US ERA ARCHIVE DOCUMENT

Enbridge Line 6B MP 608 Pipeline Release
Marshall, Michigan
Source Contamination Removal and Verification Summary Report
Talmadge Creek Section 8
Stationing 75+00L to 85+00L and 72+50R to 82+50R

Enbridge Energy September 24, 2010

## Talmadge Creek Source Contamination Removal and Verification Summary Report

Section 8 of 10 - Stationing (75+00L to 85+00L) and (72+50R to 82+50R)

#### Overview

The Enbridge Source Area Response Plan (SAR) and Sampling and Analysis Plan (SAP), dated 2 August 2010, revised 17 August 2010 was developed to prescribe response activities related to a release of crude oil from Enbridge Energy, Limited Partnership's Line 6B MP 608 pipeline in Marshall, Michigan. A detailed and defined approach to identify and complete source removal was subsequently developed and presented in the 13 September 2010 Supplement to Source Area Response Plan Approach for Source Contamination Removal, Verification and Backfill, Talmadge Creek, Enbridge Line 6B MP 608, and the Notice of Approval of Modification dated 14 September 2010. This report presents the results of the implementation of that approach for Section 8 of 10 (Stationing left bank of Talmadge Creek: 75+00L to 85+00L and Stationing right bank of Talmadge Creek: 72+50R to 82+50R).

#### **Supplemental SAR Objectives**

The following remedial objectives were identified to develop guidelines and procedures to remove the source area contamination from Talmadge Creek:

- Remove free oil from the banks of Talmadge Creek;
- Stabilize the existing creek bed;
- Identify that adjacent up bank areas are not a source of free oil.

To meet these objectives, the response actions included the completion of the following activities along Talmadge Creek:

- Site clearing and grubbing of trees and vegetation to allow access road construction and implementation of free oil removal activities;
- Construction of temporary access roads into the affected area;
- Construction of flumes along Talmadge Creek to recover free oil;
- Oil and water recovery and subsequent disposal;
- Installation and maintenance of absorbent booms along Talmadge Creek;
- Soil removal, staging, and bulking of crude oil-impacted soil with eventual characterization, transport, and offsite disposal;
- Storm water management and erosion control;

• Interim source area restoration under guidance of Michigan Department of Natural Resources and Environment (MDNRE).

#### **Section Location**

For efficiency and clarity in implementation and reporting, Divisions A and B of Talmadge Creek were divided into 10 sections as illustrated in Figure 1. Each section was subsequently divided into approximately 20, 50-foot<sup>1</sup> linear clearance areas (stationing) on both the left and right banks of Talmadge Creek as illustrated in Figure 2, (left and right banks oriented facing downstream). This summary report addresses Section 8 as described in the table below.

Section Number	Stationing
o	Left Bank: 75+00L to 85+00L
0	Right Bank: 72+50R to 82+50R

#### **Section Excavation Methods and Clearance Metrics**

Three methods for determining the vertical limit of excavation were developed and identified as A, B, or C. These three methods are defined as:

- A No visible free oil and the clearance area passed the 40 CFR Appendix 1 to Subpart
  A of Part 435 Static Sheen Test. A test pit was then constructed and inspected by the
  United States Environmental Protection Agency (U.S. EPA) representative after 6 hours.
  If free oil was observed in the 6-hour test pit, additional excavation was completed until
  clearance was obtained via method A, B, or C. If free oil was not observed, backfilling
  was completed.
- B The vertical limit was reached due to groundwater (excavation proceeded vertically at least 6-inches into groundwater). No 6-hour test pit was required for clearance.
- C The vertical limit was reached due to the silt/clay confining layer. No 6-hour test pit
  was required for clearance.

A deviation from the above noted methods was also established. This deviation is noted as "Special Condition EPA Approval" in this report, and was established because no EPA methods were applicable for certain clearance areas due to site specific conditions. EPA approval was obtained for each clearance area where a special condition was encountered.

In addition, an approximately 2-foot wide 48-hour observation pit/trench was installed along the wall of the excavation boundary and remained open for a minimum of 48 hours to allow the EPA representative to observe potential accumulation of free oil. If oil was observed, an evaluation of the source was conducted and an XTex curtain was installed to separate the impacted area from the clean area. If no oil was observed, or the barrier curtain was installed, backfilling proceeded.

#### **Soil Sampling and Analysis**

Soil samples were collected from the area of excavation and analyzed pursuant to MDNRE approved work plans for the following analytical parameters:

- Total Petroleum Hydrocarbons (TPH):
  - Gasoline Range Organics (GRO);
  - Diesel Range Organics (DRO);
  - Oil Range Organics (ORO);
- Benzene;
- Toluene;
- Ethylbenzene;
- Xylenes;
- Polynuclear Aromatics (PNAs);
- 1,2,4-Trimethlybenzene;
- 1,3,5-Trimethylbenzene;
- Barium;
- Nickel;
- Vanadium;
- Iron.

The analytical results will be evaluated as part of future assessment and remediation activities.

#### **Deviations from SAP**

No deviations from the SAP were noted in this Section.

#### Conclusion

All completed work for this section met the U.S. EPA metrics in compliance with the SAR and the Supplement to the SAR. No additional cleanup is required to fulfill the U.S. EPA's requirements pursuant to the Removal Administrative Order issued by U.S. EPA on July 27, 2010 (Docket No. CWA 1321-5-10-001) pursuant to §311(c) of the Clean Water Act.

#### **Supporting Documentation**

The following documentation is included as attachments to this document:

- Location maps indentifying the subject section (Figures 1 and 2);
- Photographs;

- Field notes;
- A table summarizing the following information:
  - Identification of final EPA clearance method used to dictate vertical limit (A, B, or C);
  - Free oil observed (for Method A);
  - Odor (for Method A);
  - o Sheen test per 40 CFR Appendix 1 to Subpart A of Part 435 (for Method A);
  - Photoionization detector (PID) headspace (for Method A);
  - o Installation date and time of 6-hour test pit;
  - EPA representative sign-off and approval of backfilling;
  - Installation date and time of 48-hour observation pit/trench;
  - o 48-hour observation.

## Talmadge Creek Source Contamination Removal and Verification Summary Table: Section 8

Division	Section Number	Station Number	Creek Bank (L/R)	Final EPA Clearance Method (A, B, C)	Free Oil Observed (Y/N)	Odor (Y/N)	40 CFR Sheen Test Sheen Observed (Y/N)	PID Headspace (ppm)	Installation Date of 6- hour Test Pit	Installation Time of 6- hour Test Pit	Method A 6-hour Test Pit EPA Representative Sign-off (Y/N)	Installation Date of 48-hour Observation Trench/Pit	Installation Time of 48-hour Observation Trench/Pit	48-hour Observation Completed (Y/N)
B4	8	75+00L - 75+50L	L	Α	N	Υ	γ*	2.2	9/21/2010	0424	Υ	9/21/2010	0424	NR
В4	8	75+50L - 76+00L	L	Α	Ν	N	N	1.0	9/16/2010	0930	Υ	9/16/2010	0930	Υ
В4	8	76+00L - 76+50L	L	Α	N	N	N	NR	9/20/2010	1932	Υ	9/20/2010	1932	Υ
В4	8	76+50L - 77+00L	L	Α	N	N	N	NR	9/20/2010	1940	Υ	9/20/2010	1940	Υ
В4	8	77+00L - 77+50L	L	Α	N	N	N	NR	9/20/2010	1905	Υ	9/20/2010	1905	Υ
В4	8	77+50L - 78+00L	L	Α	N	N	N	0.8	9/19/2010	1835	Υ	9/19/2010	1835	Υ
В4	8	78+00L - 78+50L	L	Α	N	N	N	1.4	9/19/2010	1826	Υ	9/19/2010	1826	Υ
В4	8	78+50L - 79+00L	L	Α	N	N	N	1.7	9/19/2010	1816	Υ	9/19/2010	1816	Υ
B4	8	79+00L - 79+50L	L	Α	N	N	N	0.7	9/19/2010	1805	Υ	9/19/2010	1805	Υ
В4	8	79+50L - 80+00L	L				Spe	cial Cond	ition EPA Appro	oval		NA	NA	Υ
В4	8	80+00L - 80+50L	L				Spe	cial Cond	ition EPA Appro	oval		NA	NA	Υ
В4	8	80+50L - 81+00L	L	Α	N	N	N	NR	9/15/2010	1825	Υ	9/15/2010	1825	Υ
В4	8	81+00L - 81+50L	L	Α	N	Υ	γ*	NR	9/15/2010	NR	Υ	9/15/2010	NR	Υ
В4	8	81+50L - 82+00L	L				Spe	cial Cond	ition EPA Appro	oval		NR	NR	Υ
В4	8	82+00L - 82+50L	L	Α	N	N	N	1.4	9/15/2010	1730	Υ	9/15/2010	1730	Υ
В4	8	82+50L - 83+00L	L	Α	N	N	N	1.4	9/15/2010	1715	Υ	9/15/2010	1715	Υ
В4	8	83+00L - 83+50L	L	Α	N	N	N	2.8	9/15/2010	1700	Υ	9/15/2010	1700	Υ
В4	8	83+50L - 84+00L	L	Α	N	N	N	1.9	9/17/2010	1120	Υ	9/17/2010	1120	Υ
В4	8	84+00L - 84+50L	L	Α	γ*	Υ	γ*	24.0	9/21/2010	NR	Υ	9/21/2010	NR	Υ
В4	8	84+50L - 85+00L	L	Α	N	Υ	γ*	102	9/21/2010	1135	Υ	9/21/2010	1135	Υ

#### Talmadge Creek Source Contamination Removal and Verification Summary Table: Section 8

Division	Section Number	Station Number	Creek Bank (L/R)	Final EPA Clearance Method (A, B, C)	Free Oil Observed (Y/N)	Odor (Y/N)	40 CFR Sheen Test Sheen Observed (Y/N)	PID Headspace (ppm)	Installation Date of 6- hour Test Pit	Installation Time of 6- hour Test Pit	Method A 6-hour Test Pit EPA Representative Sign-off (Y/N)	Installation Date of 48- hour Observation Trench/Pit	Installation Time of 48-hour Observation Trench/Pit	48-hour Observation Completed (Y/N)
B4	8	72+50R - 73+00R	R	Α	N	N	N	1.5	9/12/2010	1412	Υ	9/12/2010	1414	Υ
B4	8	73+00R - 73+50R	R	Α	N	N	N	1.6	9/12/2010	1420	Υ	9/12/2010	1420	Υ
B4	8	73+50R - 74+00R	R				Spe	cial Condi	tion EPA Appro	val		9/20/2010	NR	Υ
B4	8	74+00R - 74+50R	R	Α	N	N	N	1.8	9/20/2010	1845	Υ	9/20/2010	1845	Υ
B4	8	74+50R - 75+00R	R	В	NA	NA	NA	NA	NA	NA	NA	NR	NR	Υ
В4	8	75+00R - 75+50R	R	Α	N	N	N	0.0	9/20/2010	1732	Υ	9/20/2010	1732	Υ
B4	8	75+50R - 76+00R	R	Α	N	N	N	0.0	9/20/2010	1545	Υ	9/20/2010	1545	Υ
B4	8	76+00R - 76+50R	R	Α	N	N	N	0.8	9/20/2010	1717	Υ	9/20/2010	1717	Υ
B4	8	76+50R - 77+00R	R	Α	N	N	N	NR	9/20/2010	1900	Υ	9/20/2010	1900	Υ
B4	8	77+00R - 77+50R	R	Α	N	N	N	5.9	9/20/2010	1705	Υ	9/20/2010	1705	Υ
В4	8	77+50R - 78+00R	R	Α	N	N	N	0.6	9/17/2010	0937	Υ	9/17/2010	0937	Υ
В4	8	78+00R - 78+50R	R	Α	N	N	N	1.6	9/12/2010	1544	Υ	9/12/2010	1548	Υ
В4	8	78+50R - 79+00R	R	Α	N	N	N	NR	9/12/2010	1608	Υ	9/12/2010	1611	Υ
B4	8	79+00R - 79+50R	R	Α	N	N	N	1.2	9/12/2010	1622	Υ	9/12/2010	1626	Υ
B4	8	79+50R - 80+00R	R	Α	N	N	N	1.4	9/12/2010	1639	Υ	9/12/2010	1644	Υ
В4	8	80+00R - 80+50R	R	Α	N	N	N	0.8	9/12/2010	1654	Υ	9/12/2010	1654	Υ
В4	8	80+50R - 81+00R	R	Α	N	N	N	0.6	9/12/2010	1723	Υ	9/12/2010	1727	Υ
В4	8	81+00R - 81+50R	R	Α	N	N	N	1.0	9/12/2010	1749	Υ	9/12/2010	1752	Υ
B4	8	81+50R - 82+00R	R	Α	N	N	N	1.3	9/12/2010	1756	Υ	9/12/2010	1758	Υ
B4	8	82+00R - 82+50R	R	Α	N	N	N	0.7	9/12/2010	1815	Υ	9/12/2010	1815	Υ

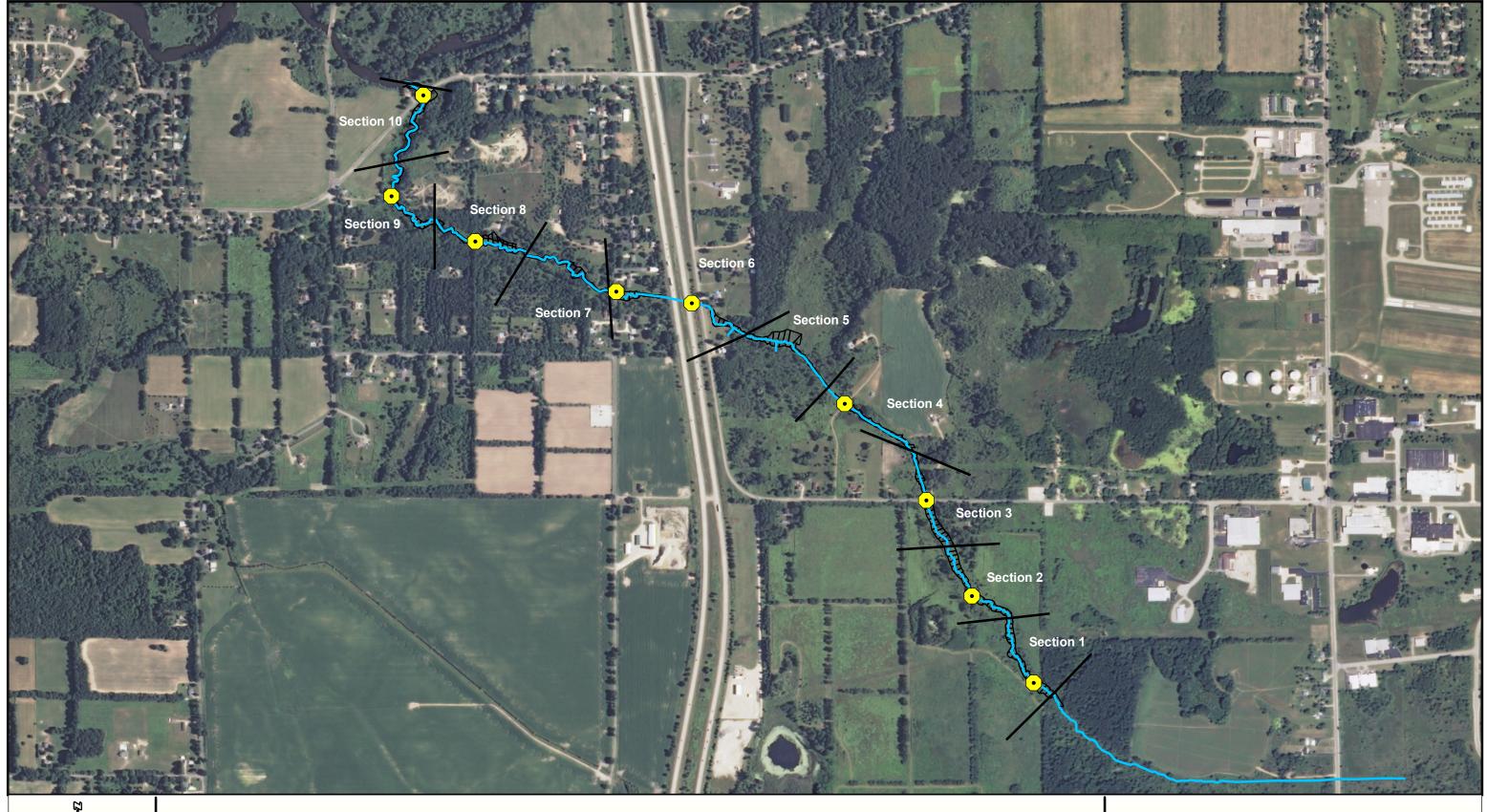
## Endnotes for Talmadge Creek Source Contamination Removal and Verification Summary Table

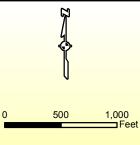
- NR Information not recorded on field log, however, U.S. EPA representative sign-off obtained.
- NA Metric not applicable to final site conditions after achieving 'B' or 'C' Method limits. Site conditions prior to achieving final excavation limits were recorded on field notes.
- ND Not Detected
- PID Photoionization detector
- ppm Parts per million
  - \* Field logs do not reflect the final observations; however, EPA approval was obtained in accordance with EPA Method A Metrics.

#### Special Condition EPA Approval

No EPA method was established for this clearance area due to site specific conditions that did not allow for – completion using the EPA Approved Methods A, B, or C. EPA approval was obtained for each clearance area where a special condition was encountered.

# **Figures**

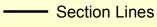




## Legend



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Talmadge Creek

FIGURE 1 **OVERALL SECTION LOCATION MAP LINE 6B MP 608** MARSHALL, MICHIGAN

SEPTEMBER, 2010



# **Field Photographs**



75+00L - 75+50L: Looking across Talmadge Creek (September 22, 2010)



75+50L – 76+00L: Looking across Talmadge Creek (September 16, 2010)



76+00L - 76+50L: Looking upstream (September 23, 2010)



76+50L - 77+00L: Looking upstream (September 23, 2010)



77+00L - 77+50L: Looking toward Talmadge Creek (September 23, 2010)



77+50L - 78+00L: Looking upstream (September 19, 2010)



78+00L - 78+50L: Looking toward Talmadge Creek (September 19, 2010)



78+50L - 79+00L: Looking downstream (September 19, 2010)



79+00L - 79+50L: Looking downstream (September 23, 2010)



79+50L - 80+00L: Looking upstream (September 20, 2010)



80+00L - 80+50L: Looking across Talmadge Creek (September 20, 2010)



80+50L - 81+00L: Looking downstream (September 23, 2010)



81+00L - 81+50L: Looking across Talmadge Creek (September 23, 2010)



81+50L - 82+00L: Looking across Talmadge Creek (September 23, 2010)



82+00L - 82+50L: Looking across Talmadge Creek (September 23, 2010)



82+50L - 83+00L: Looking downstream (September 23, 2010)



83+00L - 83+50L: Looking upstream (September 23, 2010)



83+50L - 84+00L: Looking toward Talmadge Creek (September 23, 2010)



84+00L - 84+50L: Looking toward Talmadge Creek (September 21, 2010)



84+50L – 85+00L: Looking toward Talmadge Creek (September 21, 2010)



72+50R - 73+00R: Looking upstream (September 13, 2010)



73+00R - 73+50R: Looking upstream (September 13, 2010)



73+50R - 74+00R: Looking downstream (September 23, 2010)



74+00R - 74+50R: Looking upstream (September 20, 2010)



74+50R - 75+00R: Looking downstream (September 23, 2010)



75+00R – 75+50R: Looking downstream (September 20, 2010)



75+50R - 76+00R: Looking upstream (September 20, 2010)



76+00R - 76+50R: Looking toward Talmadge Creek (September 20, 2010)



76+50R - 77+00R: Looking downstream (September 20, 2010)



77+00R - 77+50R: Looking upstream (September 20, 2010)



77+50R - 78+00R: Looking upstream (September 23, 2010)



78+00R - 78+50R: Looking upstream (September 13, 2010)



78+50R - 79+00R: Looking upstream (September 13, 2010)



79+00R - 79+50R: Looking upstream (September 13, 2010)



79+50R - 80+00R: Looking downstream (September 13, 2010)



80+00R - 80+50R: Looking upstream (September 13, 2010)



80+50R - 81+00R: Looking downstream (September 13, 2010)



81+00R - 81+50R: Looking upstream (September 13, 2010)



81+50R - 82+00R: Looking downstream (September 13, 2010)



82+00R - 82+50R: Looking upstream (September 13, 2010)

# **Field Notes**

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76.50 to 71:00L Enbridge **Creek Section** Backfill Approval EPA 48-hour Follow-up Inspection Observations and Time (If Applicable) Completed By: Jusen Eding 04:53 Date: 9/20/10 Time of Trench Excavation 6-hour Follow-up inspection Observations and Time (If Applicable) 14:35 19:40 Time of Test Pit Headspace<sup>3</sup> 19:40 Marshall Line 6B MP608 Pipeline Release Sheen Test Rainbow Sheen Observed 3 (N) (N) (N) 22131003 Sangle And 45:3 Comprete Odor<sup>2</sup> Excavation Free Phase Oil Observed Depth of Contamination (A) Groundwater (B) £ 0 Photo 1D 17 @ B C Method Used to Indicate Vertical Umit<sup>1</sup> 3 STW1 125 Project Number: 3 Project Name: Photo ID

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Groundwater (8)
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None (M), Left (L), Moderate (M), Strong (S)
PID readouts in ppm above background
ND = No Detection

2 2

Depth of Contamination (A)

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Name:	Marshall Un	Marshall Une 68 MP608 Pipeline Release	e Release		1		Date: 9-19-19	Creek Section	k Section
Number:		22131003					Completed By: 16ter 5 tepho	181460	18+50C
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(1)	Depth of Contamination (A) Groundwater (B)								
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78+500 79+40C Enbridge Creek Section Saddill Approval €PA Date: 9-19-10 Completed By: 9th Stephen CE, A) es tato 48-hour Follow-up inspection Observations and Time (if Applicable) Time of Trench Excevation 17-48/00/10 10 10 00 11-1-1 6-hour Follow-up Inspection. Observations and Time (If Applicable) FP, or, odor Time of Test Pit Sheen Shern Yest Handspace<sup>3</sup> Rainbow Sheen Pppm Observed ppm of sheen Marshall Une 68 MP608 Pipeline Release なっ 22131003 S M 7 ( > no Signs , Ogo Soil - complete Parto - collect time Q 10 1811 Photo ID Method Used to Indicate Vertical Umft<sup>1</sup> Number: Name: 9

Depth of Contamination (A) Groundwater (B) 3

Confining Layer (C)
None (N), Light (L), Moderate (M), Strong (S)
PID readouts in ppm above background
ND = No Detection <u>8</u>

Completed By: Detel Stephen 79+006 to 74+502 Enbridge Creek Section Sackfill Approval 48-hour Follow-up Inspection Observations and Time (If Applicable) Ø1-51-6 Date: Time of Tranch Excavation 6-hour Follow-up inspection. Observations and Time (If Applicable) क्रिक ०/ विद्रा Stows no sheen Go! Sheen 0 598 1 t. 0 0 . Ism 1 0 0 . Time of Test Pit Headspace\* Marshall Une 68 MP508 Pipeline Refease Sheen Test Rainbow Sheen Observed 200 22131003 complete Odo. Sheen 1755 - collec Free Phase OII Observed S DE 1367 Photo ID 180s 1805 Method Used to Indicate Vertical Number:

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Depth of Contamination (A)

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PID readout's in ppm above beckground
NO = No Detection

79.50 080.00L Creek Section Sackfill Approves 15:36 ₹63 2 Analysis Completed By: Jeases Echanon 48-hour Follow-up Inspection. Observations and Time [#Applicable] Date: 9 (20 10 Spec 70.51 - No pit regulted per Waston's notes due World level dellation Time of 6-hour Follow-up inspection Observations and Time [18] Time of Treach Yest Pit 01:31 10 Test Š Sheen Teff Headspace Rainbow Sheen ppm Observed 16:25 Marshall Line 68 MP608 Pipeline Belease 14,210 Vac 22131003 Stourt , odo Free Phase Off Observed rig. > Start Photo 1D 00 <u>--</u> Method Used to Indicate Vertical 1 Project Number: Project Name: Photo ID Øċ

Enbridge

Depth of Contamination (A) Ξ

Groundwater (8)
Confinite Layer (1)
Confinite Layer (1)
Confinite Layer (1), Moderate (M), Strong (5)
PID:residutt in ppm above background
ND - No Detection

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Supplemental Date: Sheet

19 +50 creek Section Enbridge Sackfill Approval EPA 3Wpert) 48-hour Follow-up Inspection Observations and Time (If Applicable) 2 No additional soit dug due to leight of oner bed owners request Completed By: Time of 6-hour follow-up inspection Observations and Time (# Time of Trench Test Pit Ecovetion Edd Marshall Line 68 MP608 Pipeline Release Sheen Test Rainbow Sheen Observed z N L M S Y 22131003 Odor Free Phase Off Observed z Method
Used to
Indicate Photo ID
Varitosi
Umit<sup>3</sup> 0/12/6 υ « Project Number: Project Name: Photo ID

Depth of Contamination (A) 3

Groundwater (8)
Confining Layer (C)
None (S), Light (L), Moderate (M), Strong (S)
PiDreadout's in ppin above background
ND = No Detection 金色

Marshall Une 68 MP608 Pipeline Release 22131003 Project Number: Project Name:

Creek Section
State
Stat

Completed By: Sazin Edj. munn

n Test Headspace Time of Chour Follow-up Inspection Observations and Time (If Time of Trench 48-hour Follow-up Inspection Observations and Time of Applicable) Secretion (If Applicable) (If Applicable)	sh.81	alysis 17:36	Sh: 81 74					
Shen let has Ol Odo? Rahbow Shen on Tett Pres Phase Ol	5481 3.46 3 × 18 1 5 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1	1 Semple sheen test and	test pit complete 18:45					

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Depth of Contamination (4)
Groundwater (8)
Combing Layer (1)
None (1), Light (1), Moderate (M), Strong (5)
PID nesdout in ppm above background
ND - No Defection

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<sup>88</sup> 

80+00 Lo 80 +50 L Enbridge Creek Section Sackfill Approval EPA Ocho Completed By: P. Stephens 48-hour Follow-up Inspection Observations and Time (If Applicable) moc. elevation and property Date: 9-16-10 Sive Sheen Fa is bow Shear Test
Rainbow Shean Headspace? Time of 6-hour follow-up inspection Observations and Time (if Time of Teach
Observed ppm Test Pit Applicable) Sich 150 te 5+ by EPA due-to Wany MA s heen 3 106129 じゅらん Ω IT ST -No pit reguired 8.3 COME Stre Sai \* 100 Marshall Line 6B MP608 Pipeline Release NO exc ره اله در. ما 22131003 ナンナ Odor Free Phase Oil Observed 028 Photo ID 9/21/10 О В Method Used to Indicate Vertical Umit<sup>3</sup> Project Number: Project Name: Photo ID

Depth of Contamination (A) €

Groundwater (B)
Confining Layer (C)
Confining Layer (C)
Prome (N), Light (L), Moderate (M), Strong (S)
PID readour's in pin above background
ND = No Detection 26

the com 80 45 de 81+ 000L 4 rate removed Enbridge **Creek Section** Backfill Approval 155Ues W/ out of section ă E 787 Completed By: Completed By: OHIED OF CELLED 48-bour Follow-up inspection Observations and Time (if Applicable) OWNER Date: 9-15-10 ひる 1 Vest. SILCION Time of Trench Excavation 台 6-hour Follow-up inspection Observations and Time (if Applicable) Swiperted ारिक विश्व trong Terrybow Sheen first 3 thoshram 05 450 1825 Time of Test Pit Re ten P Headspace<sup>3</sup> 23 Marshall Line 68 MP608 Pipeline Release NE Sheen Test Rainbow Sheen Observed 500 Simen 22131003 N V V 485, b. 20100 Odor Groundwater (8)
Confining Lyver (C)
Mone (N), Jight (J), Moderate (M), Strong (S)
PID readouts in ppm above background
ND = No Detection ) wind C Smolet-1 NStall Free Phase OII Observed 2 Depth of Contamination (A) >-305 450 De 1830 Photo ID Ĺ, 4 Method Used to Indicate Vertical Umit<sup>2</sup>  $\infty$ Project Number: 3 Project Name: Photo ID Notes:

Marshall Line 68 MP608 Pipeline Release 22131003	Date: 9-15+10 Completed By: Peter Stephen	Creek Section
Unit*  Unit*  Shean Test Pit  Unit*  Unit*  Shean Test Pit  Shean Test Pit  Unit*  Shean Test Pit  Shean Test	48-hour F	
collect Soil	alist citallo	EPA Enbridge
(1) Depth of Contamination (4) Groundwater (8) Confining Layer (c) (2) None (N), Light (L), Moderate (M), Strong (s) (3) PID readouts in ppm above background ND = No Detection		

Project Name: Marshall Line 68 MP608 Pipeline Rolease		
Project Number: 22131003	Date:	Creek Section
Method		91+30 10 82+00L
Unit   District   Photo ID   Free Phase Oil   Odor   Rainbow Sheen   Fast Sheen	48-hour follow-up inspection. Observations and Time (If Applicable)	pproval
5.9	15.51 0 16.51 M	Enbridge
St shows heavy		
-No Soil and No vit wish las		
(1) Depth of Ontamination (A) Groundwater (B) Groundwater (B) Confining Layer (C) (2) None (N), Light (L), Moderate (M), Strong (S) (3) PID readouts in ppm above background ND = No Detection		

Creek Section 82.450/L	Backfill Approval	EPA Enbridge	to get a							
Date: 9-15-18 Completed By: 12th 5tylusur	48-hour Follow-up inspection Observations and Time (If Applicable)	) 50.31 of the 10-5	w/ a shovel	1, or product						
Marshall Line 68 MP608 Pipeline Release 22131003 Steen Tase	Vertical Observed Odor Relinbow Sheen Headspace Time of 6-hour Follow-up Inspection Observations and Time of Trench Unit! Typh?	MODE: (17.0) V (M) LMS V (N) 1.4 1738 CHE STORY 14.35 NOON:	ide to take a sough of	1734 Complete test pit W NO oday sheen						(1) Depth of Contamination (A) Groundwarter (B) Confine Lyser (B) (2) None (NJ, Ught (L), Moderate (M), Strong (S) (3) PID readouts in ppm above background ND = No Detection

Greek Section 82+5\$\tilde{D}_{\text{to}} & 837000	Backfill Approval	EPA Enbridge						100				
Date: 9-15-18 Completed By: 1246 Stephen	48-hour Follow-up inspection Observa (If Applicable)	(55)										
Mathod  Marshall Une 68 MP608 Pigeline Release  22.13.1003	Sheen Test Observed O	1765 Collect Source to Show, Let	s no sign o	L. te post								Coput of configuration (A) Groundward confining Layer (C) Confining Layer (C) None (N), Light (L), Moderate (M), Strong (S) PID readouts in ppm above background ND ** No Detection
Project Name: Project Number:	Photo ID	Motes:									ε	(3) (5)

83+600 40 83+50c **Creek Section** Sackfill Approval 0000 2 EPA Ç enough Producy. 48-bour Follow-up inspection Observations and Time (if Applicable) 1357 6 CZ Sheer しなり Completed By: 1-SIGN Time of Trench Excavation 7 270 whotas 92021 6-hour Follow-up inspection Observations and Time (If Applicable) Sheres かんなける £ 54 Time of Test Pit 178 13 Sheen Test
Reinbow Sheen
Observed
Ppm 大いず laying additions (2) Sheers N N I N S 29. S ええ Odor Groundwater (8)
Confining Layer (c)
None (N), Light (L), Modenate (M), Strong (5)
PID readouts in ppm above background
ND = No Detection Free Phase Oil Observed Complete 1645 corretues 3 Depth of Contamination (A) abile Mathod
Used to
Indicate
Vertical
Umit\* AB C 1705 65000 3 ନ୍ଦ ନ Photo ID

Project Name:

Project Number:

22131003

Marshall Line 6B MP608 Pipeline Release

Enbridge

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Date: 9-15-16

8350 to 8460L Enbridge **Creek Section** Backfill Approval EPA Completed By. Letel Stychew 48-hour Follow-up Inspection Observations and Time (If Applicable) Date: 9-17-18 0 opsered. Time of Trench Excavation 6-hour Follow-up Inspection Observations and Time (If Applicable) Sheem, of oder +c3+ Time of Test Pit 1120 shear no FP Sheen Test
Rainbow Sheen
Observed
Pppm 4.0 Marshall Line 6B MP608 Pipeline Release (Z) tst-> je test 22131003 (S) Depth of Contamination (4)
Groundwater (8)
Confining Layer (c)
None (N), Light (L), Moderate (M), Strong (5)
PID readouts in ppm above background
NO = No Detection Odor Soil Complete - Conduc Free Phase Oil Observed (²) 1040 - collect >-Method Used to Indicate Photo ID Vertical Limit<sup>2</sup> 7521440 80 09-17-4 4-80 1120 Project Number: 3 Project Name: Photo ID

SUPPL to SUSUL Backfill Approval 1 Completed By, Refle 5 Jeffann 3051 Octobe 48-hour Follow-up Inspection Observations and Time (If Applicable) Date: 9-17-18 collected constuta Time of Trench Excavation 3 Bitio Calor 6-hour Follow-up inspection Observations and Time (If Applicable) 200 () () P Sheen 55 Sticking Time of Test Pit (a) 74.00 Sheen Test
Rainbow Sheen
Observed
Ppm Marshall Line 6B MP608 Pipeline Release 17 Observed of Chaples N S W N 1,05 22131003 Shows Odor Colact 9121 Product Free Phase Oil Observed 20 Depth of Contamination (A) ક Photo ID ķ 050/ Redug Method Used to Indicate Vertical Umlt, Project Number: Ξ Photo ID

Groundwater (B)
Confining Layer (C)
None (N), Light (L), Moderate (M), Strong (S)
PID readouts in ppm above background
ND = No Detection

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Enbridge

Project Name:

Marshall Line 68 MP508 Pipeline Release Project Name:

Creek Section Creek Section Completed By: Peder Staples ( 845 to 85+6)

	Sackilli Approve)  EPA Enbridge									
Completed By:	48-hour Follow-up Inspection Observations and Time (If Applicable)	crior orker								
	6-hour Follow-up Inspection Observations and Time (I Time of Trench Applicable)  Exervation	12/10 PHE								
22131003	Shean Yest Hasdspace Time of Ralbbow Shen ppm Yest Pit	15 O 10 11 11 11 11 11 11 11 11 11 11 11 11					e de la company de la comp			
	Method Used to Used to Indicate Photo ID Gree Phase Off Odor Vortical	N   N   N   N   N   N   N   N   N   N								
Project Number:	Photo ID		Notes:							

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Depth of Contamination (4)
Groondwater (9)
Confinite Lavier (19)
None (4), Light (1), Moderate (M), Strong (5)
Pills residents in pin above background
NO = No Detection 38

Creek Section	845/Km 85 180 C	Beckfill Approval	SRA Enbridge										
Date: 9-15-10		48-hour follow-up inspection Observations and Time (if Applicable)	12 1/2 10/45L				***************************************					**************************************	
Marshall Line 6B MP608 Pipeline Release 22131003	ce <sup>3</sup> Time of 6-bour Follow-up Inspection Observations and Time	niti Observed Ppm	7) 3/9	Move to next location									Depth of Contamination (A) Groundwater (S) Confining Layer (C) None (N), Light (L), Moderate (M), Strong (S) PID readouts in prim above background ND = No Detection
Project Name: Project Number:	Me Us Photo (D ) and Ve	7	Notes:   6 (							Who may be to the second of th	***************************************		(3)

Enbridge Backfill Approval EPA 1057 2.16.10 200 48-hour Follow-up Inspection Observations and Time (If Applicable) ş<sup>j</sup> ナーブ Time of Trench Excavation 1505 6-hour Follow-up Inspection Observations and Time Completed By: Rock Bec L 9/12/10 (If Applicable) 14.72 MA 92419, Time of Test Pit also be Of 2.3 [40] Date: Headspace<sup>3</sup> шда (Z >-(<u>)</u> Rainbow Sheen Observed TP Will Sheen Test >-§ ₹ Odor2 Marshall Line 68 MP608 Pipeline Release Narrow excountlin-2 Free Phase Oil Observed **②** > 22131003 \(\frac{\pi}{\pi}\) υ (₹) A S Method Used to Indicate Vertical Umit<sup>3</sup> Photo ID 73+50 Pto 73+50 R 72+504 13+00 A 72+05 R to 72+60R Creek Section Project Number: Project Name: Comments Comments Comments

Depth of Contembation (A)

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Groundwater (B)

Confining Layer (C)

None (N), Light (L), Maderate (M), Strong (S)
PID readouts in ppm above background
ND = No Detection

<u>1</u> 12

Date: 9/23/10 Marshall Une 68 MP608 Pipeline Release

K 73+50 10 74+00 A Embridge Creek Section Backfill Approval C Car 48-bour Follow-up impection. Observations and Time [If Applicable.] Three of Choir Follow-up inspection Observations and Time (IT Time of Tranch Applicable)

Excention 9/20/10/14:59 19/20 H Sheen Test Rainbow Sheen Observed 22131003 ž Ž Odo Free Phase Oil Observed Method
Used to
Indicate Phoce ID
Vertical
Umit<sup>2</sup> o Z project Number: Project Name: Mote ID

<sup>8</sup> 

Depth of Contamination (A)
Groundwater (B)
Confinite Leyer (C)
None (B), Light (L), Moderate (M), Strong (S)
PID residents in ppin above background
ND - No Defaction 3 3

Project Name:

Project Number:

Marshall Une 68 MP608 Pipeline Release

22131003

Date: 9/20 100

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Creek Section

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	Bacdfil Approxi	(AR)													ATTENDED TO THE PERSON NAMED TO THE PERSON NAM	
	45-bour Follow-up Inspection Observations and Time (II Applicable)	13 A 12/12 BA														With the state of
	Ime of Trench Exervation	1843														
	6-hour Follow-up Inspection Observations and Time (if Time of Trench Applicable)	124-31 1811 611516 LAD			15											
	Time of Test Pit	1.8 18:45	7257		18:45											
	Sheen Yest Reinbow Sheen Observed	Ø 1.8	Sheen	18:30												
		>	Analysis	2	1/2 Fe											
	# Odor	(8) 1 M S	Ame	10,4	Complete											
	Free Phase Off Observed	ව -	24 Ole	Examorion	P.7 (											
	Photo ID	7	50,1 Sangle											ļ		1
	Method Used to Indicate Vartical Umit <sup>3</sup>	٥ ا ا	გ	576×1	0050 / Test											
	Photo ID	以	ä		000											

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Depth of Contamination (4)
Groundwater (8)
Confining Layer (1)
Nose (4), Light (1), Moderate (44), Strong (5)
PID redducts in pin above background
ND - No Detection 28

74450K 10 7075400K Enbridge Creek Section needs retining into time EPA for new 48 h- observation Backfill Approvat ME €PA Time of Trench 48-hour follow-up Inspection Observations and Time Excernation (1f Applicable) Completed By: 16th Stephen Date: 9-19-10 00,00 6-hoor Follow-up inspection. Observations and Time (If Applicable) 9/20/10 Rooderch **W** fail The Signs of sheen FP or ode For sheen test 000 product @ 0922. Time of Yest Pit 1845. complek test pit Headspace mdd Marshall Line 68 MP608 Pipeline Release Shean Test Rainbow Sheen Observed collect soil @ 160S 22131003 000 fine Phase Oil Observed tree 9/21/10 - Redug 8410. 21/50/6 3/0c/16 Photo ID 8H81 0 18H8 Method Used to Indicate Vertical ↑ Number: t Name: Poto 10

Depth of Contemination (A) 3

Confining Layer (C)
None (N), Light (L), Moderate (M), Strong (S)
PID readouts in ppm above background
ND = No Detection දි වි

Completed By. Make Mgostini 75+00 10 10 25+50 12 Enbridge Creek Section Backfill Approval 1 & A 48-hour Follow-up Inspection. Observations and Time (# Applicable) Date: 9/20/10 Sheen first
Headspace 1 Time of 6-bour Follow-up Impection Observations and Time (If Time of Trench
Reinbow Sheen ppm Test Pit Applicable)

Execution ्री सि १० व्यक sheen test analysis Marshall Line 68 MP608 Pipeline Release Start of excavation ON COMPAN Sample and 22131003 odo. Free Phase Oil Observed Photo ID +65+ 501 <u></u> Method Used to Indicate Vertical Umit<sup>2</sup> Project Number: Project Name: Photo SD

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Oepth of Contamination (A)
Groundwater (B)
Confiding Layer (C)
Russe (M), Light (1), Moderate (M), Strong (S)
PIO sasdout in spin above background
ND - No Defection 22

75,50 to 76+00 R Enbridge Creek Section 3 Sackfill Approval 12:3 27 48-hour follow-up inspection Observations and Time (# Applicable) Completed By: 595, n ECHM on M CKCaVation Date: 9/20110 Headspace Time of 6-hour follow-up inspection Observations and Time (if Time of Trench ppm Test Pit Cocwetion Applicable) 5:45 15.25 16:31 01/20/ analysis Econore Te 12 1 0 0 0 15 45 1051 Dit Marshall Line 68 MP608 Plueling Release 54000 Sheen Test Rainbow Sheen Observed 22131003 Par Ode Ode **②** Free Phase Off Observed Sample. ex caseti Ci otoriq 50:1 min ! ن ھ (ع) Method Used to Indicate Vertical Project Number: Project Name: Photo ID 5

Notes

Depth of Contamination (A) Groundwater (B) Confinite Layer (I), About (I), Moderate (M), Strong (S) PID seadout Lin ppin above background ND = NO Detection

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76:00km 76 500 R Enbridge Creek Section Sackfill Approve? **EPA** Spirit of Leaf Porto 48-bour follow-up inspection. Observations and Time (#Applicable) Completed By: Letsen Ecknon Date: 9/20/10 Executor to an Sheen fest
Headspace Time of 6-hour follow-up inspection Observatione and Time (if Time of Trench
Rainbow Sheen
Observed
Observed 3 17:17 Cam DROTE Marshall Line 68 MP608 Pipeline Release 22131003 Seen موم 1151 Free Phase Oil Observed Sem/1c > Photo ID 9 <u>®</u> 5:1 Method Used to Indicate Vertical Umit<sup>2</sup> Project Number: Project Name: Photo ID 0 Notes

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Depth of Contamination (A)
Groundwater (B)
Confinite Layer (C)
None (N), Light (I), Moderate (M), Strong (S)
Plipseadouth in ppin above background
NO - NO Detection 2 2

Creek Section  [W+508to ]   recold	Enbridge									
Creek Section	Beckfill Approved									
	rime EPA									
on Echan	48-hour follow-up inspection Observations and Time (if Applicable)	دازاه مارحداف								
Date: 9/20 Completed By: Island E. Kruu	our Follow-up inspecti (If Appl	1								
Date: Comp	Time of Tranch 48-h Excevetion	0								
	Tilms	0/6								
	6-hour Follow-up Imprection Observations and Time (If Applicable)	91.00 01 KC 157								
		1900	Analysis	14:00						
	Hedipace Time of ppm Test Pie	1								
Marshall Line 68 MPS08 Pipeline Release	Sheen Test Rainbow Sheen Heads Observed pp		Shen Test	Campara						
68 MP608 P	Odo,	S M	5 Sh	Con						
Marshall Line	Free Phase Oil Observed		Sample Sh Excertetion	4.7						
	Ol oabout	7	Soil 5 Shut	7021						
	Method Used to Indicate Vertical Umit <sup>2</sup>	60	W W							
Project Name: Project Number:	Photo ID	Ī	Notes:							

Depth of Contamination (A)
Groundwater (8)
Confinite Layer (1)
None (8), Light (1), Moderate (M), Strong (5)
PID:eaddout in ppm above background
ND - NO Detection

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77 400 800 77+50 R Enbridge Creek Section Backfill Approval \$ Hydr Vac 43-bour Follow-up Impection Observations and Time (If Applicable) Completed By: Save n (Collymonn) अंगी शिया Date: 9/20/10 Time of 6-boar follow-up impection Observations and Time [18] Time of Tranch
Test Pit Excavetion 40:31 12/21/20/2018 20:11 to Gold 14 515 Test Pit Complete (a) (a) 1 | (b) 5.9 (1) (c) 7251 Sheen Yett Headspace Rainbow Sheen ppm Observed ppm Marshail Une 68 MP608 Pipeline Release Soir Sa-0/2 22131003 Odec baloriers shoveling Free Phase Oil Observed The 200 - Vent > Method
Used to
Indicate Photo ID
Vertical
Umit<sup>2</sup> <u>\$</u> With Project Number: Project Name: Photo ID V

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Orguh of Contamination (A)
Groundwater (B)
Confinite Lawre (B)
None (A), Light (L), Moderate (M), Strong (S)
PID resdouts in ppm above background
ND = No Detection

Groundwater (8)
Confining Layer (C)
None (W, Light (L), Moderate (M), Strong (S)
PID readouts in ppm above background
ND = No Detection

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Project Number: 22131003 Completed By: Rock Rock
Photo ID
77+502 78+0012 10 10 10 10 10 10 10 23 Entridge
comments Note: Narrow ex countries - silt fence new torsail NI toxt wit
Lapicates + reason
78-20 18+50 (ABC V (W) (W) 1 MS V (W) (6) 1.6 1544 (M)
72+509 19+004 Bol 10 10 10 10 10 10 10 10 10 10 10 10 10
Comments
(1) Depth of Consamination (A)

Marshall Line 68 MP608 Pipeline Release

Project Name:

Depth of Contamination (A)
Groundwater (B)
Confining Layer (C)
None (N), Light (L), Moderate (M), Strong (S)
PID readouts in parn above background
ND = No Detection

Marshall Line 68 MP608 Pipeline Refease

Project Name: Project Number:

22131003

22131003 Completed By: 2008 7 Be CL	Method Free Sheen 1 Test Test Observed Sheen Sheen Sheen Sheen I Time of Test Sheen	(1) o v d (1) w s v w (, 2 1/422 Menter 1626 Meson M	10 c v (1) (10 w   1 d   16 39 MM   1644 MED 5/16/10 M	When I'm Dilmis van to stream bend. The excentation near	
221311		v	> U	Singer of the t	
roject ivumber:	Greek Section Ph	79+00/2to 79,450/2	TG+50fm 86+0072.	Scroots Sofor as a comments Warrow work	

<u>2</u> <u>6</u>

Depth of Contamination (A)
Groundwater (B)
Confining Layer (C)
None (N), Light (L), Modurate (M), Strone (S)
PIO readouts in pam above background
ND = No Detection

Date:

Marshall Line 68 MP608 Pipeline Release

22131003

Project Number: Project Name:

				 	Completed By:	Br. Konger	202			
Creek Section	Photo (D	Free Phase Oil Observed	Odor²	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> Time of Test Pit		6-hour Follow-up inspection Observations and Time (If Applicable)	Time of Trench Excavation	48-hour Follow-up Inspection Observations and Time (If Applicable)	Backfii Approval
EC+SORO FILOSA	Z V	( <u>s</u> )	N S	(2) >	271 9.0	MK	0	1727	De Jano	EPA Enbridge
Comments	0K (A)8 c		ν Σ	2 >	1.0 1749	Mh	B	7251	Market	My .
81450R to 82700B	08 C	2	S S S	(Z)	1.3 1.156	Mone	B	1758	Ull Sing	H
8	Danks of Courses									
(2) (6)	Groundwater (8) Confining Layer (1) None (M), Light (1), Moderate (M), Strong (5) PID readouts in norm shown by American	A), Strong (S)								
	ND = No Detection	288								

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Depth of Contemination (A)

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Groundwater (8)

Confining Layer (C)

None (N), Light (L), Moderate (M), Strong (S) PID readouts in ppm above background ND « No Detection