CT2	51	82	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-2/CT2	97	120	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-3/CT2	72	11	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-4/CT2	118	274	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-5/CT2	0.7	1.9	--	--	Total depth = 5 feet
GP-6/CT2	125	422	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-7/CT2	1.6	1.2	--	--	Total depth = 5 feet
GP-8/CT2	0.8	15	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-9/CT2	1.0	1.2	132	409	On berm about 5 feet tall; total depth = 10 feet <sup>(2)</sup>
GP-10/CT2	286	206	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-11/CT2	873	894	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-12/CT2	830	891	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-13/CT2	1.4	33	--	--	Total depth = 5 feet <sup>(2)</sup>
GP-14/CT2	1.6	1.5	--	--	Total depth = 5 feet

NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis, except as noted.

Detected concentrations at or above an applicable NR 720 industrial direct contact RCL are in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated Dec 2018.

Readings in black font and bold exceed the standard facility-wide PID field screening guideline of 10 ppmv. However, #6 fuel oil is black in color and the 12/26/13 release occurred in an area of historical petroleum contamination. Consequently, visual observation was the most effective means to determine the extent of fuel oil contamination in the field.

Sample depth in feet below ground surface (ft bgs).

nm = Not measured.

NS = No standard.

PID = Photo-ionization detector reading in parts per million, volume (ppmv).

PID = Rae Systems MiniRAE 3000 PID with 11.7 electron volt (eV) lamp.

TMB = Trimethylbenzene.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above detection limit, which is the value shown for all VOCs except xylenes/TMBs (combined).

FOOTNOTES:

(1) Soil sample type based on the observed low water table in closest ERP monitoring well MW-1/T67 (1.40 ft bgs on 5/21/18).

(2) Residual olfactory impact (i.e., PID >10 ppmv) most likely from a conditionally closed release that occurred previously.

(3) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.



SUPERIOR REFINING COMPANY LLC  
 SUPERIOR, WISCONSIN

TABLE 3

CONTINUING OBLIGATIONS CHECKLIST

Ref. No.	This situation applies to the following property or right of way (ROW)			Site Transfer Situation - Continuing Obligation (database fees will apply, ii-xiv)	Maintenance Plan Required
	Property Type				
	Source Property	Affected Property (Off-Source)	ROW		
i				None of the following situations apply to this site transfer request	NA
ii				Residual groundwater contamination exceeds ch. NR 140 ESs	NA
iii	x			Residual soil contamination exceeds ch. NR 720 RCLs	NA
iv				Monitoring Wells Remain:	
				• Not abandoned (filled and sealed)	NA
	x			• Continued monitoring (requested or required)	Yes <sup>(1)</sup>
v				Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi				Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii	x			Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii	x			Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix			NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x			NA	Vapor: Dewatering system needed for VMS to work effectively	Yes
xi			NA	Vapor: Compounds of concern in use; full vapor assessment could not be completed	NA
xii			NA	Vapor: Commercial/industrial exposure assumptions used	NA
xiii				Vapor: Residual VOCs pose future risk of vapor intrusion	NA
xiv				Site-specific situation (e.g., methane monitoring): discuss with WDNR project manager before submitting for transfer	Site specific

FOOTNOTE:

(1) Continued monitoring of groundwater will be conducted under the facility-wide ERP site (BRRTS# 16-16-559511), which includes the required maintenance plan, etc.

ATTACHMENT E

SUMMARY OF BRRTS# 02-16-577285 MURPHY OIL – TANK 27 BASIN  
PROPOSED FOR TRANSFER TO BRRTS# 16-16-559511

## ATTACHMENT E

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

July 3, 2019

Re: Individual Site Summary for Transfer to the Referenced Facility-Wide ERP Site  
RELEASE OR ACTIVITY NAME: Murphy Oil – Tank 27 Basin  
ORIGINAL BRRTS/SRRTS# (if applicable): 02-16-577285

### **General Site Information and How and When Site Contamination was Discovered**

During a routine inspection on August 25, 2015, refinery staff identified an area of black-stained, hydrocarbon-impacted soil in the tank basin, likely from a release of crude oil before the May 1978 Wisconsin spill laws, although the specifics are unknown. In August 2015 Tank 27 was being used to store ultra-low sulfur kerosene. Because of wet conditions at the time the release was identified, refinery staff decided to wait for cold weather and frozen conditions to minimize the spread of contamination and for improved access to define the extent of the impacts, based on soil samples collected using a Geoprobe, and to excavate the impacted soil to address the direct contact pathway, if necessary. Additional required site information and attachments are summarized below.

WTM coordinates of the subject activity are X: 361624.3 m and Y: 692126.7 m

Pertinent individual site reference document(s) on file with the Wisconsin Department of Natural Resources (WDNR) include the:

- February 2016 *Historical Contamination Response Action Report for the Tank 27 Basin*

SRC contact information:

Matt Turner, (715) 398-8434, [Matthew.Turner@huskyenergy.com](mailto:Matthew.Turner@huskyenergy.com)

Environmental consultant contact information:

Cliff Wright; Gannett Fleming, Inc.; (608) 836-1500 x6722, [cwright@gfnet.com](mailto:cwright@gfnet.com)

Attachments include:

- Engineering Certification provided with the facility-wide ERP database packet submittal
- Figure E-1 Detailed Site Map and Soil Contamination
- Figure E-2 Residual Soil Contamination
- Table E-1 Soil Analytical Results
- Table E-2 Residual Soil Contamination
- Table E-3 Continuing Obligations Checklist

## ATTACHMENT E

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Site Investigation Summary**

On December 28 and 29, 2015, sampling was conducted using a direct-push rig to define the horizontal and vertical extent of impacted soil based on visual observation and field screening data from a photo-ionization detector (PID) equipped with an 11.7 electron volt (eV) lamp. A threshold PID reading of 10 parts per million volume (ppmv) was used to identify impacted soil. As shown on Figure E-1, starting directly in front of the service doors to Tank 27, a grid was established (approximately 25-foot on center), and soil samples were collected at 21 locations (GP-1 through GP-21).

### **Description of Any Structural Impediments**

The foundation of Tank 27 was a structural impediment that limited the investigation of impacted soil (e.g., see GP-1 on Figure E-1).

### **Nature, Degree, and Extent of Soil Contamination**

Field screening results document that the estimated extent of impacted soil was limited to the area shown on Figure E-1. Compounds of concern are the petroleum volatile organic compounds (PVOCs) and naphthalene. A total of 13 soil samples from 11 of the 21 borings were submitted for analysis. Table E-1 includes a summary of the analytical results.

### **Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

Lab results confirm that the concentrations of PVOCs and naphthalene in the soil were below generic NR 720 industrial direct contact residual concentration levels (RCLs), except for samples collected at GP-2. As summarized in Table E-1, the sample from 0-2 feet at GP-2 exceeded the RCL for benzene, and the sample from 2-4 feet exceeded the RCL for benzene, ethylbenzene, naphthalene, and xylenes (o- and p-xylene combined).

### **Vapor Migration Pathway**

The vapor migration pathway was ruled out, as allowed by the WDNR, because a) Tank 27 is the only structure in the basin, b) the closest occupied building is the Enbridge Energy office/shop at 10 Bardon Avenue approximately 1,300 feet to the northeast, c) there are no underground utilities in the basin, d) the basin currently is and will continue to be a petroleum storage area, and e) SRC has no plans to construct any other structures or buildings in the basin.

## ATTACHMENT E

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Remedial Actions Implemented and Residual Contamination Levels**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial RCLs.

### **Immediate or Interim Actions Under NR 708, Wis. Adm. Code**

On January 19, 21, and 22, 2016, qualified staff excavated approximately 300 cubic yards of impacted soil and collected confirmation soil samples from the Tank 27 basin excavation. As shown on Figure E-2, soil was excavated from a rectangular area approximately 45 feet long by 40 feet wide. Sidewall samples SW-1 through SW-4 were collected at 3-4 feet below ground surface (ft bgs), field screened for VOCs with an 11.7eV PID, and submitted for PVOOC-naphthalene analysis. As shown in Table E-2, concentrations of PVOOCs and naphthalene in all sidewall samples were below applicable industrial direct contact RCLs. See the February 2016 *Historical Contamination Response Action Report* for additional details.

### **Active Remedial Actions**

Other than the immediate and interim action(s) described in the previous paragraph, no active remediation was conducted at the site.

### **Nature, Degree, and Extent of Residual Contamination**

Based on soil sampling conducted in Dec 2015/Jan 2016 and summarized in Table E-2, maximum soil PVOOC-naphthalene concentrations relative to generic NR 720 industrial contact RCLs include benzene at 5.26 vs 7.07 milligrams per kilogram (mg/kg), ethylbenzene at 10.1 vs 35.4 mg/kg, and naphthalene at 16.2 vs 24.1 mg/kg in GP-5 at 0-2 ft bgs. The estimated extent of residual contamination is limited to an irregularly shaped area approximately 110 feet long and up to 100 feet wide, as shown on Figure E-2.

### **Residual Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

See the previous paragraph.



## ATTACHMENT E

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Residual Soil Contamination Above the Observed Low Water Table**

Same as above.

### **Description of How Residual Contamination Will be Addressed**

The residual contamination will be addressed by remediation through natural attenuation.

### **Soil, Groundwater, and Vapor Exposure Pathway Mitigation**

The soil and groundwater exposure pathways were adequately addressed because the immediate/interim action met the direct contact soil clean-up standards, and the existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater. The vapor exposure pathway was ruled out.

### **Continuing Obligations**

SRC will continue to utilize its network of 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) for field verification of the performance standard for the protection of groundwater. See Table E-3 for additional details.

### **Maintenance Plan(s) and Location Map(s)**

The April 2014 final site investigation/remedial action plan for SRC's facility-wide ERP site (BRRTS# 16-16-559511) and March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC provide the maintenance plan(s) and location map(s) detailing SRC's continuing obligation to field verify groundwater quality, per the previous paragraph.

### **Photograph(s) of Structural Impediment(s)**

See Figures E-1 and E-2 for aerial photographs of Tank 27.

### **Inspection Log(s)**

Not applicable.

## ATTACHMENT E

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Documentation of Investigative Waste Disposal**

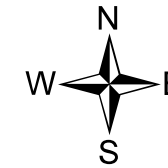
The investigative waste and excavated soil were temporarily stockpiled at the refinery's on-site soil storage facility and then transported to and properly disposed of at a landfill, as reported to the WDNR previously. No leftover drums with investigative waste remain on site.

### **Documentation of Any Remedial Action Construction**






Not applicable.

### **Plans for Decommissioning of Remedial Systems**

Not applicable.

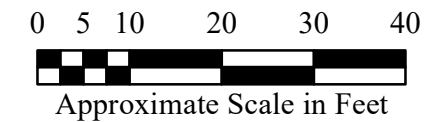



### Legend

-  Estimated Extent of Unsaturated Soil With One or More Substances  $\geq$  a Generic NR 720 Industrial Direct Contact Residual Contaminant Level (RCL)
-  Estimated Extent of Unsaturated Soil with One or More Substances  $\geq$  a Generic NR 720 Soil To Groundwater Pathway RCL
-  Structural Impediment in Investigaiion Area
-  Soil Boring Location with Unsaturated Sample(s) That Screened  $\geq$ 10 ppmv (Dec. 2015)
-  Soil Boring Location with Unsaturated Sample(s) That Screened <10 ppmv (Dec. 2015)

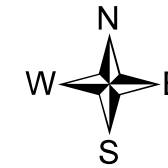
### Notes

1. WDNR BRRTS #02-16-577285 Murphy Oil - Tank 27 Basin site.
2. Tank 27 was being used to store ultra-low sulfur kerosene at the time of investigation.
3. Parcel #01-801-05132-00.








<b>Detailed Site Map and Soil Contamination (December 2015)</b>			
SUPERIOR REFINING COMPANY LLC SUPERIOR, WISCONSIN			
		Gannett Fleming, Inc. 8040 Excelsior Drive Madison WI 53717-1338 (608) 836-1500 www.gannettfleming.com	
Project No.	34265.003	Date	5/21/18
Figure	E-1		



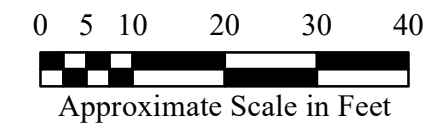


### Legend

-  Estimated Extent of Unsaturated Soil with One or More Substances  $\geq$  a Generic NR 720 Soil To Groundwater Pathway RCL
-  Limits of January 2016 Soil Excavation
-  Structural Impediment in Investigaion Area
-  Soil Boring Location with Unsaturated Sample(s) That Screened  $\geq 10$  ppmv (Dec. 2015)
-  Excavation sidewall soil sample location (Jan 2016)

### Notes

1. No results  $\geq$  a generic NR 720 industrial direct contact RCL remain.
2. The location of sidewall sample SW-2 is shown for completeness, however, its concentrations were  $<$  generic NR 720 soil to groundwater pathway RCLs.
3. WDNR BRRTS #02-16-577285 Murphy Oil - Tank 27 Basin site.
4. Tank 27 was being used to store ultra-low sulfur kerosene at the time of investigation.
5. Parcel #01-801-05132-00.



### Residual Soil Comtamination (January 2016)

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN



Gannett Fleming, Inc.  
8040 Excelsior Drive  
Madison WI 53717-1338  
(608) 836-1500  
www.gannettfleming.com

Project No.	34265.003	Date	6/19/19	Figure	E-2
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SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE E-1

SOIL ANALYTICAL RESULTS (TANK 27 BASIN)<sup>(1)</sup>

Sample			Excavated & Landfilled <sup>(2)</sup> (Yes/No)	PID (ppmv)	Benzene (mg/kg)	Ethyl-benzene (mg/kg)	Toluene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	1,2,4-TMB (mg/kg)	1,3,5-TMB (mg/kg)	TMBs combined (mg/kg)	Naphthalene (mg/kg)	Shallow Soil Multiple Contaminant Cumulative <sup>(3)</sup>	
ID	Interval (ft bgs)	Date												Hazard Index	Cancer Risk
NR 720 soil to groundwater pathway RCL					0.0051	1.57	1.1072	3.96	0.027	NS	NS	1.3787	0.6582	Hazard Index	Cancer Risk
NR 720 industrial direct contact RCL					7.07	35.4	818	260	282	219	182	NS	24.1		
GP-1	0-2	12/28/15	No	19	<0.025	0.293	<0.025	0.343	<0.025	0.025 U	0.025 U	0.050 U	0.87	0.0012	4.4E-08
GP-2	0-2	"	Yes	442	16	19.4	<0.125	56.21	0.871	43.6	14	57.6	15.1	0.087	3.4E-06
	2-4	"	Yes	404	102	90.9	153	345.9	4.38	165	54	219	59	0.443	1.9E-05
GP-3	2-4	"	Yes	137	1.09	0.382	<0.025	0.717	<0.025	0.762	0.21	0.972	0.442	0.003	1.8E-07
GP-5	0-2	12/29/15	No	367	5.26	10.1	<0.025	28.5	0.42 J	29.2	12.2	41.4	16.2	0.055	1.7E-06
	2-4	"	No	128	0.841	0.796	0.0757	2.52	<0.025	2.06	0.792	2.852	1.03	0.0047	1.8E-07
GP-7	2-4	"	No	20	<0.025	0.0723	<0.025	0.173	<0.025	0.478	0.179	0.657	0.509	0.001	2.3E-08
GP-9	2-4	"	No	113	0.795	1.35	<0.050	3.088	<0.050	3.82	2.01	5.83	2.38	0.0077	2.5E-07
GP-11	0-2	"	No	79	0.0824	0.349	<0.025	0.861	<0.025	1.4	0.591	1.991	0.879	0.0023	5.8E-08
GP-12	2-4	"	No	53	1.18	1.35	<0.050	3.791	<0.050	3.86	1.46	5.32	1.72	0.0075	2.8E-07
GP-13	2-4	"	No	128	0.963	2.15	<0.050	4.993	<0.050	6.48	3.19	9.67	3.63	0.0118	3.5E-07
GP-16	2-4	"	No	35	0.692	3.12	<0.0625	7.612	<0.0625	12.2	4.4	16.6	4.72	0.0164	3.8E-07
GP-17	2-4	"	No	23	0.102	0.488	<0.025	1.456	<0.025	2.19	1.06	3.25	1.05	0.0033	7.2E-08
SW-1	3	01/19/16	No	145	2.03	0.888	0.804	3.04	0.501	0.801	5.14	5.941	<0.317	0.0072	3.1E-07
SW-2	3	01/21/16	No	78	<0.0326	0.0584	<0.326	0.1094	<0.0652	0.123	0.288	0.411	0.455	0.0008	2.1E-08
SW-3	3	"	No	23	0.0384	<0.0322	<0.322	0.1153	<0.0644	0.159	0.239	0.398	<0.322	0.0003	5.4E-09
SW-4	4	01/22/16	No	199	0.173	0.176	<0.341	0.2981	<0.0682	0.746	0.170	0.916	<0.341	0.0008	2.9E-08



TABLE E-1

SOIL ANALYTICAL RESULTS (TANK 27 BASIN)<sup>(1)</sup>

NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

Detected concentrations at or above an applicable NR 720 industrial direct contact RCL are in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2017.

Samples analyzed for the petroleum volatile organic compounds and naphthalene.

Sample intervals are in feet below ground surface (ft bgs).

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MTBE = Methyl tert butyl ether.

NS = No standard.

PID = Photo-ionization detector reading (with an 11.7-eV lamp) in parts per million, volume (ppmv).

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above the detection limit, which is the value shown for all substances except xylenes and TMBs (combined).

FOOTNOTES:

(1) All soil samples are characterized as unsaturated because they were collected above the observed low water table in MW-22 (4.28 ft bgs on 9/3/15).

(2) Excavated & Landfilled column indicates those sample intervals that were excavated and disposed of at a local landfill.

(3) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b), Wis. Adm. Code. Levels at or above a threshold are in bold font.

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TABLE E-2

RESIDUAL SOIL CONTAMINATION (TANK 27 BASIN)<sup>(1)</sup>

Sample			PID (ppmv)	Benzene (mg/kg)	Ethyl- benzene (mg/kg)	Toluene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)	1,2,4- TMB (mg/kg)	1,3,5- TMB (mg/kg)	TMBs combined (mg/kg)	Naph- thalene (mg/kg)	Shallow Soil Multiple Contaminant Cumulative <sup>(2)</sup>	
ID	Interval (ft bgs)	Date											Hazard Index	Cancer Risk
NR 720 soil to groundwater pathway RCL				0.0051	1.57	1.1072	3.96	0.027	NS	NS	1.3787	0.6582	Hazard Index	Cancer Risk
NR 720 industrial direct contact RCL				7.07	35.4	818	260	282	219	182	NS	24.1		
GP-1	0-2	12/28/15	19	<0.025	0.293	<0.025	0.343	<0.025	0.025 U	0.025 U	0.050 U	0.87	0.0012	4.4E-08
GP-5	0-2	12/29/15	367	5.26	10.1	<0.025	28.5	0.42 J	29.2	12.2	41.4	16.2	0.055	1.7E-06
	2-4	"	128	0.841	0.796	0.0757	2.52	<0.025	2.06	0.792	2.852	1.03	0.0047	1.8E-07
GP-9	2-4	"	113	0.795	1.35	<0.050	3.088	<0.050	3.82	2.01	5.83	2.38	0.0077	2.5E-07
GP-11	0-2	"	79	0.0824	0.349	<0.025	0.861	<0.025	1.4	0.591	1.991	0.879	0.0023	5.8E-08
GP-12	2-4	"	53	1.18	1.35	<0.050	3.791	<0.050	3.86	1.46	5.32	1.72	0.0075	2.8E-07
GP-13	2-4	"	128	0.963	2.15	<0.050	4.993	<0.050	6.48	3.19	9.67	3.63	0.0118	3.5E-07
GP-16	2-4	"	35	0.692	3.12	<0.0625	7.612	<0.0625	12.2	4.4	16.6	4.72	0.0164	3.8E-07
GP-17	2-4	"	23	0.102	0.488	<0.025	1.456	<0.025	2.19	1.06	3.25	1.05	0.0033	7.2E-08
SW-1	3	01/19/16	145	2.03	0.888	0.804	3.04	0.501	0.801	5.14	5.941	<0.317	0.0072	3.1E-07
SW-3	3	"	23	0.0384	<0.0322	<0.322	0.1153	<0.0644	0.159	0.239	0.398	<0.322	0.0003	5.4E-09
SW-4	4	01/22/16	199	0.173	0.176	<0.341	0.2981	<0.0682	0.746	0.170	0.916	<0.341	0.0008	2.9E-08

TABLE E-2

RESIDUAL SOIL CONTAMINATION (TANK 27 BASIN)<sup>(1)</sup>

NOTES:

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

No results at or above an applicable NR 720 industrial direct contact RCL.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2017.

Samples analyzed for the petroleum volatile organic compounds and naphthalene.

Sample intervals are in feet below ground surface (ft bgs).

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MTBE = Methyl tert butyl ether.

NS = No standard.

PID = Photo-ionization detector reading (with an 11.7-eV lamp) in parts per million, volume (ppmv).

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above the detection limit, which is the value shown for all substances except xylenes and TMBs (combined).

FOOTNOTES:

(1) All soil samples are characterized as unsaturated because they were collected above the observed low water table in MW-22 (4.28 ft bgs on 9/3/15).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b), Wis. Adm. Code. No results at or above NR 720 threshold.

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TABLE 3

CONTINUING OBLIGATIONS CHECKLIST

Ref. No.	This situation applies to the following property or right of way (ROW)			Site Transfer Situation - Continuing Obligation (database fees will apply, ii-xiv)	Maintenance Plan Required
	Property Type				
	Source Property	Affected Property (Off-Source)	ROW		
i				None of the following situations apply to this site transfer request	NA
ii				Residual groundwater contamination exceeds ch. NR 140 ESs	NA
iii	x			Residual soil contamination exceeds ch. NR 720 RCLs	NA
iv				Monitoring Wells Remain:	
				• Not abandoned (filled and sealed)	NA
	x			• Continued monitoring (requested or required)	Yes <sup>(1)</sup>
v				Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi				Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii	x			Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii	x			Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix			NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x			NA	Vapor: Dewatering system needed for VMS to work effectively	Yes
xi			NA	Vapor: Compounds of concern in use; full vapor assessment could not be completed	NA
xii			NA	Vapor: Commercial/industrial exposure assumptions used	NA
xiii				Vapor: Residual VOCs pose future risk of vapor intrusion	NA
xiv				Site-specific situation (e.g., methane monitoring): discuss with WDNR project manager before submitting for transfer	Site specific

FOOTNOTE:

(1) Continued monitoring of groundwater will be conducted under the facility-wide ERP site (BRRTS# 16-16-559511), which includes the required maintenance plan, etc.

ATTACHMENT F

SUMMARY OF BRRTS# 02-16-580745 CALUMET SUPERIOR LLC – SPILL 04-16-580744  
PROPOSED FOR TRANSFER TO BRRTS# 16-16-559511



## ATTACHMENT F

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

July 3, 2019

Re: Individual Site Summary for Transfer to the Referenced Facility-Wide ERP Site  
RELEASE OR ACTIVITY NAME: Calumet Superior LLC – Spill 04-16-580744  
ORIGINAL BRRTS/SRRTS# (if applicable): 02-16-580745/SERTS ID 20170502NO16-1

### **General Site Information and How and When Site Contamination was Discovered**

A release of approximately 100 gallons of slop oil, in a low-lying area designed to capture storm water and controlled using earthen berms immediately south of the refinery's main wash slab and east of the facility's slop manifold, was reported to the Wisconsin Department of Natural Resources (WDNR) on May 2, 2017. The release occurred during a rain event and was most likely the result of a sump overflow due to a faulty check valve in a discharge line. Additional required site information and attachments are summarized below.

WTM coordinates of the subject activity are X: 361689 m and Y: 692876 m

Pertinent individual site reference documents on file with the Wisconsin Department of Natural Resources (WDNR) include the:

- June 2017 *Immediate Action Report*.
- September 2017 *Immediate Response Action Report*.

SRC contact information:

Matt Turner, (715) 398-8434, [Matthew.Turner@huskyenergy.com](mailto:Matthew.Turner@huskyenergy.com)

Environmental consultant contact information:

Cliff Wright; Gannett Fleming, Inc.; (608) 836-1500 x6722, [cwright@gfnet.com](mailto:cwright@gfnet.com)

Attachments include:

- Engineering Certification provided with the facility-wide ERP database packet submittal
- Figure F-1 Detailed Site Map and Soil Contamination
- Figure F-2 Residual Soil Contamination
- Table F-1 Soil Analytical Results
- Table F-2 Residual Soil Contamination
- Table F-3 Continuing Obligations Checklist

## ATTACHMENT F

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Site Investigation Summary**

Investigation work completed at the site includes soil sampling in June 2017.

### **Description of Any Structural Impediments**

Structural impediments that limited the excavation of impacted soil include the foundations to a pipe rack, out-of-service pump, and stormwater sump vault and junction box.

### **Nature, Degree, and Extent of Soil Contamination**

Investigation results document that the estimated extent of impacted soil was limited to the area shown on Figure F-1, based on visual observations and soil sampling. Compounds of concern are the petroleum volatile organic compounds (PVOCs) and naphthalene. A total of four soil samples were submitted for analysis. Table F-1 includes a summary of the analytical results.

Based on experience, slop oil is black in color, and the May 2017 release occurred in an area of historical petroleum contamination. Consequently, visual observation was the most effective means to determine the extent of slop oil contamination in the field.

### **Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

Lab results confirm that the concentrations of PVOCs/naphthalene in the soil were below generic NR 720 industrial direct contact residual concentration levels (RCLs), as summarized in Tables F-1 and F-2.

### **Vapor Migration Pathway**

The vapor migration pathway was ruled out, as allowed by the WDNR, because a) there are no structures in the earthen bermed area where the release occurred; b) the closest occupied structure is the boiler house approximately 180 feet to the east-southeast; c) there are no underground utilities in the bermed area; d) the bermed area currently is and will continue to be used for petroleum transport via above-grade pipes within the refinery complex; and e) SRC has no plans to construct any other structures or buildings in the bermed area.

### **Remedial Actions Implemented and Residual Contamination Levels**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field

## ATTACHMENT F

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial RCLs.

### **Immediate or Interim Actions Under NR 708, Wis. Adm. Code**

The degree and extent of soil contamination was limited because the 100-gallon release occurred in a topographically low area. Refinery staff were able to vacuum up some of the product and impacted storm water immediately after the release was identified. The recovered product and impacted storm water were placed in the refinery's No. 1 API separator.

Between May 2 and June 15, 2017, a total mass of approximately 6,400 pounds of slop oil-impacted soil was excavated by hand.

### **Active Remedial Actions**

Other than the immediate and interim action(s) described in the previous paragraph, no active remediation was conducted at the site.

### **Nature, Degree, and Extent of Residual Contamination**

Based on the soil sampling conducted and summarized in Table F-2, maximum PVOC/naphthalene concentrations in the upper 4 feet of residual impacted soil include benzene at 2.22 milligrams per kilogram (mg/kg), ethylbenzene at 16.3 mg/kg, xylenes at 17.82 mg/kg, methyl tert butyl ether at 3.22 mg/kg, and naphthalene at 25.43 mg/kg; all from soil sample S3 collected at 0.5 foot below ground surface. The limits of excavation cover an area approximately 28 feet long and up to 25 feet wide, as shown on Figure F-2.

### **Residual Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

See the previous paragraph.

### **Residual Soil Contamination Above the Observed Low Water Table**

Same as above.

### **Description of How Residual Contamination Will be Addressed**

The residual contamination will be addressed by remediation through natural attenuation.

## ATTACHMENT F

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Soil, Groundwater, and Vapor Exposure Pathway Mitigation**

The soil and groundwater exposure pathways were adequately addressed because the immediate/interim action met the direct contact soil clean-up standards, and the existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater. The vapor exposure pathway was ruled out.

### **Continuing Obligations**

SRC will continue to utilize its network of 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) for field verification of the performance standard for the protection of groundwater. See Table F-3 for additional details.

### **Maintenance Plan(s) and Location Map(s)**

The April 2014 final site investigation/remedial action plan for SRC's facility-wide ERP site (BRRTS# 16-16-559511) and March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC provide the maintenance plan(s) and location map(s) detailing SRC's continuing obligation to field verify groundwater quality, per the previous paragraph.

### **Photograph(s) of Structural Impediment(s)**

See Figures F-1 and F-2 for aerial photographs of the pipe rack, etc. and the September 2017 *Immediate Response Action Report* for supplemental photos.

### **Inspection Log(s)**

Not applicable.

### **Documentation of Investigative Waste Disposal**

The investigative waste and excavated soil were temporarily stockpiled at the refinery's on-site soil storage facility and then transported to and properly disposed of at a landfill, as reported to the WDNR previously. No leftover drums with investigative waste remain on site.

ATTACHMENT F

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

**Documentation of Any Remedial Action Construction**

Not applicable.

**Plans for Decommissioning of Remedial Systems**

Not applicable.





**Legend**

- Estimated extent of slop oil release
- Limits of excavation (May - June 2017)

**Notes**

- 1) WDNR BRRTS #02-16-580745 Calumet Superior LLC – Spill 04-16-580744.
- 2) Parcel #01-801-03339-00.



**Detailed Site Map and Soil Contamination**

**SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN**



Gannett Fleming, Inc.  
8040 Excelsior Drive, Suite 503  
Madison, WI 53717-1338  
(608) 836-1900  
www.gannettfleming.com

Project No.	34265.003	Date	06/17/19	Figure	F-1
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**Legend**

- Limits of excavation (May - June 2017)
- ▲ Soil sample location (6/16/17)

**Notes**

- 1) No results  $\geq$  a generic NR 720 industrial direct contact RCL.
- 2) WDNR BRRTS #02-16-580745 Calumet Superior LLC – Spill 04-16-580744.
- 3) Parcel #01-801-03339-00.



Approximate Scale in Feet

**Residual Soil Contamination**

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN



Gannett Fleming, Inc.  
8040 Excelsior Drive, Suite 503  
Madison, WI 53717-1338  
(608) 836-1900  
www.gannettflaming.com

Project No.	34265.003	Date	06/17/19	Figure	F-2
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SUPERIOR REFINING COMPANY LLC  
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TABLE F-1

SOIL ANALYTICAL RESULTS (MAY 2017 SLOP OIL RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values				NR 720 RCL (mg/kg)		
	Sample ID	S1	S2	S3	S4	Soil to Groundwater Pathway	Industrial Direct Contact
	Sample Date	06/16/17	06/16/17	06/16/17	06/16/17		
Saturated/Unsaturated <sup>(1)</sup>	Unsaturated	Unsaturated	Unsaturated	Unsaturated			
Total petroleum hydrocarbons		<0.561	1.10 J	2,160	317	No standard	No standard
Petroleum volatile organic compounds (PVOCs) and naphthalene							
Benzene		0.00507 J	<i>0.00788</i> J	<i>2.22</i>	<i>0.0214</i> J	<i>0.0051</i>	<i>7.07</i>
Ethylbenzene		<0.00464	0.00513 J	<i>16.3</i>	0.0416 J	<i>1.57</i>	<i>35.4</i>
Toluene		<0.00821	<0.00829	<0.158	<0.0319	<i>1.1072</i>	<i>818</i>
Xylenes		0.01377 JU	0.01744 JU	<i>17.82</i>	0.388	<i>3.96</i>	<i>260</i>
Methyl tert butyl ether		<0.00816	0.00898 J	<i>3.22</i>	<0.0317	<i>0.027</i>	<i>282</i>
1,2,4-Trimethylbenzene (TMB)		0.00695 J	0.0221	18.8	0.0212 U	No standard	<i>219</i>
1,3,5-TMB		0.00683 J	0.00518 J	6.63	0.0162 U	No standard	<i>182</i>
TMBs (combined)		0.01378	0.02728	<i>25.43</i>	<0.0374	<i>1.3787</i>	No standard
Naphthalene		<0.0530	<0.0536	<1.02	<0.206	<i>0.6582</i>	<i>24.1</i>
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>							
Cancer Risk (CCR)		7.2E-10	1.3E-09	7.9E-07	4.2E-09	NR 720 threshold = 1E-5	
Hazard Index (HI)		0	0	0.0205	0.0001	NR 720 threshold = 1	

NOTES:

Concentrations in milligrams per kilogram (mg/kg) on a dry weight basis and samples were collected approximately 6 inches below ground surface.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

J = Estimated concentration below laboratory quantification level.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above detection limit, which is the value shown for all PVOCs except xylenes/TMBs (combined).

FOOTNOTES:

(1) Soil sample type based on the observed low water table since Oct 2011 in closest ERP monitoring well MW-1/T67 (1.40 ft bgs on 5/21/18).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels based on detected concentrations. Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

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TABLE F-2

RESIDUAL SOIL CONTAMINATION (MAY 2017 SLOP OIL RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values				NR 720 RCL (mg/kg)		
	Sample ID	S1	S2	S3	S4	Soil to Groundwater Pathway	Industrial Direct Contact
	Sample Date	06/16/17	06/16/17	06/16/17	06/16/17		
Saturated/Unsaturated <sup>(1)</sup>	Unsaturated	Unsaturated	Unsaturated	Unsaturated			
Total petroleum hydrocarbons		<0.561	1.10 J	2,160	317	No standard	No standard
Petroleum volatile organic compounds (PVOCs) and naphthalene							
Benzene		0.00507 J	<i>0.00788</i> J	<i>2.22</i>	<i>0.0214</i> J	<i>0.0051</i>	<i>7.07</i>
Ethylbenzene		<0.00464	0.00513 J	<i>16.3</i>	0.0416 J	<i>1.57</i>	<i>35.4</i>
Toluene		<0.00821	<0.00829	<0.158	<0.0319	<i>1.1072</i>	<i>818</i>
Xylenes		0.01377 JU	0.01744 JU	<i>17.82</i>	0.388	<i>3.96</i>	<i>260</i>
Methyl tert butyl ether		<0.00816	0.00898 J	<i>3.22</i>	<0.0317	<i>0.027</i>	<i>282</i>
1,2,4-Trimethylbenzene (TMB)		0.00695 J	0.0221	18.8	0.0212 U	No standard	<i>219</i>
1,3,5-TMB		0.00683 J	0.00518 J	6.63	0.0162 U	No standard	<i>182</i>
TMBs (combined)		0.01378	0.02728	<i>25.43</i>	<0.0374	<i>1.3787</i>	No standard
Naphthalene		<0.0530	<0.0536	<1.02	<0.206	<i>0.6582</i>	<i>24.1</i>
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>							
Cancer Risk (CCR)		7.2E-10	1.3E-09	7.9E-07	4.2E-09	NR 720 threshold = 1E-5	
Hazard Index (HI)		0	0	0.0205	0.0001	NR 720 threshold = 1	

NOTES:

Concentrations in milligrams per kilogram (mg/kg) on a dry weight basis and samples were collected approximately 6 inches below ground surface.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

J = Estimated concentration below laboratory quantification level.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above detection limit, which is the value shown for all PVOCs except xylenes/TMBs (combined).

FOOTNOTES:

(1) Soil sample type based on the observed low water table since Oct 2011 in closest ERP monitoring well MW-1/T67 (1.40 ft bgs on 5/21/18).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels based on detected concentrations. Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

SUPERIOR REFINING COMPANY LLC  
 SUPERIOR, WISCONSIN

TABLE 3

CONTINUING OBLIGATIONS CHECKLIST

Ref. No.	This situation applies to the following property or right of way (ROW)			Site Transfer Situation - Continuing Obligation (database fees will apply, ii-xiv)	Maintenance Plan Required
	Property Type				
	Source Property	Affected Property (Off-Source)	ROW		
i				None of the following situations apply to this site transfer request	NA
ii				Residual groundwater contamination exceeds ch. NR 140 ESs	NA
iii	x			Residual soil contamination exceeds ch. NR 720 RCLs	NA
iv				Monitoring Wells Remain:	
	x			<ul style="list-style-type: none"> <li>Not abandoned (filled and sealed)</li> <li>Continued monitoring (requested or required)</li> </ul>	NA Yes <sup>(1)</sup>
v				Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi				Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii	x			Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii	x			Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix			NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x			NA	Vapor: Dewatering system needed for VMS to work effectively	Yes
xi			NA	Vapor: Compounds of concern in use; full vapor assessment could not be completed	NA
xii			NA	Vapor: Commercial/industrial exposure assumptions used	NA
xiii				Vapor: Residual VOCs pose future risk of vapor intrusion	NA
xiv				Site-specific situation (e.g., methane monitoring): discuss with WDNR project manager before submitting for transfer	Site specific

FOOTNOTE:

(1) Continued monitoring of groundwater will be conducted under the facility-wide ERP site (BRRTS# 16-16-559511), which includes the required maintenance plan, etc.



**ATTACHMENT G**

**SUMMARY OF BRRTS# 02-16-580790 CALUMET SUPERIOR LLC – SPILL 04-16-580792**  
**PROPOSED FOR TRANSFER TO BRRTS# 16-16-559511**

## ATTACHMENT G

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

July 3, 2019

Re: Individual Site Summary for Transfer to the Referenced Facility-Wide ERP Site  
RELEASE OR ACTIVITY NAME: Calumet Superior LLC – Spill 04-16-580792  
ORIGINAL BRRTS/SRRTS# (if applicable): 02-16-580790/SERTS ID 20170220NO16-1

### **General Site Information and How and When Site Contamination was Discovered**

A release of approximately 400 gallons of #6 fuel oil east of Tank 116 within its earthen containment dike (i.e., berm) was reported to the Wisconsin Department of Natural Resources (WDNR) on February 20, 2017. The release was the result of a leak from an insulated pipe as identified by refinery staff. Additional required site information and attachments are summarized below.

WTM coordinates of the subject activity are X: 361772 m and Y: 692906 m

Pertinent individual site reference documents on file with the Wisconsin Department of Natural Resources (WDNR) include the:

- October 2017 *Immediate Response Action Report*.

SRC contact information:

Matt Turner, (715) 398-8434, [Matthew.Turner@huskyenergy.com](mailto:Matthew.Turner@huskyenergy.com)

Environmental consultant contact information:

Cliff Wright; Gannett Fleming, Inc.; (608) 836-1500 x6722, [cwright@gfnet.com](mailto:cwright@gfnet.com)

Attachments include:

- Engineering Certification provided with the facility-wide ERP database packet submittal
- Figure G-1 Detailed Site Map and Soil Contamination
- Figure G-2 Residual Soil Contamination
- Table G-1 Soil Analytical Results
- Table G-2 Residual Soil Contamination
- Table G-3 Continuing Obligations Checklist

### **Site Investigation Summary**

Investigation work completed at the site includes soil sampling in July and September 2017.

## ATTACHMENT G

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Description of Any Structural Impediments**

Structural impediments that limited the excavation of impacted soil include the foundations to a network of pipe racks and electrical conduit.

### **Nature, Degree, and Extent of Soil Contamination**

Investigation results document that the estimated extent of impacted soil was limited to the area shown on Figure G-1 based on visual observations and soil sampling. Compounds of concern are the petroleum volatile organic compounds (PVOCs) and naphthalene. A total of seven soil samples were submitted for analysis. Table G-1 includes a summary of the analytical results.

Based on experience, #6 fuel oil is black in color, and the February 2017 release occurred in an area of historical petroleum contamination. Consequently, visual observation was the most effective means to determine the extent of fuel oil contamination in the field.

### **Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

Lab results confirm that the concentrations of PVOCs/naphthalene in the soil were below generic NR 720 industrial direct contact residual concentration levels (RCLs), as summarized in Tables G-1 and G-2.

### **Vapor Migration Pathway**

The vapor migration pathway was ruled out, as allowed by the WDNR, because a) there are no structures in the earthen bermed area where the release occurred; b) the closest occupied structure is a maintenance shed in the fuel loading area approximately 75 feet to the south; c) there are no underground utilities in the bermed area, although above-grade pipes do penetrate clay berms in several locations; d) the bermed area currently is and will continue to be used for petroleum transport via primarily above-grade pipes within the refinery complex; and e) SRC has no plans to construct any other structures or buildings in the bermed area.

### **Remedial Actions Implemented and Residual Contamination Levels**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field

## ATTACHMENT G

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial RCLs.

### **Immediate or Interim Actions Under NR 708, Wis. Adm. Code**

The degree and extent of soil contamination was limited because the 400-gallon release occurred in a topographically low area. Refinery staff were able to vacuum up some of the product immediately after the release was identified and during the clean-up process as impacted storm water accumulated in the excavation dug to remove impacted soil. The recovered product and impacted storm water were placed in the refinery's No. 1 API separator.

Between February 20 and September 14, 2017, a total volume of approximately 46 cubic yards of fuel oil-impacted soil was excavated.

### **Active Remedial Actions**

Other than the immediate and interim action(s) described in the previous paragraph, no active remediation was conducted at the site.

### **Nature, Degree, and Extent of Residual Contamination**

Based on the soil sampling conducted and summarized in Table G-2, maximum PVOC/naphthalene concentrations in the upper 4 feet of residual impacted soil include methyl tert butyl ether at 0.0534 milligrams per kilogram (mg/kg) in S2 at 0.5 foot below ground surface (ft bgs) and naphthalene at 0.493 mg/kg in S4 at 0.5 ft bgs. The limits of excavation (performed between February 20 and September 14, 2017, to remove all contaminated material impacted by the 400-gallon release of #6 fuel oil reported to the WDNR on February 20, 2017) cover an area approximately 70 feet long and up to 40 feet wide, as shown on Figure G-2.

### **Residual Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

See the previous paragraph.

### **Residual Soil Contamination Above the Observed Low Water Table**

Same as above.



## ATTACHMENT G

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Description of How Residual Contamination Will be Addressed**

The residual contamination will be addressed by remediation through natural attenuation.

### **Soil, Groundwater, and Vapor Exposure Pathway Mitigation**

The soil and groundwater exposure pathways were adequately addressed because the immediate/interim action met the direct contact soil clean-up standards, and the existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater. The vapor exposure pathway was ruled out.

### **Continuing Obligations**

SRC will continue to utilize its network of 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) for field verification of the performance standard for the protection of groundwater. See Table G-3 for additional details.

### **Maintenance Plan(s) and Location Map(s)**

The April 2014 final site investigation/remedial action plan for SRC's facility-wide ERP site (BRRTS# 16-16-559511) and March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC provide the maintenance plan(s) and location map(s) detailing SRC's continuing obligation to field verify groundwater quality, per the previous paragraph.

### **Photograph(s) of Structural Impediment(s)**

See Figures G-1 and G-2 for aerial photographs of the pipe rack network, etc. and the October 2017 *Immediate Response Action Report* for supplemental photos.

### **Inspection Log(s)**

Not applicable.

## ATTACHMENT G

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Documentation of Investigative Waste Disposal**

The investigative waste and excavated soil were temporarily stockpiled at the refinery's on-site soil storage facility and then transported to and properly disposed of at a landfill, as reported to the WDNR previously. No leftover drums with investigative waste remain on site.

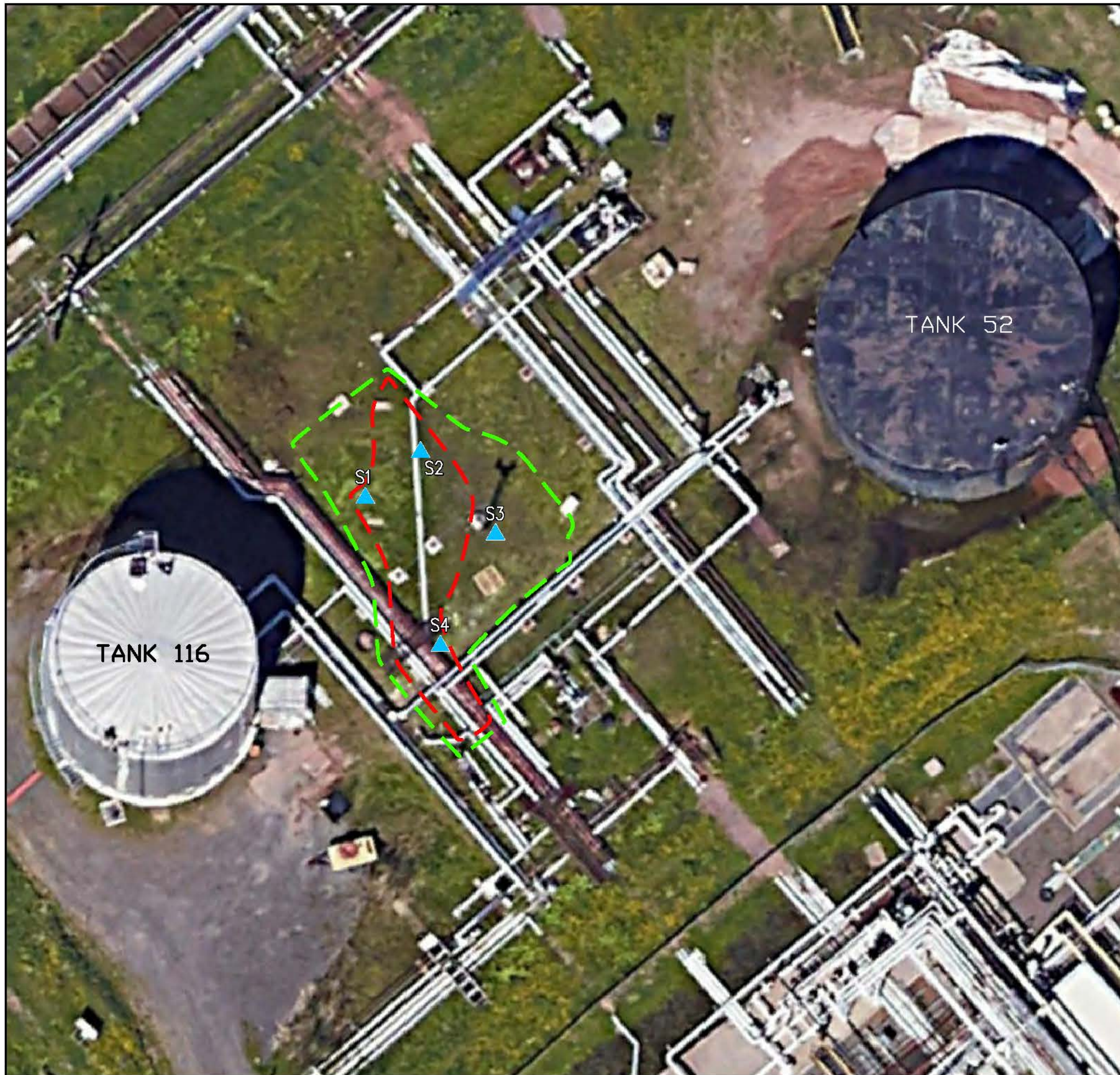
### **Documentation of Any Remedial Action Construction**

Not applicable.

### **Plans for Decommissioning of Remedial Systems**

Not applicable.



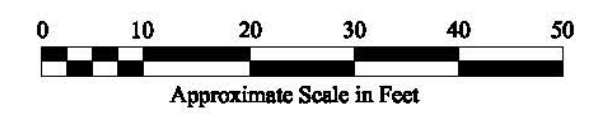


**Legend**

- Estimated extent of #6 fuel oil release
- Limits of excavation (Feb. - July 2017)
- ▲ Soil Sample Location (7/26/17)

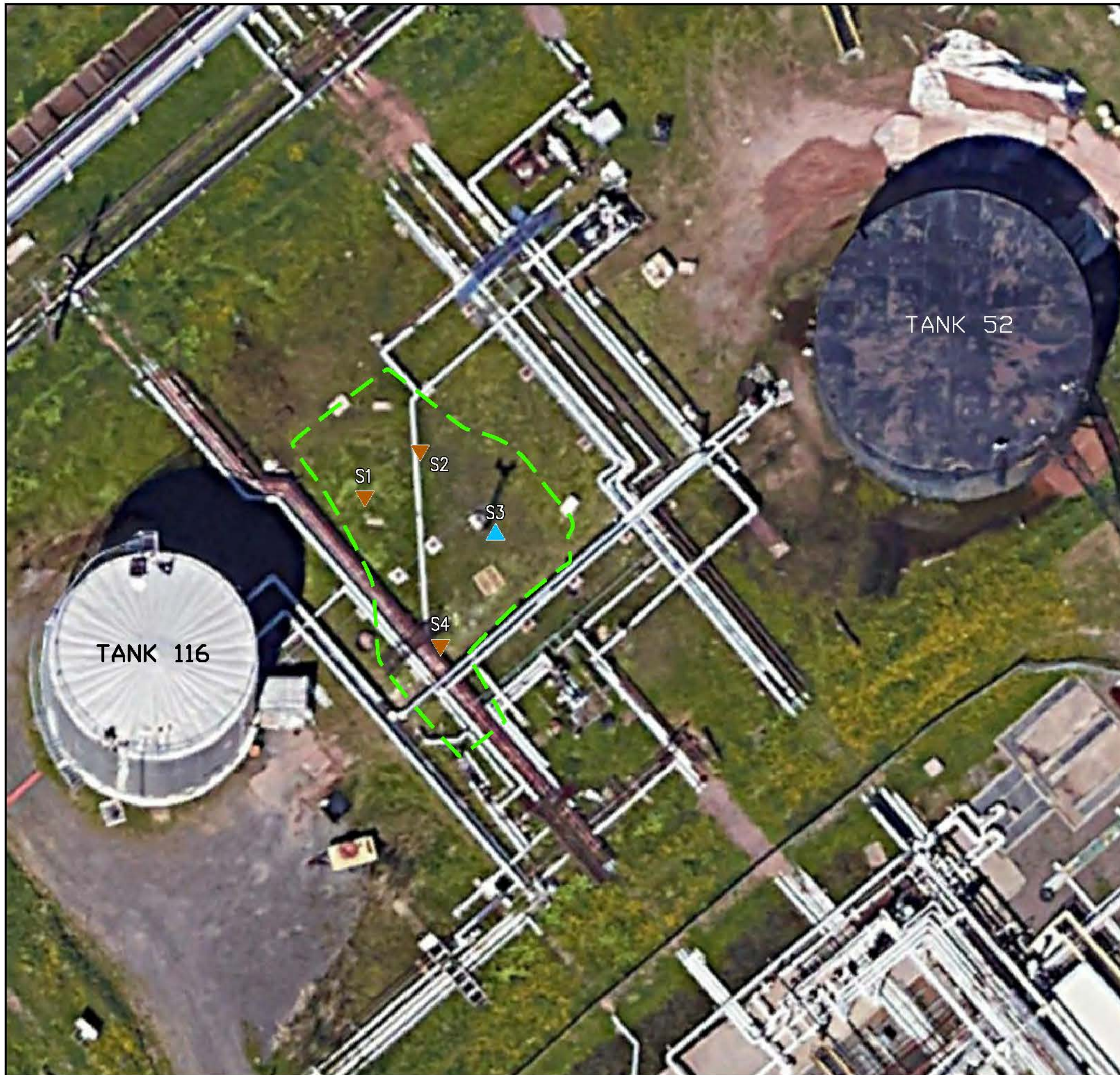
**Notes**

- 1) No results  $\geq$  a generic NR 720 industrial direct contact RCL.
- 2) WDNR BRRTS #02-16-580790 Calumet Superior LLC – Spill 04-16-580792.
- 3) Parcel #01-801-03339-00.



<b>Detailed Site Map and Soil Contamination</b>			
SUPERIOR REFINING COMPANY LLC SUPERIOR, WISCONSIN			
<b>Gannett Fleming</b>		Gannett Fleming, Inc. 8040 Excelsior Drive, Suite 303 Madison WI 53717-1338 (608) 836-1500 www.gannettfleming.com	
Project No.	34265.003	Date	06/19/19
		Figure	G-1



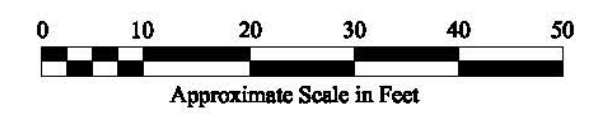


**Legend**

- Limits of excavation (Feb. - Sept. 2017)
- ▲ Soil Sample Location (7/26/17)
- ▼ Soil Sample Location (9/14/17)

**Notes**

- 1) No results  $\geq$  a generic NR 720 industrial direct contact RCL.
- 2) WDNR BRRTS #02-16-580790 Calumet Superior LLC – Spill 04-16-580792.
- 3) Parcel #01-801-03339-00.



**Residual Soil Contamination**

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN



Gannett Fleming, Inc.  
8040 Excelsior Drive, Suite 303  
Madison WI 53717-1338  
(608) 836-1500  
www.gannettfleming.com

Project No.	34265.003	Date	06/19/19	Figure	G-2
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SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE G-1

SOIL ANALYTICAL RESULTS (TANK 116 FEBRUARY 2017 RELEASE OF #6 FUEL OIL)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values							NR 720 RCL (mg/kg)		
	Sample ID	S1 <sup>(1)</sup>		S2 <sup>(1)</sup>		S3	S4 <sup>(1)</sup>		Soil to Groundwater Pathway	Industrial Direct Contact
	Sample Date	07/26/17	09/14/17	07/26/17	09/14/17	07/26/17	07/26/17	09/14/17		
	Saturated/Unsaturated <sup>(2)</sup>	Unsaturated	Unsaturated	Unsaturated	Unsaturated	Unsaturated	Unsaturated	Unsaturated		
Total petroleum hydrocarbons		<0.578	40.6	13.5	2.74	5.87	26.3	28.1	No standard	No standard
Petroleum volatile organic compounds (PVOCs) and naphthalene										
Benzene		<i>0.00602</i> J	<0.00449	<i>0.00665</i> J	<0.00449	<0.00458	<i>0.00499</i> J	<0.00453	<i>0.0051</i>	<i>7.07</i>
Ethylbenzene		<0.00478	<0.00464	<0.00491	0.00648 J	<0.00473	<0.00510	<0.00469	<i>1.57</i>	<i>35.4</i>
Toluene		<0.00845	<0.00821	<0.00869	<0.00821	<0.00837	<0.00902	<0.00829	<i>1.1072</i>	<i>818</i>
Xylenes		0.01736 J	0.04310 J	0.01950 J	0.01740 JU	<0.01300	0.02710 J	0.01853 JU	<i>3.96</i>	<i>260</i>
Methyl tert butyl ether		<0.00840	<i>0.0423</i>	<0.00864	<i>0.0534</i>	<0.00832	<0.00896	<i>0.0354</i>	<i>0.027</i>	<i>282</i>
1,2,4-Trimethylbenzene (TMB)		0.00778 BJ	0.0328	0.0216 B	0.00546 U	0.0145 BJ	0.0534 B	0.00551 U	No standard	<i>219</i>
1,3,5-TMB		0.00430 U	0.00418 U	0.00443 U	0.00418 U	0.00426 U	0.00459 U	0.00422 U	No standard	<i>182</i>
TMBs (combined)		0.01208	0.03698	0.02603	0.00964 U	0.01876	0.05799	0.00973 U	<i>1.3787</i>	No standard
Naphthalene		<0.0546	0.381 J6	0.175 J	<0.0530	0.0915 J	<i>0.661</i>	0.493	<i>0.6582</i>	<i>24.1</i>
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(3)</sup>										
Cancer Risk (CCR)		8.5E-10	1.6E-08	8.2E-09	3.7E-10	3.8E-09	2.8E-08	2.1E-08	NR 720 threshold = 1E-5	
Hazard Index (HI)		0	0.0005	0.0002	0	0.0001	0.0008	0.0006	NR 720 threshold = 1	

**NOTES:**

Concentrations are in milligrams per kilogram (mg/kg) on a dry weight basis. No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

B = The same analyte was found in the associated blank.

J = Estimated concentration below laboratory quantification level.

J6 = The sample matrix interfered with the ability to make any accurate determination, and the spike value was low.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above detection limit, which is the value shown for all PVOCs except xylenes/TMBs (combined).

**FOOTNOTES:**

(1) Confirmation soil sample pair collected ~6 inches below ground surface in the same map location but on different dates following staged excavation (see Figures 1 and 2).

(2) Soil sample type based on the observed low water table since February 2017 in closest ERP monitoring well MW-2/T66 2.32 ft bgs on 5/21/18).

(3) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE G-2

RESIDUAL SOIL CONTAMINATION (TANK 116 FEBRUARY 2017 RELEASE OF #6 FUEL OIL)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values				NR 720 RCL (mg/kg)		
	Sample ID	S1	S2	S3	S4	Soil to Groundwater Pathway	Industrial Direct Contact
	Sample Date	09/14/17	09/14/17	07/26/17	09/14/17		
Saturated/Unsaturated <sup>(1)</sup>	Unsaturated	Unsaturated	Unsaturated	Unsaturated			
Total petroleum hydrocarbons		40.6	2.74	5.87	28.1	No standard	No standard
Petroleum volatile organic compounds (PVOCs) and naphthalene							
Benzene		<0.00449	<0.00449	<0.00458	<0.00453	<i>0.0051</i>	<b>7.07</b>
Ethylbenzene		<0.00464	0.00648 J	<0.00473	<0.00469	<i>1.57</i>	<b>35.4</b>
Toluene		<0.00821	<0.00821	<0.00837	<0.00829	<i>1.1072</i>	<b>818</b>
Xylenes		0.04310 J	0.01740 JU	<0.01300	0.01853 JU	<i>3.96</i>	<b>260</b>
Methyl tert butyl ether		<i>0.0423</i>	<i>0.0534</i>	<0.00832	<i>0.0354</i>	<i>0.027</i>	<b>282</b>
1,2,4-Trimethylbenzene (TMB)		0.0328	0.00546 U	0.0145 BJ	0.00551 U	No standard	<b>219</b>
1,3,5-TMB		0.00418 U	0.00418 U	0.00426 U	0.00422 U	No standard	<b>182</b>
TMBs (combined)		0.03698	0.00964 U	0.01876	0.00973 U	<i>1.3787</i>	No standard
Naphthalene		0.381 J6	<0.0530	0.0915 J	0.493	<i>0.6582</i>	<b>24.1</b>
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>							
Cancer Risk (CCR)		1.6E-08	3.7E-10	3.8E-09	2.1E-08	NR 720 threshold = 1E-5	
Hazard Index (HI)		0.0005	0	0.0001	0.0006	NR 720 threshold = 1	

NOTES:

Concentrations are in milligrams per kilogram (mg/kg) on a dry weight basis.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

B = The same analyte was found in the associated blank.

J = Estimated concentration below laboratory quantification level.

J6 = The sample matrix interfered with the ability to make any accurate determination, and the spike value was low.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

U = Compound not detected at or above detection limit, which is the value shown for all PVOCs except xylenes/TMBs (combined).

FOOTNOTES:

(1) Soil sample type based on the observed low water table since February 2017 in closest ERP monitoring well MW-2/T66 2.32 ft bgs on 5/21/18).

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels based on detected concentrations. Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN

TABLE 3

CONTINUING OBLIGATIONS CHECKLIST

Ref. No.	This situation applies to the following property or right of way (ROW)			Site Transfer Situation - Continuing Obligation (database fees will apply, ii-xiv)	Maintenance Plan Required
	Property Type				
	Source Property	Affected Property (Off-Source)	ROW		
i				None of the following situations apply to this site transfer request	NA
ii				Residual groundwater contamination exceeds ch. NR 140 ESs	NA
iii	x			Residual soil contamination exceeds ch. NR 720 RCLs	NA
iv				Monitoring Wells Remain:	
				• Not abandoned (filled and sealed)	NA
	x			• Continued monitoring (requested or required)	Yes <sup>(1)</sup>
v				Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi				Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii	x			Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii	x			Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix			NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x			NA	Vapor: Dewatering system needed for VMS to work effectively	Yes
xi			NA	Vapor: Compounds of concern in use; full vapor assessment could not be completed	NA
xii			NA	Vapor: Commercial/industrial exposure assumptions used	NA
xiii				Vapor: Residual VOCs pose future risk of vapor intrusion	NA
xiv				Site-specific situation (e.g., methane monitoring): discuss with WDNR project manager before submitting for transfer	Site specific

FOOTNOTE:

(1) Continued monitoring of groundwater will be conducted under the facility-wide ERP site (BRRTS# 16-16-559511), which includes the required maintenance plan, etc.

**ATTACHMENT H**

**SUMMARY OF BRRTS# 02-16-580801 CALUMET SUPERIOR LLC – SPILL 04-16-580804**  
**PROPOSED FOR TRANSFER TO BRRTS# 16-16-559511**



## ATTACHMENT H

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

July 3, 2019

Re: Individual Site Summary for Transfer to the Referenced Facility-Wide ERP Site  
RELEASE OR ACTIVITY NAME: Superior Refinery – Spill 04-16-583035  
ORIGINAL BRRTS/SRRTS# (if applicable): 02-16-583029/SERTS ID 20180227NO16-1

### **General Site Information and How and When Site Contamination was Discovered**

During routine inspections, refinery staff observed ponding of product on ice/frozen ground southeast of Tank 30 but within its earthen containment dike (i.e., berm) on February 27, 2018, and promptly reported the release to the Wisconsin Department of Natural Resources (WDNR). Estimates indicate approximately 475 gallons of naphtha were released from aboveground piping located about 20 feet southeast of Tank 30 due to a gasket seal failure in the bonnet of a gate valve caused by freeze/thaw action. Additional required site information and attachments are summarized below.

WTM coordinates of the subject activity are X: 361513 m and Y: 693123 m

Pertinent individual site reference documents on file with the Wisconsin Department of Natural Resources (WDNR) include the:

- January 2019 *Immediate Response Action Report*.
- April 2019 *Tank 30 Basin Water Analytical Results* report.

SRC contact information:

Matt Turner, (715) 398-8434, [Matthew.Turner@huskyenergy.com](mailto:Matthew.Turner@huskyenergy.com)

Environmental consultant contact information:

Cliff Wright; Gannett Fleming, Inc.; (608) 836-1500 x6722, [cwright@gfnet.com](mailto:cwright@gfnet.com)

Attachments include:

Engineering Certification provided with the facility-wide ERP database packet submittal

- Figure H-1 Detailed Site Map and Soil Contamination
- Figure H-2 Residual Soil Contamination
- Table H-1 Soil Analytical Results
- Table H-2 Residual Soil Contamination
- Table H-3 Continuing Obligations Checklist

## ATTACHMENT H

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Site Investigation Summary**

Investigation work completed at the site includes surface water sampling in March, August, and October 2018 and soil sampling in November and December 2018. Results from the surface water samples collected in 2018 document the improvement in Tank 30 basin water quality over time. Given the documented improvement in water quality, the WDNR agreed that SRC could submit this request to transfer BRRTS# 02-16-583029 to BRRTS# 16-16-559511 based on the BRRTS# 02-16-583029 site soil data. See the April 2019 *Tank 30 Basin Water Analytical Results* report for additional details.

### **Description of Any Structural Impediments**

Not applicable.

### **Nature, Degree, and Extent of Soil Contamination**

Investigation results document that the estimated extent of impacted soil was limited to the area shown on Figure H-1 based on visual observations and soil sampling. Compounds of concern are the petroleum volatile organic compounds (PVOCs) and naphthalene. A total of five soil samples were submitted for analysis. Table H-1 includes a summary of the analytical results.

### **Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

Lab results confirm that the concentrations of PVOCs/naphthalene in the soil were below generic NR 720 industrial direct contact residual concentration levels (RCLs), except the benzene concentration of 13.0 milligrams per kilogram (mg/kg) in S3 at 0.5 foot below ground surface (ft bgs) was above its NR 720 industrial direct contact RCL of 7.07 mg/kg, as summarized in Table H-1. On December 6, 2018, approximately one cubic yard of impacted soil was excavated to address the elevated benzene at S3 and S5 was collected at 1.0 ft bgs to confirm removal.

### **Vapor Migration Pathway**

The vapor migration pathway was ruled out, as allowed by the WDNR, because a) Tanks 29 and 30 are the only structures in the basin, b) the closest occupied buildings are field office trailers approximately 850 feet to the southwest, c) there are no underground utilities in the

## ATTACHMENT H

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

basin, d) the basin currently is and will continue to be a petroleum storage area, and e) SRC has no plans to construct any other structures or buildings in the basin.

### **Remedial Actions Implemented and Residual Contamination Levels**

The existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater, and SRC will continue to utilize its monitoring network for field verification of the performance standard. Soil clean-up standards for direct contact are based on the generic NR 720 industrial RCLs.

### **Immediate or Interim Actions Under NR 708, Wis. Adm. Code**

The degree and extent of soil contamination was limited because the release occurred in February on ice/frozen ground, which caused the product to pond on the surface in a topographically low area and allowed field personnel time to vacuum up most of the product immediately after the release occurred. Residual soil contamination extended from the source location to the contiguous low area in the southeast corner of the tank basin where naphtha-impacted melt water in the spring and stormwater in the summer and fall accumulated prior to being removed using vacuum trucks between February 27 and October 10, 2018. The fluids collected by the trucks were routed to the refinery's No. 1 API separator for recovery of any free product and then the remainder of the fluid was directed to the refinery's wastewater treatment plant. The normal discharge of stormwater resumed on October 11, 2018, as approved by the WDNR.

### **Active Remedial Actions**

Other than the immediate and interim action(s) described in the previous paragraph, no active remediation was conducted at the site.

### **Nature, Degree, and Extent of Residual Contamination**

Based on the soil sampling conducted and summarized in Table H-2, maximum PVOC/naphthalene concentrations in the upper 4 feet of residual impacted soil include benzene at 3.80 mg/kg in S2 at 0.5 ft bgs; toluene and xylenes at 12.5 and 17.87 mg/kg, respectively, in S5 at 1.0 ft bgs; and the trimethylbenzenes (TMBs, combined) at 12.24 mg/kg in S1 at 0.5 ft bgs. The estimated extent of residual contamination is limited to an irregularly shaped area approximately 140 feet long and up to 50 feet wide, as shown on Figure H-2.

## ATTACHMENT H

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Residual Soil Contamination Within Four Feet of Ground Surface (Direct Contact Zone)**

See the previous paragraph.

### **Residual Soil Contamination Above the Observed Low Water Table**

Same as above.

### **Description of How Residual Contamination Will be Addressed**

The residual contamination will be addressed by remediation through natural attenuation.

### **Soil, Groundwater, and Vapor Exposure Pathway Mitigation**

The soil and groundwater exposure pathways were adequately addressed because the immediate/interim action met the direct contact soil clean-up standards, and the existing hydrogeology is being used as the interim action soil performance standard for the protection of groundwater. The vapor exposure pathway was ruled out.

### **Continuing Obligations**

SRC will continue to utilize its network of 23 monitoring wells (MW-1, MW-1/T67, MW-2, MW-2/T66, MW-3/T50, MW-3D, MW-5/T40, MW-5/T70, MW-7, MW-8R, MW-9B, and MW-11 through MW-22) and 8 piezometers (PZ-2/T66, PZ-3D, PZ-8R, PZ-11, PZ-13, PZ-16, PZ17, and PZ-21) for field verification of the performance standard for the protection of groundwater. See Table H-3 for additional details.

### **Maintenance Plan(s) and Location Map(s)**

The April 2014 final site investigation/remedial action plan for SRC's facility-wide ERP site (BRRTS# 16-16-559511) and March 2018 Negotiated Agreement (effective April 4, 2018) between the WDNR and SRC provide the maintenance plan(s) and location map(s) detailing SRC's continuing obligation to field verify groundwater quality, per the previous paragraph.

### **Photograph(s) of Structural Impediment(s)**

Not applicable.



## ATTACHMENT H

Superior Refining Company LLC (SRC) Refinery, Superior, Wisconsin  
WDNR Facility-Wide BRRTS# 16-16-559511 and Facility ID: 816009590

### **Inspection Log(s)**

Not applicable.

### **Documentation of Investigative Waste Disposal**

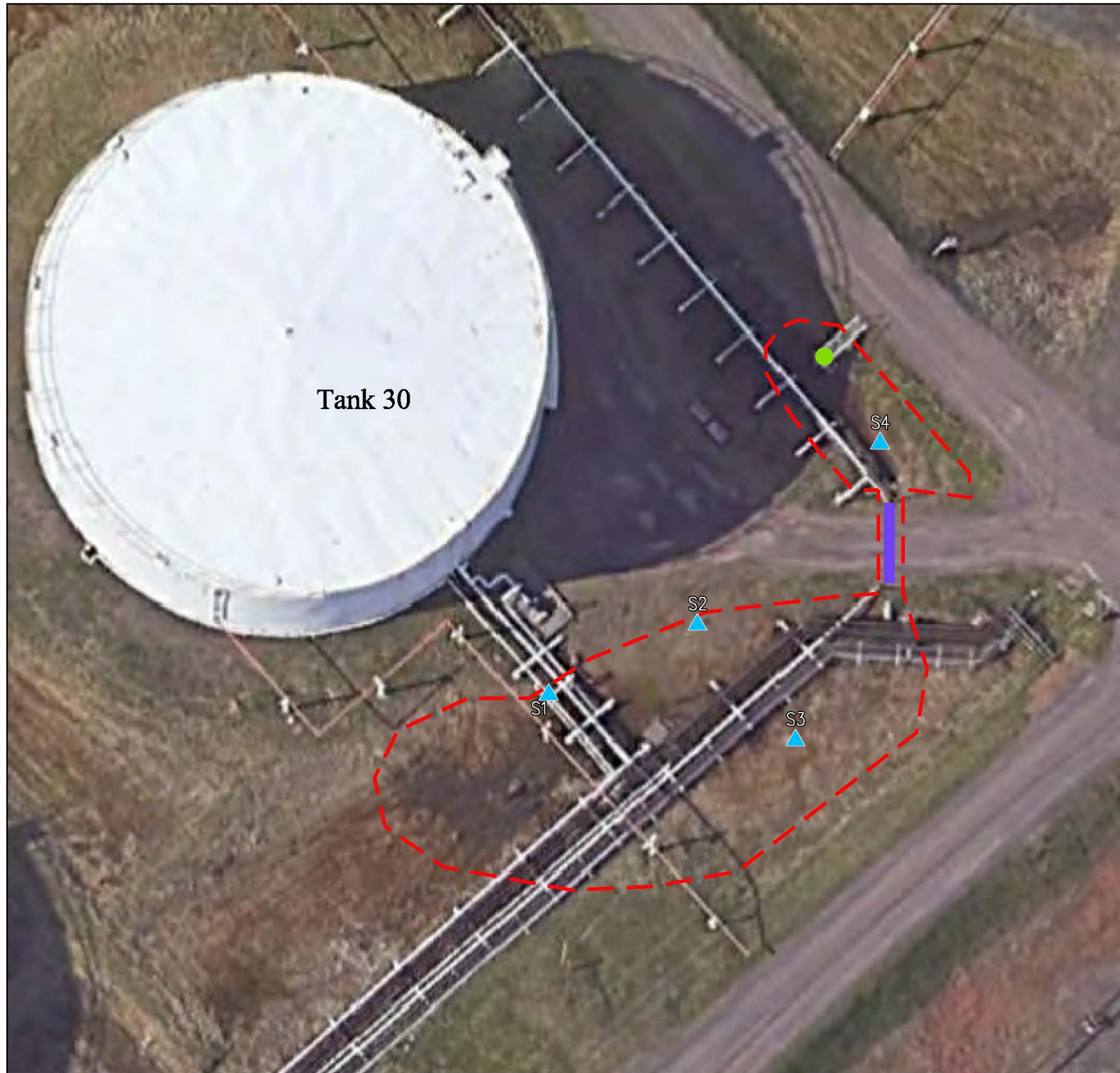
The investigative waste and excavated soil were temporarily stockpiled at the refinery's on-site soil storage facility and then transported to and properly disposed of at a landfill, as reported to the WDNR previously. No leftover drums with investigative waste remain on site.

### **Documentation of Any Remedial Action Construction**

Not applicable.

### **Plans for Decommissioning of Remedial Systems**

Not applicable.

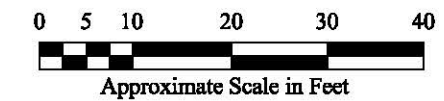


**Legend**

- - Estimated extent of February 2018 naphtha release removed by hand excavation and vacuum truck operations
- ▲ Soil sample location (11/8/18)
- Culvert
- Dike drain valve

**Notes:**

- 1) WDNR BRRTS #02-16-583029 Superior Refining – Spill 04-16-583035.
- 2) Parcel #01-801-03339-00.



**Detailed Site Map and Soil Contamination**

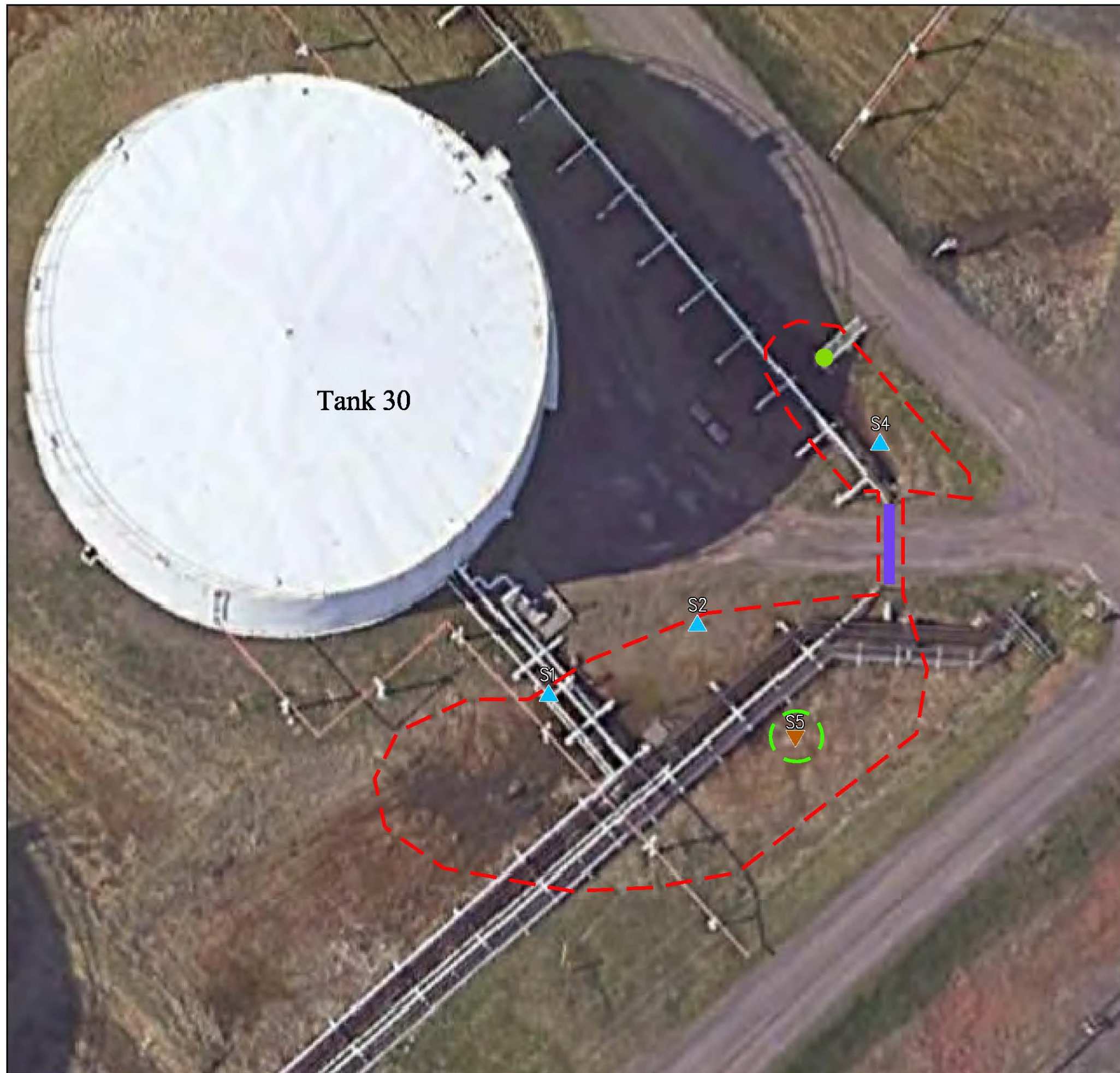
SUPERIOR REFINING COMPANY LLC  
SUPERIOR, WISCONSIN



Gannett Fleming, Inc.  
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Madison WI 53717-1338  
(608) 836-1500  
www.gannettfleming.com

Project No.	34265.003	Date	06/19/19	Figure	H-1
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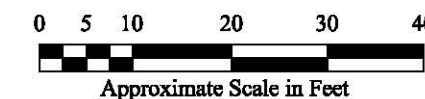


**Legend**

- - Estimated extent of February 2018 naphtha release
- - Limits of excavation (Dec 2018)
- ▲ Soil sample location (11/8/18)
- ▼ Soil sample location (12/6/18)
- █ Culvert
- Dike drain valve

**Notes:**

- 1) No results  $\geq$  a generic NR 720 industrial direct contact RCL.
- 2) WDNR BRRS #02-16-583029 Superior Refining – Spill 04-16-583035.
- 3) Parcel #01-801-03339-00.



**Residual Soil Contamination**

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Project No.	34265.003	Date	06/19/19	Figure	H-2
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TABLE H-1

SOIL ANALYTICAL RESULTS (TANK 30 BASIN, FEBRUARY 2018 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values					NR 720 RCL (mg/kg)		
	Sample ID	S1	S2	S3	S4	S5	Soil to Groundwater Pathway	Industrial Direct Contact
Sample Date	11/08/18	11/08/18	11/08/18	11/08/18	11/08/18	12/06/18		
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.		
Excavated and landfilled <sup>(2)</sup>	No	No	Yes	No	No	No		
Total petroleum hydrocarbons	175	261	341	168	383		NS	NS
Petroleum volatile organic compounds (PVOCs) and naphthalene								
Benzene	0.568	3.80	13.0	1.86	3.09		0.0051	7.07
Toluene	0.513	11.0	32.4	4.47	12.5		1.1072	818
Ethylbenzene	0.803	2.40	16.2	1.05	2.88		1.57	35.4
Xylenes	6.64	14.74	78.9	8.01	17.87		3.96	260
Methyl tert butyl ether	0.369	<0.0320	<0.0202	<0.0160	0.0961		0.027	282
1,2,4-TMB	8.44 J6	4.80	27.5	3.20	6.13 J5		NS	219
1,3,5-TMB	3.80 J3 J6	1.82	12.2	1.33	2.40		NS	182
TMBs (combined)	12.24	6.62	39.7	4.53	8.53		1.3787	NS
Naphthalene	0.329 J J6	<0.208	0.134 J	<0.104	<0.0697 J3 J5		0.6582	24.1
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(3)</sup>								
Cancer Risk (CCR)	1.2E-07	6.1E-07	2.3E-06	2.9E-07	5.2E-07		NR 720 threshold = 1E-5	
Hazard Index (HI)	0.0086	0.0138	0.063	0.0075	0.0143		NR 720 threshold = 1	

**NOTES:**

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

Detected concentrations at or above an applicable NR 720 industrial direct contact RCL are in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

J3 = The associated batch QC was outside the established quality control range for precision.

J5 = The sample matrix interfered with the ability to make any accurate determination; spike value is high.

J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.

NS = No standard.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

**FOOTNOTES:**

(1) Soil sample type (unsat. = unsaturated) based on observed conditions when the sample was collected by hand.

(2) Excavated & Landfilled row indicates the one sample location that was excavated and disposed of at a local landfill.

(3) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.



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TABLE H-2

RESIDUAL SOIL CONTAMINATION (TANK 30 BASIN, FEBRUARY 2018 RELEASE)

Group/Substance/CCR-HI	Concentration (mg/kg) except for CCR and HI values				NR 720 RCL (mg/kg)		
	Sample ID	S1	S2	S4	S5	Soil to Groundwater Pathway	Industrial Direct Contact
Sample Date	11/08/18	11/08/18	11/08/18	11/08/18	12/06/18		
Sample Depth (ft bgs)	0.5	0.5	0.5	0.5	1.0		
Saturated/Unsaturated <sup>(1)</sup>	Unsat.	Unsat.	Unsat.	Unsat.	Unsat.		
Total petroleum hydrocarbons	175	261	168	168	383	NS	NS
Petroleum volatile organic compounds (PVOCs) and naphthalene							
Benzene	<i>0.568</i>	<i>3.80</i>	<i>1.86</i>	<i>1.86</i>	<i>3.09</i>	<i>0.0051</i>	<i>7.07</i>
Toluene	0.513	<i>11.0</i>	<i>4.47</i>	<i>4.47</i>	<i>12.5</i>	<i>1.1072</i>	<i>818</i>
Ethylbenzene	0.803	<i>2.40</i>	<i>1.05</i>	<i>1.05</i>	<i>2.88</i>	<i>1.57</i>	<i>35.4</i>
Xylenes	<i>6.64</i>	<i>14.74</i>	<i>8.01</i>	<i>8.01</i>	<i>17.87</i>	<i>3.96</i>	<i>260</i>
Methyl tert butyl ether	<i>0.369</i>	<0.0320	<0.0160	<0.0160	<i>0.0961</i>	<i>0.027</i>	<i>282</i>
1,2,4-TMB	8.44 J6	4.80	3.20	3.20	6.13 J5	NS	<i>219</i>
1,3,5-TMB	3.80 J3 J6	1.82	1.33	1.33	2.40	NS	<i>182</i>
TMBs (combined)	<i>12.24</i>	<i>6.62</i>	<i>4.53</i>	<i>4.53</i>	<i>8.53</i>	<i>1.3787</i>	NS
Naphthalene	0.329 J6	<0.208	<0.104	<0.104	<0.0697 J3 J5	<i>0.6582</i>	<i>24.1</i>
Shallow Soil (Industrial) Multiple Contaminant Cumulative <sup>(2)</sup>							
Cancer Risk (CCR)	1.2E-07	6.1E-07	2.9E-07	2.9E-07	5.2E-07	NR 720 threshold = 1E-5	
Hazard Index (HI)	0.0086	0.0138	0.0075	0.0075	0.0143	NR 720 threshold = 1	

**NOTES:**

Concentrations are in units of milligrams per kilogram (mg/kg) on a dry weight basis.

No results exceed an applicable NR 720 industrial direct contact RCL, as shown in red font and bold.

Detected concentrations at or above an applicable NR 720 soil to groundwater pathway RCL are in red font and italicized.

NR 720 residual contaminant level (RCL) standards from WDNR's RR Program Soil RCL Excel workbook updated December 2018.

Sample depths are in feet below ground surface (ft bgs).

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J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.

NS = No standard.

TMBs (combined) = Trimethylbenzenes (1,2,4- and 1,3,5- combined).

**FOOTNOTES:**

(1) Soil sample type (unsat. = unsaturated) based on observed conditions when the sample was collected by hand.

(2) Industrial multiple contaminant cumulative cancer risk (CCR) and hazard index (HI) levels, if applicable (for samples within 4 feet of ground surface and based on detected concentrations only). Thresholds are 1E-5 for CCR and 1 for HI per NR 720.12(1)(b). No CCR or HI levels at or above their respective threshold were calculated.

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TABLE 3

CONTINUING OBLIGATIONS CHECKLIST

Ref. No.	This situation applies to the following property or right of way (ROW)			Site Transfer Situation - Continuing Obligation (database fees will apply, ii-xiv)	Maintenance Plan Required
	Property Type				
	Source Property	Affected Property (Off-Source)	ROW		
i				None of the following situations apply to this site transfer request	NA
ii				Residual groundwater contamination exceeds ch. NR 140 ESs	NA
iii	x			Residual soil contamination exceeds ch. NR 720 RCLs	NA
iv				Monitoring Wells Remain:	
	x			<ul style="list-style-type: none"> <li>Not abandoned (filled and sealed)</li> <li>Continued monitoring (requested or required)</li> </ul>	NA Yes <sup>(1)</sup>
v				Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi				Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii				Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii	x			Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix			NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x			NA	Vapor: Dewatering system needed for VMS to work effectively	Yes
xi			NA	Vapor: Compounds of concern in use; full vapor assessment could not be completed	NA
xii			NA	Vapor: Commercial/industrial exposure assumptions used	NA
xiii				Vapor: Residual VOCs pose future risk of vapor intrusion	NA
xiv				Site-specific situation (e.g., methane monitoring): discuss with WDNR project manager before submitting for transfer	Site specific

FOOTNOTE:

(1) Continued monitoring of groundwater will be conducted under the facility-wide ERP site (BRRTS# 16-16-559511), which includes the required maintenance plan, etc.

**ATTACHMENT I**

**ZONING VERIFICATION FOR THE FACILITY-WIDE ERP SITE PROPERTY**  
**(BRRTS# 16-16-559511)**



# CITY OF SUPERIOR ZONING MAP

- C1-COMMERCIAL
- C2-HIGHWAY COMMERCIAL
- C3-SHOPPING CENTER DISTRICT
- C4-CENTRAL BUSINESS DISTRICT
- M1-MANUFACTURING-1
- M2-MANUFACTURING-2
- PDD-PLANNED DEVELOPMENT DISTRICT
- R1A-ONE FAMILY RESIDENTIAL
- R1B-ONE FAMILY RESIDENTIAL
- R2-TWO FAMILY RESIDENTIAL
- R3-APARTMENT RESIDENTIAL
- R4-APARTMENT RESIDENTIAL
- SUB-SUBURBAN
- W1-WATERFRONT

