

January 6, 2022

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

**Re: 2021 Remediation Progress Report for Murphy Oil Tank 40 Release Site
Superior Refining Company LLC Refinery, Superior, WI
WDNR BRRTS# 02-16-222712
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 40 Basin release site (Tank 40) 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 2021.

1.0 Facility and Site Background Information

Figure 1 shows the location of Tank 40 within the refinery, the approximate property boundary of the refinery, and the area surrounding the refinery. Figure 2 presents the site layout of Tank 40 which is located in the SW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 25, Township 49 North, Range 14 West, Superior Township of Douglas County, Wisconsin.

The closest surface water to Tank 40 is Newton Creek, located approximately 2,000 feet east of the Tank 40 basin (Figure 1). The Tank 40 basin is located in the central area of the refinery which is relatively flat. The basin's ground surface is unpaved and is underlain by native clay. The average depth to groundwater in the Tank 40 monitoring wells is 3 to 4 feet below ground surface (bgs) depending on time of year. The regional groundwater flow direction below the refinery and across the Tank 40 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 Energy Inc. (Cenovus) merged to become Cenovus, however the legal name of the refinery will remain unchanged.

2.0 Tank 40 Basin Release Site Investigation and Remediation Summary

On October 17, 1998, approximately 2,300 gallons of "straight-run" gasoline were released in the Tank 40 basin. Murphy Oil notified the WDNR of the release in a letter dated December 2, 1998. At the time of the spill, the diked area was full of storm water, and the released gasoline floated on top of the storm water within the diked area. A vacuum truck was used to recover storm water and residual product from the diked area. These liquids were placed in Murphy Oil's No. 1 American Petroleum Institute (API) oil/water separator for recovery of the gasoline. As a safety precaution, the affected area was washed with water, and the wash water also was removed with a vacuum truck and placed in the API separator. Following the release and immediate response actions, multiple phases of investigation were completed including soil borings and the installation of monitoring wells, monitoring points, test pits, and recovery sumps. Currently, long-term groundwater monitoring is being conducted at the site as well as product gauging and passive recovery. This report presents monitoring and product gauging data for 2021.

As described in previous reports, measurable product has been encountered in the monitoring wells associated with the Tank 40 basin on multiple occasions. Free product was initially encountered in the basin in July 2000. Since then, the monitoring network in the Tank 40 basin (monitoring wells MW-1/T40, MW-2/T40, and MW-4/T40 through MW-7/T40; monitoring points MP-1/T40 through MP-3/T40, and test pit sump TP-1/T40; and an interceptor trench with a sump TS-1/T40) have been routinely monitored for the presence of product (Figure 2). If present, product was removed and sent through the refinery's No. 1 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). Monitoring well MW-3/T40 was abandoned in July 2007 (GF, 2019).

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 $< 1 \times 10^{-5}$ 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. 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. Recovered product and purged water are separated and stored or sent through the refinery's No. 1 API oil/water separator and on-site WWTP as described above (GF, 2019).

Based on the consistent and relatively widespread presence of product in the basin between July 2000 and July 2003, an interceptor trench was installed in August 2003 (GF, 2019). The 100-foot long interceptor trench was installed near the downgradient edge of apparent free product. Each end of the 8- to 8.5-foot-deep trench slopes toward its middle, and a 6-inch diameter recovery trench sump (TS-1/T40)

was installed in the middle of the trench (Figure 2). Since the native clay surrounding this trench has a low permeability, the interceptor trench fills relatively slowly (GF, 2019).

Between June 2004 and April 2010, recovery trench sump TS-1/T40 was periodically pumped, and approximately 187,000 gallons of gasoline-contaminated groundwater were recovered. The pumped water was treated in the refinery's No. 1 API separator/WWTP. The goal was to keep the water level in the trench relatively low to promote the flow of petroleum-contaminated groundwater and product into the trench. Since the trench was installed in August 2003, no measurable product, only petroleum-contaminated groundwater, has accumulated in TS-1/T40. As a result, no further pumping of the recovery trench sump is currently planned unless product accumulates in TS-1/T40, as described in the Future Work section of this report.

3.0 Remedial and Monitoring Activities in 2021

Year-round access to wells, monitoring points, and sumps 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. Separated oil is stored for use at the refinery and the water is treated at the on-site WWTP.

Monitoring wells and recovery sump TS-1/T40 are gauged, purged and sampled in spring and fall (typically April /May and September/October). Monitoring wells, monitoring points and sumps are routinely checked for the presence of product and, if encountered, the product is removed from the well, point, or sump by bailing.

Since the most recent remediation progress report was submitted to the WDNR on February 26, 2021 (Barr, 2021), work at Tank 40 has included the gauging of water and product levels in associated site monitoring wells, monitoring points, test pit sump, and recovery trench sump and the collection of groundwater samples from select locations. Monitoring and sampling activities conducted in 2021 are summarized in Table 1.

3.1 Product Recovery

During the reporting period, measurable product was not encountered in the monitoring wells, monitoring points, test pit sump, or recovery trench sump. As established in the 2019 report (GF, 2019), if free product is not observed during the April/May gauging event, the wells, points, and sumps 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 40 basin.

3.2 Groundwater Sampling and Results

Groundwater samples were collected by Barr and Insight Environmental (Insight) field staff at the site in spring (May and June) and fall (October) 2021. 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. Point MP-2/T40 was dry, and a gauging measurement could not be obtained during the September 8, 2021 purge event. Routine sampling of monitoring wells MW-1/T40, MW-2/T40, and MW-4/T40 through MW-7/T40 was conducted

on May 24, 2021 and October 4, 2021. The collection of groundwater samples from recovery trench sump TS-1/T40 was inadvertently missed during the May sampling event and subsequently was sampled on June 2, 2021, and October 4, 2021. Field staff used a new one-time-use polyethylene disposable bailer with new nylon rope to collect each groundwater sample. The spring 2021 groundwater samples were sent to Pace Analytical (Pace) in Green Bay, Wisconsin (Wisconsin laboratory certification #405132750) and the fall 2021 samples were sent to Pace in Minneapolis, Minnesota (Wisconsin laboratory certification #999407970); samples were analyzed for petroleum volatile organic compounds (PVOCs) 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).

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 of 1,2,4-TMB and 1,3,5-TMB. As shown in Table 2:

- Samples from the six monitored wells collected in May and October 2021 and interceptor trench (TS-1/T40) collected in June and October 2021 contained one or more PVOCs at concentrations equal to or greater than NR 140 ES with the exception of June 2021 concentrations at TS-1/T40 when no detections were recorded.
- Historically, samples collected from the monitoring wells and recovery trench sump contained one or more PVOC compounds at a concentration at or above its applicable NR 140 ES.
- Because of the removal of accumulated free product over the years, PVOC concentrations in the wells have been stable or decreasing. Figure 3 presents trend analysis plots for benzene concentrations in groundwater samples from MW-1/T40, MW-4/T40, MW-5/T40, MW-6/T40, and MW-7/T40. 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. The best-fit exponential trend lines were generated using a scatter plot chart. As shown on Figure 3, dissolved-phase benzene 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 2021.

Historically, a groundwater contour map for the Tank 40 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 40 site has not been created. However, the regional groundwater flow direction in the vicinity of the Tank 40 site is to the east (GF, 2014) (Figure 2).

4.0 Future Work

SRC's work plan for 2022 is as follows:

- Assess the condition of monitoring point MP-2/T40 which was dry or potentially obstructed during the fall 2021 gauging event.
- Continue to check for, and if present, manually bail product monthly (as conditions allow) from the six monitoring wells (MW-1/T40, MW-2/T40, and MW-4/T40 through MW-7/T40), three

monitoring points (MP-1/T40 through MP-3/T40), test pit sump (TP-1/T40) and recovery trench sump (TS-1/T40). If, however, product is not observed during the spring gauging event, as was the case in 2019- 2021, these wells, point, and sumps will only be checked quarterly. If product is observed in TS-1/T40, the recovery trench sump will be pumped out using an on-site vacuum truck. Any purged product/water will continue to be separated and stored or sent through the refinery's No. 1 API oil/water separator and on-site WWTP.

- Collect biannual (spring and fall) groundwater samples from monitoring wells and the recovery trench sump TS-1/T40 when free product is not observed, and have the samples analyzed for PVOCs by a Wisconsin-certified laboratory using EPA Method 8260B. Each monitoring well (but not TS-1/T40) will be purged dry twice and allowed to recover for at least 14 days prior to the collection of samples.
- Report the results of groundwater sample analysis, as well as the results of the recovery of product, in a remediation progress report to the WDNR by the end of January 2023. If product is not encountered in any of the wells in 2022, and decreasing trends in contaminant concentrations continue, a site closure request may be prepared for WDNR review and approval.

Feel free to contact Matt Turner at SRC and/or me if you have any comments, questions, or need additional information.

Sincerely,

BARR ENGINEERING CO.



Lynette M. Carney
Project Manager

cc: Matt Turner (SRC)

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Table 2	Groundwater Analytical Results for GRO and Detected VOCs

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Figure 3	Benzene Groundwater Concentrations vs. Time, MW-1/T40, MW-4/T40, MW-5/T40, MW-6/T40, and MW-7/T40

Attachments

Attachment A Pace Analytical Laboratory Reports

References

- Barr Engineering Co., 2021. *2021 Remediation Progress Report for Murphy Oil Tank 40 Release Site, Superior Refining Company LLC Refinery, Superior, WI, WDNR BRRTS# 02-16-222712, Facility ID: 816009590*. February 26, 2021.
- 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, 2019. *2019 Remediation Progress Report for Tank 40 Release Site, Superior Refining Company LLC Refinery, Superior, WI, WDNR BRRTS# 02-16-222712 and Facility ID: 816009590*. November 26, 2019.
- Wisconsin Department of Natural Resources, 2020. *Reminder to Include Evaluation of Emerging Contaminants in Site Investigation, Murphy Oil – Tank #40, 2407 Stinson Ave, BRRTS# 02-16-222712*. Letter to Husky Energy dated August 17, 2020.

CERTIFICATIONS

"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

January 6, 2022

Date

Tables

Table 1
2021 Fluid Level Monitoring Data
Tank 40 Release Site (1)
Superior Refining Company LLC
Superior, Wisconsin

Date	MP-1/T40		MP-2/T40		MP-3/T40		MW-1/T40		MW-2/T40		MW-4/T40		MW-5/T40		MW-6/T40		MW-7/T40		TP-1/T40		TS-1/T40		Comments/	
	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	Footnotes	
	Depth to Fluid from Top of Casing (feet)																							
04/28/21	--	4.74	--	5.79	--	6.99	--	4.09	--	3.05	--	4.74	--	3.46	--	6.60	--	3.48	--	4.88	--	3.31	(2)	
05/11/21	--	5.41	--	6.65	--	7.65	--	5.27	--	3.31	--	5.38	--	4.49	--	4.38	--	4.57	--	5.19	--	4.56	(2)	
05/24/21	--	4.75	--	5.99	--	7.00	--	4.01	--	3.51	--	4.78	--	3.47	--	3.58	--	3.43	--	4.95	--	3.31	(3)	
06/02/21	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	nm	(3)
07/27/21	--	6.80	--	7.83	--	9.01	--	4.27	--	4.14	--	5.16	--	5.05	--	5.72	--	5.41	--	6.44	--	4.96	(4)	
09/08/21	--	8.00	--	nm	--	9.64	--	5.56	--	4.85	--	5.80	--	4.54	--	5.05	--	6.27	--	6.48	--	5.20	(2)	
09/21/21	--	4.93	--	6.04	--	7.09	--	4.03	--	3.68	--	4.85	--	4.03	--	4.4	--	3.53	--	4.98	--	3.35	(2)	
10/04/21	--	5.11	--	5.81	--	7.09	--	4.11	--	7.15	--	4.86	--	3.66	--	4.08	--	3.59	--	4.99	--	3.39	(3)	

NOTES:

DTP = Depth to product.

DTW = Depth to water.

nm = Not measured.

-- = Not applicable/no free product.

FOOTNOTES:

(1) Table does not include data from MW-5/T40 when that well was gauged for Environmental Repair Program (ERP) monitoring.

(2) Bailed the monitoring wells (MWs) dry in preparation for sampling.

(3) Sampled the MWs (see Table 2 for summary of analytical results).

(4) Free product check

Table 2
Groundwater Analytical Results for GRO and Detected VOCs
Tank 40 Release Site
Superior Refining Company LLC
Superior, Wisconsin

Well ID Date	Substance Concentration (µg/l) and Results Qualifier (if any)								
	GRO	Benzene	Ethylbenzene	Toluene	Xylenes	TMBs	MTBE	Isopropylbenzene	n-Propylbenzene
NR 140 PAL	NS	0.5	140	160	400	96	12	NS	NS
NR 140 ES	NS	5	700	800	2,000	480	60	NS	NS
MW-1/T40									
10/6/1999	8180	445	206	961	2850	525	< 6.0	36.2	< 15.0
12/9/1999	8860	433	293	402	3170	2677	< 6.0	na	na
3/9/2000	15000	1700	720	1400	5800	1170	< 16	na	na
6/14/2000	21000	2400	570	2100	6900	1620	< 24	na	na
9/12/2000	32000	2100	850	1000	5500	1180	< 24	na	na
3/21/2001	20000	2700	890	860	7100	1520	< 24	na	na
3/6/2002	10000	2000	500	140	5200	1200	< 10	na	na
9/12/2002	14000	1600	710	32	4210	1170	< 4.3	na	na
3/12/2003	FP	FP	FP	FP	FP	FP	FP	FP	FP
9/30/2004	23000	3200	1400	2800	6700	1280	< 9.0	na	na
5/26/2005	25100	3340	1600	2620	8370	1705	< 30.0	na	na
11/9/2005	18200	3170	1350	1780	8560	1605	< 30.0	na	na
5/10/2006	20500	3750	1290	1500	8190	1674	< 15.0	na	na
11/16/2006	25800	2730	1670	2200	7900	1557	< 30.0	na	na
5/23/2007	16700	2260	706	756	5350	1385	< 15.0	na	na
11/15/2007	22500	2100	1220	621	6740	1897	< 60.0	na	na
5/27/2008	22400	3410	1270	763	7700	1614	< 60.0	na	na
11/24/2008	16600	1990	882	401	5760	1543	< 30.0	na	na
5/27/2009	19700	3340	1510	361	7870	1703	< 30.0	na	na
11/23/2009	8720	1040	377	66.0	3264	791	< 6.00	na	na
5/19/2010	10400	1460	642	44.8 J	3644	845	< 15.0	na	na
10/21/2010	15000	2040	817	23.8 J	5391	1396	< 15.0	na	na
6/16/2011	na	1640	742	< 20.0	4067	837	< 25.0	na	na
10/25/2011	na	1720	684	< 20.0	4646	1198	< 25.0	na	na
5/16/2012	na	2030	868	< 13.4	5088	1377	< 12.2	na	na
8/21/2013	na	2110	1050	< 8.8	5499	1769	< 9.9	na	na
6/24/2014	na	466	83.9	< 5.0	1797.3	779	< 1.7	na	na
10/21/2014	na	438	6.1	< 2.5	2406	901	< 0.87	na	na
6/23/2015	na	1530	480	< 5.0	3996	1105	< 1.7	na	na
10/6/2015	na	0.51 J	0.79 J	1.4	8.51 J	123.0	< 0.17	na	na
5/24/2016	na	2520	1030	< 10.0	5744	1189	< 3.5	na	na
10/5/2016	na	163	7.5 J	< 5.0	1003.1	312.9	< 1.7	na	na
5/16/2017	na	1790	815	< 12.5	5250	1252	< 4.4	na	na
10/25/2017	na	616	27.0	< 12.5	2094.3	569	< 4.4	na	na
6/12/2018	na	1240	405	< 10.0	3616.2	1106	< 3.5	na	na
10/9/2018	na	48.7	0.79 J	0.86 J	374.3	183.9	< 1.2	na	na
5/21/2019	na	374	103	0.61 J	1179.8	426	< 1.2	na	na
10/9/2019	na	100	1.2	0.55 J	317.2	133.5	< 1.2	na	na
5/27/2020	na	152 J-	64.1	< 0.67	311	125	< 3.1	na	na
10/6/2020	na	1460	613	1.8	4900	1544	< 0.12	na	na
5/24/2021	na	334	185	< 0.72	987	291	< 2.8	na	na
10/4/2021	na	125	27.1	0.60	670	334	< 0.18	na	na
MW-2/T40									
3/6/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/12/2002	FP	FP	FP	FP	FP	FP	FP	FP	FP
thru	FP	FP	FP	FP	FP	FP	FP	FP	FP
9/30/2004	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/26/2005	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/9/2005	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/16/2006	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/23/2007	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/15/2007	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/27/2008	FP	FP	FP	FP	FP	FP	FP	FP	FP

Table 2
Groundwater Analytical Results for GRO and Detected VOCs
Tank 40 Release Site
Superior Refining Company LLC
Superior, Wisconsin

Well ID	Substance Concentration (µg/l) and Results Qualifier (if any)								
	Date	GRO	Benzene	Ethylbenzene	Toluene	Xylenes	TMBs	MTBE	Isopropylbenzene
NR 140 PAL	NS	0.5	140	160	400	96	12	NS	NS
NR 140 ES	NS	5	700	800	2,000	480	60	NS	NS
11/24/2008	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/27/2009	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/23/2009	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/19/2010	FP	FP	FP	FP	FP	FP	FP	FP	FP
10/21/2010	FP	FP	FP	FP	FP	FP	FP	FP	FP
6/16/2011	FP	FP	FP	FP	FP	FP	FP	FP	FP
10/25/2011	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/16/2012	FP	FP	FP	FP	FP	FP	FP	FP	FP
8/21/2013	na	13400	3190	13100	12460	2599	< 49.4	na	na
6/24/2014	na	12000	2000	10100	9370	1375	< 21.8	na	na
10/21/2014	FP	FP	FP	FP	FP	FP	FP	FP	FP
6/23/2015	FP	FP	FP	FP	FP	FP	FP	FP	FP
10/6/2015	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/24/2016	na	15300	1740	7970	8770	1374	< 17.4	na	na
10/5/2016	na	6870	899	4330	9840	2186	< 8.7	na	na
5/16/2017	na	11500	1640	4730	10470	1392	< 17.4	na	na
10/25/2017	FP	FP	FP	FP	FP	FP	FP	FP	FP
6/12/2018	na	10400	1570	2080	9920	1635	< 21.8	na	na
10/9/2018	na	8450	1280	1130	9980	1349	< 156	na	na
5/21/2019	na	12100	1710	661	10300	1473	< 156	na	na
10/9/2019	na	10600	1670	464	8910	1445	< 156	na	na
5/27/2020	na	9940	1230	166	8470	1544	< 125	na	na
10/6/2020	na	10100	1700	128	9420	1562	< 1.2	na	na
5/24/2021	na	8790	1280	34.0	7520	1279	< 113	na	na
10/4/2021	na	9760	1470	14.6	9700	1510	< 9.0	na	na
MW-3/T40									
3/6/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/12/2002	FP	FP	FP	FP	FP	FP	FP	FP	FP
3/12/2003	FP	FP	FP	FP	FP	FP	FP	FP	FP
9/30/2004	Well was not available for monitoring due to construction activities and was subsequently abandoned in July 2007								
MW-4/T40									
3/6/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/12/2002	42000	19000	1300	6200	4500	760	< 110	< 82	< 120
3/12/2003	FP	FP	FP	FP	FP	FP	FP	FP	FP
9/30/2004	FP	FP	FP	FP	FP	FP	FP	FP	FP
5/26/2005	64300	20500	2010	11900	9360	1581	< 150	na	na
11/9/2005	66600	17000	1620	9190	10710	3017	< 300	na	na
5/10/2006	62000	24900	2020	12100	9160	1780	< 60.0	na	na
11/16/2006	52100	20900	1450	8680	7970	1462	< 15.0	na	na
5/23/2007	FP	FP	FP	FP	FP	FP	FP	FP	FP
11/15/2007	50200	16000	1810	7720	7220	1519	< 75.0	na	na
5/27/2008	62100	23200	2100	10400	9940	2067	< 75.0	na	na
11/24/2008	51100	18300	1630	8000	8810	2167	< 75.0	na	na
5/27/2009	50900	21000	1570	8410	9910	1994	< 60.0	na	na
11/23/2009	46300	17000	1050	6290	8590	1798	< 30.0	na	na
5/19/2010	47900	17600	1150	6350	8470	1805	< 60.0	na	na
10/19/2010	53500	17700	1140	6180	11900	3136	< 75.0	na	na
6/16/2011	na	18800	1120	5880	7630	1446	< 250	na	na
10/25/2011	na	18600	1980	6460	8360	1419	< 250	na	na
5/16/2012	na	17100	1220	4910	8640	2058	< 61.0	na	na
8/21/2013	na	16800	1630	3070	9200	2428	< 49.9	na	na
6/24/2014	na	15700	949	1490	7660	1616	< 34.8	na	na
10/21/2014	na	10400	537	790	6830	1510	< 17.4	na	na
6/23/2015	na	8260	516	277	5180	1437	< 17.4	na	na
10/6/2015	na	6500	109	< 50	4530	1103	< 17.4	na	na

Table 2
Groundwater Analytical Results for GRO and Detected VOCs
Tank 40 Release Site
Superior Refining Company LLC
Superior, Wisconsin

Well ID	Substance Concentration (µg/l) and Results Qualifier (if any)								
	GRO	Benzene	Ethylbenzene	Toluene	Xylenes	TMBs	MTBE	Isopropylbenzene	n-Propylbenzene
NR 140 PAL	NS	0.5	140	160	400	96	12	NS	NS
NR 140 ES	NS	5	700	800	2,000	480	60	NS	NS
5/24/2016	na	14600	836	< 50	7240	1550	< 17.4	na	na
10/5/2016	na	1890	< 10.0	< 10.0	2293	778	< 3.5	na	na
5/16/2017	na	10200	807	< 50	7120	1285	< 17.4	na	na
10/25/2017	na	5890	138	< 50	6500	1459	< 17.4	na	na
6/12/2018	na	1640	39.3	< 10.0	1282	377.6	< 3.5	na	na
10/9/2018	na	3750	28.4	< 3.4	4780	1096	< 24.9	na	na
5/21/2019	na	3950	185	< 3.4	2421	562	< 24.9	na	na
10/9/2019	na	4910	214	5.3 J	3710	1061	< 24.9	na	na
5/27/2020	na	2770	94.6	< 10.8	1770	525.6 a	< 49.8	na	na
10/6/2020	na	10200	887	2.5	6680	1792	< 0.12	na	na
5/24/2021	na	4750	250	< 7.2	2620	818	< 28.2	na	na
10/4/2021	na	2960	67.8	2.6	2820	1020	< 0.36	na	na
MW-5/T40									
3/6/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/12/2002	< 50	< 0.25	< 0.53	< 0.84	< 1.83	< 1.33	< 0.87	< 0.66	< 0.95
3/12/2003	100	3.9	1.4 J	< 0.68	6.0 J	4.12	< 0.43	na	na
9/30/2004	18000	980	1900	10.0 J	5800	1170	4.2 J	na	na
5/26/2005	18700	482	1930	< 60	7750	1558	< 60	na	na
11/9/2005	11500	372	1550	< 30.0	5430	1066	< 30.0	na	na
5/10/2006	10500	357	1400	< 3.00	5200	855	< 3.00	na	na
11/16/2006	14900	270	1820	< 15.0	6310	1381	< 15.0	na	na
5/23/2007	16700	279	1900	< 6.00	7070	1611	< 6.00	na	na
11/15/2007	9840	148	495	< 6.00	2588	1059	< 6.00	na	na
5/27/2008	10400	254	833	28.7	3194	1006	< 6.00	na	na
11/24/2008	11000	167	1020	24.8	3288	1052	23.2 J	na	na
5/27/2009	5010	177	324	33.8 J	1132	427	< 15.0	na	na
11/23/2009	9990	191	888	21.2 J	2725	821	< 6.00	na	na
5/19/2010	8730	160	638	< 7.40	2170	805	< 6.00	na	na
10/19/2010	9980	173	833	< 7.40	2663	880	14.6 J	na	na
6/16/2011	na	205	607	< 8.00	1835	576	< 10.0	na	na
10/25/2011	na	185	778	< 8.00	2331	1142	< 10.0	na	na
5/16/2012	na	220	579	< 3.4	1566	492	< 3.0	na	na
8/21/2013	na	310	825	< 4.4	1601.2	736	< 4.9	na	na
6/24/2014	na	135	756	< 2.5	1839.5	673	< 0.87	na	na
10/21/2014	na	63.1	208	< 1.2	611.0	256.7	< 0.44	na	na
6/23/2015	na	3.0	11.2	< 0.50	< 28.9	10.7	< 0.17	na	na
10/6/2015	na	< 0.50	< 0.50	0.70 J	1.60 J	1.01 J	< 0.17	na	na
5/24/2016	na	50.3	152	< 1.0	479.7 J	165.9	< 0.35	na	na
10/5/2016	na	< 0.50	< 0.50	< 0.50	< 1.50	< 1.00	< 0.17	na	na
5/16/2017	na	43.6	259	< 1.2	668.5 J	247.7	< 0.44	na	na
10/25/2017	na	< 0.50	< 0.50	< 0.50	< 1.50	< 1.00	< 0.17	na	na
6/12/2018	na	3.3	16.6	< 0.50	< 76.40	33.9	< 0.17	na	na
10/9/2018	na	9.6	30.4	< 0.17	< 115.26	81.9	< 1.2	na	na
5/21/2019	na	62.2	218	< 0.17	859.99 J	353.8	< 1.2	na	na
10/9/2019	na	6.7	8.2	< 0.17	172.44 J	120.7	< 1.2	na	na
5/27/2020	na	47.9	261	< 0.27	643	272.1	< 1.2	na	na
10/6/2020	na	56.9	424	< 0.12	913	443	< 0.12	na	na
5/24/2021	na	55.3	197	< 1.2	517	256.2	< 4.5	na	na
10/4/2021	na	29.2	209	< 0.11	457	278.8	< 0.18	na	na
MW-6/T40									
3/6/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/12/2002	< 50	6.8	< 0.53	< 0.84	< 1.83	< 1.33	< 0.87	< 0.66	< 0.95
3/12/2003	370	170	8	0.85 J	18.2	6.2	< 0.43	na	na
11/15/2007	4440	1500	396	< 6.00	545.3	108.1	< 6.00	na	na

Table 2
Groundwater Analytical Results for GRO and Detected VOCs
Tank 40 Release Site
Superior Refining Company LLC
Superior, Wisconsin

Well ID	Substance Concentration (µg/l) and Results Qualifier (if any)								
	Date	GRO	Benzene	Ethylbenzene	Toluene	Xylenes	TMBs	MTBE	Isopropylbenzene
NR 140 PAL	NS	0.5	140	160	400	96	12	NS	NS
NR 140 ES	NS	5	700	800	2,000	480	60	NS	NS
5/27/2008	5420	2190	572	< 6.00	666.3	157.9	< 6.00	na	na
11/24/2008	6570	1840	808	< 6.00	1092	275.2	26.2 J	na	na
5/27/2009	6070	2590	866	< 7.40	1074	257.4	24.7 J	na	na
11/23/2009	3900	1110	421	< 3.70	691	134.5	< 3.00	na	na
5/19/2010	4470	1520	503	< 7.40	635.8	169.9	< 6.00	na	na
10/21/2010	2630	1110	274	< 7.40	225.4	62.7 J	12.5 J	na	na
6/16/2011	na	2010	615	< 8.00	668.1	165.8	< 10.0	na	na
10/25/2011	na	584	100	< 8.00	63.63 J	37.9 J	< 10.0	na	na
5/16/2012	na	1040	249	< 6.7	140.1	72.2	< 6.1	na	na
8/21/2013	na	1510	607	< 4.4	373	183.1 J	< 4.9	na	na
6/24/2014	na	1600	539	< 12.5	< 374.5	< 49.6	< 4.4	na	na
10/21/2014	na	233	56.1	< 1.0	< 81.3	36.1 J	< 0.35	na	na
6/23/2015	na	1290	507	< 5.0	552.0	138.6	< 1.7	na	na
10/6/2015	na	123	8.8	< 0.50	< 9.3	< 5.3	< 0.17	na	na
5/24/2016	na	649	209	< 2.0	< 245.0	69.7	< 0.70	na	na
10/5/2016	na	12.3	< 0.50	< 0.50	< 1.50	< 1.00	< 0.17	na	na
5/16/2017	na	607	342	< 2.0	475.2 J	109.6	< 0.70	na	na
10/25/2017	na	0.63 J	< 0.50	< 0.50	< 1.50	< 1.80	< 0.17	na	na
6/12/2018	na	1180	662	< 0.50	824.3	278.3	< 0.17	na	na
10/9/2018	na	< 0.25	< 0.22	< 0.17	< 0.73	< 1.71	< 1.2	na	na
5/21/2019	na	347	195	< 0.17	< 249.26	75.2	< 1.2	na	na
10/9/2019	na	9.4	< 0.22	< 0.17	< 0.73	< 1.71	< 1.2	na	na
5/27/2020	na	730	459	< 1.3	470	156.9	< 6.2	na	na
10/6/2020	na	222	2.6	< 0.24	< 0.57	1.82 a	< 0.23	na	na
5/24/2021	na	930	646	< 1.4	710	223.3	< 5.6	na	na
10/4/2021	na	150	3.0	< 0.11	0.56 J	< 0.22	< 0.18	na	na
MW-7/T40									
3/6/2002	NI	NI	NI	NI	NI	NI	NI	NI	NI
9/12/2002	46000	12000	3100	13000	9700	1410	< 87	150 J	220 J
3/12/2003	48000	10000	2800	11000	8900	1540	< 22	na	na
11/15/2007	56300	8940	2190	12100	9870	2167	< 60.0	na	na
5/27/2008	112000	11100	3180	15500	18370	6110	< 60.0	na	na
11/24/2008	38800	6620	1280	7970	9270	2402	< 60.0	na	na
5/27/2009	51000	9480	2010	10800	11120	2227	< 60.0	na	na
11/23/2009	37000	6640	1090	7000	9020	1922	< 30.0	na	na
5/19/2010	33300	6050	814	5380	7580	1869	< 60.0	na	na
10/21/2010	248000	7900	4560	10400	34300	17700	< 60.0	na	na
6/16/2011	na	6110	511	4430	5060	896	< 100	na	na
10/25/2011	na	5490	1750	5590	9310	2175	< 100	na	na
5/16/2012	na	5090	1570	4220	11330	6170	< 24.4	na	na
8/21/2013	na	5400	1700	2400	9450	2424	< 9.9	na	na
6/24/2014	na	4680	893	1010	6090	1043	< 8.7	na	na
10/21/2014	na	2870	651	266	4740	881	< 8.7	na	na
6/23/2015	na	3660	733	167	4890	920	< 7.0	na	na
10/6/2015	na	2150	513	39.3 J	3410	607	< 7.0	na	na
5/24/2016	na	2710	351	< 10.0	2415	452	< 3.5	na	na
10/5/2016	na	506	71.0	5.2	1148	280.3	< 0.87	na	na
5/16/2017	na	2670	528	25.8	3234	541	< 3.5	na	na
10/25/2017	na	1220	113	< 10.0	2101	565	< 3.5	na	na
6/12/2018	na	934	71.4	< 10.0	1141	279.7	< 3.5	na	na
10/9/2018	na	275	33.3	1.9 J	376.3	120.2	< 2.5	na	na
5/21/2019	na	802	189	4.4 J	809	187.0	< 2.5	na	na
10/9/2019	na	4850	1200	5.6 J	4262	1091	< 12.5	na	na

Table 2
Groundwater Analytical Results for GRO and Detected VOCs
Tank 40 Release Site
Superior Refining Company LLC
Superior, Wisconsin

Well ID Date	Substance Concentration (µg/ℓ) and Results Qualifier (if any)								Isopropyl- benzene	n-Propyl- benzene
	GRO	Benzene	Ethylbenzene	Toluene	Xylenes	TMBs	MTBE			
NR 140 PAL	NS	<i>0.5</i>	<i>140</i>	<i>160</i>	<i>400</i>	<i>96</i>	<i>12</i>	NS	NS	
NR 140 ES	NS	5	700	800	2,000	480	60	NS	NS	
5/27/2020	na	220	54.4	0.48 J	162	55.5	< 1.2	na	na	
10/6/2020	na	4610	1280	2.6	5030	1351	< 0.12	na	na	
5/24/2021	na	157	29.8	< 0.72	122	37.0	< 2.8	na	na	
10/4/2021	na	700	182	1.6	921	336	< 0.18	na	na	
TS-1/T40 (recovery sump installed in a groundwater interceptor trench)										
9/30/2004	4300	140	480	6.7	529	530	0.94 J	na	na	
5/26/2005	1510	30.4	< 2.50	105	519	208.4	< 1.50	na	na	
11/9/2005	3120	125	312	< 15.0	318.9	666	< 15.0	na	na	
11/16/2006	1020	139	61.8	< 0.300	44.08	224.8	< 0.300	na	na	
11/15/2007	3790	348	681	< 3.00	773	350.9	< 3.00	na	na	
5/27/2008	4140	275	555	15.1	549	645.4	< 3.00	na	na	
11/24/2008	1020	80.1	158	7.28 J	137.2	178.2	< 3.00	na	na	
5/27/2009	655	103	15.1	< 0.370	7.40	13.74	1.68 J	na	na	
11/23/2009	462	67	20.5	4.64	6.78	17.916	< 0.300	na	na	
5/19/2010	803	127	83.8	< 0.370	33.07	76.9	1.61 J	na	na	
10/21/2010	< 50.0	< 0.310	< 0.500	< 0.370	< 1.390	< 0.84	< 0.300	na	na	
6/16/2011	na	54.9	84.0	< 0.40	67.32	62.29	< 0.50	na	na	
10/25/2011	na	393	152	< 4.00	84.1	147.0	< 5.00	na	na	
5/16/2012	na	229	103	< 1.7	59.2	35.6	< 1.5	na	na	
8/21/2013	na	41.2	12.2	< 0.44	4.6	14.6 J	< 0.49	na	na	
10/21/2014	na	< 0.50	< 0.50	< 0.50	< 1.50	< 1.00	< 0.17	na	na	
6/23/2015	na	34.9	1.9	< 0.50	< 1.50	2.29 J	< 0.17	na	na	
10/6/2015	na	4.6	1.1	< 0.50	< 1.50	10.9	< 0.17	na	na	
5/24/2016	na	73.4	78.2	< 0.50	< 32.60	64.0	< 0.17	na	na	
10/5/2016	na	1.6	< 0.50	< 0.50	< 1.50	3.0	< 0.17	na	na	
5/16/2017	na	0.67 J	1.0	< 0.50	< 1.50	3.2	< 0.17	na	na	
10/25/2017	na	2.2	1.0	< 0.50	1.80 J	6.5	< 0.17	na	na	
6/12/2018	na	20.9	2.2	< 0.50	2.00 J	6.6	< 0.17	na	na	
10/9/2018	na	2.1	< 0.22	< 0.17	< 0.73	< 1.71	< 1.2	na	na	
5/21/2019	na	10.1	2.5	< 0.17	< 1.00 J	3.5 J	< 1.2	na	na	
10/9/2019	na	0.64 J	< 0.22	< 0.17	< 0.73	< 1.71	< 1.2	na	na	
5/27/2020	Recovery sump not sampled.									
10/6/2020	Recovery sump not sampled.									
6/2/2021	na	< 0.30	< 0.33	< 0.29	< 1.0	< 0.81	< 1.1	na	na	
10/4/2021	na	20.5	0.79	< 0.11	2.3	9.4 a	< 0.18	na	na	

NOTES:

Concentrations are in micrograms per liter (µg/ℓ).

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.

Any non-detect concentration included was added at the detection limit for both xylenes and TMBs.

Prior to 2020, duplicate sample results were averaged for statistical analysis/plotting, per December 2013 Interstate Technology & Regulatory Council guidance.

Initial round of samples collected from each well were analyzed for VOCs, all subsequent samples analyzed for GRO/PVOCs or PVOCs.

Between Sept. 2004 and May 2007, MW-3/T40, MW-6/T40, and MW-7/T40 were temporarily buried as part of the expansion of an access road.

a = Estimated value, calculated using some or all values that are estimates.

FP = Free product encountered; sample not collected.

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 quantitation limits.

J- = The result is an estimated quantity and may be biased low.

MTBE = Methyl tertiary butyl ether.

na = Not analyzed.

NI = Not installed.

Table 2
Groundwater Analytical Results for GRO and Detected VOCs
Tank 40 Release Site
Superior Refining Company LLC
Superior, Wisconsin

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

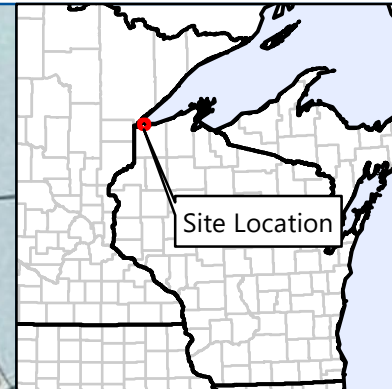
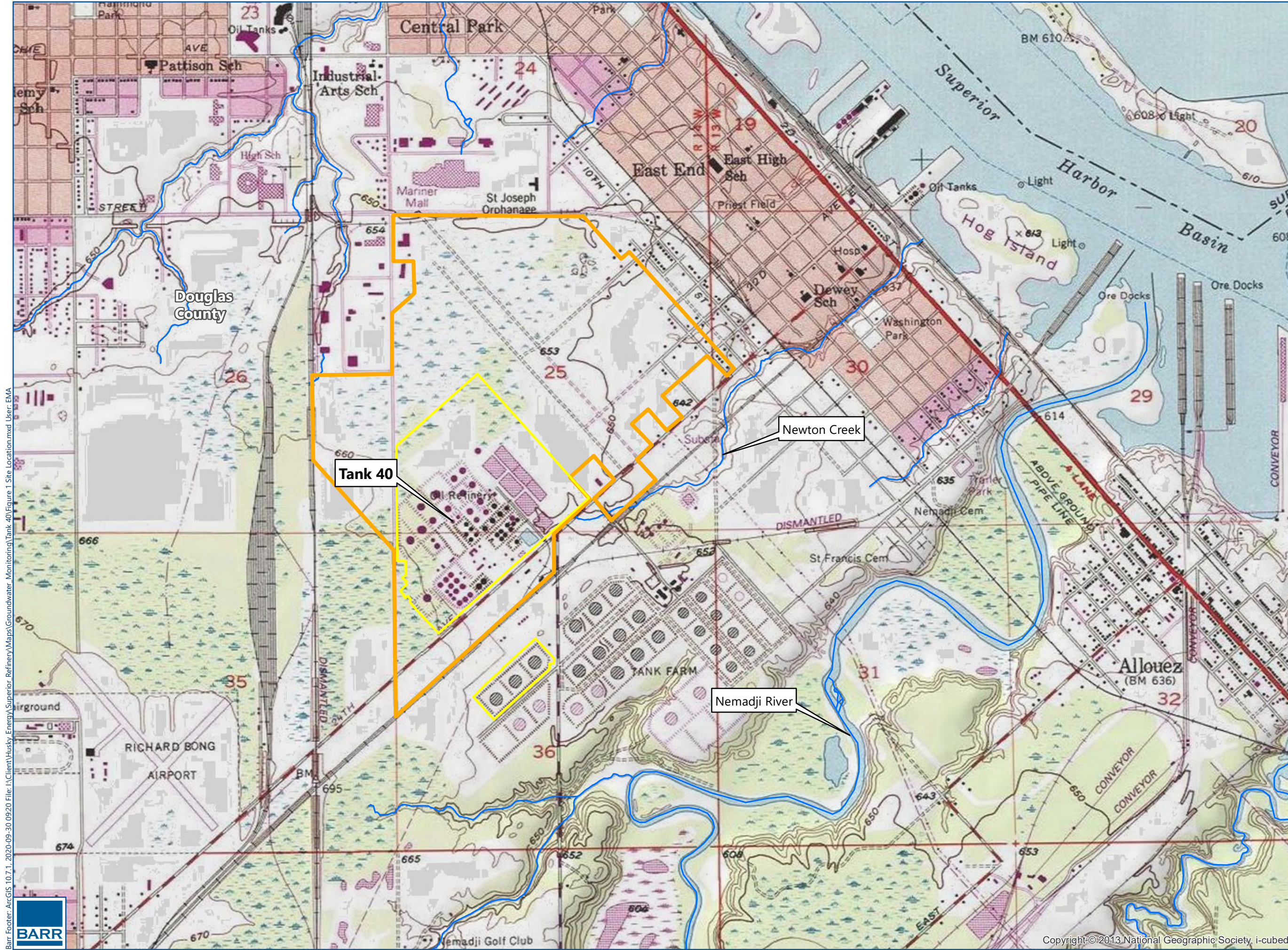
NR 140 ES = Wisconsin Administrative Code NR 140 Enforcement Standard; 7/1/2015.

NR 140 PAL = Wisconsin Administrative Code NR 140 Preventive Action Limit; 7/1/2015.

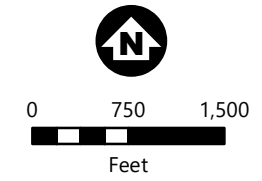
NS = No standard.

TMBs = Sum of 1,2,4-Trimethylbenzene and 1,3,5-Trimethylbenzene.

Figures



- Approximate SRC Property Boundaries for Contiguous Operations
- Approximate Fenceline Boundaries for Refining-Related Activities



SITE LOCATION
 Superior Refining Company LLC (SRC)
 Superior, WI
FIGURE 1



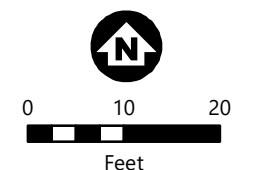


- Monitoring Point (July 2001)
- Test Pit Sump (July 2000)
- ⊗ Monitoring Well
- ▽ Twin Ports Geoprobe Soil Sample Location (November 1998)
- Interceptor Trench Installed on August 27, 2003
- ⊗ Interceptor Trench Sump TS-1/T40 Location Installed August 27, 2003
- General Direction of Groundwater Flow

Notes:

1. Gray shaded well and geoprobe boring locations have been abandoned.
2. Each monitoring point is 7 feet deep and consists of 4" diameter PVC with 3 feet of slotted PVC screen.
3. The test pit sump (TP-1/T40) is 8 feet deep and consists of 6" diameter PVC with 4 feet of slotted PVC screen.
4. The interceptor trench sump (TS-1/T40) is 9.5 feet deep and consists of 5" diameter PVC with 5 feet of slotted PVC.

Source: Gannett Fleming. Sample locations are based on field measurements made by Gannett Fleming and are approximate. Locations were not surveyed.



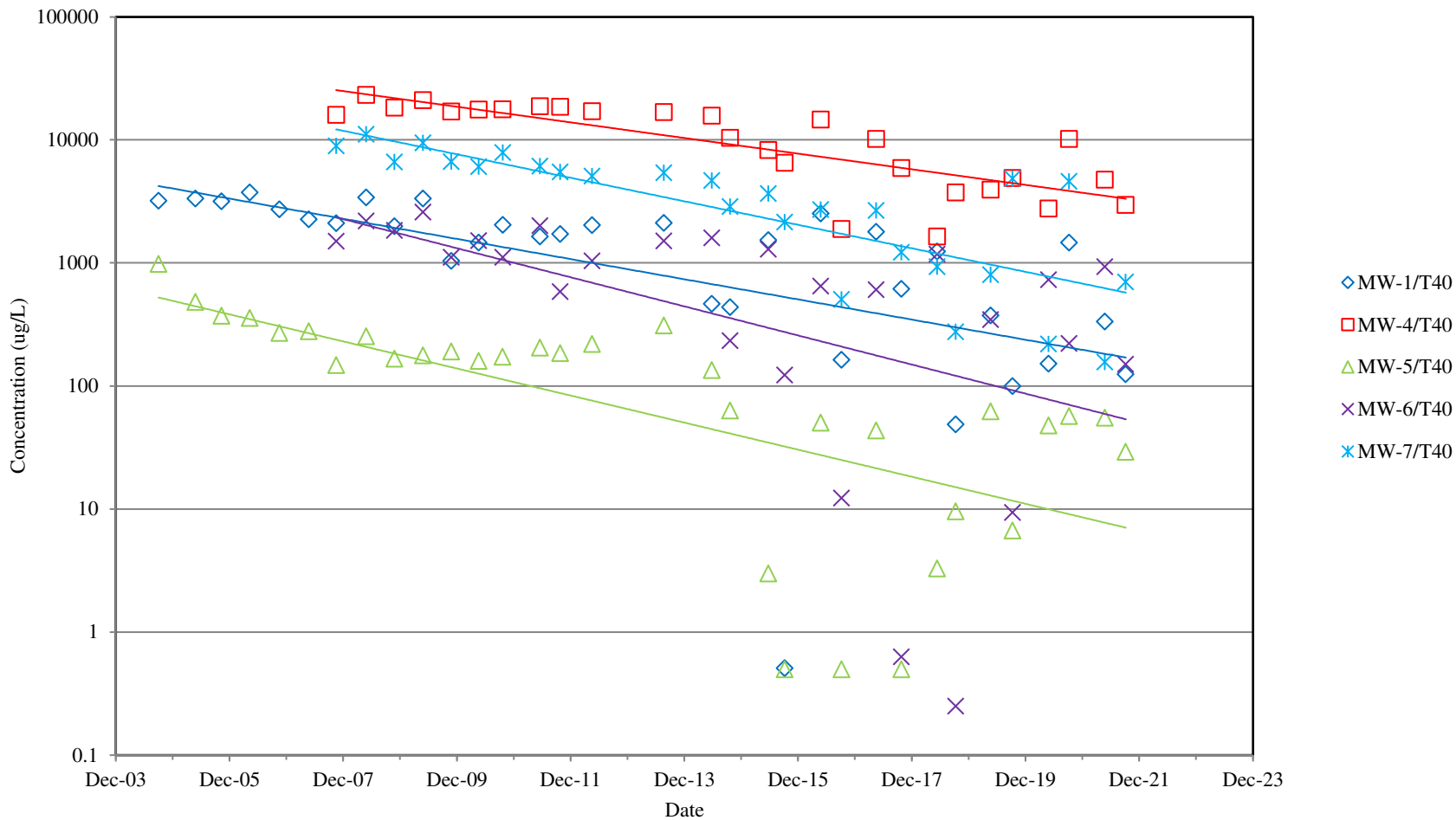
1 inch = 20 feet

TANK 40 SITE LAYOUT & MONITORING LOCATIONS
 Superior Refining Company LLC (SRC)
 Superior, WI

FIGURE 2



FIGURE 3



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

BENZENE GROUNDWATER CONCENTRATIONS TANK 40 BASIN

SUPERIOR REFINING COMPANY LLC
SUPERIOR, WISCONSIN

Attachments

Attachment A

Pace Analytical Laboratory Reports

June 03, 2021

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

RE: Project: 49161494 SRC GW Samp T40
Pace Project No.: 10562216

Dear Jim Taraldsen:

Enclosed are the analytical results for sample(s) received by the laboratory on May 24, 2021. 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 Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: BarrDM@barr.com, Barr Engineering
Data Management, Barr Engineering
Accounts Payable, Barr Engineering



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

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

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SAMPLE SUMMARY

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10562216001	MW-1/T40	Water	05/24/21 09:33	05/24/21 15:45
10562216002	MW-2/T40	Water	05/24/21 09:36	05/24/21 15:45
10562216003	MW-4/T40	Water	05/24/21 09:40	05/24/21 15:45
10562216004	MW-5/T40	Water	05/24/21 09:46	05/24/21 15:45
10562216005	MW-6/T40	Water	05/24/21 09:50	05/24/21 15:45
10562216006	MW-7/T40	Water	05/24/21 09:55	05/24/21 15:45
10562216007	Trip Blank	Water	05/24/21 00:00	05/24/21 15:45

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10562216001	MW-1/T40	EPA 8260	LAP	10	PASI-G
10562216002	MW-2/T40	EPA 8260	LAP	10	PASI-G
10562216003	MW-4/T40	EPA 8260	LAP	10	PASI-G
10562216004	MW-5/T40	EPA 8260	LAP	10	PASI-G
10562216005	MW-6/T40	EPA 8260	LAP	10	PASI-G
10562216006	MW-7/T40	EPA 8260	LAP	10	PASI-G
10562216007	Trip Blank	EPA 8260	LAP	10	PASI-G

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Sample: MW-1/T40 **Lab ID: 10562216001** Collected: 05/24/21 09:33 Received: 05/24/21 15:45 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	334	ug/L	2.5	0.74	2.5		06/01/21 11:14	71-43-2	
Ethylbenzene	185	ug/L	2.5	0.81	2.5		06/01/21 11:14	100-41-4	
Methyl-tert-butyl ether	<2.8	ug/L	12.5	2.8	2.5		06/01/21 11:14	1634-04-4	
Toluene	<0.72	ug/L	2.5	0.72	2.5		06/01/21 11:14	108-88-3	
1,2,4-Trimethylbenzene	213	ug/L	2.5	1.1	2.5		06/01/21 11:14	95-63-6	
1,3,5-Trimethylbenzene	78.0	ug/L	2.5	0.89	2.5		06/01/21 11:14	108-67-8	
Xylene (Total)	987	ug/L	7.5	2.6	2.5		06/01/21 11:14	1330-20-7	
Surrogates									
Toluene-d8 (S)	95	%	70-130		2.5		06/01/21 11:14	2037-26-5	
4-Bromofluorobenzene (S)	96	%	70-130		2.5		06/01/21 11:14	460-00-4	
1,2-Dichlorobenzene-d4 (S)	102	%	70-130		2.5		06/01/21 11:14	2199-69-1	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Sample: MW-2/T40 **Lab ID: 10562216002** Collected: 05/24/21 09:36 Received: 05/24/21 15:45 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	8790	ug/L	100	29.5	100		06/01/21 10:55	71-43-2	
Ethylbenzene	1280	ug/L	100	32.5	100		06/01/21 10:55	100-41-4	
Methyl-tert-butyl ether	<113	ug/L	500	113	100		06/01/21 10:55	1634-04-4	
Toluene	34.0J	ug/L	100	28.8	100		06/01/21 10:55	108-88-3	
1,2,4-Trimethylbenzene	1010	ug/L	100	44.9	100		06/01/21 10:55	95-63-6	
1,3,5-Trimethylbenzene	269	ug/L	100	35.7	100		06/01/21 10:55	108-67-8	
Xylene (Total)	7520	ug/L	300	105	100		06/01/21 10:55	1330-20-7	
Surrogates									
Toluene-d8 (S)	95	%	70-130		100		06/01/21 10:55	2037-26-5	
4-Bromofluorobenzene (S)	99	%	70-130		100		06/01/21 10:55	460-00-4	
1,2-Dichlorobenzene-d4 (S)	104	%	70-130		100		06/01/21 10:55	2199-69-1	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Sample: MW-4/T40 **Lab ID: 10562216003** Collected: 05/24/21 09:40 Received: 05/24/21 15:45 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	4750	ug/L	25.0	7.4	25		06/01/21 10:36	71-43-2	
Ethylbenzene	250	ug/L	25.0	8.1	25		06/01/21 10:36	100-41-4	
Methyl-tert-butyl ether	<28.2	ug/L	125	28.2	25		06/01/21 10:36	1634-04-4	
Toluene	<7.2	ug/L	25.0	7.2	25		06/01/21 10:36	108-88-3	
1,2,4-Trimethylbenzene	654	ug/L	25.0	11.2	25		06/01/21 10:36	95-63-6	
1,3,5-Trimethylbenzene	164	ug/L	25.0	8.9	25		06/01/21 10:36	108-67-8	
Xylene (Total)	2620	ug/L	75.0	26.2	25		06/01/21 10:36	1330-20-7	
Surrogates									
Toluene-d8 (S)	94	%	70-130		25		06/01/21 10:36	2037-26-5	
4-Bromofluorobenzene (S)	97	%	70-130		25		06/01/21 10:36	460-00-4	
1,2-Dichlorobenzene-d4 (S)	103	%	70-130		25		06/01/21 10:36	2199-69-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Sample: MW-5/T40 **Lab ID: 10562216004** Collected: 05/24/21 09:46 Received: 05/24/21 15:45 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	55.3	ug/L	4.0	1.2	4		06/01/21 10:18	71-43-2	
Ethylbenzene	197	ug/L	4.0	1.3	4		06/01/21 10:18	100-41-4	
Methyl-tert-butyl ether	<4.5	ug/L	20.0	4.5	4		06/01/21 10:18	1634-04-4	
Toluene	<1.2	ug/L	4.0	1.2	4		06/01/21 10:18	108-88-3	
1,2,4-Trimethylbenzene	215	ug/L	4.0	1.8	4		06/01/21 10:18	95-63-6	
1,3,5-Trimethylbenzene	41.2	ug/L	4.0	1.4	4		06/01/21 10:18	108-67-8	
Xylene (Total)	517	ug/L	12.0	4.2	4		06/01/21 10:18	1330-20-7	
Surrogates									
Toluene-d8 (S)	96	%	70-130		4		06/01/21 10:18	2037-26-5	
4-Bromofluorobenzene (S)	97	%	70-130		4		06/01/21 10:18	460-00-4	
1,2-Dichlorobenzene-d4 (S)	103	%	70-130		4		06/01/21 10:18	2199-69-1	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Sample: MW-6/T40 **Lab ID: 10562216005** Collected: 05/24/21 09:50 Received: 05/24/21 15:45 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	930	ug/L	5.0	1.5	5		06/01/21 09:59	71-43-2	
Ethylbenzene	646	ug/L	5.0	1.6	5		06/01/21 09:59	100-41-4	
Methyl-tert-butyl ether	<5.6	ug/L	25.0	5.6	5		06/01/21 09:59	1634-04-4	
Toluene	<1.4	ug/L	5.0	1.4	5		06/01/21 09:59	108-88-3	
1,2,4-Trimethylbenzene	187	ug/L	5.0	2.2	5		06/01/21 09:59	95-63-6	
1,3,5-Trimethylbenzene	36.3	ug/L	5.0	1.8	5		06/01/21 09:59	108-67-8	
Xylene (Total)	710	ug/L	15.0	5.2	5		06/01/21 09:59	1330-20-7	
Surrogates									
Toluene-d8 (S)	95	%	70-130		5		06/01/21 09:59	2037-26-5	
4-Bromofluorobenzene (S)	97	%	70-130		5		06/01/21 09:59	460-00-4	
1,2-Dichlorobenzene-d4 (S)	103	%	70-130		5		06/01/21 09:59	2199-69-1	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Sample: MW-7/T40 **Lab ID: 10562216006** Collected: 05/24/21 09:55 Received: 05/24/21 15:45 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	157	ug/L	2.5	0.74	2.5		06/01/21 09:41	71-43-2	
Ethylbenzene	29.8	ug/L	2.5	0.81	2.5		06/01/21 09:41	100-41-4	
Methyl-tert-butyl ether	<2.8	ug/L	12.5	2.8	2.5		06/01/21 09:41	1634-04-4	
Toluene	<0.72	ug/L	2.5	0.72	2.5		06/01/21 09:41	108-88-3	
1,2,4-Trimethylbenzene	30.6	ug/L	2.5	1.1	2.5		06/01/21 09:41	95-63-6	
1,3,5-Trimethylbenzene	6.4	ug/L	2.5	0.89	2.5		06/01/21 09:41	108-67-8	
Xylene (Total)	122	ug/L	7.5	2.6	2.5		06/01/21 09:41	1330-20-7	
Surrogates									
Toluene-d8 (S)	95	%	70-130		2.5		06/01/21 09:41	2037-26-5	
4-Bromofluorobenzene (S)	96	%	70-130		2.5		06/01/21 09:41	460-00-4	
1,2-Dichlorobenzene-d4 (S)	105	%	70-130		2.5		06/01/21 09:41	2199-69-1	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

Sample: Trip Blank **Lab ID: 10562216007** Collected: 05/24/21 00:00 Received: 05/24/21 15:45 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	<0.30	ug/L	1.0	0.30	1		06/01/21 18:38	71-43-2	
Ethylbenzene	<0.33	ug/L	1.0	0.33	1		06/01/21 18:38	100-41-4	
Methyl-tert-butyl ether	<1.1	ug/L	5.0	1.1	1		06/01/21 18:38	1634-04-4	
Toluene	<0.29	ug/L	1.0	0.29	1		06/01/21 18:38	108-88-3	
1,2,4-Trimethylbenzene	<0.45	ug/L	1.0	0.45	1		06/01/21 18:38	95-63-6	
1,3,5-Trimethylbenzene	<0.36	ug/L	1.0	0.36	1		06/01/21 18:38	108-67-8	
Xylene (Total)	<1.0	ug/L	3.0	1.0	1		06/01/21 18:38	1330-20-7	
Surrogates									
Toluene-d8 (S)	98	%	70-130		1		06/01/21 18:38	2037-26-5	
4-Bromofluorobenzene (S)	103	%	70-130		1		06/01/21 18:38	460-00-4	
1,2-Dichlorobenzene-d4 (S)	103	%	70-130		1		06/01/21 18:38	2199-69-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 49161494 SRC GW Samp T40
Pace Project No.: 10562216

QC Batch: 386605 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 10562216001, 10562216002, 10562216003, 10562216004, 10562216005, 10562216006, 10562216007

METHOD BLANK: 2230787 Matrix: Water
Associated Lab Samples: 10562216001, 10562216002, 10562216003, 10562216004, 10562216005, 10562216006, 10562216007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.45	1.0	06/01/21 08:08	
1,3,5-Trimethylbenzene	ug/L	<0.36	1.0	06/01/21 08:08	
Benzene	ug/L	<0.30	1.0	06/01/21 08:08	
Ethylbenzene	ug/L	<0.33	1.0	06/01/21 08:08	
Methyl-tert-butyl ether	ug/L	<1.1	5.0	06/01/21 08:08	
Toluene	ug/L	<0.29	1.0	06/01/21 08:08	
Xylene (Total)	ug/L	<1.0	3.0	06/01/21 08:08	
1,2-Dichlorobenzene-d4 (S)	%	104	70-130	06/01/21 08:08	
4-Bromofluorobenzene (S)	%	97	70-130	06/01/21 08:08	
Toluene-d8 (S)	%	95	70-130	06/01/21 08:08	

LABORATORY CONTROL SAMPLE: 2230788

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	45.3	91	70-132	
Ethylbenzene	ug/L	50	47.7	95	80-123	
Methyl-tert-butyl ether	ug/L	50	48.4	97	66-130	
Toluene	ug/L	50	45.6	91	80-121	
Xylene (Total)	ug/L	150	141	94	70-130	
1,2-Dichlorobenzene-d4 (S)	%			98	70-130	
4-Bromofluorobenzene (S)	%			99	70-130	
Toluene-d8 (S)	%			97	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2231936 2231937

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10562227002 Result	Spike Conc.	Spike Conc.	Result						
Benzene	ug/L	352	50	50	417	411	129	118	70-132	1	20 E
Ethylbenzene	ug/L	25.0	50	50	62.8	63.3	76	77	80-123	1	20 M1
Methyl-tert-butyl ether	ug/L	<1.1	50	50	51.8	51.4	104	103	66-130	1	20
Toluene	ug/L	7.2	50	50	51.4	50.2	88	86	80-121	3	20
Xylene (Total)	ug/L	273	150	150	391	384	78	74	70-130	2	20
1,2-Dichlorobenzene-d4 (S)	%						102	103	70-130		
4-Bromofluorobenzene (S)	%						94	95	70-130		
Toluene-d8 (S)	%						96	95	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

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QUALIFIERS

Project: 49161494 SRC GW Samp T40

Pace Project No.: 10562216

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

E Analyte concentration exceeded the calibration range. The reported result is estimated.

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 49161494 SRC GW Samp T40
Pace Project No.: 10562216

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10562216001	MW-1/T40	EPA 8260	386605		
10562216002	MW-2/T40	EPA 8260	386605		
10562216003	MW-4/T40	EPA 8260	386605		
10562216004	MW-5/T40	EPA 8260	386605		
10562216005	MW-6/T40	EPA 8260	386605		
10562216006	MW-7/T40	EPA 8260	386605		
10562216007	Trip Blank	EPA 8260	386605		

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Barr Engineering Co. Chain of Custody

Sample Origination State

CO MI MN MO ND TX UT WI Other: _____

40227593

REPORT TO	INVOICE TO
Company: <u>Barr Engineering Co.</u>	Company: <u>Barr</u>
Address: <u>325 S. Lake Ave</u>	Address:
Address: <u>Duluth, MN 55802</u>	Address:
Name: <u>Lynette Carney</u>	Name:
email: <u>lcarney@barr.com</u>	email:
Copy to: <u>BarrDM@barr.com</u>	P.O. <u>-</u>
Project Name: <u>SPR GWSampling Tank 40</u>	Barr Project No: <u>49161494.01 200 202</u>

Perform MS/MSD Y / N	Total Number of Containers	Analysis Requested		% Solids
		Water	Soil	
N	3	X		
N	3	X		
N	3	X		
N	3	X		
N	3	X		
N	3	X		
N	2	X		

COC Number: **NO 589408**

COC 1 of 1

Matrix Code:	Preservative Code:
GW = Groundwater	A = None
SW = Surface Water	B = HCl
WW = Waste Water	C = HNO ₃
DW = Drinking Water	D = H ₂ SO ₄
S = Soil/Solid	E = NaOH
SD = Sediment	F = MeOH
O = Other	G = NaHSO ₄
	H = Na ₂ S ₂ O ₃
	I = Ascorbic Acid
	J = Zn Acetate
	K = Other

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number of Containers	Analysis Requested Water	Analysis Requested Soil	% Solids	Preservative Code	Field Filtered Y/N
	Start	Stop	Unit (m./ft. or in.)										
1. <u>MW-1/T40</u>				<u>05/24/21</u>	<u>0933</u>	<u>GW</u>	<u>N</u>	<u>3</u>	<u>X</u>			<u>001</u>	
2. <u>MW-2/T40</u>					<u>0936</u>		<u>N</u>	<u>3</u>	<u>X</u>			<u>002</u>	
3. <u>MW-4/T40</u>					<u>0940</u>		<u>N</u>	<u>3</u>	<u>X</u>			<u>003</u>	
4. <u>MW-5/T40</u>					<u>0946</u>		<u>N</u>	<u>3</u>	<u>X</u>			<u>004</u>	
5. <u>MW-6/T40</u>					<u>0950</u>		<u>N</u>	<u>3</u>	<u>X</u>			<u>005</u>	
6. <u>MW-7/T40</u>					<u>0955</u>		<u>N</u>	<u>3</u>	<u>X</u>			<u>006</u>	
7. <u>Tap Blank</u>					<u>-</u>		<u>N</u>	<u>2</u>	<u>X</u>			<u>007</u>	
8.													
9.													
10.													

BARR USE ONLY

Sampled by: kmjs

Barr Proj. Manager: LML

Barr DQ Manager: JET

Lab Name: Pace

Lab Location: Green Bay, WI

Relinquished by: Mark M...

Relinquished by: S. Maich/Pace

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

Lab WO: _____

On Ice? N Y

Date: 5/24/21 Time: 15:45

Received by: S. Maich/Pace

Received by: _____

Air Bill Number: _____


Temperature on Receipt (°C): 30 Custody Seal Intact? Y N None

Date: 5/24/21 Time: 15:45

Requested Due Date: Standard Turn Around Time Rush _____

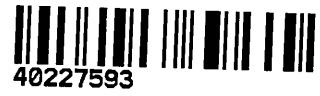
(mm/dd/yyyy) Page 15 of 15

HARRIS/STDFORMS/Chain of Custody Form 2015 RLG Rev. 01/30/2020

 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)

Client Name: Barr Engineering Project #: **WO# : 40227593**
 Courier: CS Logistics Fed Ex Speedee UPS Walco
 Client Pace Other: _____
 Tracking #: 1456 2247 5476



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 - 104 Type of Ice: Wet Blue Dry None Samples on ice, cooling process has begun
 Cooler Temperature Uncorr: 3 /Corr: 3
 Temp Blank Present: yes no Biological Tissue is Frozen: yes no

Person examining contents:
 Date: 5/26/21 /Initials: SKW
 Labeled By Initials: SRK

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

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

June 11, 2021

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

RE: Project: 49161494.01 200 202
Pace Project No.: 10563241

Dear Jim Taraldsen:

Enclosed are the analytical results for sample(s) received by the laboratory on June 02, 2021. 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 Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: BarrDM@barr.com, Barr Engineering
Data Management, Barr Engineering
Accounts Payable, Barr Engineering



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 49161494.01 200 202

Pace Project No.: 10563241

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

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SAMPLE SUMMARY

Project: 49161494.01 200 202

Pace Project No.: 10563241

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10563241001	TS-1 / T40	Water	06/02/21 13:05	06/02/21 15:46
10563241002	Trip Blank	Water	06/02/21 00:00	06/02/21 15:46

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 49161494.01 200 202

Pace Project No.: 10563241

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10563241001	TS-1 / T40	EPA 8260	LAP	10	PASI-G
10563241002	Trip Blank	EPA 8260	LAP	10	PASI-G

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 49161494.01 200 202

Pace Project No.: 10563241

Sample: TS-1 / T40 **Lab ID: 10563241001** Collected: 06/02/21 13:05 Received: 06/02/21 15:46 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	<0.30	ug/L	1.0	0.30	1		06/09/21 21:37	71-43-2	
Ethylbenzene	<0.33	ug/L	1.0	0.33	1		06/09/21 21:37	100-41-4	
Methyl-tert-butyl ether	<1.1	ug/L	5.0	1.1	1		06/09/21 21:37	1634-04-4	
Toluene	<0.29	ug/L	1.0	0.29	1		06/09/21 21:37	108-88-3	
1,2,4-Trimethylbenzene	<0.45	ug/L	1.0	0.45	1		06/09/21 21:37	95-63-6	
1,3,5-Trimethylbenzene	<0.36	ug/L	1.0	0.36	1		06/09/21 21:37	108-67-8	
Xylene (Total)	<1.0	ug/L	3.0	1.0	1		06/09/21 21:37	1330-20-7	
Surrogates									
Toluene-d8 (S)	99	%	70-130		1		06/09/21 21:37	2037-26-5	
4-Bromofluorobenzene (S)	109	%	70-130		1		06/09/21 21:37	460-00-4	
1,2-Dichlorobenzene-d4 (S)	107	%	70-130		1		06/09/21 21:37	2199-69-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 49161494.01 200 202

Pace Project No.: 10563241

Sample: Trip Blank **Lab ID: 10563241002** Collected: 06/02/21 00:00 Received: 06/02/21 15:46 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	<0.30	ug/L	1.0	0.30	1		06/09/21 17:07	71-43-2	
Ethylbenzene	<0.33	ug/L	1.0	0.33	1		06/09/21 17:07	100-41-4	
Methyl-tert-butyl ether	<1.1	ug/L	5.0	1.1	1		06/09/21 17:07	1634-04-4	
Toluene	<0.29	ug/L	1.0	0.29	1		06/09/21 17:07	108-88-3	
1,2,4-Trimethylbenzene	<0.45	ug/L	1.0	0.45	1		06/09/21 17:07	95-63-6	
1,3,5-Trimethylbenzene	<0.36	ug/L	1.0	0.36	1		06/09/21 17:07	108-67-8	
Xylene (Total)	<1.0	ug/L	3.0	1.0	1		06/09/21 17:07	1330-20-7	
Surrogates									
Toluene-d8 (S)	98	%	70-130		1		06/09/21 17:07	2037-26-5	
4-Bromofluorobenzene (S)	103	%	70-130		1		06/09/21 17:07	460-00-4	
1,2-Dichlorobenzene-d4 (S)	101	%	70-130		1		06/09/21 17:07	2199-69-1	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 49161494.01 200 202

Pace Project No.: 10563241

QC Batch: 387217

Analysis Method: EPA 8260

QC Batch Method: EPA 8260

Analysis Description: 8260 MSV UST-WATER

Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 10563241001, 10563241002

METHOD BLANK: 2233753

Matrix: Water

Associated Lab Samples: 10563241001, 10563241002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.45	1.0	06/09/21 15:23	
1,3,5-Trimethylbenzene	ug/L	<0.36	1.0	06/09/21 15:23	
Benzene	ug/L	<0.30	1.0	06/09/21 15:23	
Ethylbenzene	ug/L	<0.33	1.0	06/09/21 15:23	
Methyl-tert-butyl ether	ug/L	<1.1	5.0	06/09/21 15:23	
Toluene	ug/L	<0.29	1.0	06/09/21 15:23	
Xylene (Total)	ug/L	<1.0	3.0	06/09/21 15:23	
1,2-Dichlorobenzene-d4 (S)	%	100	70-130	06/09/21 15:23	
4-Bromofluorobenzene (S)	%	105	70-130	06/09/21 15:23	
Toluene-d8 (S)	%	96	70-130	06/09/21 15:23	

LABORATORY CONTROL SAMPLE: 2233754

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	50	45.9	92	70-132	
Ethylbenzene	ug/L	50	47.2	94	80-123	
Methyl-tert-butyl ether	ug/L	50	44.6	89	66-130	
Toluene	ug/L	50	43.9	88	80-121	
Xylene (Total)	ug/L	150	135	90	70-130	
1,2-Dichlorobenzene-d4 (S)	%			102	70-130	
4-Bromofluorobenzene (S)	%			106	70-130	
Toluene-d8 (S)	%			99	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2234870 2234871

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40227973002 Result	Spike Conc.	Spike Conc.	MS Result						
Benzene	ug/L	3.8	50	50	49.5	48.3	92	89	70-132	3	20
Ethylbenzene	ug/L	<0.33	50	50	44.4	45.4	89	91	80-123	2	20
Methyl-tert-butyl ether	ug/L	<1.1	50	50	51.8	40.9	104	82	66-130	24	20 R1
Toluene	ug/L	0.88J	50	50	42.8	43.3	84	85	80-121	1	20
Xylene (Total)	ug/L	<1.0	150	150	128	129	85	86	70-130	1	20
1,2-Dichlorobenzene-d4 (S)	%						98	97	70-130		
4-Bromofluorobenzene (S)	%						105	103	70-130		
Toluene-d8 (S)	%						102	103	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

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QUALIFIERS

Project: 49161494.01 200 202

Pace Project No.: 10563241

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

R1 RPD value was outside control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 49161494.01 200 202

Pace Project No.: 10563241

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10563241001	TS-1 / T40	EPA 8260	387217		
10563241002	Trip Blank	EPA 8260	387217		

REPORT OF LABORATORY ANALYSIS

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Barr Engineering Co. Chain of Custody

Sample Origination State

CO MI MN MO ND TX UT WI Other: _____

REPORT TO	INVOICE TO
Company: <i>Barr Engineering</i>	Company: <i>Barr</i>
Address: <i>325 S. Lake Ave</i>	Address:
Address: <i>Duluth, MN 55802</i>	Address:
Name: <i>Lynette Carney</i>	Name:
email: <i>lcarney@barr.com</i>	email:
Copy to: <i>BarrDM@barr.com</i>	P.O.:
Project Name: <i>SRL GW Sampling Tank 40</i>	Barr Project No: <i>49161494.01 200 202</i>

Analysis Requested		COC Number: № 589410
Water	Soil	COC <u>1</u> of <u>1</u>

WO#: 10563241

PM: AA1 Due Date: 06/16/21
CLIENT: BARR

O = Other
G = NaHSO₄
H = Na₂S₂O₃
I = Ascorbic Acid
J = Zn Acetate
K = Other

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested	COC Number	COC of	% Solids	Preservative Code	Field Filtered Y/N
	Start	Stop	Unit (m./ft. or in.)											
1. <i>TS-1/T40</i>				<i>6/2/2021</i>	<i>1305</i>	<i>GW</i>	<i>N</i>	<i>3</i>						
2. <i>Trip Blank</i>				<i>-</i>	<i>-</i>	<i>-</i>	<i>N</i>	<i>2</i>						
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

BARR USE ONLY		Relinquished by: <i>Kant Hunt</i>	On Ice? <input checked="" type="checkbox"/> N	Date: <i>6/2/2021</i>	Time: <i>1546</i>	Received by: <i>Joe Pace</i>	Date: <i>6/2/21</i>	Time: <i>15:46</i>
Sampled by: <i>UMS</i>	Relinquished by:	On Ice? <input type="checkbox"/> Y <input type="checkbox"/> N	Date:	Time:	Received by:	Date:	Time:	
Barr Proj. Manager: <i>LMC</i>	Samples Shipped VIA: <input type="checkbox"/> Ground Courier <input type="checkbox"/> Air Carrier	Air Bill Number:		Requested Due Date: <input checked="" type="checkbox"/> Standard Turn Around Time				
Barr DQ Manager: <i>JET</i>	<input type="checkbox"/> Sampler <input type="checkbox"/> Other: _____	Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input checked="" type="checkbox"/> None		Page 10 of 14 (mm/dd/yyyy)				
Lab Name: <i>Pace</i>	Lab WO:	Temperature on Receipt (°C): <i>2.0</i>						
Lab Location: <i>Green Bay, WI</i>								

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

Sample Condition Upon Receipt **Client Name:** BARR ENGINEERING **Project #:** **WO# : 10563241**

Courier: Fed Ex UPS USPS Client **PM: AA1** **Due Date: 06/16/21**
 Speedee Pace Other: _____ **CLIENT: BARR**

Tracking Number: _____

Custody Seal on Cooler/Box Present? Yes No **Seals Intact?** Yes No

Packing Material: Bubble Wrap Bubble Bags None Other: _____

Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Is there evidence of ice formation in samples? Yes No **Biological Tissue Frozen?** Yes No NA

Temp Blank? Yes No **Thermometer Used:** 01339252/1710 122639816 **Correction Factor °C:** -0.3

Temp should be above freezing to 6 °C **Cooler Temp Read °C:** 2.3 **Cooler Temp Corrected °C:** 2.0

Date and Initials of Person Examining Contents: 06/02/2021 *[Signature]*

			Comments:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		3.
Sampler Name and Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5. If Fecal: <input type="checkbox"/> <8 hours <input type="checkbox"/> >8, <24 hours <input type="checkbox"/> >24 hours	
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		8.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		10.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		11. Note if sediment is visible in the dissolved containers:
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		12.
-Includes Date/Time/ID/Analysis Matrix: <u>WT</u>			
All containers needing acid/base preservation properly preserved?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		13. Note samples needing adjustment:
Headspace in Methyl Mercury Container	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		14.
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		15.
Trip Blank Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		16.
Trip Blank Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):			

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

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

FECAL WAIVER ON FILE: Y N TEMPERATURE WAIVER ON FILE: Y N

Project Manager Review: _____ **Date:** 6/3/21

Sample Preservation Receipt Form

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

Client Name: Pace - Mn

Project # 40227968

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

Initial when completed:

Date/Time:


Lab Lot# of pH paper:

Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass							Plastic					Vials				Jars				General			VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)					
	AG1U	BG1U	AG1H	AG4S	AG4U	AG5U	AG2S	BP1U	BP3U	BP3B	BP3N	BP3S	VG9A	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T								ZPLC	GN			
001																																			2.5 / 5 / 10
002																																			2.5 / 5 / 10
003																																			2.5 / 5 / 10
004																																			2.5 / 5 / 10
005																																			2.5 / 5 / 10
006																																			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	BP1U 1 liter plastic unpres	VG9A 40 mL clear ascorbic	JGFU 4 oz amber jar unpres
BG1U 1 liter clear glass	BP3U 250 mL plastic unpres	DG9T 40 mL amber Na Thio	JG9U 9 oz amber jar unpres
AG1H 1 liter amber glass HCL	BP3B 250 mL plastic NaOH	VG9U 40 mL clear vial unpres	WGFU 4 oz clear jar unpres
AG4S 125 mL amber glass H2SO4	BP3N 250 mL plastic HNO3	VG9H 40 mL clear vial HCL	WPFU 4 oz plastic jar unpres
AG4U 120 mL amber glass unpres	BP3S 250 mL plastic H2SO4	VG9M 40 mL clear vial MeOH	SP5T 120 mL plastic Na Thiosulfate
AG5U 100 mL amber glass unpres		VG9D 40 mL clear vial DI	ZPLC ziploc bag
AG2S 500 mL amber glass H2SO4			GN
BG3U 250 mL clear glass unpres			

 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 #: _____

Client Name: Pace - Mn

WO# : 40227968

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



Tracking #: _____

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 - 9 Type of Ice: Wet Blue Dry None Samples on ice, cooling process has begun

Cooler Temperature Uncorr: 0.5 ICorr: 1.5

Temp Blank Present: yes no Biological Tissue is Frozen: yes no

Person examining contents:	
Date: <u>6/14/21</u>	Initials: <u>KJ</u>
Labeled By Initials: <u>AKS</u>	

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

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4. <u>IRWO KJ 6/14/21</u>
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	7.
Sufficient Volume:		8.
For Analysis: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MS/MSD: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.
Sample Labels match COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.
-Includes date/time/ID/Analysis Matrix: <u>W</u>		
Trip Blank Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	13.
Trip Blank Custody Seals Present	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased): <u>031521-304D</u>		

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

October 25, 2021

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

RE: Project: 49161494 SRC GW Sampling TK40
Pace Project No.: 10581759

Dear Jim Taraldsen:

Enclosed are the analytical results for sample(s) received by the laboratory on October 05, 2021. 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 Albrecht
amanda.albrecht@pacelabs.com
(612)607-6382
Project Manager

Enclosures

cc: BarrDM@barr.com, Barr Engineering
Data Management, Barr Engineering
Accounts Payable, Barr Engineering



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Pace Analytical Services, LLC - 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 Tribal Water Systems+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

Michigan Certification #: 9909

Minnesota Certification #: 027-053-137*

Minnesota Dept of Ag Approval: via MN 027-053-137

Minnesota Petrofund Registration #: 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 (1700) #: CL101

Ohio VAP Certification (1800) #: CL110*

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 ().

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SAMPLE SUMMARY

Project: 49161494 SRC GW Sampling TK40
Pace Project No.: 10581759

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10581759001	MW-1/T40	Water	10/04/21 11:07	10/05/21 15:30
10581759002	MW-2/T40	Water	10/04/21 11:12	10/05/21 15:30
10581759003	MW-4/T40	Water	10/04/21 11:18	10/05/21 15:30
10581759004	MW-5/T40	Water	10/04/21 11:22	10/05/21 15:30
10581759005	MW-6/T40	Water	10/04/21 11:27	10/05/21 15:30
10581759006	MW-7/T40	Water	10/04/21 11:32	10/05/21 15:30
10581759007	TS-1/T40	Water	10/04/21 11:36	10/05/21 15:30
10581759008	Trip Blank	Water	10/04/21 00:00	10/05/21 15:30

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SAMPLE ANALYTE COUNT

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10581759001	MW-1/T40	EPA 8260D	NMB	10	PASI-M
10581759002	MW-2/T40	EPA 8260D	NMB	10	PASI-M
10581759003	MW-4/T40	EPA 8260D	NMB	10	PASI-M
10581759004	MW-5/T40	EPA 8260D	NMB	10	PASI-M
10581759005	MW-6/T40	EPA 8260D	NMB	10	PASI-M
10581759006	MW-7/T40	EPA 8260D	NMB	10	PASI-M
10581759007	TS-1/T40	EPA 8260D	NMB	10	PASI-M
10581759008	Trip Blank	EPA 8260D	NMB	10	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: MW-1/T40 **Lab ID: 10581759001** Collected: 10/04/21 11:07 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	125	ug/L	0.40	0.12	1		10/15/21 01:58	71-43-2	
Ethylbenzene	27.1	ug/L	0.23	0.069	1		10/15/21 01:58	100-41-4	
Methyl-tert-butyl ether	<0.18	ug/L	0.60	0.18	1		10/15/21 01:58	1634-04-4	
Toluene	0.60	ug/L	0.38	0.11	1		10/15/21 01:58	108-88-3	
1,2,4-Trimethylbenzene	228	ug/L	0.40	0.12	1		10/15/21 01:58	95-63-6	
1,3,5-Trimethylbenzene	106	ug/L	0.32	0.096	1		10/15/21 01:58	108-67-8	
Xylene (Total)	670	ug/L	14.8	4.4	25		10/12/21 03:23	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	100	%	70-130		1		10/15/21 01:58	2199-69-1	
4-Bromofluorobenzene (S)	101	%	75-125		1		10/15/21 01:58	460-00-4	
Toluene-d8 (S)	100	%	75-125		1		10/15/21 01:58	2037-26-5	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: MW-2/T40 **Lab ID: 10581759002** Collected: 10/04/21 11:12 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	9760	ug/L	19.8	6.0	50		10/12/21 04:18	71-43-2	
Ethylbenzene	1470	ug/L	11.4	3.4	50		10/12/21 04:18	100-41-4	
Methyl-tert-butyl ether	<9.0	ug/L	30.1	9.0	50		10/12/21 04:18	1634-04-4	
Toluene	14.6J	ug/L	18.8	5.6	50		10/12/21 04:18	108-88-3	
1,2,4-Trimethylbenzene	1190	ug/L	19.8	6.0	50		10/12/21 04:18	95-63-6	
1,3,5-Trimethylbenzene	320	ug/L	16.0	4.8	50		10/12/21 04:18	108-67-8	
Xylene (Total)	9700	ug/L	29.6	8.9	50		10/12/21 04:18	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	100	%	70-130		50		10/12/21 04:18	2199-69-1	D4
4-Bromofluorobenzene (S)	102	%	75-125		50		10/12/21 04:18	460-00-4	
Toluene-d8 (S)	98	%	75-125		50		10/12/21 04:18	2037-26-5	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: MW-4/T40 **Lab ID: 10581759003** Collected: 10/04/21 11:18 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	2960	ug/L	19.8	6.0	50		10/12/21 04:36	71-43-2	
Ethylbenzene	67.8	ug/L	0.46	0.14	2		10/15/21 02:16	100-41-4	
Methyl-tert-butyl ether	<0.36	ug/L	1.2	0.36	2		10/15/21 02:16	1634-04-4	
Toluene	2.6	ug/L	0.75	0.23	2		10/15/21 02:16	108-88-3	
1,2,4-Trimethylbenzene	785	ug/L	19.8	6.0	50		10/12/21 04:36	95-63-6	
1,3,5-Trimethylbenzene	235	ug/L	0.64	0.19	2		10/15/21 02:16	108-67-8	
Xylene (Total)	2820	ug/L	29.6	8.9	50		10/12/21 04:36	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	100	%	70-130		2		10/15/21 02:16	2199-69-1	D4
4-Bromofluorobenzene (S)	99	%	75-125		2		10/15/21 02:16	460-00-4	
Toluene-d8 (S)	100	%	75-125		2		10/15/21 02:16	2037-26-5	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: MW-5/T40 **Lab ID: 10581759004** Collected: 10/04/21 11:22 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	29.2	ug/L	0.40	0.12	1		10/15/21 02:35	71-43-2	
Ethylbenzene	209	ug/L	0.23	0.069	1		10/15/21 02:35	100-41-4	
Methyl-tert-butyl ether	<0.18	ug/L	0.60	0.18	1		10/15/21 02:35	1634-04-4	
Toluene	<0.11	ug/L	0.38	0.11	1		10/15/21 02:35	108-88-3	
1,2,4-Trimethylbenzene	240	ug/L	0.40	0.12	1		10/15/21 02:35	95-63-6	
1,3,5-Trimethylbenzene	38.8	ug/L	0.32	0.096	1		10/15/21 02:35	108-67-8	
Xylene (Total)	457	ug/L	0.59	0.18	1		10/15/21 02:35	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	100	%	70-130		1		10/15/21 02:35	2199-69-1	
4-Bromofluorobenzene (S)	102	%	75-125		1		10/15/21 02:35	460-00-4	
Toluene-d8 (S)	100	%	75-125		1		10/15/21 02:35	2037-26-5	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: MW-6/T40 **Lab ID: 10581759005** Collected: 10/04/21 11:27 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	150	ug/L	0.40	0.12	1		10/12/21 02:46	71-43-2	
Ethylbenzene	3.0	ug/L	0.23	0.069	1		10/12/21 02:46	100-41-4	
Methyl-tert-butyl ether	<0.18	ug/L	0.60	0.18	1		10/12/21 02:46	1634-04-4	
Toluene	<0.11	ug/L	0.38	0.11	1		10/12/21 02:46	108-88-3	
1,2,4-Trimethylbenzene	<0.12	ug/L	0.40	0.12	1		10/12/21 02:46	95-63-6	
1,3,5-Trimethylbenzene	<0.096	ug/L	0.32	0.096	1		10/12/21 02:46	108-67-8	
Xylene (Total)	0.56J	ug/L	0.59	0.18	1		10/12/21 02:46	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	99	%	70-130		1		10/12/21 02:46	2199-69-1	
4-Bromofluorobenzene (S)	104	%	75-125		1		10/12/21 02:46	460-00-4	
Toluene-d8 (S)	96	%	75-125		1		10/12/21 02:46	2037-26-5	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: MW-7/T40 **Lab ID: 10581759006** Collected: 10/04/21 11:32 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	700	ug/L	9.9	3.0	25		10/12/21 03:59	71-43-2	
Ethylbenzene	182	ug/L	0.23	0.069	1		10/15/21 02:53	100-41-4	
Methyl-tert-butyl ether	<0.18	ug/L	0.60	0.18	1		10/15/21 02:53	1634-04-4	
Toluene	1.6	ug/L	0.38	0.11	1		10/15/21 02:53	108-88-3	
1,2,4-Trimethylbenzene	250	ug/L	9.9	3.0	25		10/12/21 03:59	95-63-6	
1,3,5-Trimethylbenzene	86.0	ug/L	0.32	0.096	1		10/15/21 02:53	108-67-8	
Xylene (Total)	921	ug/L	14.8	4.4	25		10/12/21 03:59	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	99	%	70-130		1		10/15/21 02:53	2199-69-1	
4-Bromofluorobenzene (S)	100	%	75-125		1		10/15/21 02:53	460-00-4	
Toluene-d8 (S)	100	%	75-125		1		10/15/21 02:53	2037-26-5	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: TS-1/T40 **Lab ID: 10581759007** Collected: 10/04/21 11:36 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	20.5	ug/L	0.40	0.12	1		10/15/21 03:11	71-43-2	
Ethylbenzene	0.79	ug/L	0.23	0.069	1		10/15/21 03:11	100-41-4	
Methyl-tert-butyl ether	<0.18	ug/L	0.60	0.18	1		10/15/21 03:11	1634-04-4	
Toluene	<0.11	ug/L	0.38	0.11	1		10/15/21 03:11	108-88-3	
1,2,4-Trimethylbenzene	9.1	ug/L	0.40	0.12	1		10/15/21 03:11	95-63-6	
1,3,5-Trimethylbenzene	0.29J	ug/L	0.32	0.096	1		10/15/21 03:11	108-67-8	
Xylene (Total)	2.3	ug/L	0.59	0.18	1		10/15/21 03:11	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	99	%	70-130		1		10/15/21 03:11	2199-69-1	
4-Bromofluorobenzene (S)	102	%	75-125		1		10/15/21 03:11	460-00-4	
Toluene-d8 (S)	99	%	75-125		1		10/15/21 03:11	2037-26-5	

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ANALYTICAL RESULTS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Sample: Trip Blank **Lab ID: 10581759008** Collected: 10/04/21 00:00 Received: 10/05/21 15:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV UST									
Analytical Method: EPA 8260D									
Pace Analytical Services - Minneapolis									
Benzene	<0.12	ug/L	0.40	0.12	1		10/12/21 00:38	71-43-2	
Ethylbenzene	<0.069	ug/L	0.23	0.069	1		10/12/21 00:38	100-41-4	
Methyl-tert-butyl ether	<0.18	ug/L	0.60	0.18	1		10/12/21 00:38	1634-04-4	
Toluene	<0.11	ug/L	0.38	0.11	1		10/12/21 00:38	108-88-3	
1,2,4-Trimethylbenzene	<0.12	ug/L	0.40	0.12	1		10/12/21 00:38	95-63-6	
1,3,5-Trimethylbenzene	<0.096	ug/L	0.32	0.096	1		10/12/21 00:38	108-67-8	
Xylene (Total)	<0.18	ug/L	0.59	0.18	1		10/12/21 00:38	1330-20-7	
Surrogates									
1,2-Dichlorobenzene-d4 (S)	100	%	70-130		1		10/12/21 00:38	2199-69-1	
4-Bromofluorobenzene (S)	103	%	75-125		1		10/12/21 00:38	460-00-4	
Toluene-d8 (S)	102	%	75-125		1		10/12/21 00:38	2037-26-5	

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QUALITY CONTROL DATA

Project: 49161494 SRC GW Sampling TK40
Pace Project No.: 10581759

QC Batch: 775911 Analysis Method: EPA 8260D
QC Batch Method: EPA 8260D Analysis Description: 8260D MSV UST-WATER
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10581759001, 10581759002, 10581759003, 10581759005, 10581759006, 10581759008

METHOD BLANK: 4132842 Matrix: Water
Associated Lab Samples: 10581759001, 10581759002, 10581759003, 10581759005, 10581759006, 10581759008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.12	0.40	10/11/21 23:43	
1,3,5-Trimethylbenzene	ug/L	<0.096	0.32	10/11/21 23:43	
Benzene	ug/L	<0.12	0.40	10/11/21 23:43	
Ethylbenzene	ug/L	<0.069	0.23	10/11/21 23:43	
Methyl-tert-butyl ether	ug/L	<0.18	0.60	10/11/21 23:43	
Toluene	ug/L	<0.11	0.38	10/11/21 23:43	
Xylene (Total)	ug/L	<0.18	0.59	10/11/21 23:43	
1,2-Dichlorobenzene-d4 (S)	%	101	70-130	10/11/21 23:43	
4-Bromofluorobenzene (S)	%	103	75-125	10/11/21 23:43	
Toluene-d8 (S)	%	102	75-125	10/11/21 23:43	

LABORATORY CONTROL SAMPLE & LCSD: 4132843 4132844

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	18.4	18.8	92	94	75-126	2	20	
1,3,5-Trimethylbenzene	ug/L	20	18.8	19.1	94	96	75-125	2	20	
Benzene	ug/L	20	19.9	19.9	100	100	73-125	0	20	
Ethylbenzene	ug/L	20	18.3	18.4	91	92	75-125	1	20	
Methyl-tert-butyl ether	ug/L	20	20.0	20.5	100	103	75-125	3	20	
Toluene	ug/L	20	19.3	19.3	96	97	75-125	0	20	
Xylene (Total)	ug/L	60	59.9	60.4	100	101	75-125	1	20	
1,2-Dichlorobenzene-d4 (S)	%				99	101	70-130			
4-Bromofluorobenzene (S)	%				100	101	75-125			
Toluene-d8 (S)	%				98	97	75-125			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4132845 4132846

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10581298003 Result	Spike Conc.	Spike Conc.	MS Result						
1,2,4-Trimethylbenzene	ug/L	ND	20	20	18.0	18.1	90	91	68-126	0	30
1,3,5-Trimethylbenzene	ug/L	ND	20	20	18.5	18.2	92	91	67-125	2	30
Benzene	ug/L	ND	20	20	20.3	19.5	101	98	60-125	4	30
Ethylbenzene	ug/L	ND	20	20	18.4	18.1	92	90	61-125	2	30
Methyl-tert-butyl ether	ug/L	ND	20	20	19.4	18.6	97	93	61-125	4	30
Toluene	ug/L	ND	20	20	19.4	18.9	97	94	61-125	3	30
Xylene (Total)	ug/L	ND	60	60	59.8	59.0	100	98	63-125	1	30
1,2-Dichlorobenzene-d4 (S)	%						100	101	70-130		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Parameter	Units	4132845		4132846		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10581298003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
4-Bromofluorobenzene (S)	%.					101	102	75-125			
Toluene-d8 (S)	%.					97	97	75-125			

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QUALITY CONTROL DATA

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

QC Batch: 776975 Analysis Method: EPA 8260D
 QC Batch Method: EPA 8260D Analysis Description: 8260D MSV UST-WATER
 Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10581759001, 10581759003, 10581759004, 10581759006, 10581759007

METHOD BLANK: 4138758

Matrix: Water

Associated Lab Samples: 10581759001, 10581759003, 10581759004, 10581759006, 10581759007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trimethylbenzene	ug/L	<0.12	0.40	10/15/21 00:27	
1,3,5-Trimethylbenzene	ug/L	<0.096	0.32	10/15/21 00:27	
Benzene	ug/L	<0.12	0.40	10/15/21 00:27	
Ethylbenzene	ug/L	<0.069	0.23	10/15/21 00:27	
Methyl-tert-butyl ether	ug/L	<0.18	0.60	10/15/21 00:27	
Toluene	ug/L	<0.11	0.38	10/15/21 00:27	
Xylene (Total)	ug/L	<0.18	0.59	10/15/21 00:27	
1,2-Dichlorobenzene-d4 (S)	%	102	70-130	10/15/21 00:27	
4-Bromofluorobenzene (S)	%	99	75-125	10/15/21 00:27	
Toluene-d8 (S)	%	96	75-125	10/15/21 00:27	

LABORATORY CONTROL SAMPLE & LCSD: 4138759

4138760

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	18.7	18.5	94	93	75-126	1	20	
1,3,5-Trimethylbenzene	ug/L	20	18.7	18.7	93	93	75-125	0	20	
Benzene	ug/L	20	19.8	19.5	99	98	73-125	1	20	
Ethylbenzene	ug/L	20	17.6	17.6	88	88	75-125	0	20	
Methyl-tert-butyl ether	ug/L	20	21.1	20.5	105	103	75-125	3	20	
Toluene	ug/L	20	19.6	19.2	98	96	75-125	2	20	
Xylene (Total)	ug/L	60	60.3	59.8	100	100	75-125	1	20	
1,2-Dichlorobenzene-d4 (S)	%				100	100	70-130			
4-Bromofluorobenzene (S)	%				101	101	75-125			
Toluene-d8 (S)	%				98	96	75-125			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4138766

4138767

Parameter	Units	10581974006 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	0.27J	40	40	29.0	28.1	72	70	68-126	3	30	
1,3,5-Trimethylbenzene	ug/L	<0.096	40	40	29.4	28.8	73	72	67-125	2	30	
Benzene	ug/L	<0.12	40	40	36.5	34.1	91	85	60-125	7	30	
Ethylbenzene	ug/L	<0.069	40	40	30.0	28.8	75	72	61-125	4	30	
Methyl-tert-butyl ether	ug/L	<0.18	40	40	37.3	33.8	93	84	61-125	10	30	
Toluene	ug/L	<0.11	40	40	34.7	32.1	87	80	61-125	8	30	
Xylene (Total)	ug/L	0.31J	120	120	98.8	93.3	82	77	63-125	6	30	
1,2-Dichlorobenzene-d4 (S)	%						99	100	70-130			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4138766 4138767												
Parameter	Units	10581974006 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
			Spike Conc.	Spike Conc.								
4-Bromofluorobenzene (S)	%.							100	99	75-125		
Toluene-d8 (S)	%.							98	97	75-125		

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

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

D4 Sample was diluted due to the presence of high levels of target analytes.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 49161494 SRC GW Sampling TK40

Pace Project No.: 10581759

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10581759001	MW-1/T40	EPA 8260D	775911		
10581759001	MW-1/T40	EPA 8260D	776975		
10581759002	MW-2/T40	EPA 8260D	775911		
10581759003	MW-4/T40	EPA 8260D	775911		
10581759003	MW-4/T40	EPA 8260D	776975		
10581759004	MW-5/T40	EPA 8260D	776975		
10581759005	MW-6/T40	EPA 8260D	775911		
10581759006	MW-7/T40	EPA 8260D	775911		
10581759006	MW-7/T40	EPA 8260D	776975		
10581759007	TS-1/T40	EPA 8260D	776975		
10581759008	Trip Blank	EPA 8260D	775911		

REPORT OF LABORATORY ANALYSIS

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Barr Engineering Co. Chain of Custody

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: _____

Analysis Requested	Water	Soil
COC Number: 57635		
COC <u>1</u> of <u>1</u>		
Matrix Code:	Preservative Code:	
GW = Groundwater	A = None	
SW = Surface Water	B = HCl	
WW = Waste Water	C = HNO ₃	
DW = Drinking Water	D = H ₂ SO ₄	
S = Soil/Solid	E = NaOH	
	F = MeOH	
	G = NaHSO ₄	
	H = Na ₂ S ₂ O ₃	
	I = Ascorbic Acid	
	J = NH ₄ Cl	
	K = Zn Acetate	
	O = Other	

WO#: 10581759



REPORT TO	INVOICE TO
Company: <u>Barr Engineering Co.</u>	Company: <u>Barr</u>
Address: <u>325 S. Lake Ave. Duluth, MN</u>	Address: <u>[Redacted]</u>
Name: <u>Lynette Cavaney</u>	Name: <u>[Redacted]</u>
email: <u>lcavaney@barr.com</u>	email: <u>[Redacted]</u>
Copy to: <u>datamgt@barr.com</u>	P.O. <u>—</u>
Project Name: <u>SPL GW Sampling TX 40</u>	Barr Project No: <u>4916144.01 200 203</u>

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number of Containers	Preservative Code	Field Filtered Y/N
	Start	Stop	Unit (m./ft. or in.)							
1. <u>MW-1/T40</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>10/04/2021</u>	<u>1107</u>	<u>GW</u>	<u>N</u>	<u>3</u>	<u>X</u>	<u>CC1</u>
2. <u>MW-2/T40</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>[Redacted]</u>	<u>1112</u>	<u>[Redacted]</u>	<u>N</u>	<u>3</u>	<u>X</u>	<u>CC2</u>
3. <u>MW-4/T40</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>[Redacted]</u>	<u>1118</u>	<u>[Redacted]</u>	<u>N</u>	<u>3</u>	<u>X</u>	<u>CC3</u>
4. <u>MW-5/T40</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>[Redacted]</u>	<u>1122</u>	<u>[Redacted]</u>	<u>N</u>	<u>3</u>	<u>X</u>	<u>CC4</u>
5. <u>MW-6/T40</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>[Redacted]</u>	<u>1127</u>	<u>[Redacted]</u>	<u>N</u>	<u>3</u>	<u>X</u>	<u>CC5</u>
6. <u>MW-7/T40</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>[Redacted]</u>	<u>1132</u>	<u>[Redacted]</u>	<u>N</u>	<u>3</u>	<u>X</u>	<u>CC6</u>
7. <u>TS-1/T40</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>[Redacted]</u>	<u>1136</u>	<u>[Redacted]</u>	<u>N</u>	<u>3</u>	<u>X</u>	<u>CC7</u>
8. <u>Trip Blank</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>[Redacted]</u>	<u>—</u>	<u>—</u>	<u>N</u>	<u>2</u>	<u>X</u>	<u>CC8</u>
9.										
10.										

BARR USE ONLY	Relinquished by: <u>[Signature]</u>	On Ice? <input checked="" type="checkbox"/> N	Date: <u>10/14/21</u>	Time: <u>1535</u>	Received by: <u>[Signature]</u>	Date: <u>10/14/21</u>	Time: <u>1540</u>
	Relinquished by: <u>[Signature]</u>	On Ice? <input checked="" type="checkbox"/> N	Date: <u>10/14/21</u>	Time: <u>1540</u>	Received by: <u>[Signature]</u>	Date: <u>10/15/21</u>	Time: <u>15:30</u>
	Samples Shipped VIA: <input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input type="checkbox"/> Other: _____	Air Bill Number: _____		Requested Due Date: <input checked="" type="checkbox"/> Standard Turn Around Time <input type="checkbox"/> Rush _____ (mm/dd/yyyy)			
Sampled by: <u>LMJ3</u>	Lab Location: <u>Minneapolis, MN</u>	Lab WO: _____	Temperature on Receipt (°C): <u>3.5</u>		Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input checked="" type="checkbox"/> None		

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



Document Name: Sample Condition Upon Receipt (SCUR) - MN

Document Revised: 14Apr2021

Page 1 of 1

Document No.: ENV-FRM-MIN4-0150 Rev.02

Pace Analytical Services - Minneapolis

Sample Condition Upon Receipt

Client Name:

Project #:

Barr Engineering Co.

WO#: 10581759
PM: AA1 Due Date: 10/19/21
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), OS418-LS, T4(0254), T5(0489), 160285052 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: 3.5 °C

Average Corrected Temp (no temp blank only): °C See Exceptions ENV-FRM-MIN4-0142 1 Container

Correction Factor: TRUE Cooler Temp Corrected w/temp blank: 3.5 °C

USDA Regulated Soil: N/A, water sample/Other:

Date/Initials of Person Examining Contents: ED 10/6/21

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.

Table with 2 columns: Questions and COMMENTS. Contains 14 numbered rows of questions and checkboxes.

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted:

Date/Time:

Comments/Resolution:

Project Manager Review:

Date: 10/6/21

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).