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BARR

February 26, 2021

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

Re: 2020 Remediation Progress Report for Murphy Oil Tank 70 Release Site
Superior Refining Company LLC Refinery, Superior, WI
WDNR BRRTS# 02-16-223154
Facility ID: 816009590

Dear John:

On behalf of Superior Refining Company LLC (SRC), Barr Engineering Co. (Barr) is submitting this remediation progress report for the Murphy Oil Tank 70 Basin release site (Tank 70) at the SRC refinery in Superior, Wisconsin. Periodic site progress reporting to the Wisconsin Department of Natural Resources (WDNR) is required pursuant to ss. NR 700.11(1) and 724.13(3), Wisconsin Administrative Code. This report summarizes monitoring activities conducted at the site in 2020.

1.0 Facility and Site Background Information

Figure 1 shows the location of Tank 70 within the refinery, the approximate property boundary of the refinery, and the area surrounding the refinery. Figure 2 presents the site layout of Tank 70, which is located in the SW ¼ of the SW ¼ of Section 25, Township 49 North, Range 14 West, Superior Township of Douglas County, Wisconsin.

The closest surface water to Tank 70 is Newton Creek, located approximately 2,000 feet east of the Tank 70 basin (Figure 1). The basin is located in the central area of the refinery which is relatively flat. The basin's ground surface is unpaved. Beneath an impermeable liner installed in June 2003 (described in the following section), the basin is underlain by native clay. The average depth to groundwater in the Tank 70 monitoring wells ranges from 1 to 4 feet below ground surface (bgs) depending on time of year. The regional groundwater flow direction below the refinery and across the Tank 70 site is toward the east (Figure 2).

As presented in the April 2014 Gannett Fleming, Inc. (GF) *Final Memorandum of Agreement, Site Investigation and Remedial Action Plan* (GF, 2014), the hydraulic conductivity of the native clay underlying the refinery is on the order of 1×10^{-7} centimeters per second (cm/sec). Assuming a horizontal hydraulic gradient of 0.003 feet per foot eastward and an effective porosity of 0.06, the estimated horizontal groundwater flow velocity at the refinery is approximately 0.01 foot per year (ft/yr) (GF, 2014).

In October 2011, Calumet Superior, LLC (Calumet) acquired the refinery from Murphy Oil. In November 2017, Husky Superior Refining Holding Corp. (Husky Superior) purchased Calumet and changed its legal name to Superior Refining Company LLC. In January 2021, Husky and Cenovus merged to become Cenovus Energy Inc. (Cenovus); however, the legal name of the refinery will remain unchanged.

2.0 Tank 70 Basin Release Site Investigation and Remediation Summary (February 1999-October 2019)

A release of about 200 gallons of *platformate* (gasoline blend stock) within the Tank 70 basin was reported to the WDNR on February 25, 1999. The release occurred when a bleeder valve cracked at the ground surface due to frost heave. In immediate response to the release, Murphy Oil personnel shoveled and drummed the stained snow, and a small amount of water was applied to float the gasoline. The water/gasoline mixture was vacuumed and sent through the refinery's No. 1 American Petroleum Institute (API) oil/water separator. Separated oil was stored for use at the refinery and the water was treated at the on-site wastewater treatment plant (WWTP). When the snow melted in the spring, water in the basin was also vacuumed and sent through the No. 1 API oil/water separator and WWTP.

In January 2002, all liquid product (platformate) was removed from Tank 70 to conduct an API 653 tank inspection. An access hatch was removed to allow workers access to the inside of the tank. On January 7, 2002, a fire occurred inside Tank 70 as the tank was being cleaned. Murphy Oil personnel used a mixture of water and foam to put out the fire, which took approximately two hours. The water and foam that were used to put out the fire ran out the open access hatch into the bermed Tank 70 basin. Some of the water/foam mixture was pumped into the adjacent Tank 71 basin, which is lined with a plastic membrane. Because of the extremely cold temperatures at the time of the fire and other activities associated with the fire that needed to be completed, Murphy Oil was not able to immediately remove all the water/foam mixture from the Tank 70 and Tank 71 basins.

Sampling conducted after both the 1999 and 2002 releases defined the estimated extent of platformate-impacted soil. Summaries of the soil investigations and analytical results are provided in a GF October 26, 2010, closure request to the WDNR. In addition, after removing the tank that was destroyed by fire in January 2002 and prior to installing the new tank in the basin, Murphy Oil installed an impermeable liner in the Tank 70 basin in June 2003. Prior to the installation of the liner, soil in the Tank 70 basin was graded flat, a layer of cobbles was laid down and leveled, followed by 0.5 foot of sand. The liner is 60-mil high density polyethylene (HDPE) and was covered with 1.5 feet of clay fill. The 1.5 feet layer of clay protects the liner from exposure to weather extremes, maintenance vehicles, and personnel. This clay layer and liner serve as a permanent engineered barrier that eliminates direct-contact and meets the performance standard criteria in NR 720.08. This liner also minimizes future soil- to-groundwater contaminant migration (GF, 2020).

Multiple phases of investigation have been completed at the site including soil borings and test pits and the installation of monitoring wells, monitoring points, test pits, test pit sumps, and recovery sumps (Figure 2). Currently, long-term groundwater monitoring is being conducted at the site as well as product gauging and passive recovery. This report presents monitoring and project gauging data for 2020.

Research conducted by the API and published in a 2004 document titled, "*API Interactive LNAPL Guide, Version 2.0*", found that periodic manual removal of product is most appropriate for low permeability aquifers (hydraulic conductivity < 1×10^{-5} cm/sec). The hydraulic conductivity of the native clay underlying the refinery is on the order of 1×10^{-7} cm/sec, as described in the previous section of this letter report (GF, 2014).

Based on the recommendations included in the API Interactive LNAPL Guide document, product has been manually bailed when observed in a monitoring well. The API Interactive LNAPL Guide also states that product preferentially accumulates in wells when the potentiometric surface is low. This occurs because, as the potentiometric surface drops, product that remains above the water level will drain downward into the well. As the potentiometric surface rises, the product becomes submerged and trapped in the soil pores and subsequently will not accumulate in the well. In general, this appears to be the case in the Tank 70 site wells that have had measurable product. To take advantage of this apparent pattern, the wells located in the basin were purged dry following each depth to product or groundwater measurement event to promote the accumulation of product (GF, 2020).

Using this approach from November 1999 to May 2009, a total of 262 liters (approximately 70 gallons) of product was recovered. Most of the free product (>92%) was recovered from MP-1/T70, MP-4/T70, MW-1/T70, and MW-2/T70. Recovered product was sent through the refinery's No.1 API oil/water separator and stored for refinery use. Water from the separator and groundwater recovered from monitoring locations was treated in the refinery's on-site WWTP.

In addition to bailing free product, 1.5-inch-diameter, petroleum-absorbent socks were installed in select wells and monitoring points. These socks passively absorbed any free product that collected in the well. The absorbent socks were regularly inspected and replaced as necessary.

In October 2010, GF submitted a closure request to the WDNR on behalf of Murphy Oil, summarized as follows:

- There is an engineered cap in place to prevent direct contact and limit infiltration.
- Summaries of the historical free product measurements and volume of product recovered were included and documented that product had been recovered to the extent practicable.
- The residual groundwater contamination is not likely to migrate beyond the immediate vicinity of the Tank 70 basin, based on the relatively low (i.e., approximately 0.01 ft/yr) horizontal groundwater flow velocity in the native clay.
- The site would be registered on the WDNR's Geographic Information System (GIS) database of sites where residual soil and groundwater contamination remains.

In August 2011, supplemental soil and groundwater data from outside the Tank 70 basin were submitted to the WDNR, as requested, in support of the October 2010 closure request. However, on September 9, 2011, the WDNR denied site closure and requested additional groundwater monitoring to show stable or decreasing trends. Subsequent SRC/GF groundwater monitoring data submittals to the WDNR include October 2011 through August 2013 data submitted in May 2014; September 2013 through December 2017 data submitted in April 2018; June through October 2018 data submitted in November 2018 and April 2019 through October 2019 data submitted in January 2020.

3.0 Remedial and Monitoring Activities in 2020

The Tank 70 basin monitoring network currently includes MW-1R/T70, MW-2R/T70, and MW-3/T70 through MW-7/T70; monitoring points MP-1/T70 through MP-4/T70; and test pit sump TP-1/T70, as shown on Figure 2. Note that:

- Test pits TP-2/T70 and TP-5/T70 were backfilled in June 2000.
- MW-1/T70 and MW-2/T70 were abandoned in November 2007 and replaced by MW-1R/T70 and MW-2R/T70, respectively.
- MW-7/T70 has not been sampled since June 2015, and MW-1R/T70 has not been sampled since October 2017 because of damaged PVC casing and possible surface water infiltration.

Year-round access to monitoring wells, monitoring points, and the test pit at the refinery is not practical because of relatively shallow groundwater, cold weather, and snow. When conditions allow access, water and product levels are monitored monthly. If product is encountered, the product is removed and sent through the refinery's No. 1 API oil/water separator and stored for refinery use.

Monitoring wells are gauged, purged and sampled in spring and fall (typically April/May and September/October). Monitoring wells, monitoring points and test pit TP-1/T70 are routinely checked for the presence of product and, if encountered, the product is removed from the well, point, or pit by bailing.

Since the most recent remediation progress report was submitted to the WDNR on January 28, 2020 (GF,2020), work at Tank 70 has included the gauging of water and product levels in associated site monitoring wells, monitoring points, and a test pit, and the collection of groundwater samples from select locations. Monitoring and sampling activities conducted in 2020 are summarized in Table 1.

3.1 Product Recovery

During the reporting period, measurable product was not encountered in the monitoring wells, monitoring points, or test pit TP-1/T70. As established in the 2019 report (GF, 2020), if free product is not observed during the April/May gauging event, the wells, points, and test pit are then checked quarterly (rather than monthly) through the October sampling event.

SRC will continue to check for free product, but for all practical purposes, free product likely has been recovered to the extent practical from the Tank 70 basin.

3.2 Groundwater Sampling and Results

Groundwater samples were collected by Barr and Insight Environmental (Insight) field staff at the site during May and October 2020. Each well was purged dry twice and allowed to recover for at least 14 days between purge events and prior to the collection of the samples. Routine sampling of monitoring wells MW-2R/T70 through MW-6/T70 was conducted on May 27, 2020 and October 6, 2020. Field staff used new one-time-use polyethylene disposable bailers with new nylon rope to collect each groundwater sample. The May 2020 groundwater samples were sent to Pace Analytical (Pace) in Green Bay, Wisconsin (Wisconsin laboratory certification #405132750) and the October 2020 samples were sent to Pace in Minneapolis, Minnesota (Wisconsin laboratory certification #999407970); samples were analyzed for

petroleum volatile organic compounds (PVOCs) and naphthalene using Method 8260B. The PVOC analyte list consisted of benzene, toluene, ethylbenzene, and xylenes (BTEX); 1,2,4- and 1,3,5-trimethylbenzene (TMB) and methyl-tert-butyl-ether (MTBE).

Wells not sampled due to damaged PVC casing/surface water infiltration include MW-7/T70 starting in October 2015 and MW-1R/T70 starting in June 2018.

Table 2 presents the analytical results of the groundwater samples compared to the NR 140 Preventative Action Limits (PAL) and Enforcement Standards (ES). The TMB results presented on Table 2 are a sum of the concentrations for 1,2,4-TMB and 1,3,5-TMB. As shown in Table 2:

- Historically, at least one PVOC compound has been present at a concentration at or above its applicable ES in each well. The recent exception is monitoring well MW-5/T70 where there have been no PVOC concentrations that exceed ESs since 2017; however, concentrations of benzene and naphthalene continue to exceed PALs.
- Because of the removal of accumulated free product over the years, PVOC and naphthalene concentrations in the wells have been stable or decreasing. For example, Figure 3 through Figure 5 present trend analysis plots for concentrations of BTEX; BTEX plus naphthalene; and BTEX plus naphthalene plus TMBs (respectively) in groundwater samples from MW-1R/T70, MW-2R/T70, and MW-4/T70 through MW-7/T70. Note that the best-fit exponential trend lines were generated using a scatter plot chart. Note that the plotted data for each well only includes the time period since: a) free product was most recently removed; and b) samples were collected at least once per year. As shown on Figure 3 through Figure 5, dissolved-phase concentrations in the wells have followed a general downward trend.

Attachment A provides copies of the laboratory reports and chain of custody records for the groundwater samples collected in 2020.

Historically, a groundwater contour map for the Tank 70 release site has not been prepared because groundwater levels in the wells either are influenced by local surface/melt water in the spring or typically do not have sufficient time to reach static levels after they are purged dry later in the year. Consequently, a groundwater contour map representing static conditions for the Tank 70 site has not been created. However, the regional groundwater flow direction in the vicinity of the Tank 70 site is to the east (GF, 2014) (Figure 2).

4.0 Future Work

SRC's work plan for 2021 is as follows:

- Abandon MW-1R/T70 and MW-7/T70 since the PVC casing of both wells is damaged. A replacement well will not be installed at either location because:
    - Product has never been measured in MW-1R/T70 since it was installed in May 2008.
    - Product has not been measured in MW-7/T70 since November 2007.
    - Historical data documents that PVOC and naphthalene concentrations in both wells are decreasing (Figure 3 through Figure 5). SRC had planned to abandon MW-1R/T70 and MW-7/T70 in 2019 or 2020, but the work was delayed due to a temporary refocusing of

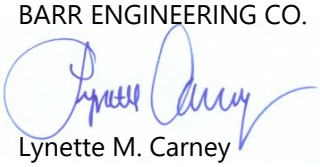
efforts on the refinery rebuild activities and implementation of a new policy on ground disturbance at the refinery.

- Continue to check for, and if present, manually bail product from the remaining five monitoring wells (MW-2R/T70 through MW-6/T70), the four monitoring points (MP-1/T70 through MP-4/T70), and the test pit sump TP-1/T70 during each sampling event as conditions allow. If product is observed, then check the wells, points, and test pit sump monthly. If product is not observed, then check the wells, points, and sump quarterly.
- If product is observed in TP-1/T70, the sump will be pumped out using an on-site vacuum truck. The purged/pumped product/water will be separated and stored or sent through the refinery's No. 1 API oil/water separator and on-site WWTP as described above.
- Discontinue monthly product checks at monitoring wells and monitoring points. If, however, product is observed during the spring gauging event, monthly monitoring of these locations will resume. If product is not observed, the wells and points will only be checked during the spring and fall sampling events.
- Collect biannual (spring and fall) groundwater samples from monitoring wells without free product and have the samples analyzed for PVOCs and naphthalene by a Wisconsin-certified laboratory using EPA Method 8260B. Each monitoring well (but not test pit sump TP-1/T70) will be purged dry twice and allowed to recover for at least 14 days, prior to the collection of samples.
- Document the proper abandonment of MW-1R/T70 and MW-7/T70, recovery of any product, and analytical results of the 2021 groundwater samples in a remediation progress report to the WDNR by the end of January 2022. If product is not encountered in any of the wells, monitoring points, or sump in 2021, and the concentrations continue to show a decreasing trend, a site closure request may be prepared for WDNR review and approval.

Please contact Matt Turner at SRC and/or me if you have any comments, questions, need additional information, or agree that the site is now ready for closure.

Sincerely,

BARR ENGINEERING CO.



Lynette M. Carney
Project Manager

cc: Matt Turner (SRC)

Tables

Table 1 2020 Fluid Level Monitoring Data
Table 2 Groundwater Analytical Results for Detected Compounds

Figures

Attachments

References

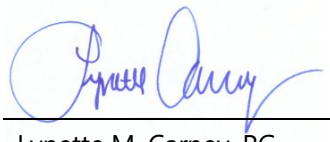
Gannett Fleming, Inc. (GF), 2014. *Final Memorandum of Agreement, Site Investigation and Remedial Action Plan, Superior Refinery, Superior, Wisconsin, WDNR BRRTS# 02-16-559511*. April 2014.

GF, 2020. *2019 Remediation Progress Report for Tank 70 Release Site, Superior Refining Company LLC Refinery, Superior, WI, WDNR BRRTS# 02-16-223154 and Facility ID: 816009590*. January 28, 2020.

Wisconsin Department of Natural Resources, 2020. *Reminder to Include Evaluation of Emerging Contaminants in Site Investigation, Murphy Oil – Tank #70, 2407 Stinson Ave, BRRTS# 02-16-223154*. Letter to Husky Energy dated August 17, 2020.

CERTIFICATION

"I, Lynette M. Carney, 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 of the information contained in this document is correct, and the document was prepared in compliance with all applicable requirements in Chapters NR 700 to 726, Wis. Adm. Code."



Lynette M. Carney, PG
Reg #: 1138

2/26/2021
Date

Tables

Superior Refining Company LLC
Superior, Wisconsin
Table 1
2020 Fluid Level Monitoring Data for Tank 70 Release Site (1)

	MP-1/T70		MP-2/T70		MP-3/T70		MP-4/T70		MW-1R/T70		MW-2R/T70		MW-3/T70		MW-4/T70		MW-5/T70		MW-6/T70		MW-7/T70		TP-1/T70		Foot-
Date	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**DTP**	**DTW**	**notes**
	Depth to Fluid from Top of Casing (feet)																								
04/28/20	--	4.80	--	6.08	--	5.05	--	4.99	nm	nm	--	2.19	--	4.55	--	4.62	--	3.61	--	3.42	nm	nm	--	4.00	(2)
05/12/20	--	5.34	--	6.05	--	5.38	--	5.62	nm	nm	--	2.82	--	5.03	--	4.84	--	4.43	--	4.18	nm	nm	--	4.54	(2)
07/16/20	--	5.18	--	6.02	--	5.42	--	5.55	--	3.30	--	2.60	--	5.20	--	4.79	--	4.25	--	4.02	--	4.06	--	4.40	(4)
09/10/20	--	5.14	--	6.04	--	5.51	--	5.46	nm	nm	--	3.20	--	4.88	--	4.63	--	4.62	--	4.33	nm	nm	--	4.52	(2)
09/23/20	--	5.15	--	6.10	--	5.50	--	5.49	nm	nm	--	3.49	--	5.09	--	4.80	--	4.56	--	4.14	nm	nm	--	4.44	(2)
10/06/20	--	5.24	--	6.18	--	5.55	--	5.50	nm	nm	--	3.50	--	5.46	--	4.93	--	4.68	--	4.30	nm	nm	--	4.45	(3)

NOTES:
DTP = Depth to product in feet.
DTW = Depth to water in feet.
nm = Not measured.
-- = Not applicable/no free product.

FOOTNOTES:
(1) Table does not include data from MW-5/T70 when that well was gauged for Environmental Repair Program (ERP) monitoring.
(2) Bailed the monitoring wells (MWs) dry in preparation for sampling, but skipped MW-1R/T70 and MW-7/T70 due to damaged PVC casing.
(3) Sampled the MWs (see Table 2 for summary of analytical results), but MW-1R/T70 and MW-7/T70 not sampled due to damaged PVC casing/surface water infiltration.
(4) Free product check

Superior Refining Company LLC
Superior, Wisconsin
Table 2
Groundwater Analytical Results for Detected Compounds - Tank 70 Release Site

Well ID / Date	Substance Concentration (µg/ℓ) and Results Qualifier (if any)									
	GRO	**Benzene**	**Ethyl-benzene**	**Toluene**	**Xylenes**	**TMBs**	**MTBE**	**Isopropyl-benzene**	**Naphthalene**	**n-Propyl-benzene**
NR 140 PAL	NS	*0.5*	*140*	*160*	*400*	*96*	*12*	NS	*10*	NS
NR 140 ES	NS	**5**	**700**	**800**	**2,000**	**480**	**60**	NS	**100**	NS
MW-1/T70 from 09/09/99 through 11/15/07 and its replacement MW-1R/T70 since 05/27/08										
9/9/1999	115000	***25900***	***4390***	***33800***	***16600***	***3720***	< 1,500	na	na	na
12/9/1999	115000	***23100***	***2730***	***30500***	***17280***	***3584***	< 150	na	na	na
3/9/2000	87000	***25000***	***2400***	***31000***	***14000***	***3130***	< 160	na	na	na
6/14/2000	120000	***28000***	***3300***	***43000***	***21000***	***4040***	< 94	na	na	na
6/7/2002	130000	***31000***	***2600***	***33000***	***16100***	***3030***	< 35	55 J	***450***	240 J
9/12/2002	110000	***29000***	***2600***	***34000***	***17700***	***3920***	< 86	na	***810***	na
9/30/2004	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/26/2005	167000	***25100***	***5510***	***50300***	***32800***	***10970***	< 150	na	***848***	na
11/9/2005	108000	***38200***	***2130***	***46000***	***13890***	***1578***	< 300	na	< 800	na
5/10/2006	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/16/2006	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/27/2008	103000	***31000***	***1750***	***31500***	***13910***	***2657***	< 15.0	na	***475***	na
11/24/2008	96400	***26400***	***2060***	***28100***	***15790***	***3592***	< 150	na	***753*** J	na
5/27/2009	115000	***32900***	***2930***	***33600***	***18510***	***3555***	< 60.0	na	***669***	na
10/25/2011	na	***28100***	***1970***	***24200***	***13040***	***2003*** J	< 500	na	< 1000	na
5/16/2012	na	***26300***	***2360***	***23000***	***14890***	***2882***	< 122	na	< 178	na
8/21/2013	na	***24850***	***2545***	***22250***	***16885***	***3524.5*** J	< 123	na	***668*** J	na
10/21/2014	na	***13600***	***983***	***10500***	***9390***	***2032***	< 48.5	na	***348***	na
6/23/2015	na	***14600***	***1500***	***14300***	***12770***	***2397***	< 21.8	na	***418*** J	na
10/6/2015	na	***10400***	*570*	***8130***	***8750***	***1904***	< 21.8	na	< 312	na
5/24/2016	na	***30800***	***1670***	***20700***	***13870***	***2668***	< 21.8	na	***380*** J	na
10/5/2016	na	***12400***	106 J	***8630***	***8450***	***1280***	< 21.8	na	< 312	na
5/17/2017	na	***30400***	***2020***	***21100***	***14280***	***2269***	< 34.8	na	***599*** J	na
10/25/2017	na	***22000***	***1410***	***13900***	***11420***	***2275***	< 34.8	na	< 500	na
6/12/2018	Starting 06/12/18, well not sampled due to PVC casing damage and surface water infiltration									
MW-2/T70 from 09/12/02 through 11/16/06 and its replacement MW-2R/T70 since 05/27/08										
9/12/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/30/2004	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/26/2005	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/9/2005	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/10/2006	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/16/2006	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/27/2008	160000	***37900***	***3920***	***56000***	***26540***	***4431***	< 15.0	na	***777***	na
11/24/2008	140000	***31100***	***3900***	***46200***	***24045***	***5245***	< 150	na	***1055*** J	na
5/27/2009	148000	***32400***	***4210***	***51100***	***26605***	***4935***	< 75.0	na	***966.5***	na
10/25/2011	na	***23600***	***2700***	***38100***	***20590***	***3270*** J	< 500	na	< 1000	na
5/16/2012	na	***23200***	***3210***	***37300***	***23890***	***5420***	< 122	na	***445*** J	na
8/21/2013	na	***20800***	***5410***	***41200***	***44100***	***19330***	< 98.7	na	***3950***	na
10/21/2014	na	***17300***	***2280***	***25800***	***19110***	***4280***	< 97.0	na	***776***	na
6/23/2015	na	***15900***	***2130***	***25200***	***21480***	***4483***	< 43.6	na	***743*** J	na
10/6/2015	na	***15200***	***1600***	***24100***	***17850***	***4002***	< 43.6	na	< 625	na
5/24/2016	na	***22000***	***2150***	***29500***	***19980***	***3918***	< 43.6	na	< 625	na
10/5/2016	na	***19200***	***1480***	***25700***	***18670***	***3086***	< 43.6	na	< 625	na
5/16/2017	na	***23000***	***2510***	***31500***	***23540***	***4044***	< 43.6	na	< 625	na
10/25/2017	na	***19800***	***2250***	***28400***	***21060***	***3678***	< 43.6	na	< 625	na
6/12/2018	na	***16300***	***2000***	***24400***	***21700***	***4410***	< 43.6	na	< 625	na
10/9/2018	na	***14400***	***1850***	***20900***	***21540***	***4919***	< 311	na	***575*** J	na
5/21/2019	na	***5650***	***875***	***9910***	***19720***	***5990***	< 249	na	***766*** J	na
10/9/2019	na	***11800***	***1310***	***15700***	***18610***	***5400***	< 249	na	***919*** J	na
5/27/2020	na	***19100***	***2310***	***25600***	***19900***	***4026***	< 249	na	***692*** J	na
10/6/2020	na	***18500***	***1970***	***23000***	***23900***	***4720*** a	< 0.12	na	***888*** J	na
MW-3/T70										
9/12/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/30/2004	1400	***400***	66	3.2	143	87	< 0.90	na	*14*	na
5/26/2005	5970	***1200***	61.7	***884***	*1412*	*274.3*	< 15.0	< 15.5	*47.3*	< 15.0
11/9/2005	665	***129***	13.8	< 6.00	44	13	< 6.00	na	< 16.0	na
5/10/2006	< 10,000	***500***	102.0	*636*	*823*	*231.7*	< 0.300	na	*27.5*	na
11/16/2006	< 50.0	< 0.31	< 0.500	< 0.300	< 0.920	< 0.710	< 0.300	na	< 0.800	na
5/23/2007	< 50.0	< 0.31	< 0.500	0.948 J	1.90 J	< 0.710	< 0.300	na	2.51 J	na
11/15/2007	< 50.0	< 0.31	< 0.500	< 0.300	< 0.920	< 0.710	< 0.300	na	0.975 J	na

Superior Refining Company LLC
Superior, Wisconsin
Table 2
Groundwater Analytical Results for Detected Compounds - Tank 70 Release Site

Well ID / Date	Substance Concentration (µg/ℓ) and Results Qualifier (if any)									
	GRO	Benzene	Ethyl-benzene	Toluene	Xylenes	TMBs	MTBE	Isopropyl-benzene	Naphthalene	n-Propyl-benzene
NR 140 PAL	NS	*0.5*	*140*	*160*	*400*	*96*	*12*	NS	*10*	NS
NR 140 ES	NS	**5**	**700**	**800**	**2,000**	**480**	**60**	NS	**100**	NS
5/27/2008	151	***14.2***	3.57	5.44	15.62	4.06	< 0.300	na	< 0.800	na
11/24/2008	< 50.0	*2.73*	0.998 J	< 0.300	< 0.920	1.12	< 0.300	na	< 0.800	na
5/27/2009	252	***38.2***	11.8	3.5	40.9	19.16	1.76 J	na	1.86 J	na
10/25/2011	na	***2040***	*444*	154	***2536***	***899***	< 50.0	na	***189*** J	na
5/16/2012	na	***2080***	*483*	*295*	***2494***	***761***	< 12.2	na	*33.7* J	na
8/21/2013	na	***186***	31.4	6.7	198.3	75.6	< 0.99	na	8.0 J	na
10/21/2014	na	***273***	7.2	6.0	*436*	*149.1*	< 1.2	na	8.9	na
6/23/2015	na	*2.8*	< 0.50	< 0.50	3.63 J	< 3.8	< 0.17	na	< 2.50	na
10/6/2015	na	*4.0*	0.70 J	< 0.50	< 1.77 J	< 1.28 J	< 0.17	na	< 2.50	na
5/24/2016	na	***748***	44.5	12.2	*522*	*218.4*	< 1.7	na	< 25.0	na
10/5/2016	na	< 0.50	< 0.50	< 0.50	< 1.50	< 1.00	< 0.17	na	< 2.50	na
5/17/2017	na	***56.1***	< 0.50	0.78 J	22.6	8.42 J	< 0.17	na	3.2 J	na
10/25/2017	na	*0.83* J	< 0.50	< 0.50	2.20 J	< 1.12 J	***108***	na	< 2.5	na
6/12/2018	na	***441***	9.5 J	12.5	299.7	95.8	< 1.7	na	< 25.0	na
10/9/2018	na	***32.5***	4.1	0.50 J	55.8	36.6	< 1.2	na	5.1	na
5/21/2019	na	***270***	22.2	7.1	265.8	*104.9*	< 1.2	na	*15.7*	na
10/9/2019	na	***364***	31.2	3.0 J	210.1	*105.3* J	< 3.1	na	*24.8*	na
5/27/2020	na	***821***	*179*	23.0	*592*	*252.1*	< 1.2	na	*46.5*	na
10/6/2020	na	***365***	31.2	3.1	206	*98.0*	< 0.12	na	*21.8*	na
MW-4/T70										
9/12/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/30/2004	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/26/2005	234000	***23400***	***4280***	***49300***	***35130***	***9800***	< 600	< 620	***1810***	820
11/9/2005	145000	***28900***	***4640***	***50300***	***47400***	***11850***	< 75.0	na	***1060***	na
5/10/2006	88350	***23600***	***2505***	***39700***	***25550***	***5805***	< 150	na	***750*** J	na
11/16/2006	116000	***22900***	***2420***	***40900***	***25130***	***4970***	< 75.0	na	***979***	na
5/23/2007	129000	***24300***	***2080***	***37600***	***24630***	***5160***	< 75.0	na	***1040***	na
11/15/2007	110000	***19800***	***1770***	***29000***	***22290***	***5200***	< 150	na	***1380***	na
5/27/2008	127000	***27100***	***2320***	***38800***	***26540***	***5270***	< 150	na	***777*** J	na
11/24/2008	104000	***22000***	***1800***	***30500***	***22890***	***5810***	< 150	na	***1150*** J	na
5/27/2009	123000	***27200***	***2750***	***38900***	***24340***	***4820***	***440***	na	***808***	na
10/25/2011	na	***20300***	***2110***	***37100***	***25290***	***5160***	< 500	na	< 1000	na
5/16/2012	na	***21700***	***1720***	***30500***	***21400***	***5100***	< 122	na	***279*** J	na
8/21/2013	na	***21300***	***1800***	***31200***	***23170***	***5790*** J	< 123	na	***997*** J	na
10/21/2014	na	***15300***	***1140***	***21000***	***18090***	***3863***	< 97.0	na	***751***	na
6/23/2015	na	***6210***	*615*	***9580***	***10030***	***2067***	< 17.4	na	***497*** J	na
10/6/2015	na	***10700***	***1500***	***17600***	***17470***	***3190***	< 17.4	na	***515***	na
5/24/2016	na	***14700***	***2160***	***20700***	***23200***	***4118***	< 17.4	na	***712***	na
10/5/2016	na	***10600***	***1520***	***15700***	***18360***	***3446***	< 17.4	na	***686***	na
5/17/2017	na	***16700***	***1750***	***25900***	***21540***	***3906***	< 21.8	na	***584*** J	na
10/25/2017	na	***11100***	***954***	***13600***	***11720***	***2148***	< 34.8	na	< 500	na
6/12/2018	na	***12200***	***1560***	***15900***	***21550***	***4152***	< 17.4	na	***681***	na
10/9/2018	na	***17400***	***1810***	***23200***	***24230***	***4283***	< 125	na	***609***	na
5/21/2019	na	***16200***	***1860***	***18300***	***22430***	***4430***	< 12.5	na	***923***	na
10/9/2019	na	***16400***	***1600***	***20000***	***20810***	***4221***	< 249	na	***847*** J	na
5/27/2020	na	***12000***	***1380***	***15400***	***19400***	***3814***	< 249	na	***724*** J	na
10/6/2020	na	***17500***	***1820***	***21800***	***26300***	***4630*** a	< 0.12	na	***869*** J	na
MW-5/T70										
9/12/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/30/2004	1600	***6.1***	11	17	78	35	< 0.61	0.62 J	78	< 0.81
5/26/2005	1530	*4.75*	3.05	17.8	66.4	26.43	< 0.3	na	*72.3*	na
11/9/2005	1810	***7.81***	3.01	25.2	120.2	*174*	< 0.3	na	*85*	na
5/10/2006	1620	***5.87***	8.73	18.9	78.3	*109.9*	< 0.300	na	*47.3*	na
11/16/2006	1560	***6.89***	2.55	18.1	87.5	52.1	< 0.300	na	*72.2*	na
5/23/2007	1270	*4.54*	24.5	15.0	65.1	48.3	< 0.300	na	*68.1*	na
11/15/2007	1150	***6.78***	< 2.50	12.0	57.7	37.4	< 1.50	na	*57.0*	na
5/27/2008	1120	***8.79***	22.5	18.4	76.8	36.1	< 1.50	na	*60.6*	na
11/24/2008	1190	***6.84*** J	17.2	15.0	84.6	51.6	< 1.50	na	***101***	na
5/27/2009	1930	***7.69***	59.1	24.3	120.0	65.7	< 0.300	na	***112***	na
10/25/2011	na	***9.13***	78.8	30.4	143.0	80.8	< 0.50	na	***148***	na
5/16/2012	na	***10.4***	58.2	25.9	107.5	62.7	< 0.61	na	***129***	na

Superior Refining Company LLC
Superior, Wisconsin
Table 2
Groundwater Analytical Results for Detected Compounds - Tank 70 Release Site

Well ID / Date	Substance Concentration (µg/ℓ) and Results Qualifier (if any)									
	GRO	Benzene	Ethyl-benzene	Toluene	Xylenes	TMBs	MTBE	Isopropyl-benzene	Naphthalene	n-Propyl-benzene
NR 140 PAL	NS	*0.5*	*140*	*160*	*400*	*96*	*12*	NS	*10*	NS
NR 140 ES	NS	**5**	**700**	**800**	**2,000**	**480**	**60**	NS	**100**	NS
8/21/2013	na	***8.7***	80.8	31.5	143.4	80.1	< 0.49	na	***198***	na
10/21/2014	na	*0.91* J	< 0.39	1.0	7.4 J	< 1.52	< 0.48	na	3.4	na
6/23/2015	na	*2.6*	17.4	8.1	41.3	23.7	< 0.17	na	*48.6*	na
10/6/2015	na	*1.6*	0.59 J	< 0.50	11.3	3.1	< 0.17	na	*10.9*	na
5/24/2016	na	*4.9*	20.7	11.3	46.9	25.8	< 0.17	na	*61.4*	na
10/5/2016	na	*3.4*	3.2	7.5	41.0	16.9	< 0.17	na	*42.2*	na
5/16/2017	na	*1.7*	8.8	4.1	20.4	10.7	< 0.17	na	*20.4*	na
10/25/2017	na	***179***	9.9	1.6	136.8	56.8	< 0.17	na	*17.9*	na
6/12/2018	na	*2.0*	10.5	5.7	30.7	14.3	< 0.35	na	*32.4*	na
10/9/2018	na	*4.3*	0.66 J	0.51 J	4.08 J	< 1.97 J	< 1.2	na	2.5 J	na
5/21/2019	na	< 0.25	< 0.22	< 0.17	< 0.73	< 1.71	< 1.2	na	< 1.2	na
10/9/2019	na	*1.3*	0.85 J	2.1 J	11.1	5.2 J	< 1.2	na	*14.8*	na
5/27/2020	na	< 0.25	< 0.32	< 0.27	< 1.5	< 1.71	< 1.2	na	< 1.2	na
10/6/2020	na	*1.7*	3.9	3.4	16.7	20.5 a	< 0.12	na	*35.1* J+	na
MW-6/T70										
9/12/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/30/2004	9700	***1200***	58	140	***3400***	***850***	< 6.1	< 5.9	*26*	< 8.1
5/26/2005	21600	***5490***	52	***3620***	***5150***	***1287***	< 15.0	na	< 40.0	na
11/9/2005	18600	***5240***	*258*	***4150***	***5460***	***1296***	< 30.0	na	***192***	na
5/10/2006	34600	***14900***	*399*	***17900***	***9570***	***1719***	< 60.0	na	< 160	na
11/16/2006	59100	***13800***	*659*	***16500***	***13000***	***2904***	< 75.0	na	< 200	na
5/23/2007	35700	***8730***	< 125	***8020***	***7450***	***2166***	< 75.0	na	***295*** J	na
11/15/2007	21100	***4040***	*335*	***4150***	***4060***	***1012***	< 30.0	na	***248*** J	na
5/27/2008	50100	***13400***	***960***	***14100***	***9870***	***1882***	< 30.0	na	***250*** J	na
11/24/2008	2520	***337***	28.7	*341*	*617*	*189*	< 3.00	na	*30.1*	na
5/27/2009	27400	***4600***	*629*	***4780***	***6890***	***1820***	*59.4* J	na	***229***	na
10/25/2011	na	***7420***	***763***	***2410***	***8750***	***2460***	< 50.0	na	***251*** J	na
5/16/2012	na	***1600***	*260*	*660*	*1935*	***620***	< 6.1	na	*49.9* J	na
8/21/2013	na	***3990***	*393*	*313*	***2650***	***774***	< 9.9	na	***114***	na
10/21/2014	na	***2630***	16.0 J	126	***2126***	***579***	< 9.7	na	*85.9*	na
6/23/2015	na	***537***	6.3	33.4	160.9	57.7	< 0.87	na	*14.5* J	na
10/6/2015	na	***84.1***	4.6	6.4	101.7	25.0	< 0.17	na	4.0 J	na
5/24/2016	na	***1270***	69.7	158	*1158*	*295.5*	< 1.7	na	*41.9* J	na
10/5/2016	na	***147***	8.1	9.1	211.3	54.8	< 0.17	na	*11.4*	na
5/16/2017	na	***2380***	*394*	*191*	***2407***	***647***	< 8.7	na	< 125	na
10/25/2017	na	***350***	4.0 J	12.0	276.4	88.6	< 0.70	na	*12.5* J	na
6/12/2018	na	***42.3***	< 0.50	2.3	66.0	13.0	< 0.17	na	3.0 J	na
10/9/2018	na	***235***	16.2	8.2	164.6	30.4	< 1.2	na	2.8 J	na
5/21/2019	na	***666***	54.0	36.3	239.0	71.4	< 2.5	na	*11.3*	na
10/9/2019	na	***271***	23.6	7.1 J	181.7	74.4	< 2.5	na	*13.8*	na
5/27/2020	na	***387***	43.5	15.0	134	77.1	< 1.2	na	*13.4*	na
10/6/2020	na	***128***	6.7	3.1	121	38.6 a	< 0.12	na	6.8 J+	na
MW-7/T70										
9/12/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/30/2004	120000	***29000***	***2900***	***36000***	***18800***	***3600***	< 120	< 130	***560***	240 J
5/26/2005	144000	***26400***	***3640***	***40600***	***24370***	***6440***	< 150	na	***4430***	na
11/9/2005	104000	***31000***	***3100***	***44400***	***21950***	***3661***	< 150	na	***500***	na
5/10/2006	105000	***29900***	***2420***	***34700***	***17580***	***3613***	< 60.0	na	***836***	na
11/16/2006	111000	***30700***	***2420***	***38150***	***17525***	***2634***	< 150	na	< 400	na
5/23/2007	127500	***31350***	***3170***	***41050***	***20880***	***4460***	< 150	na	***996.5*** J	na
11/15/2007	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/27/2008	153000	***38700***	***3470***	***53800***	***26310***	***4810***	< 150	na	***809*** J	na
11/24/2008	123000	***28300***	***2740***	***36100***	***22150***	***5200***	< 150	na	***1100*** J	na
5/27/2009	115000	***31200***	***3130***	***32200***	***21500***	***4410***	< 75.0	na	***682***	na
10/25/2011	na	***27600***	***2320***	***22500***	***17750***	***7270***	< 500	na	***1100*** J	na
5/16/2012	na	***26300***	***2460***	***21900***	***18620***	***5360***	< 122	na	***459*** J	na
8/21/2013	na	***24900***	***2450***	***18200***	***16860***	***5030*** J	< 123	na	***753*** J	na
10/21/2014	na	***21000***	***1930***	***21000***	***15100***	***3023***	< 60.6	na	***501***	na
6/23/2015	na	***17000***	***1570***	***19300***	***13650***	***2573***	< 34.8	na	< 500	na
10/6/2015	Starting 10/06/15, well not sampled due to PVC casing damage and surface water infiltration									

Superior Refining Company LLC
Superior, Wisconsin
Table 2
Groundwater Analytical Results for Detected Compounds - Tank 70 Release Site

Well ID Date	Substance Concentration (µg/ℓ) and Results Qualifier (if any)									
	GRO	**Benzene**	**Ethyl-benzene**	**Toluene**	**Xylenes**	**TMBs**	**MTBE**	**Isopropyl-benzene**	**Naphthalene**	**n-Propyl-benzene**
NR 140 PAL	NS	*0.5*	*140*	*160*	*400*	*96*	*12*	NS	*10*	NS
NR 140 ES	NS	**5**	**700**	**800**	**2,000**	**480**	**60**	NS	**100**	NS

NOTES:
Results are in micrograms per liter (µg/ℓ) or parts per billion (ppb).
Detected concentrations at or above an applicable NR 140 PAL are in **bold** font; those at or above an NR 140 ES are in *italicized* font.
Prior to 2020, duplicate sample results were averaged for statistical analysis/plotting, per Dec 2013 ITRC guidance.
Samples collected from most wells were analyzed for VOCs at least once; all other samples analyzed for GRO/PVOCs and naphthalene or PVOCs and naphthalene.
In addition, MW-1/T70 was sampled for dissolved lead on 09/09/99 (6.25 ppb) and 12/09/99 (<1.0 ppb).
a = Estimated value, calculated using some or all values that are estimates.
FP = Free product, well not sampled.
GRO = Gasoline range organics.
J (Pre 2020) = Estimated concentration below laboratory quantitation level.
J (Post 2020) = Estimated detected value. Either certain QC criteria were not met or the concentration is between the laboratory's detection and quanitation limits.
J+ = The result is an estimated quantity and may be biased high.
MTBE = Methyl tert butyl ether.
na = Not analyzed.
NI = Not installed.
NR 140 ES = Wisconsin Administrative Code NR 140 Enforcement Standard; 7/1/2015.
NR 140 PAL = Wisconsin Administrative Code NR 140 Preventive Action Limit; 7/1/2015.
NS = No standard.
TMBs = Sum of 1,2,4-Trimethylbenzene and 1,3,5-Trimethylbenzene.

Figures

Tank 70

Newton Creek

Nemadji River

Douglas County

Superior Refining Company LLC (SRC)

Oil Refinery

TANK FARM

Site Location

Approximate SRC Property Boundaries for Contiguous Operations

Approximate Fenceline Boundaries for Refining-Related Activities

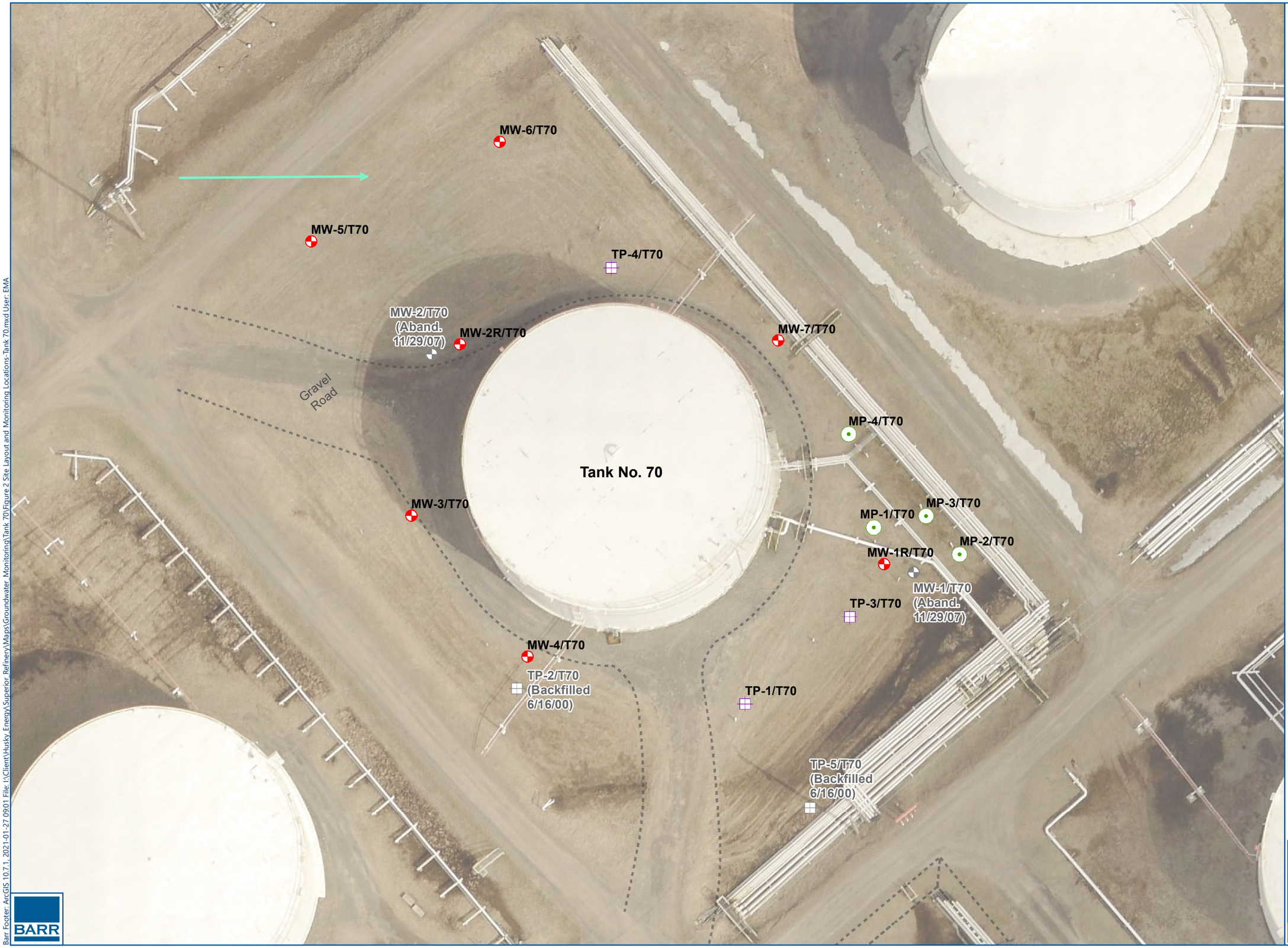
0 750 1,500

Feet

SITE LOCATION
Superior Refining Company LLC (SRC)
Superior, WI

FIGURE 1

Barr Footer: ArcGIS 10.7.1, 2020-09-30 09:29 File: I:\Client\Husky_Energy\Superior_Refinery\Maps\Groundwater_Monitoring\Tank 70\Figure 1 Site Location.mxd User: EMA



Monitoring Well

MW-1/T-70 installed 1999. MW-2/T70, MW-3/T70, MW-4/T70 installed 2003. MW-5/T70, MW-6/T70, MW-7/T70 installed 2004. MW-1R/T70 and MW-2R/T70 installed 2007.

Test Pit

Monitoring Point (July 2001)

General Direction of Groundwater Flow

Notes:
1. Gray shaded wells/test pits have been abandoned, back-filled, or are not locatable.
2. Site layout and sample locations are based on field measurements by Twin Ports Testing and are to be considered approximate; site not surveyed.
3. Sumps installed in Test Pits TP-1, TP-3, and TP-4 in June 2000. Each sump is 8 feet deep and consists of 6" diameter PVC with 4 feet of slotted PVC screen.
4. Each monitoring point is 7 feet deep and consists of PVC with 3 feet of 4" diameter slotted PVC screen.
5. Impermeable liner with clay layer cap installed in Tank 70 basin, June 2003.

Source: Gannett Fleming

N

0 15 30

Feet

1 inch = 30 feet

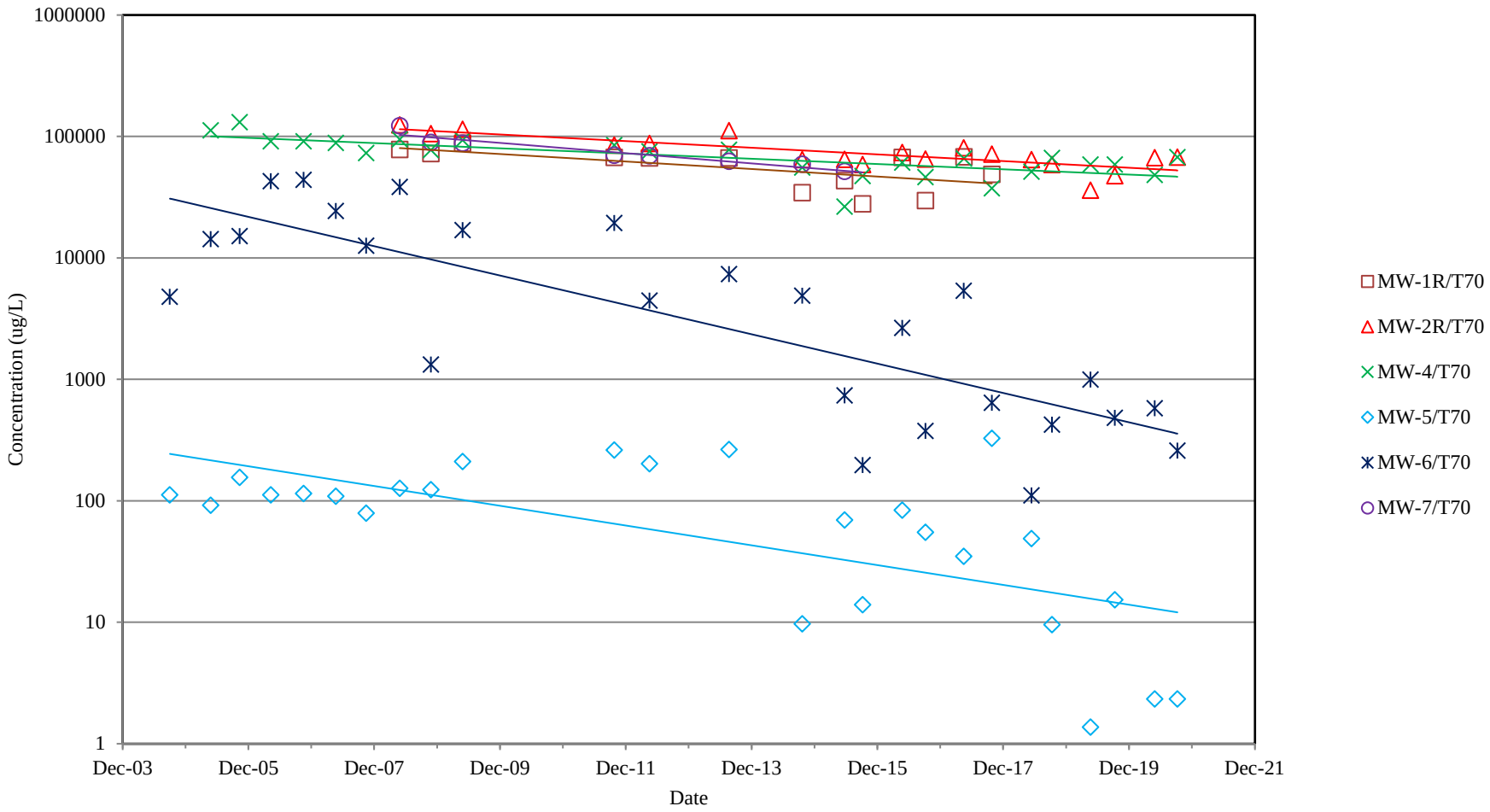
TANK 70 SITE LAYOUT & MONITORING LOCATIONS
Superior Refining Company LLC (SRC)
Superior, WI

FIGURE 2

BARR

Barr Footer: ArcGIS 10.7.1, 2021-01-27 09:01 File: I:\Client\Husky_Energy\Superior_Refinery\Maps\Groundwater_Monitoring\Tank 70\Figure 2 Site Layout and Monitoring Locations-Tank 70.mxd User: EMA

FIGURE 3

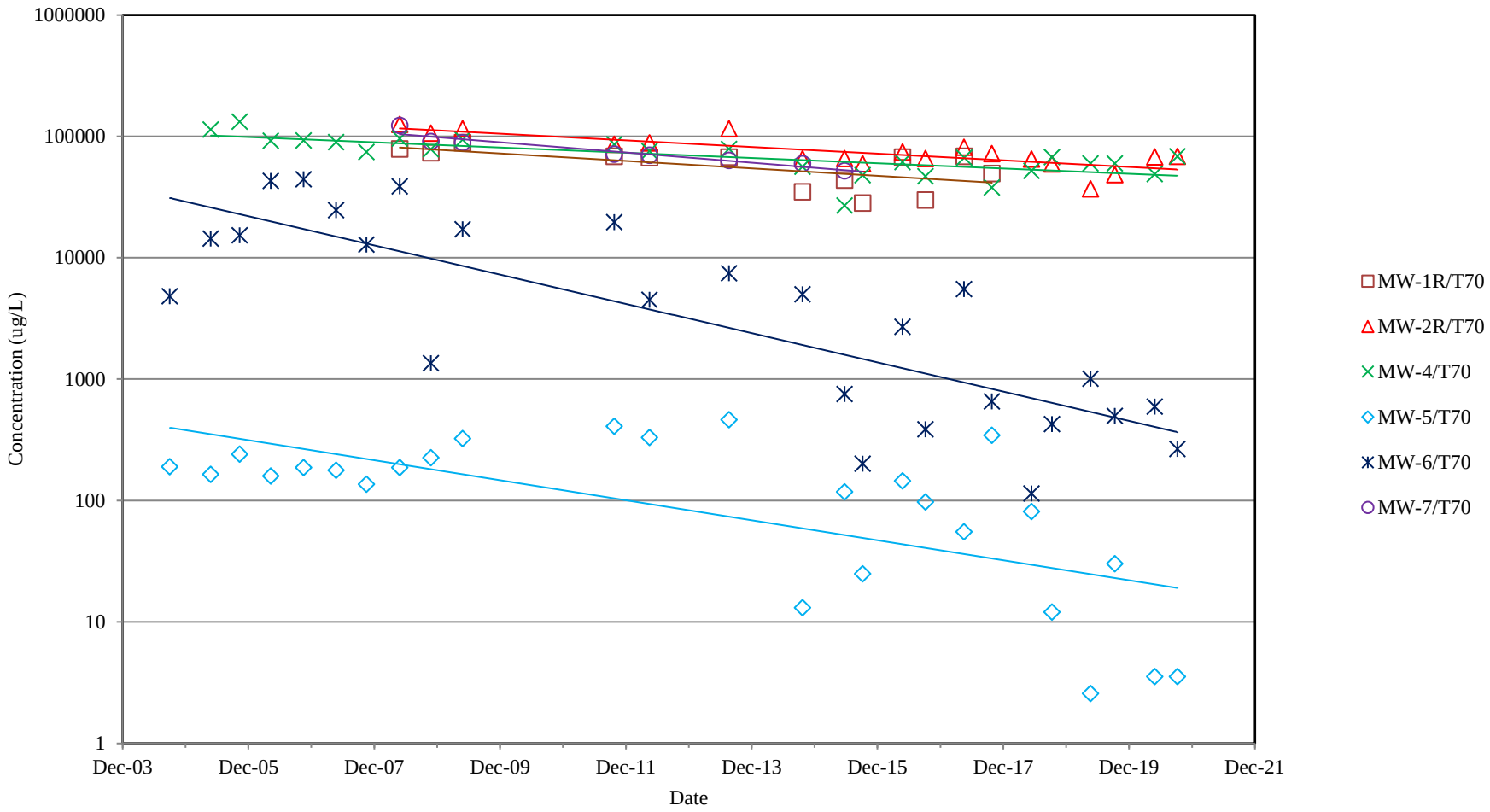


Note: Best-fit exponential trend lines generated using Excel and non-detect concentrations (if any) plotted at detection limit.

BTEX GROUNDWATER CONCENTRATIONS TANK 70 BASIN

SUPERIOR REFINING COMPANY LLC
SUPERIOR, WISCONSIN

FIGURE 4

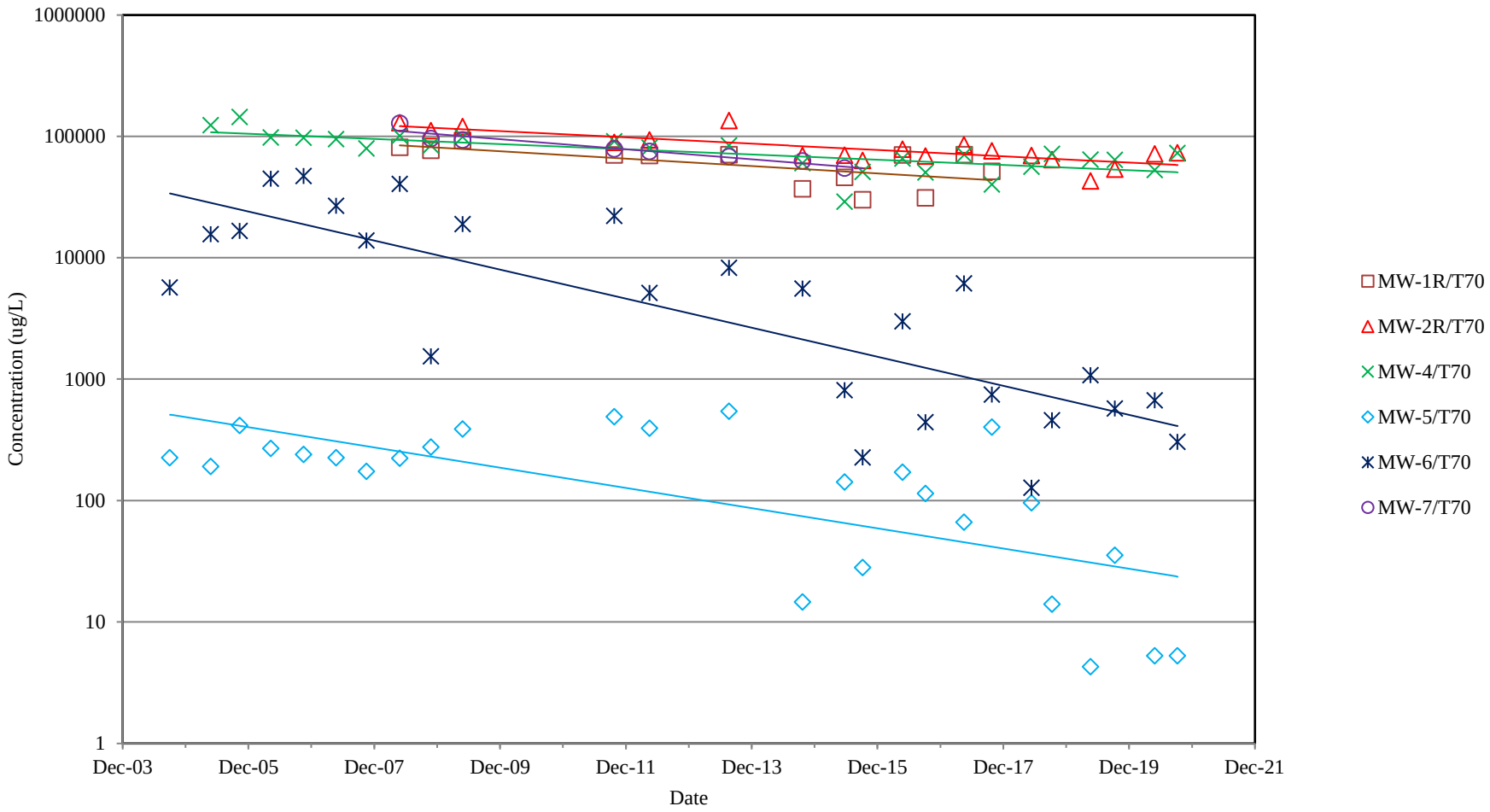


Note: Best-fit exponential trend lines generated using Excel and non-detect concentrations (if any) plotted at detection limit.

BTEX+N GROUNDWATER CONCENTRATIONS TANK 70 BASIN

SUPERIOR REFINING COMPANY LLC
SUPERIOR, WISCONSIN

FIGURE 5



Note: Best-fit exponential trend lines generated using Excel and non-detect concentrations (if any) plotted at detection limit.

BTEX+N+TMBs GROUNDWATER CONCENTRATIONS TANK 70 BASIN

SUPERIOR REFINING COMPANY LLC
SUPERIOR, WISCONSIN

Attachments

Attachment A

Pace Analytical Laboratory Reports

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

June 12, 2020

Jim Taraldsen
Barr Engineering Company
325 S Lake Ave
Duluth, MN 55802

RE: Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Dear Jim Taraldsen:

Enclosed are the analytical results for sample(s) received by the laboratory on May 28, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:
- Pace Analytical Services - Green Bay

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

Sincerely,

Amanda J Albrecht

Amanda Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: BarrDM, Barr Engineering Company
Data Management, Barr Engineering
Accounts Payable, Barr Engineering

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Pace Analytical Services Green Bay
1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10519567001	**MW-2R/T70**	Water	05/27/20 13:57	05/28/20 18:45
10519567002	**MW-3/T70**	Water	05/27/20 14:01	05/28/20 18:45
10519567003	**MW-4/T70**	Water	05/27/20 14:07	05/28/20 18:45
10519567004	**MW-5/T70**	Water	05/27/20 14:12	05/28/20 18:45
10519567005	**MW-6/T70**	Water	05/27/20 14:15	05/28/20 18:45
10519567006	**Trip Blank**	Water	05/27/20 00:00	05/28/20 18:45

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SAMPLE ANALYTE COUNT

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10519567001	**MW-2R/T70**	EPA 8260	HNW	11	PASI-G
10519567002	**MW-3/T70**	EPA 8260	HNW	11	PASI-G
10519567003	**MW-4/T70**	EPA 8260	HNW	11	PASI-G
10519567004	**MW-5/T70**	EPA 8260	HNW	11	PASI-G
10519567005	**MW-6/T70**	EPA 8260	HNW	11	PASI-G
10519567006	**Trip Blank**	EPA 8260	HNW	11	PASI-G

PASI-G = Pace Analytical Services - Green Bay

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Sample: MW-2R/T70 **Lab ID: 10519567001** Collected: 05/27/20 13:57 Received: 05/28/20 18:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260 Pace Analytical Services - Green Bay								
Benzene	**19100**	ug/L	200	49.3	200		06/02/20 12:08	71-43-2	
Ethylbenzene	**2310**	ug/L	212	63.7	200		06/02/20 12:08	100-41-4	
Methyl-tert-butyl ether	**<249**	ug/L	831	249	200		06/02/20 12:08	1634-04-4	
Naphthalene	**692J**	ug/L	1000	235	200		06/02/20 12:08	91-20-3	
Toluene	**25600**	ug/L	180	53.9	200		06/02/20 12:08	108-88-3	
1,2,4-Trimethylbenzene	**3200**	ug/L	560	168	200		06/02/20 12:08	95-63-6	
1,3,5-Trimethylbenzene	**826**	ug/L	582	175	200		06/02/20 12:08	108-67-8	
Xylene (Total)	**19900**	ug/L	600	300	200		06/02/20 12:08	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	91	%	70-130		200		06/02/20 12:08	1868-53-7	
Toluene-d8 (S)	98	%	70-130		200		06/02/20 12:08	2037-26-5	
4-Bromofluorobenzene (S)	87	%	70-130		200		06/02/20 12:08	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Sample: MW-3/T70 **Lab ID: 10519567002** Collected: 05/27/20 14:01 Received: 05/28/20 18:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260 Pace Analytical Services - Green Bay								
Benzene	**821**	ug/L	20.0	4.9	20		06/02/20 16:26	71-43-2	
Ethylbenzene	**179**	ug/L	1.1	0.32	1		06/02/20 12:51	100-41-4	
Methyl-tert-butyl ether	**<1.2**	ug/L	4.2	1.2	1		06/02/20 12:51	1634-04-4	
Naphthalene	**46.5**	ug/L	5.0	1.2	1		06/02/20 12:51	91-20-3	
Toluene	**23.0**	ug/L	0.90	0.27	1		06/02/20 12:51	108-88-3	
1,2,4-Trimethylbenzene	**217**	ug/L	56.0	16.8	20		06/02/20 16:26	95-63-6	
1,3,5-Trimethylbenzene	**35.1**	ug/L	2.9	0.87	1		06/02/20 12:51	108-67-8	
Xylene (Total)	**592**	ug/L	60.0	30.0	20		06/02/20 16:26	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	92	%	70-130		1		06/02/20 12:51	1868-53-7	
Toluene-d8 (S)	101	%	70-130		1		06/02/20 12:51	2037-26-5	
4-Bromofluorobenzene (S)	102	%	70-130		1		06/02/20 12:51	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Sample: MW-4/T70 **Lab ID: 10519567003** Collected: 05/27/20 14:07 Received: 05/28/20 18:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260 Pace Analytical Services - Green Bay								
Benzene	**12000**	ug/L	200	49.3	200		06/02/20 12:30	71-43-2	
Ethylbenzene	**1380**	ug/L	212	63.7	200		06/02/20 12:30	100-41-4	
Methyl-tert-butyl ether	**<249**	ug/L	831	249	200		06/02/20 12:30	1634-04-4	
Naphthalene	**724J**	ug/L	1000	235	200		06/02/20 12:30	91-20-3	
Toluene	**15400**	ug/L	180	53.9	200		06/02/20 12:30	108-88-3	
1,2,4-Trimethylbenzene	**3040**	ug/L	560	168	200		06/02/20 12:30	95-63-6	
1,3,5-Trimethylbenzene	**774**	ug/L	582	175	200		06/02/20 12:30	108-67-8	
Xylene (Total)	**19400**	ug/L	600	300	200		06/02/20 12:30	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	90	%	70-130		200		06/02/20 12:30	1868-53-7	
Toluene-d8 (S)	99	%	70-130		200		06/02/20 12:30	2037-26-5	
4-Bromofluorobenzene (S)	88	%	70-130		200		06/02/20 12:30	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Sample: MW-5/T70 **Lab ID: 10519567004** Collected: 05/27/20 14:12 Received: 05/28/20 18:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260 Pace Analytical Services - Green Bay								
Benzene	**<0.25**	ug/L	1.0	0.25	1		06/02/20 15:43	71-43-2	
Ethylbenzene	**<0.32**	ug/L	1.1	0.32	1		06/02/20 15:43	100-41-4	
Methyl-tert-butyl ether	**<1.2**	ug/L	4.2	1.2	1		06/02/20 15:43	1634-04-4	
Naphthalene	**<1.2**	ug/L	5.0	1.2	1		06/02/20 15:43	91-20-3	
Toluene	**<0.27**	ug/L	0.90	0.27	1		06/02/20 15:43	108-88-3	
1,2,4-Trimethylbenzene	**<0.84**	ug/L	2.8	0.84	1		06/02/20 15:43	95-63-6	
1,3,5-Trimethylbenzene	**<0.87**	ug/L	2.9	0.87	1		06/02/20 15:43	108-67-8	
Xylene (Total)	**<1.5**	ug/L	3.0	1.5	1		06/02/20 15:43	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	96	%	70-130		1		06/02/20 15:43	1868-53-7	
Toluene-d8 (S)	97	%	70-130		1		06/02/20 15:43	2037-26-5	
4-Bromofluorobenzene (S)	82	%	70-130		1		06/02/20 15:43	460-00-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Sample: MW-6/T70 **Lab ID: 10519567005** Collected: 05/27/20 14:15 Received: 05/28/20 18:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260 Pace Analytical Services - Green Bay								
Benzene	**387**	ug/L	10.0	2.5	10		06/03/20 07:55	71-43-2	
Ethylbenzene	**43.5**	ug/L	1.1	0.32	1		06/02/20 13:34	100-41-4	
Methyl-tert-butyl ether	**<1.2**	ug/L	4.2	1.2	1		06/02/20 13:34	1634-04-4	
Naphthalene	**13.4**	ug/L	5.0	1.2	1		06/02/20 13:34	91-20-3	
Toluene	**15.0**	ug/L	0.90	0.27	1		06/02/20 13:34	108-88-3	
1,2,4-Trimethylbenzene	**68.5**	ug/L	2.8	0.84	1		06/02/20 13:34	95-63-6	
1,3,5-Trimethylbenzene	**8.6**	ug/L	2.9	0.87	1		06/02/20 13:34	108-67-8	
Xylene (Total)	**134**	ug/L	3.0	1.5	1		06/02/20 13:34	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	92	%	70-130		1		06/02/20 13:34	1868-53-7	
Toluene-d8 (S)	100	%	70-130		1		06/02/20 13:34	2037-26-5	
4-Bromofluorobenzene (S)	92	%	70-130		1		06/02/20 13:34	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Sample: Trip Blank **Lab ID: 10519567006** Collected: 05/27/20 00:00 Received: 05/28/20 18:45 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260								
	Pace Analytical Services - Green Bay								
Benzene	**<0.25**	ug/L	1.0	0.25	1		06/02/20 15:00	71-43-2	
Ethylbenzene	**<0.32**	ug/L	1.1	0.32	1		06/02/20 15:00	100-41-4	
Methyl-tert-butyl ether	**<1.2**	ug/L	4.2	1.2	1		06/02/20 15:00	1634-04-4	
Naphthalene	**<1.2**	ug/L	5.0	1.2	1		06/02/20 15:00	91-20-3	
Toluene	**<0.27**	ug/L	0.90	0.27	1		06/02/20 15:00	108-88-3	
1,2,4-Trimethylbenzene	**<0.84**	ug/L	2.8	0.84	1		06/02/20 15:00	95-63-6	
1,3,5-Trimethylbenzene	**<0.87**	ug/L	2.9	0.87	1		06/02/20 15:00	108-67-8	
Xylene (Total)	**<1.5**	ug/L	3.0	1.5	1		06/02/20 15:00	1330-20-7	
Surrogates									
Dibromofluoromethane (S)	94	%	70-130		1		06/02/20 15:00	1868-53-7	
Toluene-d8 (S)	98	%	70-130		1		06/02/20 15:00	2037-26-5	
4-Bromofluorobenzene (S)	82	%	70-130		1		06/02/20 15:00	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

QC Batch: 356259
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV UST-WATER
Laboratory: Pace Analytical Services - Green Bay
Associated Lab Samples: 10519567001, 10519567002, 10519567003, 10519567004, 10519567005, 10519567006

METHOD BLANK: 2060736 Matrix: Water
Associated Lab Samples: 10519567001, 10519567002, 10519567003, 10519567004, 10519567005, 10519567006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.84	2.8	06/02/20 06:47	
1,3,5-Trimethylbenzene	ug/L	<0.87	2.9	06/02/20 06:47	
Benzene	ug/L	<0.25	1.0	06/02/20 06:47	
Ethylbenzene	ug/L	<0.32	1.1	06/02/20 06:47	
Methyl-tert-butyl ether	ug/L	<1.2	4.2	06/02/20 06:47	
Naphthalene	ug/L	<1.2	5.0	06/02/20 06:47	
Toluene	ug/L	<0.27	0.90	06/02/20 06:47	
Xylene (Total)	ug/L	<1.5	3.0	06/02/20 06:47	
4-Bromofluorobenzene (S)	%	85	70-130	06/02/20 06:47	
Dibromofluoromethane (S)	%	92	70-130	06/02/20 06:47	
Toluene-d8 (S)	%	99	70-130	06/02/20 06:47	

LABORATORY CONTROL SAMPLE: 2060737

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	46.0	92	70-130	
Ethylbenzene	ug/L	50	49.3	99	80-120	
Methyl-tert-butyl ether	ug/L	50	54.7	109	61-129	
Toluene	ug/L	50	46.5	93	80-120	
Xylene (Total)	ug/L	150	149	99	70-130	
4-Bromofluorobenzene (S)	%			98	70-130	
Dibromofluoromethane (S)	%			93	70-130	
Toluene-d8 (S)	%			96	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2061045 2061046

Parameter	Units	10519565001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	152	50	50	183	154	62	3	70-136	18	20	M1
Ethylbenzene	ug/L	64.1	50	50	116	104	104	80	80-120	11	20	
Methyl-tert-butyl ether	ug/L	<3.1	50	50	57.8	54.7	116	109	61-136	6	20	
Toluene	ug/L	<0.67	50	50	49.6	49.5	98	98	80-120	0	20	
Xylene (Total)	ug/L	311	150	150	473	407	108	64	70-130	15	20	MS
4-Bromofluorobenzene (S)	%						104	102	70-130			
Dibromofluoromethane (S)	%						94	94	70-130			
Toluene-d8 (S)	%						99	99	70-130			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MS	Analyte recovery in the matrix spike was outside QC limits for one or more of the constituent analytes used in the calculated result.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 49161494.00 200 202 SRC GW 70
Pace Project No.: 10519567

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10519567001	**MW-2R/T70**	EPA 8260	356259		
10519567002	**MW-3/T70**	EPA 8260	356259		
10519567003	**MW-4/T70**	EPA 8260	356259		
10519567004	**MW-5/T70**	EPA 8260	356259		
10519567005	**MW-6/T70**	EPA 8260	356259		
10519567006	**Trip Blank**	EPA 8260	356259		

4020858 1

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☒ Duluth ☐ Hibbing ☐ Minneapolis
☐ Bismarck ☐ Grand Rapids ☐ Jefferson City ☐ Salt Lake City

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

COC Number: 58465
COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Engineering	Company: Barr
Address: 325 S. Lake Ave. Duluth MN	Address:
Name: Lynette Carney	Name:
email: lcarney@barr.com	email:
Copy to: datamgt@barr.com	P.O. —
Project Name: SRL GW Sampling Tank 70	Barr Project No: 49161494.00 200 202

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

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

	Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: PVOC + Naphthalene	% Solids	Preservative Code	Field Filtered Y/N
1.	MW-2R/T70	—			05/27/20	1357	GW	N	3	X			001
2.	MW-3/T70	—				1401		N	3	X			002
3.	MW-4/T70	—				1407		N	3	X			003
4.	MW-5/T70	—				1412		N	3	X			004
5.	MW-6/T70	—				1415		N	3	Y			005
6.	Trip Blank	—				—	—	N	2	Y			006
7.													
8.													
9.													
10.													

BARR USE ONLY

Sampled by: WMTB
Barr Proj. Manager: LMC
Barr DQ Manager: JET
Lab Name: Pace
Lab Location: Pace Minneapolis

Relinquished by: [signature] On Ice? (Y) N Date 5/28/20 Time 1045 Received by: Pace Date 5/28/20 Time ~~1045~~ 1050

Relinquished by: Pace On Ice? (Y) N Date 5/28/20 Time 10:50 Received by: [signature] Pace Date 5/29/20 Time 1345

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☐ Sampler ☐ Other: ____

Air Bill Number:

Lab WO: Temperature on Receipt (°C): 1 Custody Seal Intact? ☒ Y ☐ N ☐ None

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush ____ (mm/dd/yyyy)

Page 14 of

BRRLG STDFORMS\Chain of Custody Form 2015 RLG Rev. 01/02/18

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

Waltco 5/30/20 0830 [signature] Pace 5/30/20 0830

Chain of Custody

40208581

Pace Analytical®
www.pacelabs.com

☐ Samples were sent directly to the Subcontracting Laboratory.

State Of Origin: WI
Cert. Needed: ☒ Yes ☐ No
Owner Received Date: 5/28/2020 Results Requested By: 6/12/2020

Workorder: 10519567 **Workorder Name:** 49161494.00 200 202 SRC GW 70

Report To	Subcontract To
Amanda Albrecht Pace Analytical Minnesota 1700 Elm Street Suite 200 Minneapolis, MN 55414 Phone (612)607-6382	Pace Analytical Green Bay 1241 Bellevue Street Suite 9 Green Bay, WI 54302 Phone (920)469-2436

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HCL	VOC's by 8260 *	LAB USE ONLY
1	MW-2R/T70	PS	5/27/2020 13:57	10519567001	Water	3	X	001
2	MW-3/T70	PS	5/27/2020 14:01	10519567002	Water	3	X	002
3	MW-4/T70	PS	5/27/2020 14:07	10519567003	Water	3	X	003
4	MW-5/T70	PS	5/27/2020 14:12	10519567004	Water	3	X	004
5	MW-6/T70	PS	5/27/2020 14:15	10519567005	Water	3	X	005
6	Trip Blank	PS	5/27/2020 00:00	10519567006	Water	2	X	006

VG9H's

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature]	5/29/20 1345		
2	Walco	5/30/20 0830	[signature]	5/30/20 0830
3				

Comments: *PVOCs + Naph (BTEX, MTBE, 124, 135 TMB's)

Cooler Temperature on Receipt 1 °C | **Custody Seal** (Y) or N | **Received on Ice** (Y) or N | **Samples Intact** (Y) or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Client Name: Pace IMN

Sample Preservation Receipt Form

Project # (40208581)

Pace Analytical Services, LLC
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

All containers needing preservation have been checked and noted below: ☐Yes ☐No ☐N/A

Lab Lot# of pH paper: Lab Std #ID of preservation (if pH adjusted): Initial when completed: Date/ Time:

	Glass								Plastic					Vials						Jars				General							
Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001																	3															2.5 / 5 / 10
002																	3															2.5 / 5 / 10
003																	3															2.5 / 5 / 10
004																	3															2.5 / 5 / 10
005																	3															2.5 / 5 / 10
006																	2															2.5 / 5 / 10
007																																2.5 / 5 / 10
008																																2.5 / 5 / 10
009																																2.5 / 5 / 10
010																																2.5 / 5 / 10
011																																2.5 / 5 / 10
012																																2.5 / 5 / 10
013																																2.5 / 5 / 10
014																																2.5 / 5 / 10
015																																2.5 / 5 / 10
016																																2.5 / 5 / 10
017																																2.5 / 5 / 10
018																																2.5 / 5 / 10
019																																2.5 / 5 / 10
020																																2.5 / 5 / 10

Exceptions to preservation check: VOA Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: _____ Headspace in VOA Vials (>6mm) : ☐Yes ☐No ☐N/A ***If yes look in headspace column**

AG1U	1 liter amber glass
BG1U	1 liter clear glass
AG1H	1 liter amber glass HCL
AG4S	125 mL amber glass H2SO4
AG4U	120 mL amber glass unpres
AG5U	100 mL amber glass unpres
AG2S	500 mL amber glass H2SO4
BG3U	250 mL clear glass unpres

BP1U	1 liter plastic unpres
BP3U	250 mL plastic unpres
BP3B	250 mL plastic NaOH
BP3N	250 mL plastic HNO3
BP3S	250 mL plastic H2SO4

VG9A	40 mL clear ascorbic
DG9T	40 mL amber Na Thio
VG9U	40 mL clear vial unpres
VG9H	40 mL clear vial HCL
VG9M	40 mL clear vial MeOH
VG9D	40 mL clear vial DI

JGFU	4 oz amber jar unpres
JG9U	9 oz amber jar unpres
WGFU	4 oz clear jar unpres
WPFU	4 oz plastic jar unpres
SP5T	120 mL plastic Na Thiosulfate
ZPLC	ziploc bag
GN	

Pace Analytical® 1241 Bellevue Street, Green Bay, WI 54302	Document Name: Sample Condition Upon Receipt (SCUR)	Document Revised: 26Mar2020
	Document No.: ENV-FRM-GBAY-0014-Rev.00	Author: Pace Green Bay Quality Office

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO#: 40208581

40208581

Client Name: Pace MN

Courier: ☐ CS Logistics ☐ Fed Ex ☐ Speedee ☐ UPS ☒ Waltco ☐ Client ☐ Pace Other:

Tracking #: 2451434-2

Custody Seal on Cooler/Box Present: ☒ yes ☐ no Seals intact: ☒ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Packing Material: ☒ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other

Thermometer Used SR - 86 **Type of Ice:** (Wet) Blue Dry None ☒ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 0 /Corr: 1

Person examining contents:

Temp Blank Present: ☒ yes ☐ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Date: 5/30/20 /Initials: MM

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Labeled By Initials: SMW

Chain of Custody Present:	☒Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☒Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☐No ☒N/A	4. JKW 0 5/30/20 MM
Samples Arrived within Hold Time:	☒Yes ☐No	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☒No	6.
Rush Turn Around Time Requested:	☐Yes ☒No	7.
Sufficient Volume: For Analysis: ☒Yes ☐No MS/MSD: ☐Yes ☒No ☐N/A		8.
Correct Containers Used:	☒Yes ☐No	9.
-Pace Containers Used:	☐Yes ☐No ☒N/A	
-Pace IR Containers Used:	☒Yes ☐No ☐N/A	
Containers Intact:	☒Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☒N/A	11.
Sample Labels match COC:	☒Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
Trip Blank Present:	☒Yes ☐No ☐N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution:

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

Pace Container Order #647911

402858

Addresses

Order By :		Ship To :		Return To:	
Company	Barr Engineering	Company	HOLD FOR CLIENT	Company	Pace Analytical Minnesota
Contact	Taraldsen, James	Contact	Taraldsen, James	Contact	Albrecht, Amanda
Email	jtaraldsen@barr.com	Email	jtaraldsen@barr.com	Email	amanda.albrecht@pacelabs.com
Address	325 South Lake Avenue	Address	4730 Oneota Street	Address	1700 Elm Street
Address 2	Suite 700	Address 2		Address 2	Suite 200
City	Duluth	City	Duluth	City	Minneapolis
State	MN Zip 55802	State	MN Zip 55807	State	MN Zip 55414
Phone	218-529-7138	Phone	(218) 529-7138	Phone	(612)607-6382

Info

Project Name SRC GW sampling Tank 70 **Due Date** 05/20/2020 **Profile** 38604, line 6 **Quote** 00074987

Project Manager Albrecht, Amanda **Return Date** **Carrier** Pace Courier **Location** WI

Trip Blanks

[X] Include Trip Blanks

Bottle Labels

[ ] Blank
[X] Pre-Printed No Sample IDs
[ ] Pre-Printed With Sample IDs

Bottles

[ ] Boxed Cases
[ ] Individually Wrapped
[X] Grouped By Sample ID/Matrix

Return Shipping Labels

[ ] No Shipper
[X] With Shipper

COC Options

[ ] Number of Blanks
[ ] Pre-Printed

Misc

[ ] Sampling Instructions
[X] Custody Seal
[X] Temp. Blanks
[X] Coolers
[ ] Syringes
[ ] Extra Bubble Wrap
[ ] Short Hold/Rush Stickers
[ ] DI Water Liter(s)
[ ] USDA Regulated Soils

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
5	WT	PVOC + Naphthalene	3-40mL glass vial w/ HCl	15	0	021720-3cyr	
1	WT	Trip BLANK	2-40mL HCL w/custody seal	2	0	257175	

RETURN W/ SAMPLES

Hazard Shipping Placard In Place : YES

*Sample receiving hours are Mon-Fri 7:30am-7:00pm and Sat 9:00am-1:00pm unless special arrangements are made with your project manager.

*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage/disposal.

*Payment term are net 30 days.

*Please include the proposal number on the chain of custody to insure proper billing.

LAB USE:

Ship Date :	05/19/2020
Prepared By:	PC
Verified By:	

Sample

CLIENT USE (Optional):

Date Rec'd:	
Received By:	
Verified By:	

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

October 23, 2020

Jim Taraldsen
Barr Engineering Company
325 S Lake Ave
Duluth, MN 55802

RE: Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Dear Jim Taraldsen:

Enclosed are the analytical results for sample(s) received by the laboratory on October 06, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis

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

Sincerely,

Amanda J Albrecht

Amanda Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: BarrDM, Barr Engineering Company
Data Management, Barr Engineering
Accounts Payable, Barr Engineering

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Massachusetts DWP Certification #: via MN 027-053-137
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Certifcation #: via MN 027-053-137
Minnesota Petrofund Certification #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10534505001	**MW-3 / T70**	Water	10/06/20 09:20	10/06/20 19:30
10534505002	**MW-4 / T70**	Water	10/06/20 09:25	10/06/20 19:30
10534505003	**MW-2R / T70**	Water	10/06/20 09:28	10/06/20 19:30
10534505004	**MW-5 / T70**	Water	10/06/20 09:34	10/06/20 19:30
10534505005	**MW-6 / T70**	Water	10/06/20 09:37	10/06/20 19:30
10534505006	**Trip Blank**	Water	10/06/20 00:00	10/06/20 19:30

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(612)607-1700

SAMPLE ANALYTE COUNT

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10534505001	**MW-3 / T70**	EPA 8260B	LT1	11	PASI-M
10534505002	**MW-4 / T70**	EPA 8260B	LT1	11	PASI-M
10534505003	**MW-2R / T70**	EPA 8260B	LT1	11	PASI-M
10534505004	**MW-5 / T70**	EPA 8260B	LT1	11	PASI-M
10534505005	**MW-6 / T70**	EPA 8260B	LT1	11	PASI-M
10534505006	**Trip Blank**	EPA 8260B	LT1	11	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Sample: MW-3 / T70 **Lab ID: 10534505001** Collected: 10/06/20 09:20 Received: 10/06/20 19:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV UST	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis								
Benzene	**365**	ug/L	0.80	0.24	2		10/19/20 21:04	71-43-2	
Ethylbenzene	**31.2**	ug/L	0.25	0.075	1		10/14/20 18:24	100-41-4	
Methyl-tert-butyl ether	**<0.12**	ug/L	0.39	0.12	1		10/14/20 18:24	1634-04-4	
Naphthalene	**21.8**	ug/L	2.3	0.68	1		10/14/20 18:24	91-20-3	
Toluene	**3.1**	ug/L	0.41	0.12	1		10/14/20 18:24	108-88-3	
1,2,4-Trimethylbenzene	**95.1**	ug/L	0.57	0.17	1		10/14/20 18:24	95-63-6	
1,3,5-Trimethylbenzene	**2.9**	ug/L	0.41	0.12	1		10/14/20 18:24	108-67-8	
Xylene (Total)	**206**	ug/L	0.96	0.29	1		10/14/20 18:24	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	103	%.	75-125		1		10/14/20 18:24	17060-07-0	
Toluene-d8 (S)	103	%.	75-125		1		10/14/20 18:24	2037-26-5	
4-Bromofluorobenzene (S)	108	%.	75-125		1		10/14/20 18:24	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Sample: MW-4 / T70 **Lab ID: 10534505002** Collected: 10/06/20 09:25 Received: 10/06/20 19:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV UST	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis								
Benzene	**17500**	ug/L	40.0	12.0	100		10/20/20 16:55	71-43-2	
Ethylbenzene	**1820**	ug/L	5.0	1.5	20		10/19/20 22:39	100-41-4	
Methyl-tert-butyl ether	**<0.12**	ug/L	0.39	0.12	1		10/14/20 18:42	1634-04-4	
Naphthalene	**869**	ug/L	45.3	13.6	20		10/19/20 22:39	91-20-3	1M
Toluene	**21800**	ug/L	40.6	12.2	100		10/20/20 16:55	108-88-3	
1,2,4-Trimethylbenzene	**3540**	ug/L	57.3	17.2	100		10/20/20 16:55	95-63-6	1M
1,3,5-Trimethylbenzene	**1090**	ug/L	8.3	2.5	20		10/19/20 22:39	108-67-8	
Xylene (Total)	**26300**	ug/L	191	57.4	200		10/20/20 16:07	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-125		1		10/14/20 18:42	17060-07-0	
Toluene-d8 (S)	82	%.	75-125		1		10/14/20 18:42	2037-26-5	
4-Bromofluorobenzene (S)	115	%.	75-125		1		10/14/20 18:42	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Sample: MW-2R / T70 **Lab ID: 10534505003** Collected: 10/06/20 09:28 Received: 10/06/20 19:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV UST	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis								
Benzene	**18500**	ug/L	40.0	12.0	100		10/20/20 17:19	71-43-2	
Ethylbenzene	**1970**	ug/L	5.0	1.5	20		10/19/20 22:15	100-41-4	
Methyl-tert-butyl ether	**<0.12**	ug/L	0.39	0.12	1		10/14/20 19:00	1634-04-4	
Naphthalene	**888**	ug/L	45.3	13.6	20		10/19/20 22:15	91-20-3	1M
Toluene	**23000**	ug/L	40.6	12.2	100		10/20/20 17:19	108-88-3	
1,2,4-Trimethylbenzene	**3580**	ug/L	57.3	17.2	100		10/20/20 17:19	95-63-6	1M
1,3,5-Trimethylbenzene	**1140**	ug/L	8.3	2.5	20		10/19/20 22:15	108-67-8	
Xylene (Total)	**23900**	ug/L	191	57.4	200		10/20/20 16:31	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	103	%.	75-125		1		10/14/20 19:00	17060-07-0	
Toluene-d8 (S)	80	%.	75-125		1		10/14/20 19:00	2037-26-5	
4-Bromofluorobenzene (S)	114	%.	75-125		1		10/14/20 19:00	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Sample: MW-5 / T70 **Lab ID: 10534505004** Collected: 10/06/20 09:34 Received: 10/06/20 19:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV UST	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis								
Benzene	**1.7**	ug/L	0.40	0.12	1		10/19/20 16:19	71-43-2	
Ethylbenzene	**3.9**	ug/L	0.25	0.075	1		10/19/20 16:19	100-41-4	
Methyl-tert-butyl ether	**<0.12**	ug/L	0.39	0.12	1		10/19/20 16:19	1634-04-4	
Naphthalene	**35.1**	ug/L	2.3	0.68	1		10/14/20 19:18	91-20-3	C8
Toluene	**3.4**	ug/L	0.41	0.12	1		10/19/20 16:19	108-88-3	
1,2,4-Trimethylbenzene	**18.6**	ug/L	0.57	0.17	1		10/14/20 19:18	95-63-6	C8
1,3,5-Trimethylbenzene	**1.9**	ug/L	0.41	0.12	1		10/19/20 16:19	108-67-8	
Xylene (Total)	**16.7**	ug/L	0.96	0.29	1		10/19/20 16:19	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115	%.	75-125		1		10/19/20 16:19	17060-07-0	
1,2-Dichloroethane-d4 (S)	99	%.	75-125		1		10/14/20 19:18	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		10/14/20 19:18	2037-26-5	
Toluene-d8 (S)	107	%.	75-125		1		10/19/20 16:19	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		10/19/20 16:19	460-00-4	
4-Bromofluorobenzene (S)	111	%.	75-125		1		10/14/20 19:18	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Sample: MW-6 / T70 **Lab ID: 10534505005** Collected: 10/06/20 09:37 Received: 10/06/20 19:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV UST	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis								
Benzene	**128**	ug/L	0.40	0.12	1		10/19/20 16:42	71-43-2	
Ethylbenzene	**6.7**	ug/L	0.25	0.075	1		10/19/20 16:42	100-41-4	
Methyl-tert-butyl ether	**<0.12**	ug/L	0.39	0.12	1		10/19/20 16:42	1634-04-4	
Naphthalene	**6.8**	ug/L	2.3	0.68	1		10/14/20 19:36	91-20-3	C8
Toluene	**3.1**	ug/L	0.41	0.12	1		10/19/20 16:42	108-88-3	
1,2,4-Trimethylbenzene	**30.9**	ug/L	0.57	0.17	1		10/14/20 19:36	95-63-6	C8
1,3,5-Trimethylbenzene	**7.7**	ug/L	0.41	0.12	1		10/19/20 16:42	108-67-8	
Xylene (Total)	**121**	ug/L	0.96	0.29	1		10/19/20 16:42	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	105	%.	75-125		1		10/19/20 16:42	17060-07-0	
1,2-Dichloroethane-d4 (S)	98	%.	75-125		1		10/14/20 19:36	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		10/14/20 19:36	2037-26-5	
Toluene-d8 (S)	105	%.	75-125		1		10/19/20 16:42	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		10/19/20 16:42	460-00-4	
4-Bromofluorobenzene (S)	110	%.	75-125		1		10/14/20 19:36	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Sample: Trip Blank **Lab ID: 10534505006** Collected: 10/06/20 00:00 Received: 10/06/20 19:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV UST	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis								
Benzene	**0.16J**	ug/L	0.40	0.12	1		10/14/20 14:33	71-43-2	
Ethylbenzene	**<0.075**	ug/L	0.25	0.075	1		10/14/20 14:33	100-41-4	
Methyl-tert-butyl ether	**<0.12**	ug/L	0.39	0.12	1		10/14/20 14:33	1634-04-4	
Naphthalene	**<0.68**	ug/L	2.3	0.68	1		10/14/20 14:33	91-20-3	
Toluene	**<0.12**	ug/L	0.41	0.12	1		10/14/20 14:33	108-88-3	
1,2,4-Trimethylbenzene	**<0.17**	ug/L	0.57	0.17	1		10/14/20 14:33	95-63-6	
1,3,5-Trimethylbenzene	**<0.12**	ug/L	0.41	0.12	1		10/14/20 14:33	108-67-8	
Xylene (Total)	**<0.29**	ug/L	0.96	0.29	1		10/14/20 14:33	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	104	%.	75-125		1		10/14/20 14:33	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		10/14/20 14:33	2037-26-5	
4-Bromofluorobenzene (S)	111	%.	75-125		1		10/14/20 14:33	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

QC Batch: 704416
QC Batch Method: EPA 8260B
Analysis Method: EPA 8260B
Analysis Description: 8260B MSV UST-WATER
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10534505001, 10534505002, 10534505003, 10534505006

METHOD BLANK: 3763318 Matrix: Water
Associated Lab Samples: 10534505001, 10534505002, 10534505003, 10534505006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.17	0.57	10/14/20 13:46	
1,3,5-Trimethylbenzene	ug/L	<0.12	0.41	10/14/20 13:46	
Benzene	ug/L	<0.12	0.40	10/14/20 13:46	
Ethylbenzene	ug/L	<0.075	0.25	10/14/20 13:46	
Methyl-tert-butyl ether	ug/L	<0.12	0.39	10/14/20 13:46	
Naphthalene	ug/L	<0.68	2.3	10/14/20 13:46	
Toluene	ug/L	<0.12	0.41	10/14/20 13:46	
Xylene (Total)	ug/L	<0.29	0.96	10/14/20 13:46	
1,2-Dichloroethane-d4 (S)	%.	101	75-125	10/14/20 13:46	
4-Bromofluorobenzene (S)	%.	110	75-125	10/14/20 13:46	
Toluene-d8 (S)	%.	100	75-125	10/14/20 13:46	

LABORATORY CONTROL SAMPLE: 3763319

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	19.9	100	75-125	
1,3,5-Trimethylbenzene	ug/L	20	20.2	101	75-125	
Benzene	ug/L	20	17.2	86	75-125	
Ethylbenzene	ug/L	20	19.0	95	75-125	
Methyl-tert-butyl ether	ug/L	20	18.2	91	69-125	
Naphthalene	ug/L	20	20.3	102	70-125	
Toluene	ug/L	20	18.4	92	75-125	
Xylene (Total)	ug/L	60	56.1	94	75-125	
1,2-Dichloroethane-d4 (S)	%.			102	75-125	
4-Bromofluorobenzene (S)	%.			112	75-125	
Toluene-d8 (S)	%.			101	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3764881 3764882

Parameter	Units	10535369002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trimethylbenzene	ug/L	<0.17	20	20	17.1	18.6	85	93	56-139	9	30	
1,3,5-Trimethylbenzene	ug/L	<0.12	20	20	17.4	18.9	87	94	63-132	8	30	
Benzene	ug/L	<0.12	20	20	15.0	15.0	75	75	63-125	0	30	
Ethylbenzene	ug/L	<0.075	20	20	16.6	17.4	83	87	66-128	5	30	
Methyl-tert-butyl ether	ug/L	<0.12	20	20	15.8	16.3	79	81	60-125	3	30	
Naphthalene	ug/L	<0.68	20	20	16.9	18.6	84	93	55-135	10	30	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3764881 3764882

Parameter	Units	10535369002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene	ug/L	<0.12	20	20	16.2	16.8	81	84	64-125	3	30	
Xylene (Total)	ug/L	<0.29	60	60	49.3	51.1	82	85	64-131	4	30	
1,2-Dichloroethane-d4 (S)	%.						102	103	75-125			
4-Bromofluorobenzene (S)	%.						108	109	75-125			
Toluene-d8 (S)	%.						100	100	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

QC Batch: 705294
QC Batch Method: EPA 8260B
Analysis Method: EPA 8260B
Analysis Description: 8260B MSV UST-WATER
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10534505004, 10534505005

METHOD BLANK: 3774063 Matrix: Water
Associated Lab Samples: 10534505004, 10534505005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.17	0.57	10/14/20 13:46	
1,3,5-Trimethylbenzene	ug/L	<0.12	0.41	10/19/20 14:20	
Benzene	ug/L	<0.12	0.40	10/19/20 14:20	
Ethylbenzene	ug/L	<0.075	0.25	10/19/20 14:20	
Methyl-tert-butyl ether	ug/L	<0.12	0.39	10/19/20 14:20	
Naphthalene	ug/L	<0.68	2.3	10/14/20 13:46	
Toluene	ug/L	<0.12	0.41	10/19/20 14:20	
Xylene (Total)	ug/L	<0.29	0.96	10/19/20 14:20	
1,2-Dichloroethane-d4 (S)	%.	101	75-125	10/14/20 13:46	
1,2-Dichloroethane-d4 (S)	%.	114	75-125	10/19/20 14:20	
4-Bromofluorobenzene (S)	%.	105	75-125	10/19/20 14:20	
4-Bromofluorobenzene (S)	%.	110	75-125	10/14/20 13:46	
Toluene-d8 (S)	%.	100	75-125	10/14/20 13:46	
Toluene-d8 (S)	%.	108	75-125	10/19/20 14:20	

LABORATORY CONTROL SAMPLE: 3774064

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	19.9	100	75-125	
1,3,5-Trimethylbenzene	ug/L	20	21.3	106	75-125	
Benzene	ug/L	20	17.2	86	75-125	
Ethylbenzene	ug/L	20	19.8	99	75-125	
Methyl-tert-butyl ether	ug/L	20	18.3	91	69-125	
Naphthalene	ug/L	20	20.3	102	70-125	
Toluene	ug/L	20	18.1	90	75-125	
Xylene (Total)	ug/L	60	61.7	103	75-125	
1,2-Dichloroethane-d4 (S)	%.			102	75-125	
1,2-Dichloroethane-d4 (S)	%.			97	75-125	
4-Bromofluorobenzene (S)	%.			102	75-125	
4-Bromofluorobenzene (S)	%.			112	75-125	
Toluene-d8 (S)	%.			101	75-125	
Toluene-d8 (S)	%.			103	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3774061 3774062

Parameter	Units	10536238001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2,4-Trimethylbenzene	ug/L	<0.17	20	20	17.1	18.6	85	93	56-139	9	30	
1,3,5-Trimethylbenzene	ug/L	0.38J	20	20	16.4	17.2	80	84	63-132	5	30	
Benzene	ug/L	<0.12	20	20	12.7	12.7	64	64	63-125	0	30	
Ethylbenzene	ug/L	<0.075	20	20	14.6	14.7	73	73	66-128	1	30	
Methyl-tert-butyl ether	ug/L	<0.12	20	20	12.6	13.6	63	68	60-125	8	30	
Naphthalene	ug/L	<0.68	20	20	16.9	18.6	84	93	55-135	10	30	
Toluene	ug/L	0.41	20	20	13.7	13.5	66	65	64-125	2	30	
Xylene (Total)	ug/L	17.7	60	60	67.3	68.4	83	84	64-131	2	30	
1,2-Dichloroethane-d4 (S)	%.						102	103	75-125			
1,2-Dichloroethane-d4 (S)	%.						96	103	75-125			
1,2-Dichloroethane-d4 (S)	%.						102	99	75-125			
1,2-Dichloroethane-d4 (S)	%.						96	99	75-125			
4-Bromofluorobenzene (S)	%.						108	109	75-125			
4-Bromofluorobenzene (S)	%.						104	103	75-125			
4-Bromofluorobenzene (S)	%.						108	103	75-125			
4-Bromofluorobenzene (S)	%.						104	109	75-125			
Toluene-d8 (S)	%.						100	102	75-125			
Toluene-d8 (S)	%.						100	100	75-125			
Toluene-d8 (S)	%.						100	100	75-125			
Toluene-d8 (S)	%.						100	102	75-125			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1M	Results not compliant with NR-149. No second CCV was analyzed for quadratic curve fit by lab error.
C8	Result may be biased high due to carryover from previously analyzed sample.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 49161494.00 200 203 SRC GW T70
Pace Project No.: 10534505

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10534505001	**MW-3 / T70**	EPA 8260B	704416		
10534505002	**MW-4 / T70**	EPA 8260B	704416		
10534505003	**MW-2R / T70**	EPA 8260B	704416		
10534505004	**MW-5 / T70**	EPA 8260B	705294		
10534505005	**MW-6 / T70**	EPA 8260B	705294		
10534505006	**Trip Blank**	EPA 8260B	704416		

Barr Engineering Co. Chain of Custody

Sample Origination State

☐ CO ☐ MI ☐ MN ☐ MO ☐ ND ☐ TX ☐ UT ☒ WI ☐ Other: _____

COC Number: **№ 587978**

COC 1 of 1

WO# : 10534505

10534505

REPORT TO	INVOICE TO
Company: Barr Engineering Co.	Company: Barr
Address: 325 S. Lake Ave.	Address:
Address: Duluth, MN 55802	Address:
Name: Lynette Carney	Name:
email: lcarney@barr.com	email:
Copy to: BarrDM@barr.com	P.O. —
Project Name: SEC GW Sampling Tank 70	Barr Project No: 49161494.00 200 203

Matrix Code: GW = Groundwater; SW = Surface Water

Preservative Code: A = None; B = HCl; HNO_3; H_2SO_4; NaOH; MeOH; $NaHSO_4$; $Na_2S_2O_3$; Ascorbic Acid; Zn Acetate; K = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water: Voc + Naphthalene	Soil: % Sol	Preservative Code	Field Filtered Y/N	
1. MW-3/T70	—			10/06/2020	0920	GW	N	3	X				001
2. MW-4/T70	—				0925		N	3	X				002
3. MW-2R/T70	—				0928		N	3	X				003
4. MW-5/T70	—				0934		N	3	X				004
5. MW-6/T70	—				0937		N	3	X				005
6. Trip Blank	—				—	—	N	2	X				006
7.													
8.													
9.													
10.													

BARR USE ONLY

Sampled by: KMJ3

Barr Proj. Manager: LMC

Barr DQ Manager: JET

Lab Name: Pace

Lab Location: Minneapolis

Relinquished by: Kaitlin Moritz — On Ice? Y / N: Y — Date: 10/6/20 — Time: 1310

Received by: — Date: 10/6/20 — Time: 1310

Relinquished by: — On Ice? Y / N: Y — Date: 10/6/20 — Time: 1900

Received by: PACE — Date: 10/6/20 — Time: 1930

Samples Shipped VIA: ☐ Ground Courier ☐ Air Carrier ☐ Sampler ☐ Other: _____

Air Bill Number:

Lab WO:

Temperature on Receipt (°C): 4.5 Custody Seal Intact? ☐ Y ☐ N ☐ None

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)

Distribution - White-Original: Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Scan and email:** a copy to BarrDM@barr.com for tracking and filing procedures

H:\RLG\STDFORMS\Chain of Custody Form 2015 RLG Rev. 01/30/2020

Pace Analytical®	Document Name: Sample Condition Upon Receipt (SCUR) - MN	Document Revised: 12Aug2020 Page 1 of 1
	Document No.: ENV-FRM-MIN4-0150 Rev.01	Pace Analytical Services - Minneapolis

Sample Condition Upon Receipt

Client Name: Barr

Project #: WO#: 10534505

PM: AA1 Due Date: 10/14/20
CLIENT: BARR

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☑ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: _____ See Exceptions ☐ ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No

Thermometer: ☐ T1(0461) ☑ T2(1336) ☐ T3(0459) ☐ T4(0254) ☐ T5(0489) **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☒ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 4.8 °C **Average Corrected Temp (no temp blank only):** _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

Correction Factor: +.1 **Cooler Temp Corrected w/temp blank:** 4.5 °C

USDA Regulated Soil: (☒ N/A, water sample/Other: _____) **Date/Initials of Person Examining Contents:** AB 10/9/20

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other _____
Rush Turn Around Time Requested?	☐ Yes	☒ No		6.
Sufficient Volume?	☑ Yes	☐ No		7.
Correct Containers Used?	☑ Yes	☐ No		8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐ ENV-FRM-MIN4-0142
Matrix: ☒ Water ☐ Soil ☐ Oil ☐ Other _____				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☑ Yes	☐ No	☐ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No **pH Paper Lot#** **See Exception** ☐ ENV-FRM-MIN4-0142
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	13. **See Exception** ☐ ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☒ No	☐ N/A	
Trip Blank Present?	☑ Yes	☐ No	☐ N/A	14.
Trip Blank Custody Seals Present?	☑ Yes	☐ No	☐ N/A	Pace Trip Blank Lot # (if purchased): 273500 (2)

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 10/9/20

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: RVC