resourceful. naturally.
engineering and environmental consultants

BARR

Technical Memorandum

To: Nick Larabel, Enbridge Energy
From: Ryan Erickson
Subject: Enbridge Terminal – Booster Pump #56 Response
WDNR BRRTS #: 02-16-338051 (LAKEHEAD PIPELINE - BOOSTER PUMP #56)
Barr Project: 49161092.11
Site Coordinates: 46.686150°, -92.056890° (NAD83)
Date: December 19, 2022

This memorandum summarizes the environmental response activities performed by Barr Engineering (Barr) at the request of Enbridge Energy (Enbridge) following the discovery of historical petroleum impacts near the Booster Pump #56 site (site) at the Enbridge Superior Terminal (Terminal) in Superior, Wisconsin (Figure 1).

Background

On October 17, 2022, Enbridge contractors excavating buried infrastructure for maintenance activities encountered an apparent petroleum sheen on excavation water on the northeast side of Booster Pump 56 (hereafter referred to as the site; Figure 2). When impacts were encountered, Enbridge personnel inspected the pipeline infrastructure and no active release was identified. Enbridge reviewed historical release documents and confirmed the excavation was in an area with previously identified historical petroleum impacts that had been reported to the Wisconsin Department of Natural Resources (WDNR), as described below. During subsequent project activities, soil and groundwater with evidence of petroleum-impacts were managed as contaminated material, as described in the Material Management section of this memo.

Enbridge requested that Barr complete the following activities:

- review historical records of releases near the site,
- assist with the off-site management coordination of soil and/or water with suspected impacts,
- field screen and sample soil from the excavation extents to document the soil conditions, and
- prepare a memorandum summarizing the response actions and the excavation conditions upon the completion of project activities.

On October 26, 2022, Enbridge notified the WDNR of historical petroleum impacts in the project excavation and existing Bureau of Remediation & Redevelopment Tracking System (BRRTS) number #02-16-338051 (LAKEHEAD PIPELINE - BOOSTER PUMP #56) was referenced based on the site location. This BRRTS site is associated with a January 2, 2002, 10-barrel crude oil release. The site Closure with Continuing Obligations letter was issued by the WDNR on July 21, 2006. The site was reopened by the WDNR when impacts were encountered in 2012 and then re-closed with continuing obligations on October 15, 2013 (WDNR, 2013).

Field Activities and Results

On October 18, 2022, Barr was on site to observe site conditions. Barr confirmed that the sheen appeared to be a petroleum sheen (Photos 1 and 2). On October 19, 2022, Barr returned to the site after excavation activities were completed to field screen and sample the final excavation sidewalls and document environmental conditions per the WDNR-approved *Site Investigation and Response Action Plan* (SI/RAP; 2014). The final excavation was approximately 40 feet long (northwest to southeast) by 25 feet wide (southwest to northeast) by up to 10 feet deep. Soil in the sidewalls away from the booster pump consisted of clay. Soil beneath the booster pump (southwest sidewall) consisted of sand fill and clay. Water in the excavation had been pumped down to facilitate project work at the time of the site visits.

Barr collected fifteen field screening soil samples from the excavation sidewalls (Photos 3 and 4; Attachment A). The soil samples were tested for the presence of organic vapors using a 10.6eV photoionization detector (PID) and inspected for the presence of other potential indicators of petroleum impacts such as odor, discoloration and sheen. The soil in the northwest, northeast, and southeast sidewalls had headspace readings between 0.8 and 2.2 parts per million (ppm) and no discoloration, petroleum odor, or sheen were identified. Soil in the southwest sidewall beneath the booster pump (Photo 4) had headspace readings between 1.0 and 23.2 ppm and a petroleum odor was identified. Soil with elevated headspace readings and petroleum odor was located at approximately 6 feet below ground surface (bgs).

Analytical soil sample *BS56-S-1* was collected from the excavation sidewall where the headspace reading was highest (*S-3*, 6 feet bgs; Figure 2) and *BS56-S-2* was collected above *BS56-S-1* to document conditions in the direct contact zone (*S-3*, 2 feet bgs). The samples were submitted to ALS Environmental Laboratory (ALS) in Holland, Michigan for analysis of petroleum volatile organic compounds (PVOCs) and naphthalene. The analyte concentrations were below the laboratory reporting limits and WDNR Groundwater Residual Contaminant Levels (RCLs). The laboratory results are summarized in Table 1 and the ALS laboratory report is provided in Attachment B.

Upon completion of the project activities, the excavation was backfilled with clean fill.

Receptor Survey

No direct contact risks were identified based on the field screening and analytical sampling results and the use of clean backfill material. No impacts to surface water were identified and there is little risk of future surface water impacts based on the project remedial actions and the site's location within the Terminal where surface water conditions are monitored for evidence of potential impacts. No groundwater risks were identified based on the historical nature of the impacts and ongoing facility-wide groundwater monitoring activities. Specifically, the groundwater pathway at the Superior Terminal is addressed on a facility-wide basis through the established hydrogeologic performance standard approved by the WDNR. Enbridge samples the Terminal monitoring well network (shown on Figure 3) on an annual basis and provides the data to the WDNR. The nearest downgradient monitoring well is approximately 250 feet southwest of the excavation. The nearest enclosed structures is a pipeline operation building approximately 30 feet northwest of the excavation and it has limited human occupancy. The nearest regularly occupied building is the Terminal office building approximately 1,000 feet to the north. The risk of hazardous vapor accumulation in this structure is low due to the soil conditions, the distance to the

structure, and the slab-on-grade construction. Terminal employees are also required to wear four-gas detectors that would alert them to a potentially hazardous atmosphere.

Material Management

Excavated soil and water with evidence of potential petroleum impacts was transported to the Terminal Soil Management Area (SMA) (Photo 5) and solidified and stockpiled until landfill approval was granted. Barr collected a soil characterization sample (Sample BP56-Stockpile-1) from the stockpile on October 19, 2022, for laboratory analysis at ALS. The sample was analyzed for diesel range organics (DRO) and benzene, toluene, ethyl benzene, and total xylenes (BTEX). The laboratory report and waste profile application were submitted to the VONCO V landfill in Duluth, Minnesota and the soil was assigned waste profile #22-103-I. A total of 44.76 tons of contaminated soil was hauled to the landfill on October 27, 2022. The waste profile approval, landfill summary, and waste characterization laboratory report are included in Attachment C.

Conclusions

Evidence of historical petroleum impacts were identified during the Booster Pump #56 project in October 2022. No active release was identified during the work. Soil and water with evidence of petroleum impacts that was removed from the excavation was managed at a landfill. Based on the results of field screening and sampling, the soil with residual historical impacts in the final excavation had analyte concentrations below laboratory reporting limits and below WDNR soil reference values and clean fill was used to backfill the excavation.

Based on the location of the current Booster Pump 56 excavation, field observations, and ongoing facility environmental monitoring activities, we believe the residual historical impacts are associated with the Lakehead Pipeline – Booster Pump #56 site (BRRTS# 02-16-338051) and that there is no apparent risk to human health and the environmental receptors. Based on this, Barr believes that no additional investigation actions will be required, and we recommend that Enbridge request that the WDNR add this report to the Lakehead Pipeline – Booster Pump #56 site BRRTS file.

Certification

I, Ryan Erickson, 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 chs. NR 700 to 726, Wis. Adm. Code.

, Professional Geologist (1446-13) 12/19/2021

Signature and Title DATE

References

Barr Engineering Co. 2014, *Site Investigation and Response Action Plan Enbridge, Energy Superior Terminal (Facility-Wide)*. Prepared for Enbridge Energy, July 2014.

WDNR, 2013. *Post Closure Review and Change in Continuing Obligations, Former Lakehead Pipeline Booster Pump #56 (DV 566 Valve), Enbridge Energy Superior Terminal, Superior, WI, WDNR BRRTS Activity #: 02-16-338051*. WDNR site closure with continuing obligations letter sent to Enbridge Energy, October 15, 2013.

Attachments:

Site Photos	1 through 5
Table 1	Analytical Soil Data Summary
Figure 1	Site Location
Figure 2	Site Layout
Figure 3	Receptor Survey
Attachment A	Site Investigation Field Sampling and Screening Log
Attachment B	ALS Environmental Laboratory Report for Excavation Soil Samples
Attachment C	Material Management Documents

Site Photos

Photo 1

Photo 2

Photo 1: Booster Pump 56 excavation. Photo taken facing southwest on October 18, 2022.
Photo 2: Water with a sheen in bottom Booster Pump 56 excavation. Photo taken facing southeast on October 18, 2022.

Photo 3

Photo 4

Photo 3: Booster Pump 56 excavation. Photo taken facing west on October 19, 2022.
Photo 4: Southwest excavation sidewall where evidence of petroleum impacts was identified (yellow arrow). Photo taken facing west on October 19, 2022.

Photo 5: Booster 56 contaminated soil stockpile in soil management area building. Photo taken on October 19, 2022.

Table 1
Analytical Soil Data Summary
Booster Pump #56
Enbridge Energy

		Location	BS56-S-1	BS56-S-2
		Date	10/19/2022	10/19/2022
		Depth	6 ft	2 ft
Parameter	Wisconsin Groundwater RCLs, DF=2	Wisconsin Not to Exceed Direct Contact Industrial RCLs		
Effective Date	06/01/2018	06/01/2018		
Exceedance Key	No Exceedances	No Exceedances		
Volatile Organic Compounds				
1,2,4-Trimethylbenzene	1.3787 (1)	219	< 0.029 U	< 0.029 U
1,3,5-Trimethylbenzene	1.3787 (1)	182	< 0.047 U	< 0.046 U
Benzene	0.0051	7.07	< 0.019 U	< 0.019 U
Ethyl benzene	1.57	35.4	< 0.0084 U	< 0.0084 U
Naphthalene	6.582	24.1	< 0.096 U	< 0.095 U
Toluene	1.1072	818	< 0.011 U	< 0.011 U
Xylene, total	3.96	260	< 0.053 U	< 0.053 U

-All values in mg/kg unless otherwise noted

Barr Standard Footnotes and Qualifiers

U	The analyte was analyzed for, but was not detected.

Wisconsin Groundwater RCLs, DF=2

(1)	Representing the criteria for combined Trimethylbenzenes.

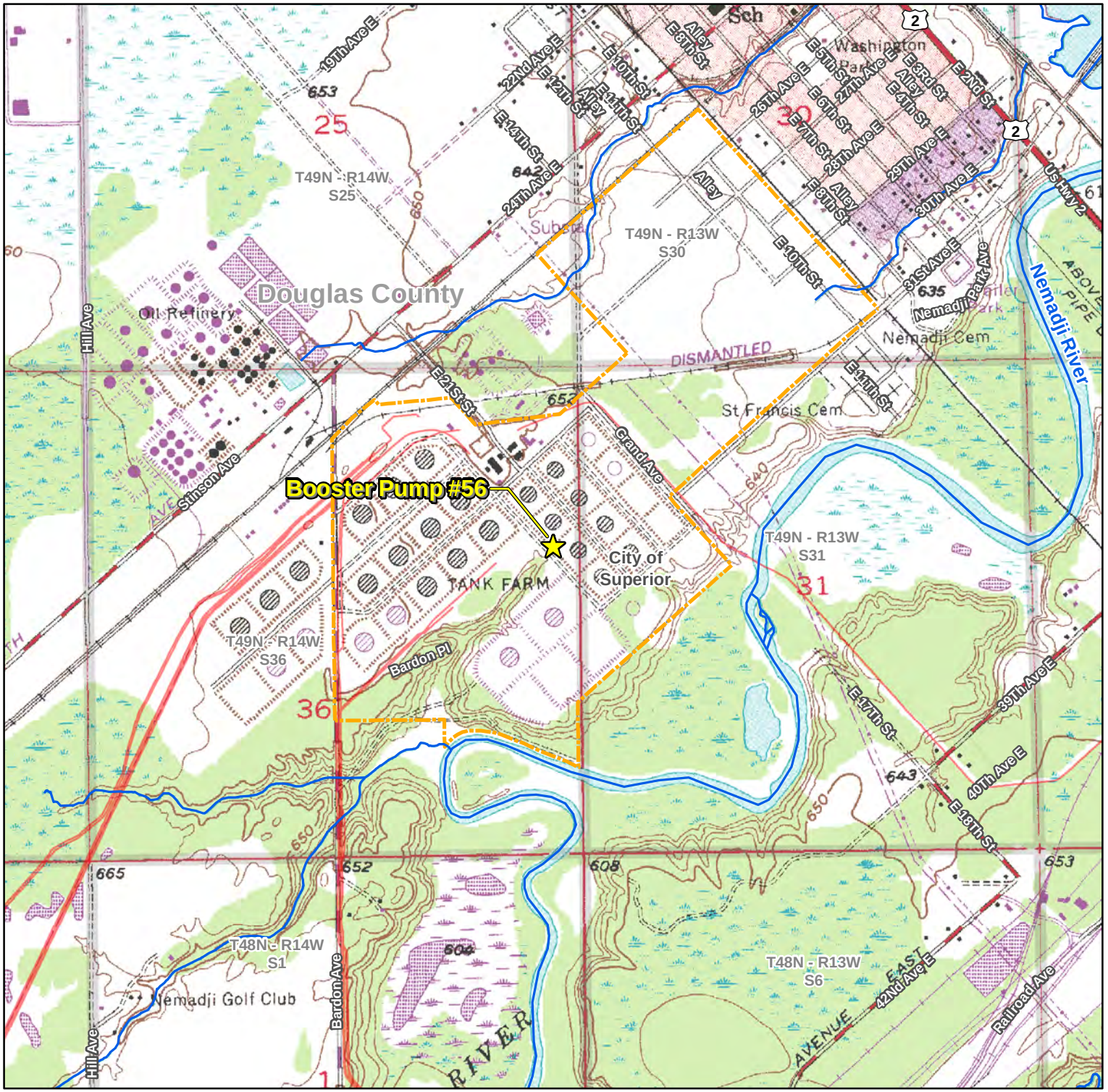


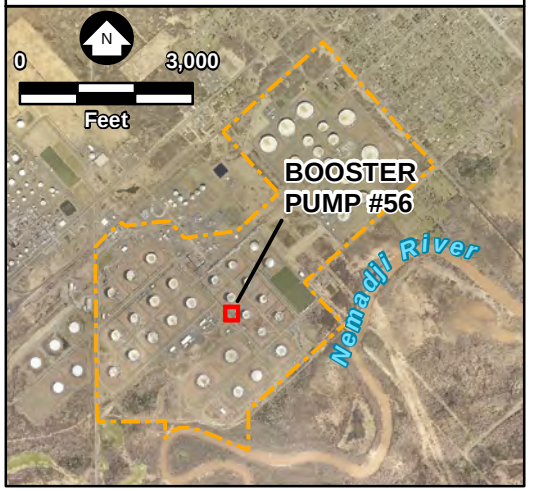
Figure 1

SITE LOCATION
BOOSTER PUMP #56
SUPERIOR TERMINAL
Enbridge Energy, L.P.
Superior, Wisconsin

ENBRIDGE

Barr Footer: ArcGIS 10.8.1, 2022-12-14 14:33 File: I:\Client\Enbridge_Energy\Work_Orders\Terminal_Permitting\49161092\Maps\Reports\Booster_57_Response\Figure 1 Booster 56 Site Location.mxd User: vaw

ENBRIDGE SUPERIOR TERMINAL



- Sample Location
- Excavation Extent
- BRRTS Site# 0216338051
- Pipeline Infrastructure
- Terminal Property Boundary

N

0 30 60

Feet

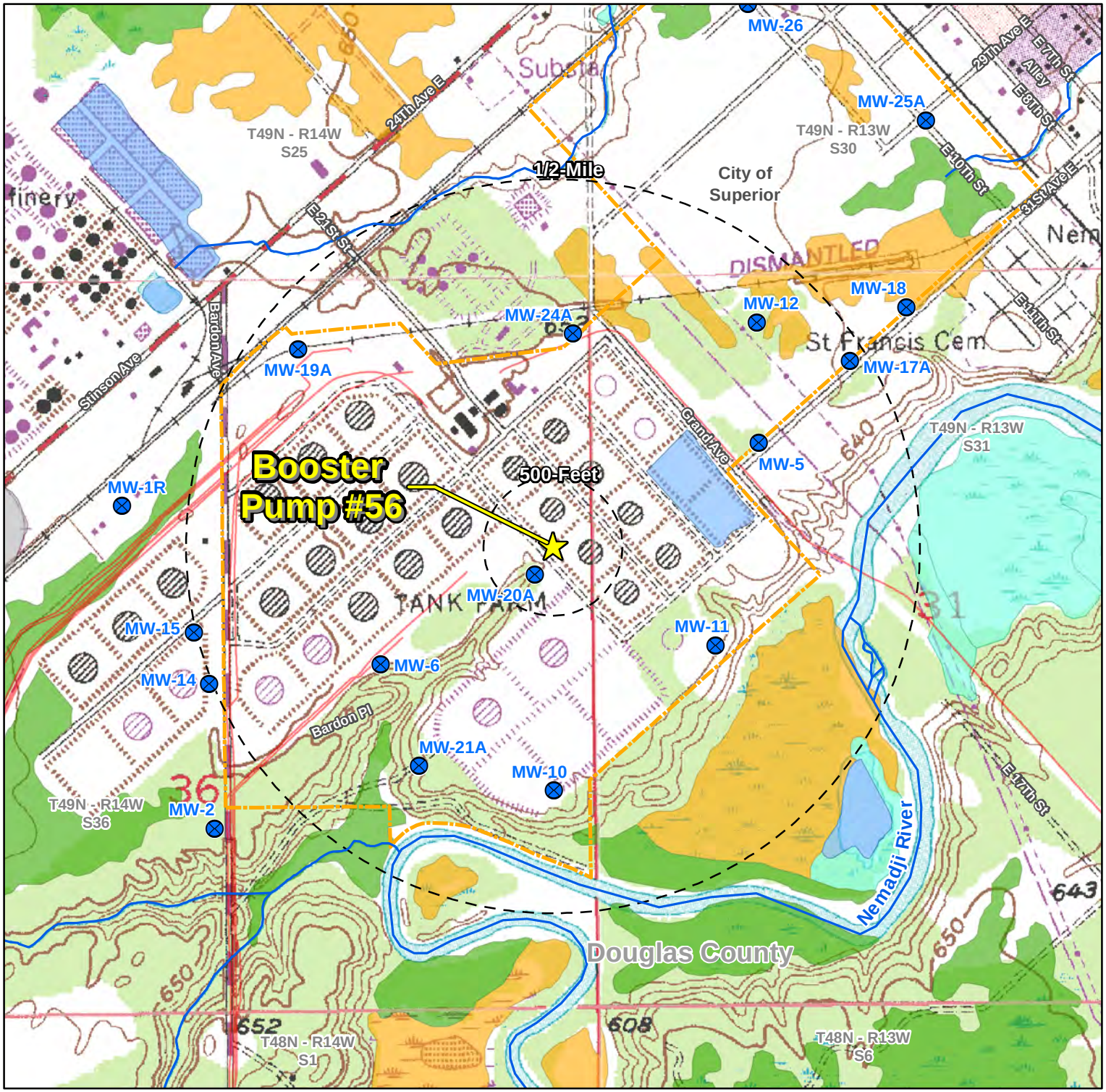
1 Inch = 30 Feet

Douglas County Imagery Circa May, 2019

Figure 2

SITE LAYOUT
BOOSTER PUMP #56
SUPERIOR TERMINAL
Enbridge Energy, L.P.
Superior, Wisconsin

ENBRIDGE



Site Location

Enbridge Monitoring Well

Receptor Buffers

Enbridge Pipelines

Terminal Property Boundary

Watercourses

Wisconsin Wetland Inventory

Emergent/wet meadow

Filled/drained wetland

Forested

Open Water

Scrub/Shrub

N

0 1,000 2,000

Feet

1 Inch = 1,000 Feet

Figure 3

RECEPTOR SURVEY
BOOSTER PUMP #56
SUPERIOR TERMINAL
Enbridge Energy, L.P.
Superior, Wisconsin

ENBRIDGE

Barr Footer: ArcGIS 10.8.1, 2022-12-14 14:35 File: I:\Client\Enbridge_Energy\Work_Orders\Terminal_Permitting\49161092\Maps\Reports\Booster_57_Response\Figure 3 Booster 56 Receptor Survey.mxd User: vaw

Attachment A

Site Investigation Field Sampling and Screening Log

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Location: *Milepost or Facility* Superior Terminal Booster 56

Equipment used: PID *-ionization detector with* 10.6 *eV lamp*

Background Headspace: 0.0 ppm

Date: 10/19/22

Sampler: REE

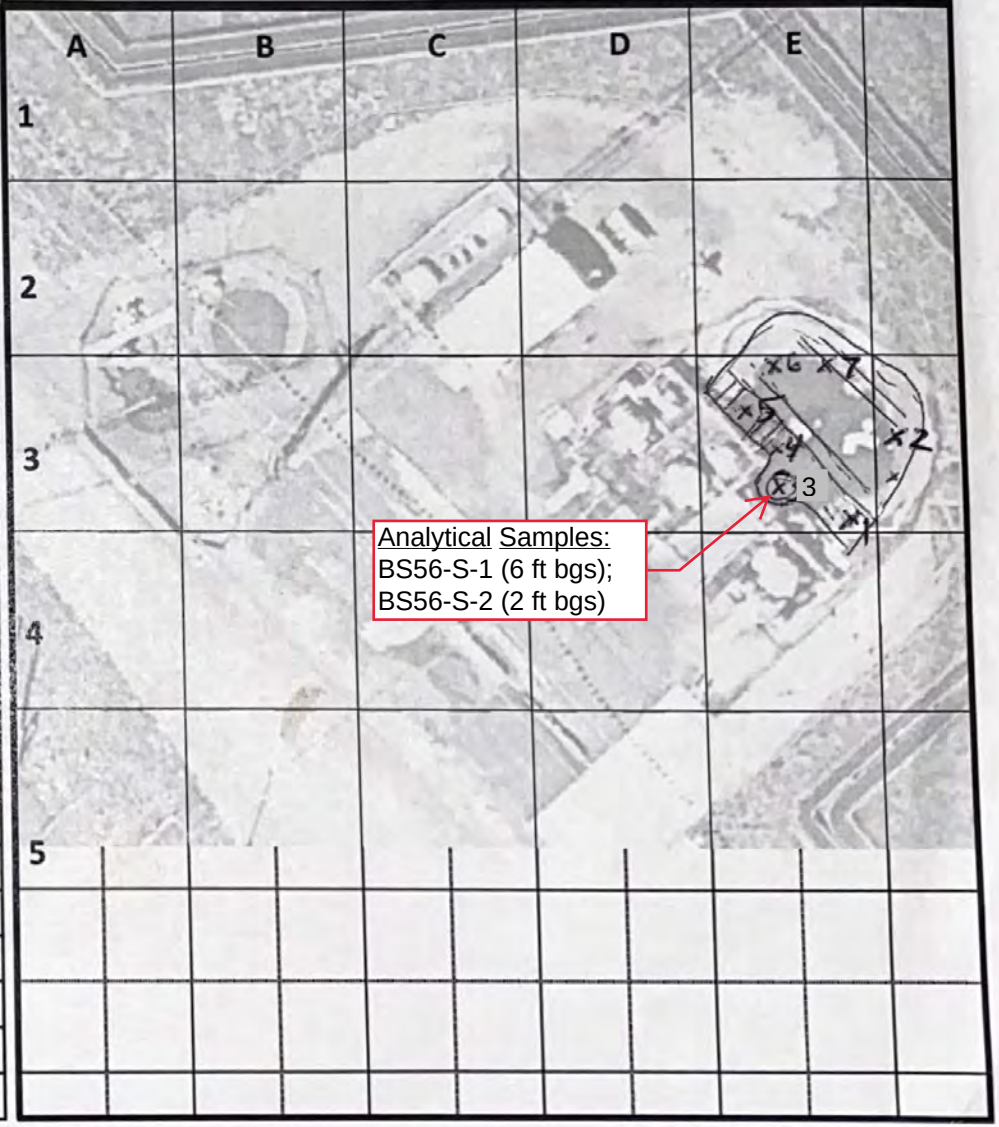
Calibration Time: 1100

Sample Nomenclature *(Location - sample type - #):* BP56 -

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

Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/ Discolor	Odor/ Sheen	Headspace Reading (ppm)
Example: A3-NE	4	16:30	CL	Reddish brown	Petroleum/ Rainbow	275
S-1	2	1230	Gravel Clay & Sand Fill	Reddish brown	N/N	4.4
S-1	6				Pet odor/N	20.2
S-1	10				N/N	4.4
S-2	2				N/N	1.8
S-2	6				N/N	2.1
S-3	2		Sandy		N/N	1.0
S-3	6		Sandy		Pet odor/N	23.2
S-4	1				N/N	2.2
S-4	4				N/N	2.0
S-5	1				N/N	1.1
S-5	4				N/N	.8
S-5	8				N/N	1.0
S-6	8				N/N	1.0
S-7	5				N/N	1.6
S-7	8	1300	↓	↓	N/N	.8
Analytical						
BS56-S-1	6'				Pet odor	
BS56-S-2	2'				No odor	

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



Attachment B

ALS Environmental Laboratory Report for Excavation Soil Samples

26-Oct-2022

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

Re: **Booster 56** Work Order: **22101880**

Dear Ryan,

ALS Environmental received 2 samples on 20-Oct-2022 09:00 AM for the analyses presented in the following report.

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

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

The total number of pages in this report is 14.

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

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Jodi Blouw

Electronically approved by: Jodi Blouw

Jodi Blouw

ALS Group, USA

Date: 26-Oct-22

Client: Barr Engineering Company
Project: Booster 56
Work Order: **22101880**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
22101880-01	BS56-S-1	Soil		10/19/2022 13:00	10/20/2022 09:00	☐
22101880-02	BS56-S-2	Soil		10/19/2022 13:05	10/20/2022 09:00	☐
22101880-02	BS56-S-2	Soil		10/19/2022 13:05	10/20/2022 09:00	☐

Client: Barr Engineering Company
Project: Booster 56
WorkOrder: **22101880**

QUALIFIERS, ACRONYMS, UNITS

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

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

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

Client: Barr Engineering Company
Project: Booster 56
Work Order: 22101880

Case Narrative

Samples for the above noted Work Order were received on 10/20/2022. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, sample condition, preservation, and temperature compliance.
In order to ensure compliance with NR 149 criteria, please note the following report format:
(1) The Limit of Detection (LOD) is reported as the MDL (Method Detection Limit)
(2) The Limit of Quantitation (LOQ) is reported as the PQL (Practical Quantitation Limit)
(3) All reported concentrations, including those for the LOD and LOQ, are adjusted for any required dilutions
(4) All reported concentrations, including those for the LOD and LOQ, are adjusted for moisture content when samples are reported on a dry weight basis.

Samples were analyzed according to the analytical methodology previously documented in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Detail as to the associated samples can be found at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, acronyms, and units utilized in reporting.

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

Volatile Organics
No deviations or anomalies noted

Wet Chemistry
No deviations or anomalies noted

ALS Group, USA

Date: *26-Oct-22*

Client: Barr Engineering Company
Project: Booster 56
Sample ID: BS56-S-1
Collection Date: 10/19/2022 01:00 PM

Work Order: 22101880
Lab ID: 22101880-01
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260C**			Prep: SW5035A / 10/20/22		Analyst: **HJ**
1,2,4-Trimethylbenzene	U		29	98	µg/Kg-dry	1	10/20/2022 23:11
1,3,5-Trimethylbenzene	U		47	160	µg/Kg-dry	1	10/20/2022 23:11
Benzene	U		19	64	µg/Kg-dry	1	10/20/2022 23:11
Ethylbenzene	U		8.4	28	µg/Kg-dry	1	10/20/2022 23:11
m,p-Xylene	U		53	180	µg/Kg-dry	1	10/20/2022 23:11
Naphthalene	U		96	320	µg/Kg-dry	1	10/20/2022 23:11
o-Xylene	U		15	51	µg/Kg-dry	1	10/20/2022 23:11
Toluene	U		11	36	µg/Kg-dry	1	10/20/2022 23:11
Xylenes, Total	U		53	180	µg/Kg-dry	1	10/20/2022 23:11
Surr: 1,2-Dichloroethane-d4	*103*			*80-120*	*%REC*	1	10/20/2022 23:11
Surr: 4-Bromofluorobenzene	*110*			*80-120*	*%REC*	1	10/20/2022 23:11
Surr: Dibromofluoromethane	*88.7*			*80-120*	*%REC*	1	10/20/2022 23:11
Surr: Toluene-d8	*99.5*			*80-120*	*%REC*	1	10/20/2022 23:11
MOISTURE		Method: **SW3550C**					Analyst: **ALG**
Moisture	**20**		**0.10**	**0.10**	**% of sample**	1	10/20/2022 15:15

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

ALS Group, USA

Date: *26-Oct-22*

Client: Barr Engineering Company
Project: Booster 56
Sample ID: BS56-S-2
Collection Date: 10/19/2022 01:05 PM

Work Order: 22101880
Lab ID: 22101880-02
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260C**			Prep: SW5035A / 10/20/22		Analyst: **HJ**
1,2,4-Trimethylbenzene	U		29	97	µg/Kg-dry	1	10/20/2022 23:27
1,3,5-Trimethylbenzene	U		46	150	µg/Kg-dry	1	10/20/2022 23:27
Benzene	U		19	64	µg/Kg-dry	1	10/20/2022 23:27
Ethylbenzene	U		8.4	28	µg/Kg-dry	1	10/20/2022 23:27
m,p-Xylene	U		53	180	µg/Kg-dry	1	10/20/2022 23:27
Naphthalene	U		95	320	µg/Kg-dry	1	10/20/2022 23:27
o-Xylene	U		15	51	µg/Kg-dry	1	10/20/2022 23:27
Toluene	U		11	36	µg/Kg-dry	1	10/20/2022 23:27
Xylenes, Total	U		53	180	µg/Kg-dry	1	10/20/2022 23:27
Surr: 1,2-Dichloroethane-d4	*102*			*80-120*	*%REC*	1	10/20/2022 23:27
Surr: 4-Bromofluorobenzene	*104*			*80-120*	*%REC*	1	10/20/2022 23:27
Surr: Dibromofluoromethane	*89.9*			*80-120*	*%REC*	1	10/20/2022 23:27
Surr: Toluene-d8	*99.6*			*80-120*	*%REC*	1	10/20/2022 23:27
MOISTURE		Method: **SW3550C**					Analyst: **ALG**
Moisture	**19**		**0.10**	**0.10**	**% of sample**	1	10/20/2022 15:15

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

ALS Group, USA

Date: 26-Oct-22

Client: Barr Engineering Company

Work Order: 22101880

Project: Booster 56

QC BATCH REPORT

Batch ID: **205200** Instrument ID **VMS9** Method: **SW8260C**

MBLK Sample ID: **MBLK-205200-205200** Units: **µg/Kg-dry** Analysis Date: **10/20/2022 10:09 PM**

Client ID: Run ID: **VMS9_221020B** SeqNo: **8921086** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	U	22	30								
1,3,5-Trimethylbenzene	U	35	100								
Benzene	U	15	30								
Ethylbenzene	U	6.3	30								
m,p-Xylene	U	40	60								
Naphthalene	U	72	100								
o-Xylene	U	12	30								
Toluene	U	8.2	30								
Xylenes, Total	U	40	90								
Surr: 1,2-Dichloroethane-d4	*999*	0	0	*1000*	0	*99.9*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*1046*	0	0	*1000*	0	*105*	*80-120*	0			
Surr: Dibromofluoromethane	*942*	0	0	*1000*	0	*94.2*	*80-120*	0			
Surr: Toluene-d8	*985.5*	0	0	*1000*	0	*98.6*	*80-120*	0			

MBLK Sample ID: **MBLK-205200-205200** Units: **µg/Kg-dry** Analysis Date: **10/20/2022 10:09 PM**

Client ID: Run ID: **VMS9_221020B** SeqNo: **8921389** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	U	22	73	0	0	0	0-0	0			
1,3,5-Trimethylbenzene	U	35	120	0	0	0	0-0	0			
Benzene	U	15	48	0	0	0	0-0	0			
Ethylbenzene	U	6.3	21	0	0	0	0-0	0			
m,p-Xylene	U	40	130	0	0	0	0-0	0			
Naphthalene	U	72	240	0	0	0	0-0	0			
o-Xylene	U	12	39	0	0	0	0-0	0			
Toluene	U	8.2	27	0	0	0	0-0	0			
Xylenes, Total	U	40	130	0	0	0	0-0	0			
Surr: 1,2-Dichloroethane-d4	*999*	0	0	*1000*	0	*99.9*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*1046*	0	0	*1000*	0	*105*	*80-120*	0			
Surr: Dibromofluoromethane	*942*	0	0	*1000*	0	*94.2*	*80-120*	0			
Surr: Toluene-d8	*985.5*	0	0	*1000*	0	*98.6*	*80-120*	0			

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

Client: Barr Engineering Company
Work Order: 22101880
Project: Booster 56

QC BATCH REPORT

Batch ID: **205200** Instrument ID **VMS9** Method: **SW8260C**

LCS Sample ID: **LCS-205200-205200** Units: **µg/Kg-dry** Analysis Date: **10/20/2022 09:22 PM**
Client ID: Run ID: **VMS9_221020B** SeqNo: **8921084** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	988.5	22	30	1000	0	98.8	64-126	0			
1,3,5-Trimethylbenzene	1019	35	100	1000	0	102	66-130	0			
Benzene	1054	15	30	1000	0	105	78-122	0			
Ethylbenzene	1025	6.3	30	1000	0	102	75-121	0			
m,p-Xylene	2050	40	60	2000	0	103	67-129	0			
Naphthalene	1050	72	100	1000	0	105	53-135	0			
o-Xylene	1026	12	30	1000	0	103	75-120	0			
Toluene	1020	8.2	30	1000	0	102	76-120	0			
Xylenes, Total	3077	40	90	3000	0	103	67-129	0			
Surr: 1,2-Dichloroethane-d4	*1049*	0	0	*1000*	0	*105*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*948.5*	0	0	*1000*	0	*94.8*	*80-120*	0			
Surr: Dibromofluoromethane	*1068*	0	0	*1000*	0	*107*	*80-120*	0			
Surr: Toluene-d8	*979.5*	0	0	*1000*	0	*98*	*80-120*	0			

MS Sample ID: **22101877-01C MS** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 03:55 A**
Client ID: Run ID: **VMS9_221020B** SeqNo: **8921108** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	2375	48	66	2186	15.3	108	64-126	0			
1,3,5-Trimethylbenzene	2471	77	220	2186	0	113	66-130	0			
Benzene	2476	32	66	2186	0	113	78-122	0			
Ethylbenzene	2359	14	66	2186	0	108	75-121	0			
m,p-Xylene	4736	87	130	4372	0	108	67-129	0			
Naphthalene	2224	160	220	2186	25.14	101	53-135	0			
o-Xylene	2319	25	66	2186	0	106	75-120	0			
Toluene	2367	18	66	2186	42.62	106	76-120	0			
Xylenes, Total	7055	87	200	6558	0	108	67-129	0			
Surr: 1,2-Dichloroethane-d4	*2298*	0	0	*2186*	0	*105*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*2223*	0	0	*2186*	0	*102*	*80-120*	0			
Surr: Dibromofluoromethane	*2062*	0	0	*2186*	0	*94.4*	*80-120*	0			
Surr: Toluene-d8	*2113*	0	0	*2186*	0	*96.6*	*80-120*	0			

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

Client: Barr Engineering Company
Work Order: 22101880
Project: Booster 56

QC BATCH REPORT

Batch ID: **205200** Instrument ID **VMS9** Method: **SW8260C**

MS Sample ID: **22101877-01C MS** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 03:55 A**
Client ID: Run ID: **VMS9_221020B** SeqNo: **8921411** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	2375	48	160	2186	15.3	108	64-126	0			
1,3,5-Trimethylbenzene	2471	77	260	2186	0	113	66-130	0			
Benzene	2476	32	110	2186	0	113	78-122	0			
Ethylbenzene	2359	14	46	2186	0	108	75-121	0			
m,p-Xylene	4736	87	290	4372	0	108	67-129	0			
Naphthalene	2224	160	520	2186	25.14	101	53-135	0			
o-Xylene	2319	25	85	2186	0	106	75-120	0			
Toluene	2367	18	60	2186	42.62	106	76-120	0			
Xylenes, Total	7055	87	290	6558	0	108	67-129	0			
Surr: 1,2-Dichloroethane-d4	*2298*	0	0	*2186*	0	*105*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*2223*	0	0	*2186*	0	*102*	*80-120*	0			
Surr: Dibromofluoromethane	*2062*	0	0	*2186*	0	*94.4*	*80-120*	0			
Surr: Toluene-d8	*2113*	0	0	*2186*	0	*96.6*	*80-120*	0			

MSD Sample ID: **22101877-01C MSD** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 04:11 A**
Client ID: Run ID: **VMS9_221020B** SeqNo: **8921109** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	2532	48	66	2186	15.3	115	64-126	2375	6.41	30	
1,3,5-Trimethylbenzene	2548	77	220	2186	0	117	66-130	2471	3.05	30	
Benzene	2457	32	66	2186	0	112	78-122	2476	0.753	30	
Ethylbenzene	2423	14	66	2186	0	111	75-121	2359	2.7	30	
m,p-Xylene	4828	87	130	4372	0	110	67-129	4736	1.92	30	
Naphthalene	2308	160	220	2186	25.14	104	53-135	2224	3.71	30	
o-Xylene	2531	25	66	2186	0	116	75-120	2319	8.74	30	
Toluene	2439	18	66	2186	42.62	110	76-120	2367	3	30	
Xylenes, Total	7359	87	200	6558	0	112	67-129	7055	4.22	30	
Surr: 1,2-Dichloroethane-d4	*2082*	0	0	*2186*	0	*95.3*	*80-120*	2298	*9.88*	*30*	
Surr: 4-Bromofluorobenzene	*2366*	0	0	*2186*	0	*108*	*80-120*	2223	*6.24*	*30*	
Surr: Dibromofluoromethane	*2046*	0	0	*2186*	0	*93.6*	*80-120*	2062	*0.798*	*30*	
Surr: Toluene-d8	*2151*	0	0	*2186*	0	*98.4*	*80-120*	2113	*1.79*	*30*	

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

Client: Barr Engineering Company
Work Order: 22101880
Project: Booster 56

QC BATCH REPORT

Batch ID: **205200** Instrument ID **VMS9** Method: **SW8260C**

MSD Sample ID: **22101877-01C MSD** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 04:11 A**

Client ID: Run ID: **VMS9_221020B** SeqNo: **8921412** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
1,2,4-Trimethylbenzene	2532	48	160	2186	15.3	115	64-126	2375	6.41	30	
1,3,5-Trimethylbenzene	2548	77	260	2186	0	117	66-130	2471	3.05	30	
Benzene	2457	32	110	2186	0	112	78-122	2476	0.753	30	
Ethylbenzene	2423	14	46	2186	0	111	75-121	2359	2.7	30	
m,p-Xylene	4828	87	290	4372	0	110	67-129	4736	1.92	30	
Naphthalene	2308	160	520	2186	25.14	104	53-135	2224	3.71	30	
o-Xylene	2531	25	85	2186	0	116	75-120	2319	8.74	30	
Toluene	2439	18	60	2186	42.62	110	76-120	2367	3	30	
Xylenes, Total	7359	87	290	6558	0	112	67-129	7055	4.22	30	
Surr: 1,2-Dichloroethane-d4	*2082*	0	0	*2186*	0	*95.3*	*80-120*	2298	*9.88*	*30*	
Surr: 4-Bromofluorobenzene	*2366*	0	0	*2186*	0	*108*	*80-120*	2223	*6.24*	*30*	
Surr: Dibromofluoromethane	*2046*	0	0	*2186*	0	*93.6*	*80-120*	2062	*0.798*	*30*	
Surr: Toluene-d8	*2151*	0	0	*2186*	0	*98.4*	*80-120*	2113	*1.79*	*30*	

The following samples were analyzed in this batch: 22101880-01A 22101880-02A

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

Client: Barr Engineering Company
Work Order: 22101880
Project: Booster 56

QC BATCH REPORT

Batch ID: **R356201** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R356201** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921438** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	U	0.1	0.10								

LCS Sample ID: **LCS-R356201** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921437** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.1	0.10	100	0	100	98-102	0			

DUP Sample ID: **22101602-01A DUP** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921421** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	84.08	0.1	0.10	0	0	0	0-0	84.11	0.0357	10	

DUP Sample ID: **22101608-03B DUP** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921425** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	11.54	0.1	0.10	0	0	0	0-0	11.87	2.82	10	

The following samples were analyzed in this batch: 22101880-01B 22101880-02B

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

Barr Engineering Co. Chain of Custody

Sample Origination State

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

COC Number: **№ 591437**

COC 1 of 1

REPORT TO	INVOICE TO
Company: BARR	Company: Barr
Address: Duluth	Address:
Address:	Address:
Name: RYAN ERICKSON	Name:
email: RERICKSON@barr.com	email:
Copy to: BarrDM@barr.com	P.O.
Project Name: Booster 56	Barr Project No: 49161092.11003 008

Matrix Code: GW = Groundwater; SW = Surface Water; DW = Drinking Water; PW = Pore Water; WW = Waste Water; WQ = TB, FB, EB, etc.; W = Unspecified; S = Soil/Solid; SD = Sediment; SQ = MeOH blank; OTH = Other (Oil, etc.)

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

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water — PVOCs + Naphthalene	Soil — PVOCs + Naphthalene	Soil — % Solids	Preservative Code	Field Filtered Y/N
1. BS 56 - S - 1	6	6	FT	10/19/22	1100	S			☒	2	1		
2. BS 56 - S - 2	2	2	↓	↓	1105	S			-	2	1		
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													

BARR USE ONLY	Relinquished by:	On Ice? Y N	Date	Time	Received by:	Date	Time
Sampled by: REE							
Barr Proj. Manager: REE	Relinquished by:	On Ice? Y N	Date	Time	Received by:	Date	Time
Barr DQ Manager: JET						10-20-22	0900
Lab Name: ALS	Samples Shipped VIA: ☒ Ground Courier ☐ Air Carrier ☐ Sampler ☐ Other: _____				Air Bill Number:	Requested Due Date: ☒ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)	
Lab Location: Holland, MI	Lab WO:	Temperature on Receipt (°C): 5.2			Custody Seal Intact? ☐ Y ☐ N ☒ None		

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

ALS Group, USA
Holland, Michigan

Sample Receipt Checklist

Client Name: **BARRENG-MN** Date/Time Received: **20-Oct-22 09:00**

Work Order: **22101880** Received by: **JD**

Checklist completed by Jason Delinger (eSignature) 20-Oct-22 (Date) Reviewed by: Jodi Blouw (eSignature) 20-Oct-22 (Date)

Matrices: soil
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☐	No ☑	
Temperature(s)/Thermometer(s):	3.2/4.2 c	ir3	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	10/20/2022 11:46:34 AM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

Attachment C

Material Management Documents

Cassidy Potter
Sales Representative
1100 West Gary Street
Duluth, MN 55808

Office: 218.626.3867
Mobile: 218.395.0315
Fax: 218.626.1009
CPotter@VoncoUSA.com

October 26, 2022

Enbridge Energy
Ross Peterson
1100 Louisiana Ave, Ste 3300
Houston, TX 77002

RE: Profile 22-103-I/ Hydrocarbon Contaminated soil

Ross,

Please be advised that the above described waste material is acceptable for 500**/yards** for disposal at the Vonco V Waste Management Campus Facility in Duluth, MN. The waste material is acceptable per Vonco V (SW-536) Minnesota Pollution Control Agency Industrial Solid Waste Management Plan.

The referenced waste must maintain consistency with what was originally submitted on the waste profile. Vonco V Waste Management Campus must be contacted immediately for any changes in material composition or process generation as further testing and analysis may apply. The term of the approval is 3 years and will expire on 10\19\2024.

Additionally, acceptance is subject to the following conditions:

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

Thank you for choosing Vonco V Waste Management Campus. We appreciate your business. If you have any questions or concerns, please feel free to contact me at: (218)-395-0315.

We look forward to working with you,

Cassidy Potter

Vonco V Duluth, LLC

Vonco V Duluth LLC
1100 West Gary Street
Duluth, MN 55808
Permit: SW 536

Enbridge Energy					
Date	Ticket	Profile/Job	Truck	Material	Tons
10/27/2022	347912	22-103-I Superior Terminal Booster 56	T53690W	Contaminated Soil - Tons	23.18
10/27/2022	347925	22-103-I Superior Terminal Booster 56	T53690W	Contaminated Soil - Tons	21.58
				Total Tons	***44.76***
				Total Loads	***2***

25-Oct-2022

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

Re: **Booster 56** Work Order: **22101877**

Dear Ryan,

ALS Environmental received 1 sample on 20-Oct-2022 09:00 AM for the analyses presented in the following report.

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

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

The total number of pages in this report is 13.

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

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Jodi Blouw

Electronically approved by: Jodi Blouw

Jodi Blouw

ALS Group, USA

Date: 25-Oct-22

Client: Barr Engineering Company
Project: Booster 56
Work Order: **22101877**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
22101877-01	BP56-Stockpile-1	Soil		10/19/2022 12:00	10/20/2022 09:00	☐

Client: Barr Engineering Company
Project: Booster 56
WorkOrder: **22101877**

QUALIFIERS, ACRONYMS, UNITS

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

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

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

Client: Barr Engineering Company
Project: Booster 56
Work Order: 22101877

Case Narrative

Samples for the above noted Work Order were received on 10/20/2022. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, sample condition, preservation, and temperature compliance.
In order to ensure compliance with NR 149 criteria, please note the following report format:
(1) The Limit of Detection (LOD) is reported as the MDL (Method Detection Limit)
(2) The Limit of Quantitation (LOQ) is reported as the PQL (Practical Quantitation Limit)
(3) All reported concentrations, including those for the LOD and LOQ, are adjusted for any required dilutions
(4) All reported concentrations, including those for the LOD and LOQ, are adjusted for moisture content when samples are reported on a dry weight basis.

Samples were analyzed according to the analytical methodology previously documented in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Detail as to the associated samples can be found at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, acronyms, and units utilized in reporting.

All sample analyses achieved analytical criteria.

ALS Group, USA

Date: *25-Oct-22*

Client: Barr Engineering Company
Project: Booster 56
Sample ID: BP56-Stockpile-1
Collection Date: 10/19/2022 12:00 PM

Work Order: 22101877
Lab ID: 22101877-01
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID		Method: **PUBL-SW-141**			Prep: PUBL-SW-141 / 10/21/22		Analyst: **MTB**
DRO (C10-C28)	**110**		**0.82**	**8.3**	**mg/Kg-dry**	1	10/21/2022 23:31
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260C**			Prep: SW5035A / 10/20/22		Analyst: **HJ**
Benzene	U		32	110	µg/Kg-dry	1	10/20/2022 22:56
Ethylbenzene	U		14	46	µg/Kg-dry	1	10/20/2022 22:56
m,p-Xylene	U		87	290	µg/Kg-dry	1	10/20/2022 22:56
o-Xylene	U		25	85	µg/Kg-dry	1	10/20/2022 22:56
Toluene	**43**	J	**18**	**60**	**µg/Kg-dry**	1	10/20/2022 22:56
Xylenes, Total	U		87	290	µg/Kg-dry	1	10/20/2022 22:56
Surr: 1,2-Dichloroethane-d4	*102*			*80-120*	*%REC*	1	10/20/2022 22:56
Surr: 4-Bromofluorobenzene	*109*			*80-120*	*%REC*	1	10/20/2022 22:56
Surr: Dibromofluoromethane	*88.7*			*80-120*	*%REC*	1	10/20/2022 22:56
Surr: Toluene-d8	*98.8*			*80-120*	*%REC*	1	10/20/2022 22:56
MOISTURE		Method: **SW3550C**					Analyst: **ALG**
Moisture	**39**		**0.10**	**0.10**	**% of sample**	1	10/20/2022 15:15

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

ALS Group, USA

Date: 25-Oct-22

Client: Barr Engineering Company

Work Order: 22101877

Project: Booster 56

QC BATCH REPORT

Batch ID: **205254** Instrument ID **GC8** Method: **PUBL-SW-141**

MBLK Sample ID: **DBLKS1-205254-205254** Units: **mg/Kg** Analysis Date: **10/21/2022 06:30 PM**

Client ID: Run ID: **GC8_221021A** SeqNo: **8925746** Prep Date: **10/21/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	0.9676	0.5	5.0								J

LCS Sample ID: **DLCSS1-205254-205254** Units: **mg/Kg** Analysis Date: **10/21/2022 07:08 PM**

Client ID: Run ID: **GC8_221021A** SeqNo: **8925747** Prep Date: **10/21/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	10.78	0.5	5.0	10	0	108	70-120	0			

LCSD Sample ID: **DLCSDS1-205254-205254** Units: **mg/Kg** Analysis Date: **10/21/2022 09:38 PM**

Client ID: Run ID: **GC8_221021A** SeqNo: **8925751** Prep Date: **10/21/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	11.29	0.5	5.0	10	0	113	70-120	10.78	4.63	20	

The following samples were analyzed in this batch: 22101877-01A

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

Client: Barr Engineering Company
Work Order: 22101877
Project: Booster 56

QC BATCH REPORT

Batch ID: **205200** Instrument ID **VMS9** Method: **SW8260C**

MBLK Sample ID: **MBLK-205200-205200** Units: **µg/Kg-dry** Analysis Date: **10/20/2022 10:09 PM**
Client ID: Run ID: **VMS9_221020B** SeqNo: **8921086** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	15	30								
Ethylbenzene	U	6.3	30								
m,p-Xylene	U	40	60								
o-Xylene	U	12	30								
Toluene	U	8.2	30								
Xylenes, Total	U	40	90								
Surr: 1,2-Dichloroethane-d4	*999*	0	0	*1000*	0	*99.9*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*1046*	0	0	*1000*	0	*105*	*80-120*	0			
Surr: Dibromofluoromethane	*942*	0	0	*1000*	0	*94.2*	*80-120*	0			
Surr: Toluene-d8	*985.5*	0	0	*1000*	0	*98.6*	*80-120*	0			

MBLK Sample ID: **MBLK-205200-205200** Units: **µg/Kg-dry** Analysis Date: **10/20/2022 10:09 PM**
Client ID: Run ID: **VMS9_221020B** SeqNo: **8921389** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	15	48	0	0	0	0-0	0			
Ethylbenzene	U	6.3	21	0	0	0	0-0	0			
m,p-Xylene	U	40	130	0	0	0	0-0	0			
o-Xylene	U	12	39	0	0	0	0-0	0			
Toluene	U	8.2	27	0	0	0	0-0	0			
Xylenes, Total	U	40	130	0	0	0	0-0	0			
Surr: 1,2-Dichloroethane-d4	*999*	0	0	*1000*	0	*99.9*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*1046*	0	0	*1000*	0	*105*	*80-120*	0			
Surr: Dibromofluoromethane	*942*	0	0	*1000*	0	*94.2*	*80-120*	0			
Surr: Toluene-d8	*985.5*	0	0	*1000*	0	*98.6*	*80-120*	0			

LCS Sample ID: **LCS-205200-205200** Units: **µg/Kg-dry** Analysis Date: **10/20/2022 09:22 PM**
Client ID: Run ID: **VMS9_221020B** SeqNo: **8921084** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1054	15	30	1000	0	105	78-122	0			
Ethylbenzene	1025	6.3	30	1000	0	102	75-121	0			
m,p-Xylene	2050	40	60	2000	0	103	67-129	0			
o-Xylene	1026	12	30	1000	0	103	75-120	0			
Toluene	1020	8.2	30	1000	0	102	76-120	0			
Xylenes, Total	3077	40	90	3000	0	103	67-129	0			
Surr: 1,2-Dichloroethane-d4	*1049*	0	0	*1000*	0	*105*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*948.5*	0	0	*1000*	0	*94.8*	*80-120*	0			
Surr: Dibromofluoromethane	*1068*	0	0	*1000*	0	*107*	*80-120*	0			
Surr: Toluene-d8	*979.5*	0	0	*1000*	0	*98*	*80-120*	0			

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

Client: Barr Engineering Company
Work Order: 22101877
Project: Booster 56

QC BATCH REPORT

Batch ID: **205200** Instrument ID **VMS9** Method: **SW8260C**

MS Sample ID: **22101877-01C MS** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 03:55 A**
Client ID: **BP56-Stockpile-1** Run ID: **VMS9_221020B** SeqNo: **8921108** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	2476	32	66	2186	0	113	78-122	0			
Ethylbenzene	2359	14	66	2186	0	108	75-121	0			
m,p-Xylene	4736	87	130	4372	0	108	67-129	0			
o-Xylene	2319	25	66	2186	0	106	75-120	0			
Toluene	2367	18	66	2186	42.62	106	76-120	0			
Xylenes, Total	7055	87	200	6558	0	108	67-129	0			
Surr: 1,2-Dichloroethane-d4	*2298*	0	0	*2186*	0	*105*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*2223*	0	0	*2186*	0	*102*	*80-120*	0			
Surr: Dibromofluoromethane	*2062*	0	0	*2186*	0	*94.4*	*80-120*	0			
Surr: Toluene-d8	*2113*	0	0	*2186*	0	*96.6*	*80-120*	0			

MS Sample ID: **22101877-01C MS** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 03:55 A**
Client ID: **BP56-Stockpile-1** Run ID: **VMS9_221020B** SeqNo: **8921411** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	2476	32	110	2186	0	113	78-122	0			
Ethylbenzene	2359	14	46	2186	0	108	75-121	0			
m,p-Xylene	4736	87	290	4372	0	108	67-129	0			
o-Xylene	2319	25	85	2186	0	106	75-120	0			
Toluene	2367	18	60	2186	42.62	106	76-120	0			
Xylenes, Total	7055	87	290	6558	0	108	67-129	0			
Surr: 1,2-Dichloroethane-d4	*2298*	0	0	*2186*	0	*105*	*80-120*	0			
Surr: 4-Bromofluorobenzene	*2223*	0	0	*2186*	0	*102*	*80-120*	0			
Surr: Dibromofluoromethane	*2062*	0	0	*2186*	0	*94.4*	*80-120*	0			
Surr: Toluene-d8	*2113*	0	0	*2186*	0	*96.6*	*80-120*	0			

MSD Sample ID: **22101877-01C MSD** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 04:11 A**
Client ID: **BP56-Stockpile-1** Run ID: **VMS9_221020B** SeqNo: **8921109** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	2457	32	66	2186	0	112	78-122	2476	0.753	30	
Ethylbenzene	2423	14	66	2186	0	111	75-121	2359	2.7	30	
m,p-Xylene	4828	87	130	4372	0	110	67-129	4736	1.92	30	
o-Xylene	2531	25	66	2186	0	116	75-120	2319	8.74	30	
Toluene	2439	18	66	2186	42.62	110	76-120	2367	3	30	
Xylenes, Total	7359	87	200	6558	0	112	67-129	7055	4.22	30	
Surr: 1,2-Dichloroethane-d4	*2082*	0	0	*2186*	0	*95.3*	*80-120*	2298	*9.88*	*30*	
Surr: 4-Bromofluorobenzene	*2366*	0	0	*2186*	0	*108*	*80-120*	2223	*6.24*	*30*	
Surr: Dibromofluoromethane	*2046*	0	0	*2186*	0	*93.6*	*80-120*	2062	*0.798*	*30*	
Surr: Toluene-d8	*2151*	0	0	*2186*	0	*98.4*	*80-120*	2113	*1.79*	*30*	

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

Client: Barr Engineering Company
Work Order: 22101877
Project: Booster 56

QC BATCH REPORT

Batch ID: **205200** Instrument ID **VMS9** Method: **SW8260C**

MSD Sample ID: **22101877-01C MSD** Units: **µg/Kg-dry** Analysis Date: **10/21/2022 04:11 A**

Client ID: **BP56-Stockpile-1** Run ID: **VMS9_221020B** SeqNo: **8921412** Prep Date: **10/20/2022** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	2457	32	110	2186	0	112	78-122	2476	0.753	30	
Ethylbenzene	2423	14	46	2186	0	111	75-121	2359	2.7	30	
m,p-Xylene	4828	87	290	4372	0	110	67-129	4736	1.92	30	
o-Xylene	2531	25	85	2186	0	116	75-120	2319	8.74	30	
Toluene	2439	18	60	2186	42.62	110	76-120	2367	3	30	
Xylenes, Total	7359	87	290	6558	0	112	67-129	7055	4.22	30	
Surr: 1,2-Dichloroethane-d4	*2082*	0	0	*2186*	0	*95.3*	*80-120*	2298	*9.88*	*30*	
Surr: 4-Bromofluorobenzene	*2366*	0	0	*2186*	0	*108*	*80-120*	2223	*6.24*	*30*	
Surr: Dibromofluoromethane	*2046*	0	0	*2186*	0	*93.6*	*80-120*	2062	*0.798*	*30*	
Surr: Toluene-d8	*2151*	0	0	*2186*	0	*98.4*	*80-120*	2113	*1.79*	*30*	

The following samples were analyzed in this batch: 22101877-01C

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

Client: Barr Engineering Company
Work Order: 22101877
Project: Booster 56

QC BATCH REPORT

Batch ID: **R356201** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R356201** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921438** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	U	0.1	0.10								

LCS Sample ID: **LCS-R356201** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921437** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	100	0.1	0.10	100	0	100	98-102	0			

DUP Sample ID: **22101602-01A DUP** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921421** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	84.08	0.1	0.10	0	0	0	0-0	84.11	0.0357	10	

DUP Sample ID: **22101608-03B DUP** Units: **% of sample** Analysis Date: **10/20/2022 03:15 PM**
Client ID: Run ID: **MOIST_221020C** SeqNo: **8921425** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	11.54	0.1	0.10	0	0	0	0-0	11.87	2.82	10	

The following samples were analyzed in this batch: 22101877-01B

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

Barr Engineering Co. Chain of Custody

Sample Origination State

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

COC Number: № 589358

COC 1 of 1

REPORT TO		INVOICE TO	
Company:	Barr Engineering	Company:	
Address:	325 S. Lake Ave	Address:	— Same —
Address:	Duluth MN	Address:	
Name:	Ryan Erickson	Name:	Barr Engineering
email:	rerickson@barr.com	email:	
Copy to:	BarrDM@barr.com / JTaraldsen@Barr.com	PO:	
Project Name:	Booster 56	Barr Project No:	49161092.11 003 008

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

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

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers	Analysis Requested: Water	Soil: 4 oz Jar - DRO	Soil: VOA Vials - BTEX	Soil: % Solids	Preservative Code	Field Filtered Y/N
										A	B	A		
										-	-	-		
1. BP56-Stockpile-1	—	—		10/19/22	12:00	S	N			1	2	1	DRO, BTEX, Moisture	
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

ASAP TAT

BARR USE ONLY

Sampled by: J. Taraldsen
Barr Proj. Manager: Ryan Erickson
Barr DQ Manager: JET
Lab Name: ALS Environmental
Lab Location: Holland, MI

Relinquished by: James Taraldsen — On Ice? (Y) N — Date 10/19/22 — Time 15:30
Relinquished by: — On Ice? Y N — Date — Time

Received by: — Date — Time
Received by: — Date 10.20.22 — Time 0900

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

Air Bill Number:

Lab WO: — Temperature on Receipt (°C): 3.2 — Custody Seal Intact? ☐ Y ☐ N ☒ None

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

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

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

ALS Group, USA
Holland, Michigan

Sample Receipt Checklist

Client Name: **BARRENG-MN** Date/Time Received: **20-Oct-22 09:00**

Work Order: **22101877** Received by: **JD**

Checklist completed by Jason Delinger (eSignature) 20-Oct-22 (Date) Reviewed by: Jodi Blouw (eSignature) 20-Oct-22 (Date)

Matrices: soil
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	3.2/4.2 c	ir3	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	10/20/2022 11:36:00 AM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction: