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BARR

Technical Memorandum

To: Alex Smith, Enbridge Energy
From: Ryan Erickson
Subject: Nemadji Corridor Response: Tank 13/16 Pipeline Excavation
WDNR #: 02-16-513788
Date: March 7, 2019
Project: 49161092

This memorandum summarizes the environmental response activities performed by Barr Engineering (Barr) at the request Enbridge Energy (Enbridge) following the discovery of historical hydrocarbon impacts encountered in the Nemadji Corridor at the Enbridge Superior Terminal (Terminal) in Superior, Wisconsin (Figure 1).

Background

On October 12, 2018, Enbridge contractors excavating soil for the construction of a Tank 13 and Tank 16 buried connector pipeline encountered hydrocarbon impacts (i.e., hydrocarbon odor, sheen on excavation water, small volume of free-product) near the southeast end of the project area (Photos 1 and 2; Figure 2). Enbridge personnel evaluated the site and no active release was identified. Based on the lack of an identified active release and the excavation's proximity to the 2003 Nemadji River crude oil release, Enbridge inferred that the impacts were historical. Excavated soil with evidence of hydrocarbon impacts was segregated by the project contractors and transported to the Terminal Soil Management Area (SMA) until offsite management was approved, as described in the *Material Management* section of this memo.

Enbridge requested Barr's assistance with the following activities:

- assess and document environmental site conditions,
- assist with the offsite management coordination of the of impacted soil, and
- prepare a memorandum summarizing the response actions and the environmental conditions upon the completion of remedial activities.

The identified impacted soil is located within the Wisconsin Department of Natural Resources (WDNR) Bureau for Remediation and Redevelopment Tracking System (BRRTS) area of potential residual impacts for the historical *Nemadji River* crude oil release (BRRTS: 02-16-513788). The *Nemadji River* release was a 4,500 barrel crude oil release that occurred in 2003.

Per the *Site Investigation and Response Action Plan* (SI/RAP; 2014) guidance and the conditions observed in the field, the site was not reported to the WDNR at the time of discovery. This memorandum will be provided to the WDNR to provide a documentation about the conditions encountered, and the site will be referenced in the next *Nemadji River* BRRTS-site geographic information systems (GIS) Package Update.

Field Activities

On October 12, 2018, Barr was notified of the discovery of the hydrocarbon impacts. Enbridge personnel continued project excavation activities, and Barr visited the site on October 15 to document site conditions and collect waste characterization samples. Barr returned to the site on October 30 and November 8 to confirm site conditions as the project progressed. During the October 15 site visit, Barr documented environmental conditions through soil field screening, as required by the SI/RAP (2014) and discussed below.

Field screening methods used to document the environmental conditions in the excavation included testing soil for the presence of organic vapors using a 10.6eV photoionization detector (PID) and inspecting soil for the presence of other potential indicators of petroleum impacts such as odor, discoloration and sheen. The PID readings and physical observations were documented on site investigation field sampling and screening logs (Attachment A). Soil with headspace readings greater than 10 parts per million (ppm) or presenting other evidence of hydrocarbon contamination (e.g., hydrocarbon odor, sheen, the presence of free product) are considered impacted.

No analytical confirmation samples were collected from the excavation based on field observations and field screening results.

Barr collected analytical waste characterization samples *TK13_16_Stockpile-1* and *TK13_16_Stockpile-2* from the contaminated soil stockpile on October 15, 2018 and submitted them to the ALS Environmental Laboratory in Holland, Michigan for analysis of benzene, toluene, ethyl benzene and xylene (BTEX) and diesel range organics (DRO), as described in the *Material Management* section below. Waste management documents are provided in Attachment B.

Results

On October 15, 2018 Barr documented site conditions after soil with identified hydrocarbon impacts had been excavated by the contractor and transported to the Terminal SMA (Photos 3 through 6; Figure 2; Attachment A). The excavation was approximately 20 feet by 18 feet. In the center of the excavation was a 10-foot wide by 12-foot long by 14-foot deep trench box. Soil observed in this location consisted of fat clay and some construction fill. Water was not observed in the excavation on October 15.

Barr collected eight field screening soil samples from the accessible excavation sidewalls and bottom (Attachment A). The sidewall samples were collected from the shallow excavation around the trench box, and the bottom samples were collected from beneath the bottom of the trench box. Headspace readings were between 0.2 and 1.8 ppm, and no other evidence of residual hydrocarbon impacts (odor, discoloration) was identified. No analytical confirmation samples were collected based on field observations and screening results.

Project excavation activities continued beyond October 15, 2018. Barr returned to the site in November to observe site conditions (Photos 7 and 8) and discuss field observations with the site inspector. No additional residual impacts were observed in the project excavation by Barr or the inspector.

Material Management

On October 15, 2018 Barr collected analytical waste characterization samples *TK13_16_Stockpile-1* and *TK13_16_Stockpile-2* from the contaminated soil stockpile. The samples were analyzed for DRO and BTEX. The laboratory report and a waste profile application were submitted to the VONCO V landfill in Duluth, Minnesota and the soil was accepted and assigned waste profile #18-109-I. A total of 258.28 tons of soil were hauled to the landfill. The waste profile documents, the waste characterization laboratory report, and the landfill summary report are included in Attachment B.

Receptor Survey

No direct contact risks were identified based on field screening and analytical sampling results. No impacts to surface water were identified and there is little risk to surface water receptors based the conditions encountered. The groundwater pathway at the Superior Terminal is addressed on a facility-wide basis through the established hydrogeologic performance standard approved by the WDNR that includes sampling of groundwater monitoring network at the Terminal. Enbridge samples its monitoring well network on a biannual basis and will conduct its next sampling event in the spring of 2019. The nearest downgradient monitoring well is MW-24, which is located approximately 1,200 feet to the northeast of the site. The nearest potential vapor receptors are a slab-on-grade structure approximately 150 feet east of the site. The risk of hazardous vapor accumulation is low because it is an above ground building with minimal human occupancy. Onsite employees are also required to wear four-gas detectors that would alert them to a potentially hazardous atmosphere.

Conclusions

The hydrocarbon impacts encountered in the Tank 13/16 pipeline excavation are believed to be associated with the *Nemadji River* release and no residual impacts were identified in the final excavation extents. Based on the field conditions documented in the final remedial excavation, Barr believes that no additional investigation will be required for this project. Barr recommends that this report be added to the *Nemadji River* BRRTS file (02-16-513788), and that the project and associated report be noted in the next Nemadji River GIS Package update.

Attachments:

Figure 1	Site Location
Figure 2	Site Layout
Site Photos	1 through 8
Attachment A	Site Investigation Field Sampling and Screening Log
Attachment B	Material Management Documentation

FIGURES:

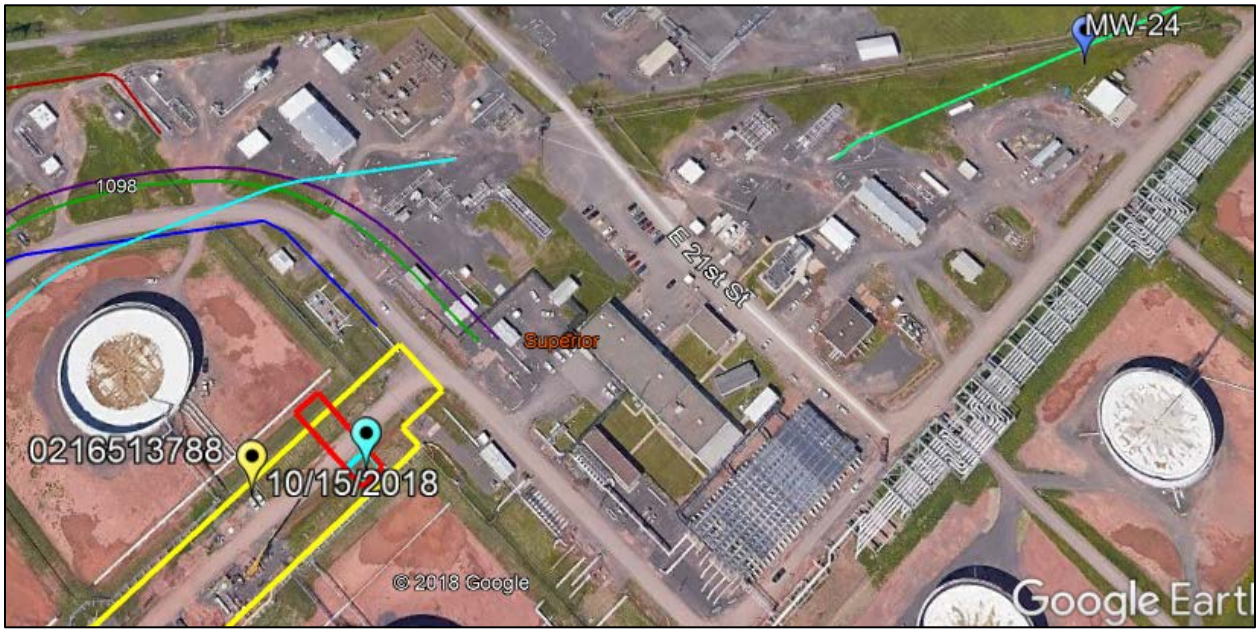

Figure 1, Site Location: The north half of the Nemadji River Corridor (yellow box) and the Nemadji River release location (yellow pin; BRRTS: 0216513788). The Tank 13/16 pipeline excavation (red box) and location of identified residual impacts (blue pin; 10/15/2018). Monitoring well MW-24 is in the top right corner. Image from Google Earth.

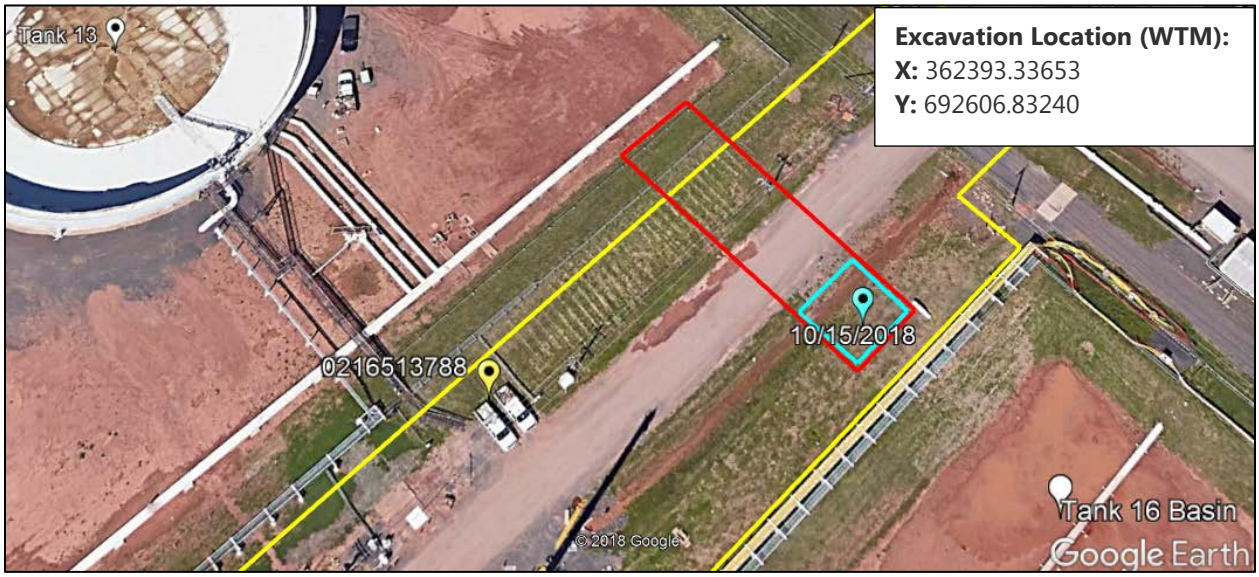

Figure 2, Site Layout: Tank 13/16 pipeline excavation (red box) and the inferred area where residual hydrocarbon impacts were encountered (blue box within the red box). The area with identified hydrocarbon impacts were field screened on October 15, 2018. Image from Google Earth.

Site Photos

Photo 1

Photo 2

Photo 1: Tank 13/16 pipeline construction excavation on the southeast end of the project trench. Photo taken by the site inspector on October 17, 2018.
Photo 2: Free-product observed on a sidewall near the southeast end of the project trench excavation. Photo taken by the site inspector on October 17, 2018.

Photo 3

Photo 4

Photo 3: Southeast end of the Tank 13/16 pipeline excavation. Photo taken facing southeast on October 15, 2018.
Photo 4: Southeast end of the Tank 13/16 pipeline excavation showing trench box and exposed excavation sidewalls. Photo taken facing southeast on October 15, 2018.

Photo 5

Photo 6

Photo 5: Bottom of the final Tank 13/16 pipeline excavation. Field screening samples *B-1* through *B-4* were collected from the exposed soil beneath the bottom edge of the trench box. Photo taken facing southeast on October 15, 2018.
Photo 6: Exposed soil in the northwest Tank 16 containment berm. Field screening samples *S-1* through S-4 were collected from the exposed soil away from the trench box. Photo taken facing southeast on October 15, 2018.

Photo 7

Photo 8

Photo 7: Southeast end of the final Tank 13/16 pipeline excavation. Photo taken facing south on November 8, 2018.
Photo 8: The final Tank 13/16 pipeline excavation. Photo taken facing northwest on November 8, 2018.

Attachment A

Site Investigation Field Sampling and Screening Log

SITE INVESTIGATION FIELD SAMPLING AND SCREENING LOG

Page__of__

Location: *Milepost or Facility* Nemadji Corridor Tank 13-16 Pipeline

Equipment used: PID *-ionization detector with* 10.6 *eV lamp* Background Headspace: ___ppm Date: 10/15/18

Sample Nomenclature *(Location - sample type - #):* - Sampler: MAB

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

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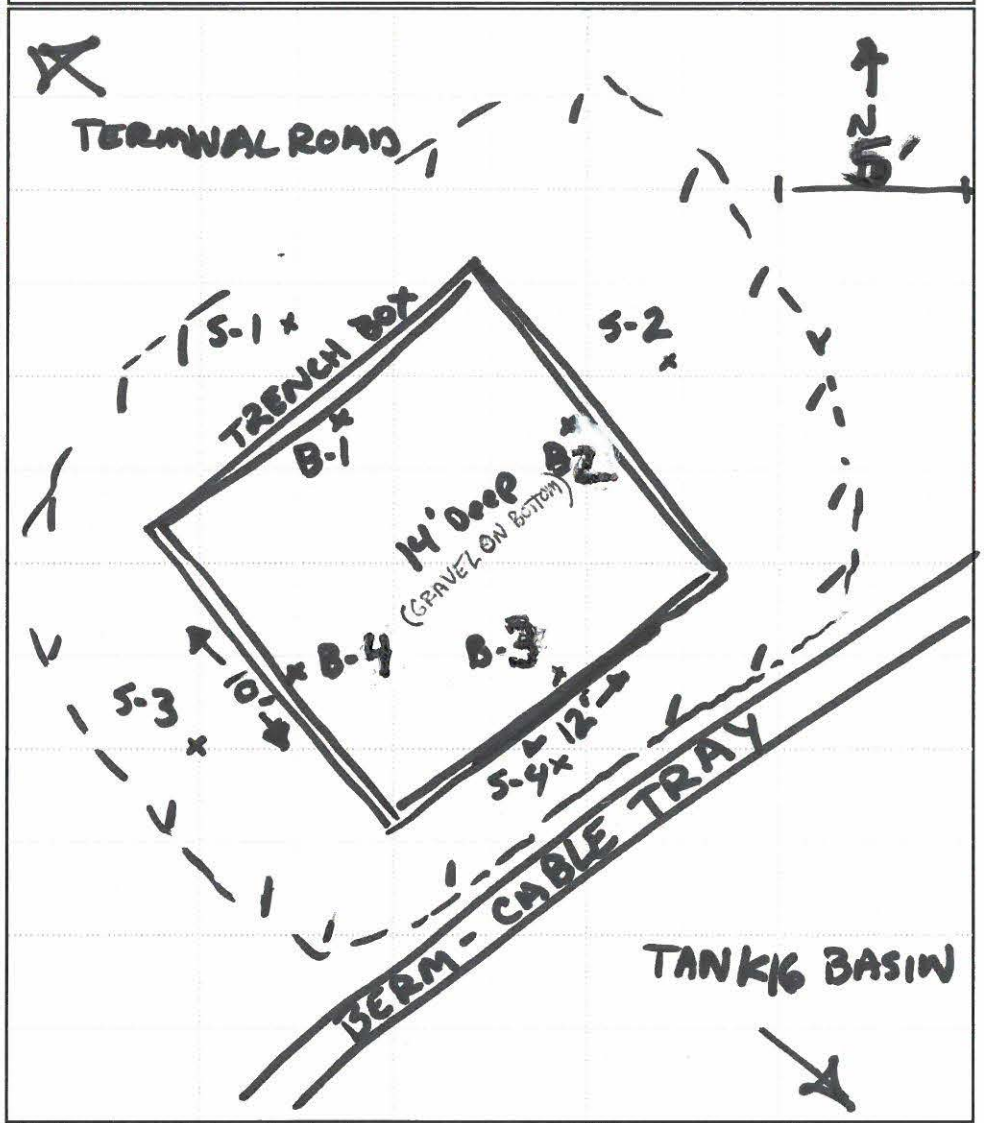
Sample ID	Depth (FT)	Time (military)	Soil Type (USCS)	Color/ Discolor	Odor/ Sheen	Headspace Reading (ppm)
Example: TK99-S-1	4	16:30	CL	Reddish brown	Petroleum/ Rainbow	275
B-1	12	1440	CL	Red-brown	N/N	0.2
B-2	12	↓	↓	↓	↓	0.4
B-3	12	↓	↓	↓	↓	0.6
B-4	12	↓	↓	↓	↓	0.6
S-1	2	1450	↓	↓	↓	1.8
S-2	2	↓	↓	↓	↓	0.2
S-3	2	↓	↓	↓	↓	0.4
S-4	2	↓	↓	↓	↓	0.5

SITE SKETCH: *north is up; excavation extents & depths, impacted areas, sample locations, borings, wells, structures, utilities, natural features...* ***1 inch/grid =*** 5 ***FEET***



Bottom samples collected from soil exposed beneath bottom edge of trench box.

Attachment B

Material Management Documentation

Chris Guillemette
Vice President
1100 West Gary Street
Duluth, MN 55808
Office: 218.626.3830
Mobile: 612.221.0785
Fax: 218.626.4874
CGuillemette@VoncoUSA.com

October 22, 2018

Enbridge Energy
Alex Smith
2800 E 21st Street
Superior, WI 54880

RE: 18-109-I/Superior Terminal – Nemadji Corridor (Contaminated Soil)

Alex,

Please be advised that the above described waste material is acceptable for up to **1000/yards** 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\15\2021.

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: 612-221-0785.

We look forward to working with you,

Vonco V, LLC
Vice President

VONCO V, LLC.

Industrial Waste Profile Sheet

PROFILE# _____

Designated Facility: Vonco V, LLC.

Permit #536

A. Generator, Waste Site Location

Name	Enbridge Energy Superior Terminal - Nemadji Corridor
Site Address	2800 E 21st St
City, State, Zip	Superior, WI 54880
Contact	Alex Smith
Phone	715-395-3836
Fax	832-325-5511
County	Douglas

B. Billing

Name	Enbridge Energy
Site Address	1100 Louisiana Ave, Ste 3300
City, State, Zip	Houston, TX 77002
Contact	Alex Smith
Phone	715-395-3836
Fax	

C. Description of Waste

Name of Waste: Nemadji Corridor - Soil

Process Generating Waste: Hydrocarbon contaminated soil from project excavation.

Estimated Volume: 100 CY

Frequency: One time

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

Flash Point (°F): Not applicable pH: _____ Total Solids: _____

D. Other Comments

E. Sample Information

Check all that apply:

☒ Laboratory Analysis submitted ☐ Material Safety Data Sheet submitted

Laboratory Name: ALS Environmental Sample Date: 10/15/2018 Sample I.D.: TK13_16_Stockpile-1, -2

F. Generator Certifications

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

Generator's Signature _____ Title: Environmental Advisor

Print Name: Alex Smith Date: 10/22/2018

G. Landfill Approval

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

Landfill Signature _____ Date _____

Recertification Date _____

18-Oct-2018

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

Re: **TK13_16 Low Road (49161092.06)** Work Order: **18101040**

Dear Ryan,

ALS Environmental received 2 samples on 16-Oct-2018 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,

Ehrland Bosworth

Electronically approved by: Ehrland Bosworth

Ehrland Bosworth
Project Manager

Report of Laboratory Analysis

Certificate No: WI: 399084510

ALS Group, USA

Date: 18-Oct-18

Client: Barr Engineering Company
Project: TK13_16 Low Road (49161092.06)
Work Order: **18101040**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
18101040-01	TK13_16_Stockpile-1	Soil		10/15/2018 16:00	10/16/2018 10:30	☐
18101040-02	TK13_16_Stockpile-2	Soil		10/15/2018 16:05	10/16/2018 10:30	☐

Client: Barr Engineering Company
Project: TK13_16 Low Road (49161092.06)
WorkOrder: **18101040**

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
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

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

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

ALS Group, USA

Date: 18-Oct-18

Client: Barr Engineering Company
Project: TK13_16 Low Road (49161092.06)
Work Order: 18101040

Case Narrative

Samples for the above noted Work Order were received on 10/16/18. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

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

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

Volatile Organics:
No deviations or anomalies were noted.

Extractable Organics:
No deviations or anomalies were noted.

Wet Chemistry:
No deviations or anomalies were noted.

ALS Group, USA

Date: *18-Oct-18*

Client: Barr Engineering Company
Project: TK13_16 Low Road (49161092.06)
Sample ID: TK13_16_Stockpile-1
Collection Date: 10/15/2018 04:00 PM

Work Order: 18101040
Lab ID: 18101040-01
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 / 10/17/18		Analyst: **RP**
DRO (C10-C28)	**390**		**0.67**	**6.7**	**mg/Kg-dry**	1	10/17/2018 18:55
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260C**			Prep: SW5035 / 10/17/18		Analyst: **EMR**
Benzene	U		8.7	51	µg/Kg-dry	1	10/17/2018 13:58
Ethylbenzene	**220**		**11**	**51**	**µg/Kg-dry**	1	10/17/2018 13:58
m,p-Xylene	**220**		**24**	**100**	**µg/Kg-dry**	1	10/17/2018 13:58
o-Xylene	U		20	51	µg/Kg-dry	1	10/17/2018 13:58
Toluene	U		14	51	µg/Kg-dry	1	10/17/2018 13:58
Xylenes, Total	**220**		**44**	**150**	**µg/Kg-dry**	1	10/17/2018 13:58
Surr: 1,2-Dichloroethane-d4	*98.2*			*70-130*	*%REC*	1	10/17/2018 13:58
Surr: 4-Bromofluorobenzene	*106*			*70-130*	*%REC*	1	10/17/2018 13:58
Surr: Dibromofluoromethane	*94.2*			*70-130*	*%REC*	1	10/17/2018 13:58
Surr: Toluene-d8	*106*			*70-130*	*%REC*	1	10/17/2018 13:58
MOISTURE		Method: **SW3550C**					Analyst: **TRP**
Moisture	**26**		**0.025**	**0.050**	**% of sample**	1	10/17/2018 15:24

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

ALS Group, USA

Date: *18-Oct-18*

Client: Barr Engineering Company
Project: TK13_16 Low Road (49161092.06)
Sample ID: TK13_16_Stockpile-2
Collection Date: 10/15/2018 04:05 PM

Work Order: 18101040
Lab ID: 18101040-02
Matrix: SOIL

Analyses	Result	Qual	MDL	PQL	Units	Dilution Factor	Date Analyzed
DIESEL RANGE ORGANICS BY GC-FID		Method: **PUBL-SW-141**			Prep: PUBL-SW-141 / 10/17/18		Analyst: **RP**
DRO (C10-C28)	**220**		**0.54**	**5.4**	**mg/Kg-dry**	1	10/17/2018 19:24
VOLATILE ORGANIC COMPOUNDS		Method: **SW8260C**			Prep: SW5035 / 10/17/18		Analyst: **EMR**
Benzene	U		8.7	51	µg/Kg-dry	1	10/17/2018 14:14
Ethylbenzene	**99**		**11**	**51**	**µg/Kg-dry**	1	10/17/2018 14:14
m,p-Xylene	**140**		**24**	**100**	**µg/Kg-dry**	1	10/17/2018 14:14
o-Xylene	U		20	51	µg/Kg-dry	1	10/17/2018 14:14
Toluene	U		14	51	µg/Kg-dry	1	10/17/2018 14:14
Xylenes, Total	**140**	J	**44**	**150**	**µg/Kg-dry**	1	10/17/2018 14:14
Surr: 1,2-Dichloroethane-d4	*97.7*			*70-130*	*%REC*	1	10/17/2018 14:14
Surr: 4-Bromofluorobenzene	*110*			*70-130*	*%REC*	1	10/17/2018 14:14
Surr: Dibromofluoromethane	*93.6*			*70-130*	*%REC*	1	10/17/2018 14:14
Surr: Toluene-d8	*106*			*70-130*	*%REC*	1	10/17/2018 14:14
MOISTURE		Method: **SW3550C**					Analyst: **TRP**
Moisture	**26**		**0.025**	**0.050**	**% of sample**	1	10/17/2018 15:24

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

ALS Group, USA

Date: 18-Oct-18

Client: Barr Engineering Company

QC BATCH REPORT

Work Order: 18101040

Project: TK13_16 Low Road (49161092.06)

Batch ID: **126394** Instrument ID **GC8** Method: **PUBL-SW-141**

MBLK Sample ID: **SMBLKS1-126394-126394** Units: **mg/Kg** Analysis Date: **10/17/2018 06:26 P**

Client ID: Run ID: **GC8_181017A** SeqNo: **5330097** Prep Date: **10/17/2018** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	U	0.5	5.0	0	0	0		0			

LCS Sample ID: **SLCSS1-126394-126394** Units: **mg/Kg** Analysis Date: **10/17/2018 05:57 P**

Client ID: Run ID: **GC8_181017A** SeqNo: **5330096** Prep Date: **10/17/2018** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	8.062	0.5	5.0	10	0	80.6	70-120	0			

LCSD Sample ID: **SLCSDS1-126394-126394** Units: **mg/Kg** Analysis Date: **10/17/2018 07:53 P**

Client ID: Run ID: **GC8_181017A** SeqNo: **5330102** Prep Date: **10/17/2018** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
DRO (C10-C28)	7.634	0.5	5.0	10	0	76.3	70-120	8.062	5.46	20	

The following samples were analyzed in this batch:

18101040-01A	18101040-02A

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

Client: Barr Engineering Company
Work Order: 18101040
Project: TK13_16 Low Road (49161092.06)

QC BATCH REPORT

Batch ID: **126368** Instrument ID **VMS8** Method: **SW8260C**

MBLK Sample ID: **MBLK-126368-126368** Units: **µg/Kg-dry** Analysis Date: **10/17/2018 12:56 P**
Client ID: Run ID: **VMS8_181017A** SeqNo: **5329596** Prep Date: **10/17/2018** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.1	30								
Ethylbenzene	U	6.3	30								
m,p-Xylene	U	14	60								
o-Xylene	U	12	30								
Toluene	U	8.2	30								
Xylenes, Total	U	26	90								
Surr: 1,2-Dichloroethane-d4	*976.5*	0	0	*1000*	0	*97.6*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*962*	0	0	*1000*	0	*96.2*	*70-130*	0			
Surr: Dibromofluoromethane	*910.5*	0	0	*1000*	0	*91*	*70-130*	0			
Surr: Toluene-d8	*1027*	0	0	*1000*	0	*103*	*70-130*	0			

LCS Sample ID: **LCS-126368-126368** Units: **µg/Kg-dry** Analysis Date: **10/17/2018 12:09 P**
Client ID: Run ID: **VMS8_181017A** SeqNo: **5329593** Prep Date: **10/17/2018** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	967	5.1	30	1000	0	96.7	75-125	0			
Ethylbenzene	982.5	6.3	30	1000	0	98.2	75-125	0			
m,p-Xylene	1958	14	60	2000	0	97.9	80-125	0			
o-Xylene	961.5	12	30	1000	0	96.2	75-125	0			
Toluene	977	8.2	30	1000	0	97.7	70-125	0			
Xylenes, Total	2920	26	90	3000	0	97.3	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1010*	0	0	*1000*	0	*101*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*990*	0	0	*1000*	0	*99*	*70-130*	0			
Surr: Dibromofluoromethane	*972*	0	0	*1000*	0	*97.2*	*70-130*	0			
Surr: Toluene-d8	*1022*	0	0	*1000*	0	*102*	*70-130*	0			

MS Sample ID: **18101058-01A MS** Units: **µg/Kg-dry** Analysis Date: **10/17/2018 09:16 P**
Client ID: Run ID: **VMS8_181017A** SeqNo: **5329622** Prep Date: **10/17/2018** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1604	8.6	50	1667	0	96.2	75-125	0			
Ethylbenzene	1613	11	50	1667	0	96.8	75-125	0			
m,p-Xylene	3212	24	100	3333	0	96.4	80-125	0			
o-Xylene	1579	19	50	1667	10	94.2	75-125	0			
Toluene	1622	14	50	1667	0	97.3	70-125	0			
Xylenes, Total	4792	43	150	5000	0	95.8	75-125	0			
Surr: 1,2-Dichloroethane-d4	*1662*	0	0	*1667*	0	*99.8*	*70-130*	0			
Surr: 4-Bromofluorobenzene	*1678*	0	0	*1667*	0	*101*	*70-130*	0			
Surr: Dibromofluoromethane	*1645*	0	0	*1667*	0	*98.7*	*70-130*	0			
Surr: Toluene-d8	*1683*	0	0	*1667*	0	*101*	*70-130*	0			

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

Client: Barr Engineering Company
Work Order: 18101040
Project: TK13_16 Low Road (49161092.06)

QC BATCH REPORT

Batch ID: **126368** Instrument ID **VMS8** Method: **SW8260C**

MSD Sample ID: **18101058-01A MSD** Units: **µg/Kg-dry** Analysis Date: **10/17/2018 09:32 P**

Client ID: Run ID: **VMS8_181017A** SeqNo: **5329625** Prep Date: **10/17/2018** DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	1634	8.6	50	1667	0	98	75-125	1604	1.85	30	
Ethylbenzene	1640	11	50	1667	0	98.4	75-125	1613	1.64	30	
m,p-Xylene	3272	24	100	3333	0	98.2	80-125	3212	1.85	30	
o-Xylene	1652	19	50	1667	10	98.6	75-125	1579	4.54	30	
Toluene	1637	14	50	1667	0	98.2	70-125	1622	0.921	30	
Xylenes, Total	4925	43	150	5000	0	98.5	75-125	4792	2.74	30	
Surr: 1,2-Dichloroethane-d4	*1622*	0	0	*1667*	0	*97.3*	*70-130*	1662	*2.49*	*30*	
Surr: 4-Bromofluorobenzene	*1693*	0	0	*1667*	0	*102*	*70-130*	1678	*0.939*	*30*	
Surr: Dibromofluoromethane	*1608*	0	0	*1667*	0	*96.5*	*70-130*	1645	*2.25*	*30*	
Surr: Toluene-d8	*1698*	0	0	*1667*	0	*102*	*70-130*	1683	*0.838*	*30*	

The following samples were analyzed in this batch: 18101040-01C 18101040-02C

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

Client: Barr Engineering Company
Work Order: 18101040
Project: TK13_16 Low Road (49161092.06)

QC BATCH REPORT

Batch ID: **R247205** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R247205** Units: **% of sample** Analysis Date: **10/17/2018 03:24 P**
Client ID: Run ID: **MOIST_181017A** SeqNo: **5329317** Prep Date: DF: **1**

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

LCS Sample ID: **LCS-R247205** Units: **% of sample** Analysis Date: **10/17/2018 03:24 P**
Client ID: Run ID: **MOIST_181017A** SeqNo: **5329316** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	99.99	0.025	0.050	100	0	100	99.5-100.5	0			

DUP Sample ID: **18101040-01B DUP** Units: **% of sample** Analysis Date: **10/17/2018 03:24 P**
Client ID: **TK13_16_Stockpile-1** Run ID: **MOIST_181017A** SeqNo: **5329299** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	24.58	0.025	0.050	0	0	0	0-0	25.7	4.46	10	

DUP Sample ID: **18101040-02B DUP** Units: **% of sample** Analysis Date: **10/17/2018 03:24 P**
Client ID: **TK13_16_Stockpile-2** Run ID: **MOIST_181017A** SeqNo: **5329301** Prep Date: DF: **1**

Analyte	Result	MDL	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	27.4	0.025	0.050	0	0	0	0-0	26.15	4.67	10	

The following samples were analyzed in this batch: 18101040-01B 18101040-02B

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

1810140

Barr Engineering Co. Chain of Custody

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

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

COC Number: 53538

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Engineering	Company: SAME
Address: 325 S Lake Ave	Address:
Name: Ryan Erickson	Name:
email: REE@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: TK13_16 Low Road	Barr Project No: 49161092.06 003 001

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

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

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers	Water	Soil: GRO	Soil: DRO	Soil: % Solids	Preservative Code	Field Filtered Y/N
1. TK13_16_STOCKPILE-1				10/15/2018	1600	S		5		2	2	1		Rush TAT / 2 Day
2. TK13_16_STOCKPILE-2				10/15/2018	1605	S		5		2	2	1		
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Analysis Requested: Water; Soil: GRO, DRO, % Solids

Preservative Code: F F N A

Field Filtered Y/N: Y N

BARR USE ONLY		Relinquished by	On Ice? Y N	Date	Time	Received by	Date	Time
Sampled by:	MAB	Mark Bo	Y	10/15/18	1800			
Barr Proj. Manager:	REE	Relinquished by	On Ice? Y N	Date	Time	Received by:	Date 10.16.18	Time 10:30
Barr DQ Manager:	JET							
Lab Name:	ALS							
Lab Location:	Holland, MI							

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

Air Bill Number: 8121 0024 3030

Requested Due Date: ☐ Standard Turn Around Time ☒ Rush 2-Day (mm/dd/yyyy)

Lab WO: 1810140 Temperature on Receipt (°C): 4.4 Custody Seal Intact? ☐ Y ☐ N ☒ None

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

FR

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

FedEx Express Package US Airbill

FedEx Tracking Number 8121 0024 3030

Form ID No. 0200

Recipient's Copy

1 From

Date 10/15/18

Sender's Name Martin Bevis Phone 218 349 3434

Company Barr Engineering

Address 325 S Lake Ave

Dept./Floor/Suite/Room

City Duluth State MN ZIP 55812

2 Your Internal Billing Reference 49161092.06 003 001

3 To

Recipient's Name Tom Beamish Phone 616 399 6070

Company ALS Environmental

Address 3352 128th Ave

We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept./Floor/Suite/Room

Address

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

City Holland State MI ZIP 49424

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

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

8121 0024 3030

4 Express Package Service * To most locations.

Packages up to 150 lbs. For packages over 150 lbs., use the FedEx Express Freight US Airbill.

Next Business Day	2 or 3 Business Days
☐ FedEx First Overnight — Earliest next business morning delivery to select locations. Friday shipments will be delivered on Monday unless Saturday Delivery is selected.	☐ FedEx 2Day A.M. — Second business morning.* Saturday Delivery NOT available.
☒ FedEx Priority Overnight — Next business morning.* Friday shipments will be delivered on Monday unless Saturday Delivery is selected.	☐ FedEx 2Day — Second business afternoon.* Thursday shipments will be delivered on Monday unless Saturday Delivery is selected.
☐ FedEx Standard Overnight — Next business afternoon.* Saturday Delivery NOT available.	☐ FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

5 Packaging * Declared value limit $500.

☐ FedEx Envelope* ☐ FedEx Pak* ☐ FedEx Box ☐ FedEx Tube ☒ Other

6 Special Handling and Delivery Signature Options Fees may apply. See the FedEx Service Guide.

☐ Saturday Delivery — NOT available for FedEx Standard Overnight, FedEx 2Day A.M., or FedEx Express Saver.

☒ No Signature Required — Package may be left without obtaining a signature for delivery.

☐ Direct Signature — Someone at recipient's address may sign for delivery.

☐ Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. For residential deliveries only.

Does this shipment contain dangerous goods?

One box must be checked.

☒ No ☐ Yes — As per attached Shipper's Declaration. ☐ Yes — Shipper's Declaration not required. ☐ Dry Ice — Dry Ice, 9, UN 1845 ____ x ____ kg

Restrictions apply for dangerous goods — see the current FedEx Service Guide. ☐ Cargo Aircraft Only

7 Payment *Bill to:*

Enter FedEx Acct. No. or Credit Card No. below. Obtain recip. Acct. No. ☐

☒ Sender — Acct. No. in Section 1 will be billed ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

Total Packages 1 Total Weight ____ lbs. Credit Card Auth. ____

†Our liability is limited to US$100 unless you declare a higher value. See the current FedEx Service Guide for details.

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ALS Group, USA

Sample Receipt Checklist

Client Name: **BARRENG-MN** Date/Time Received: **16-Oct-18 10:30**

Work Order: **18101040** Received by: **BNF**

Checklist completed by Tom Bramish (eSignature) 16-Oct-18 (Date) Reviewed by: Ehrland Bosworth (eSignature) 16-Oct-18 (Date)

Matrices: soil

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	4.4 / 4.4 C	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	10/16/2018 1450		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

VONCO

Vonco V Waste Management Campus
1100 West Gary Street
Duluth, MN 55808
Permit: SW 536

18-109-I Superior Terminal Nemadji Corridor					
Date	**Ticket**	**Customer**	**Truck**	**Material**	**Tons**
10/31/2018	305020	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	17.37
10/31/2018	305021	001342 - Enbridge Pipelines LLC	T53690W	Alternative Daily cover	18.64
10/31/2018	305027	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	18.74
10/31/2018	305030	001342 - Enbridge Pipelines LLC	T53690W	Alternative Daily cover	19.93
10/31/2018	305039	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	23.21
10/31/2018	305040	001342 - Enbridge Pipelines LLC	T53690W	Alternative Daily cover	25.20
10/31/2018	305047	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	22.51
10/31/2018	305050	001342 - Enbridge Pipelines LLC	T53690W	Alternative Daily cover	20.69
10/31/2018	305058	001342 - Enbridge Pipelines LLC	T53690W	Alternative Daily cover	21.73
11/01/2018	305065	001342 - Enbridge Pipelines LLC	T53690W	Alternative Daily cover	21.32
11/01/2018	305068	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	16.62
11/01/2018	305074	001342 - Enbridge Pipelines LLC	T53690W	Alternative Daily cover	17.52
11/01/2018	305077	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	14.80
11/30/2018	305746	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	17.60
11/30/2018	305748	001342 - Enbridge Pipelines LLC	S19589X	Alternative Daily cover	14.06
11/30/2018	305750	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	18.16
11/30/2018	305758	001342 - Enbridge Pipelines LLC	S19589X	Alternative Daily cover	14.85
11/30/2018	305762	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	18.65
11/30/2018	305763	001342 - Enbridge Pipelines LLC	S19589X	Alternative Daily cover	15.90
12/03/2018	305772	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	17.03
12/03/2018	305784	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	20.97
12/03/2018	305801	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	23.39
12/03/2018	305802	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	21.92
12/03/2018	305810	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	21.63
12/04/2018	305821	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	13.36
12/04/2018	305831	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	19.81
12/04/2018	305840	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	17.25
12/04/2018	305848	001342 - Enbridge Pipelines LLC	T53691W	Alternative Daily cover	19.29
				Total Tons	**532.15**
				Total Loads	**28**

Highlighted lines are associated with the **Nemadji Corridor project**.

The total tonnage for these lines was **258.28 tons**.