

US EPA 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**

**US EPA ARCHIVE DOCUMENT**

**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
8	Left Bank: 75+00L to 85+00L 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-Trimethylbenzene;
- 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);
  - Sheen test per 40 CFR Appendix 1 to Subpart A of Part 435 (for Method A);
  - Photoionization detector (PID) headspace (for Method A);
  - 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;
  - 48-hour observation.

# Table

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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	A	N	Y	γ*	2.2	9/21/2010	0424	Y	9/21/2010	0424	NR
B4	8	75+50L - 76+00L	L	A	N	N	N	1.0	9/16/2010	0930	Y	9/16/2010	0930	Y
B4	8	76+00L - 76+50L	L	A	N	N	N	NR	9/20/2010	1932	Y	9/20/2010	1932	Y
B4	8	76+50L - 77+00L	L	A	N	N	N	NR	9/20/2010	1940	Y	9/20/2010	1940	Y
B4	8	77+00L - 77+50L	L	A	N	N	N	NR	9/20/2010	1905	Y	9/20/2010	1905	Y
B4	8	77+50L - 78+00L	L	A	N	N	N	0.8	9/19/2010	1835	Y	9/19/2010	1835	Y
B4	8	78+00L - 78+50L	L	A	N	N	N	1.4	9/19/2010	1826	Y	9/19/2010	1826	Y
B4	8	78+50L - 79+00L	L	A	N	N	N	1.7	9/19/2010	1816	Y	9/19/2010	1816	Y
B4	8	79+00L - 79+50L	L	A	N	N	N	0.7	9/19/2010	1805	Y	9/19/2010	1805	Y
B4	8	79+50L - 80+00L	L	Special Condition EPA Approval								NA	NA	Y
B4	8	80+00L - 80+50L	L	Special Condition EPA Approval								NA	NA	Y
B4	8	80+50L - 81+00L	L	A	N	N	N	NR	9/15/2010	1825	Y	9/15/2010	1825	Y
B4	8	81+00L - 81+50L	L	A	N	Y	γ*	NR	9/15/2010	NR	Y	9/15/2010	NR	Y
B4	8	81+50L - 82+00L	L	Special Condition EPA Approval								NR	NR	Y
B4	8	82+00L - 82+50L	L	A	N	N	N	1.4	9/15/2010	1730	Y	9/15/2010	1730	Y
B4	8	82+50L - 83+00L	L	A	N	N	N	1.4	9/15/2010	1715	Y	9/15/2010	1715	Y
B4	8	83+00L - 83+50L	L	A	N	N	N	2.8	9/15/2010	1700	Y	9/15/2010	1700	Y
B4	8	83+50L - 84+00L	L	A	N	N	N	1.9	9/17/2010	1120	Y	9/17/2010	1120	Y
B4	8	84+00L - 84+50L	L	A	γ*	Y	γ*	24.0	9/21/2010	NR	Y	9/21/2010	NR	Y
B4	8	84+50L - 85+00L	L	A	N	Y	γ*	102	9/21/2010	1135	Y	9/21/2010	1135	Y

See endnotes for description of notations



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	A	N	N	N	1.5	9/12/2010	1412	Y	9/12/2010	1414	Y
B4	8	73+00R - 73+50R	R	A	N	N	N	1.6	9/12/2010	1420	Y	9/12/2010	1420	Y
B4	8	73+50R - 74+00R	R	Special Condition EPA Approval								9/20/2010	NR	Y
B4	8	74+00R - 74+50R	R	A	N	N	N	1.8	9/20/2010	1845	Y	9/20/2010	1845	Y
B4	8	74+50R - 75+00R	R	B	NA	NA	NA	NA	NA	NA	NA	NR	NR	Y
B4	8	75+00R - 75+50R	R	A	N	N	N	0.0	9/20/2010	1732	Y	9/20/2010	1732	Y
B4	8	75+50R - 76+00R	R	A	N	N	N	0.0	9/20/2010	1545	Y	9/20/2010	1545	Y
B4	8	76+00R - 76+50R	R	A	N	N	N	0.8	9/20/2010	1717	Y	9/20/2010	1717	Y
B4	8	76+50R - 77+00R	R	A	N	N	N	NR	9/20/2010	1900	Y	9/20/2010	1900	Y
B4	8	77+00R - 77+50R	R	A	N	N	N	5.9	9/20/2010	1705	Y	9/20/2010	1705	Y
B4	8	77+50R - 78+00R	R	A	N	N	N	0.6	9/17/2010	0937	Y	9/17/2010	0937	Y
B4	8	78+00R - 78+50R	R	A	N	N	N	1.6	9/12/2010	1544	Y	9/12/2010	1548	Y
B4	8	78+50R - 79+00R	R	A	N	N	N	NR	9/12/2010	1608	Y	9/12/2010	1611	Y
B4	8	79+00R - 79+50R	R	A	N	N	N	1.2	9/12/2010	1622	Y	9/12/2010	1626	Y
B4	8	79+50R - 80+00R	R	A	N	N	N	1.4	9/12/2010	1639	Y	9/12/2010	1644	Y
B4	8	80+00R - 80+50R	R	A	N	N	N	0.8	9/12/2010	1654	Y	9/12/2010	1654	Y
B4	8	80+50R - 81+00R	R	A	N	N	N	0.6	9/12/2010	1723	Y	9/12/2010	1727	Y
B4	8	81+00R - 81+50R	R	A	N	N	N	1.0	9/12/2010	1749	Y	9/12/2010	1752	Y
B4	8	81+50R - 82+00R	R	A	N	N	N	1.3	9/12/2010	1756	Y	9/12/2010	1758	Y
B4	8	82+00R - 82+50R	R	A	N	N	N	0.7	9/12/2010	1815	Y	9/12/2010	1815	Y

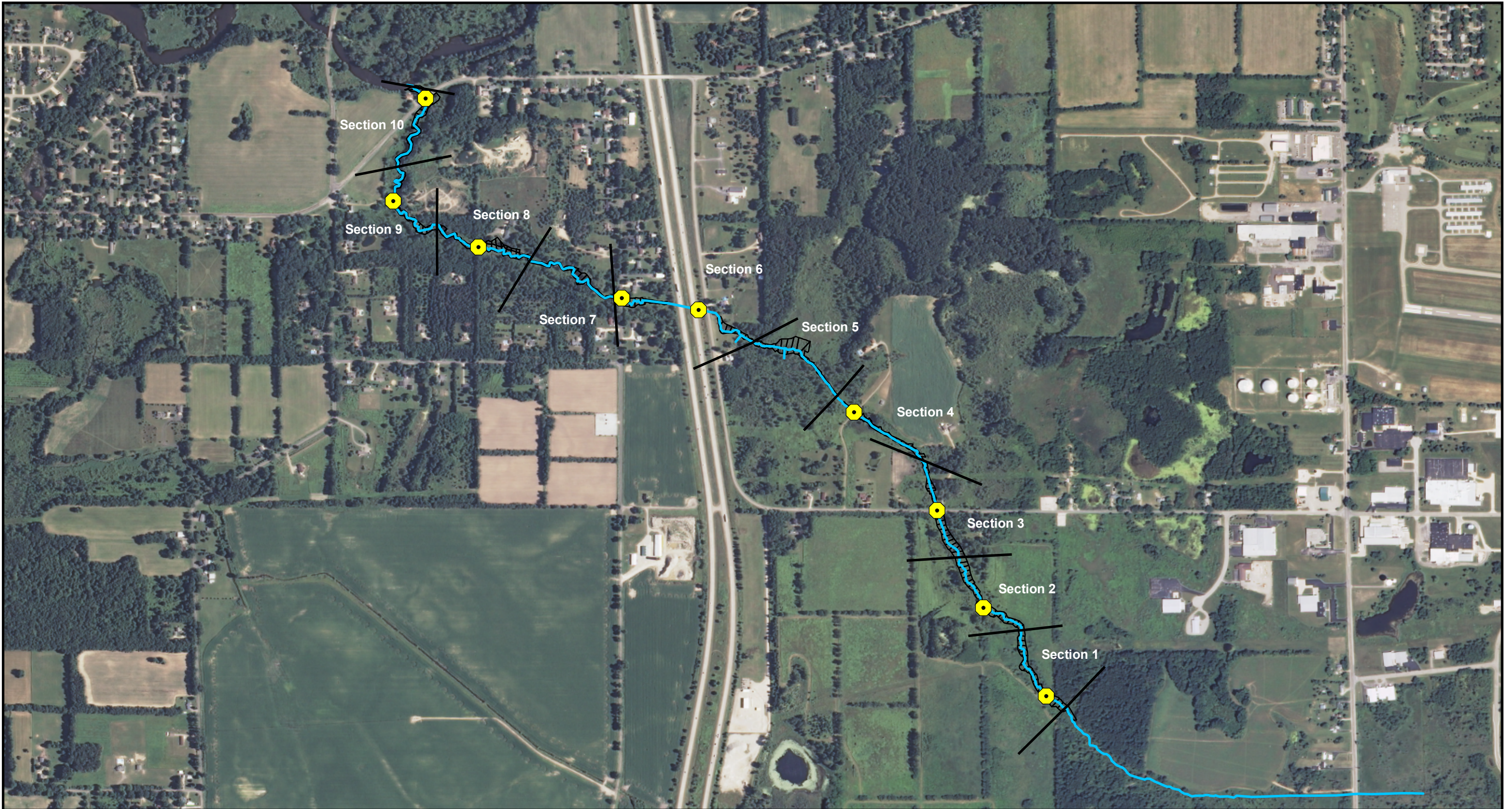
See endnotes for description of notations

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

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0 500 1,000 Feet

**Legend**

-  Culverts
-  Section Lines
-  Talmadge Creek

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





SEPTEMBER, 2010



**Right Bank**

**Left Bank**

**Legend**

-  Culverts
-  Talmadge Creek
-  Section Lines
-  Environmental Clearance Areas

01+00L



0 37.5 75 Feet

SEPTEMBER, 2010

**FIGURE 2**  
**SECTION 8 STATION LOCATIONS**  
**TALMADGE CREEK**  
**LINE 6B MP 608**  
**MARSHALL, MICHIGAN**

# Field Photographs

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## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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



## Field Photographs – Section 8



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



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

**Field Photographs – Section 8**



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



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

## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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

**Field Photographs – Section 8**



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



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

## Field Photographs – Section 8



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



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

**Field Photographs – Section 8**



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



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

## Field Photographs – Section 8



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



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



## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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

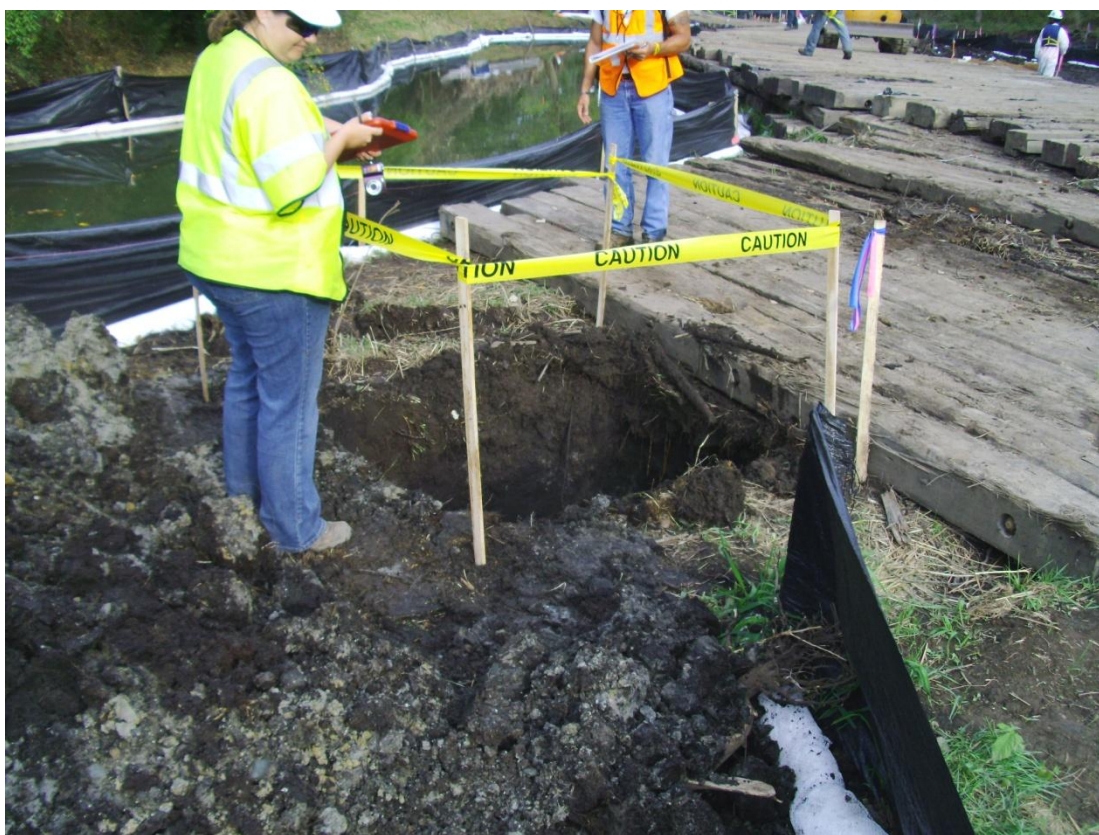


74+00R – 74+50R: Looking upstream (September 20, 2010)

## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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



## Field Photographs – Section 8



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



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

## Field Photographs – Section 8



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



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

# Field Notes

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Project Name: Marshall Line 6B MP608 Pipeline Release Creek Section  
 Date: 7/16/10  
 Project Number: 22131003 75+00 to 75+50  
 Completed By: ERIC SCHEIDT

Photo ID	Method Used to Indicate Vertical Limit	Photo ID	Free Phase Oil Observed	Odor	Sheen Test Rainbow Sheen Observed	Headspace ppm	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)	Backfill Approval	Enbridge
	A B C YUB		Y	N C M S	N	2.2		9/22/10 09:39		9/22/10 08:16		(E)
<p>NOTE: SHEEN TEST SAMPLE COLLECTED AT 09:35          RESULTS OF SHEEN TEST INDICATED RAINBOW SHEEN, BUT NO FREE PHASE OIL OBSERVED. TEST PIT NOT RESTORED.</p> <p>Redug 9/21 @ 0424</p>												

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

Project Name: Marshall Line 6B MP608 Pipeline Release Creek Section

Date: 9/16/10

Project Number: 22131003

Completed By: Eric Suter

7550 to 767004

Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>			Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	EPA	Backfill Approval
				Y	N	M								
TIME 9:36	A   B   C		Y	N			N	1.0	09:36	09:20/10 09:31	09:20/10 09:31	(A)		

Notes:

TIME SOIL SAMPLE COLLECTED: 09:25

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













Name: Marshall Line 6B MP608 Pipeline Release

Number: 22131003

Date: 9-19-10  
Completed By: Peter Stephen  
Creek Section: 78+500 to 79+000

Photo ID	Method Used to Indicate Vertical Limit	Free Phase Oil Observed	Odor	Sheen Test Rainbow Sheen Observed	Headspace ppm	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)	Backfill Approval	
										EPA	Enbridge
1819	Y			Y	1.7	1816	9/22/10 16:30			(PS)	
<p>1818 - collect soil for sheen test          1816 - complete test pit          → no signs of sheen, FP, or odor</p>											

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





# Supplemental Sheet

Project Name: Marshall Line 6B MPEOS Pipeline Release  
 Project Number: 22131003

Date: 7/19/10 to 8/04/10  
 Creek Section

Completed By: \_\_\_\_\_

Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>			Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>	Shim Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	Bedfill Approval	
	A	B	C										EPA	Enbridge
					Y	N	Y	N		<i>[Signature]</i>			<i>[Signature]</i>	

Notes:  
 9/24/10 No additional pit dug due to height of creek bed and property owners request  
 JS - Hattor

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







Project Name:

Marshall Line 68 MP608 Pipeline Release

Project Number:

22131003

Date: 9-15-10

Creek Section

Completed By: Peter Stephen

8015040 811001L

Photo ID	Method Used to Indicate Vertical Limit	Photo ID	Fire Phase Oil Observed	Odor	Sheen Test Rainbow Sheen Observed	Headspace ppm	Time of Test Pit	6-hour Follow-up Inspection (if Applicable) Observations and Time	Time of Trench Excavation	48-hour Follow-up Inspection (if Applicable) Observations and Time	Backfill Approval	
											EPA	Enbridge
(A) B C 1830		Time	Y (N)	N L M S	Y N	1825	9:20 AM	1805 collect soil for sheen test		9:20 AM		
<p>Notes:</p> <p>1817 - install pit - minor sheen noted - no rainbar</p> <p>1825 - complete pit - only feasible place to put pit, suggested by Westin, land owner has issues w/ tree removal + root removal</p>												

(1) Depth of Contamination (A)

Groundwater (B)

Confining Layer (C)

(2) None (N), Light (L), Moderate (M), Strong (S)

(3) PID readings in ppm above background

ND = No Detection

Project Name: Marshall Line 6B MP608 Pipeline Release

Project Number: 22131003

Creek Section  
81 road to 81+50 L

Date: 9-15-10

Completed By: Peter Stephen

Photo ID	Method Used to Indicate Vertical Limit*			Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	EPA	Backfill Approval	Enbridge
	A	B	C												
<u>TP 1755</u>					<u>Y</u>	<u>N</u>	<u>N</u>	<u>(L) (M) (S)</u>		<u>9/15/10 15:10</u>		<u>9/15/10 15:10</u>	<u>(N)</u>		

Notes: 1755 - collect soil for sheen test  
- Sheen noted, but odor or FP

- (1) Depth of Contamination (A)  
Groundwater (B)  
Confining Layer (C)
- (2) None (N), Light (L), Moderate (M), Strong (S)
- (3) PID readings in ppm above background  
ND = No Detection

Project Name:

Marshall Line 68 MP608 Pipeline Release

Project Number:

22131003

Date: 9-15-10

Creek Section

Completed By: Peter Stephens

81+50L to 82+00L

Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	Time of Test Pit	6-hour Follow-up Inspection (If Applicable)	Time of Trench Excavation	48-hour Follow-up Inspection (If Applicable)	EPA	Backfill Approval	Enbridge
			Y	N	(N) (M) (S) (Y) (N)	5.9		9/15/10 15:21					

Notes:

1735 - collect soil for sheen test  
test shows heavy sheen + odor

- No soil dug, no pit installed

- (1) Depth of Contamination (A)  
Groundwater (B)  
Confining Layer (C)
- (2) None (N), Light (L), Moderate (M), Strong (S)
- (3) PID readings in ppm above background  
ND - No Detection

Project Name:

Marshall Line 6B MP608 Pipeline Release

Project Number:

22131003

Date: 9-15-10

Creek Section

Completed By: Peter Stephens 82702L to 82750L

Photo ID	Method Used to Indicate Vertical Limit	Photo ID	Free Phase Oil Observed	Odor	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	Time of Test Pit	6-hour Follow-up Inspection Observations and Time (if Applicable)		48-hour Follow-up Inspection Observations and Time (if Applicable)		Backfill Approval	Enbridge
								Observations and Time	Time of Trench Excavation	Observations and Time	Time of Trench Excavation		
1736	(A) B C	FWD	Y	(N) L M S	Y N	1.4	1730	collected soil for sheen test	15:05	collected soil for sheen test	15:05		(A)

Notes: 172d- decide to take a sample closer to shore / lower w/ a shovel to get a more representative sample  
 173d - test comes back w/ no odor, sheen, or product  
 173d Complete test pit

- (1) Depth of Contamination (A)  
Groundwater (B)  
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 5B MF608 Pipeline Release Creek Section  
 Date: 9-17-10  
 Project Number: 22131003 Completed By: Peter Stephen 8350L to 8400L

Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>			Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	Backfill Approval	
				N	L	S							EPA	Enbridge
1040	C	1336	Y	N	N	N	Y	1.9	1120	1540 9-17-10				

Notes:  
 1040 - collect soil for sheen test  
 - conduct test -> no FP, sheen, or odor observed.  
 1120 - complete test pit,

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

Project Name: Marshall Line 6B MP608 Pipeline Release Creek Section  
 Project Number: 22131003 8400L to 8450L  
 Date: 9-17-18  
 Completed By: Peter Stephan

Photo ID	Method Used to Indicate Vertical Limits <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	Time of Test Pit	6-hour Follow-up Inspection Observations and Time (If Applicable)	48-hour Follow-up Inspection Observations and Time (If Applicable)	Backfill Approval
K1050	A	---	(Y)	N	(Y)	24.0		9/17/18 14:58	9/17/18 15:06	(AT)
Notes: 1050 - collect soil for sheen test										
- test shows FP + sheen										
- No digging -> mat road not yet constructed										
- product observed sticking to bag soil was collected in										
Redug on 9/21										

(1) Depth of Contamination (A)  
 Groundwater (B)  
 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 6B MP608 Pipeline Release

Date: 9/12/10

Completed By: Roger Beck

Project Number: 22131003

Creek Section	Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	Backfill Approval	
											EPA	Enbridge
72+00R to 72+60R		(A) D C	Y (N)	(N) L M S	Y (D)	2.3	1401	Handwritten	1405	Handwritten	1054 9-15-10	MR
72+50R to 73+00R		(A) B C	Y (N)	(N) L M S	Y (N)	1.5	1412	Handwritten	1414	Handwritten	1057 9-16-10	MR
73+00R to 73+50R		(A) B C	Y (N)	(N) L M S	Y (N)	1.6	1420	Handwritten		Handwritten	1058 9-16-10	MR

Comments: Narrow excavation - TP will also be OP

- (1) Depth of Contamination (A)  
Groundwater (B)  
Confining Layer (C)
- (2) None (N), Light (L), Moderate (M), Strong (S)
- (3) PID readings in ppm above background  
ND - No Detection





t Name: Marshall Line 6B MP608 Pipeline Release  
 t Number: 22131003

Date: 9-19-10  
 Completed By: Peter Stephen  
 Creek Section 74750R to 7075700R

Photo ID	Method Used to Indicate Vertical Units <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspoil <sup>3</sup> ppm	Time of Test Pit	6-hour Follow-up Inspection (If Applicable) Observations and Time	Time of Trench Excavation	Bedfill Approval	
										EPA	Enbridge
1848	(A) BIC	Y	(N)	NILMS	Y	1.2	1845	Fail 9/20/10			(EPA)

1840 - collect soil for sheen test  
 1845 - no signs of sheen FL or odor  
 1845 - complete test pit

9/20/10 - Free product @ 0933. Needs retiming info from EPA for new 48 hr observation  
 9/21/10 - Redug @ 1605

9/22/10 Soil Gas Free Product 09:00

- (1) Depth of Contamination (A)  
Groundwater (B)  
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 6B MP608 Pipeline Release Creek Section

Date: 9/20/10

Completed By: Tyson Ekman 7600816 r50R

Project Number: 22131003

Photo ID	Method Used to Indicate Vertical Unit <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headpace <sup>3</sup> ppm	Time of Test Pit	6-hour Follow-up Inspection Observations and Time (if Applicable)	Time of Trench Excavation	48-hour Follow-up Inspection (if Applicable)	Backfill Approval	
											EPA	Enbridge
10	6" B/C	10	Y	0	0	0.8	17:17	Start 16:39		Start 17:10		
Notes: Soil Sample Sheen Test analysis 16:39 Start of Excavation 17:10												
Test pit complete 17:17												

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

Project Name: Marshall Line 68 MP608 Pipeline Release Creek Section  
 Date: 9/20  
 Completed By: Jesse Eckman 76550 to 77200 R

Project Number: 22131003

Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	Backfill Approval	
											EPA	Enbridge
14	0 B/C	14	Y	(S)	Y	(N)	1900	21:20 to 21:30		21:20 to 21:30	(S)	(S)

Notes:  
 Soil Sample Sheen Test Analysis  
 Start Excavation 18:55  
 Test Pit Complete 19:00

- (1) Depth of Contamination (A)  
Groundwater (B)  
Confining Layer (C)
- (2) None (N), Light (L), Moderate (M), Strong (S)
- (3) PID readings in ppm above background  
ND - No Detection

Project Name: Marshall Line SE MP608 Pipeline Release

Date: 9/20/10

Creek Section

Completed By: Jason Eukman

77 has to 77+50 R

Project Number: 22131003

Photo ID	Method Used to Indicate Vertical Unit	Photo ID	Free Phase Oil Observed	Odor		Sheen Test Rainbow Sheen Observed	Headspace ppm	Time of Test Pit	6-hour Follow-up Inspection Observations and Time (if Applicable)	Time of Trench Excavation	6-hour Follow-up Inspection Observations and Time (if Applicable)	Backfill Approval	
				Y/N	Y/N							EPA	Enbridge
9	BIC	9	Y	N	N	Y	5-9	17:05	9/20/10 16:55			(EPA)	
<p>Notes: <u>Hydro Vac Soil Sample Sheen Test analysis 16:04 Start of Hydro Vac for Test pit 16:50 with laborers shoveling Test pit complete at 17:05</u></p>													

(1) Depth of Contamination (A)  
Groundwater (B)  
Confining Layer (C)  
None (N), Light (L), Moderate (M), Strong (S)  
PID readout in ppm above background (3)  
ND = No Detection

Project Name:

Marshall Line 6B MP608 Pipeline Release

Project Number:

22131003

Date: 9-17-10

Creek Section

Completed By: Peter Stephens

7750R<sub>10</sub> 7800A

Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Photo ID	Free Phase Oil Observed	Odor <sup>2</sup>		Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	Time of Test Pit	6-hour Follow-up Inspection (if Applicable)	Observations and Time	Time of Trench Excavation	Backfill Approval	
				Y	N							EPA	Enbridge
0925	0925	0925	Y	N	Y	N	0.6	0937	100%	9-18-10		55	
<p>Notes: 0925 - collect soil for sheen test</p> <p>→ no odor, sheen, or FP observed</p> <p>0937 - complete test pit, take photo</p> <p>Dug w/ mini</p>													

- (1) Depth of Contamination (A)  
Groundwater (B)  
Confining Layer (C)
- (2) None (N), Light (L), Moderate (M), Strong (S)
- (3) PID readings in ppm above background  
ND = No Detection

Project Name: Marshall Line 66 MP608 Pipeline Release  
 Project Number: 22131003

Date: 9/12/10  
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	Backfill Approval	
											EPA	Enbridge
B-4.5 77+50R 78+00R		A B C A B C	Y (N)	(N) L M S	Y (N)	2.3						
Comments: Note: Narrow excavation - silt fence next to road. No test pit - Duplicated & Cleared												
78+50R 78+50R		A B C A B C	Y (N)	(N) L M S	Y (N)	1.6	1544		1548			
Comments:												
78+50R 78+00R		A B C A B C	Y (N)	(N) L M S	Y (N)		1608		1641			
Comments:												

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

Project Name: Marshall Line 6B MP608 Pipeline Release

Date: 9/12/10

Completed By: Roger Beck

Project Number: 22131003

Creek Section	Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Free Phase Oil Observed	Odor <sup>2</sup>	Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	Backfill Approval	
											EPA	Enbridge
79+00R to 79+50R		A B C	Y	(N) L M S	Y (N)	1.2	1622	Admitted	1624	ND 9-16-10	1114	MR
79+50R to 80+00R		A B C	Y	(N) L M S	Y (N)	1.4	1639	Admitted	1644	ND 9-16-10	1116	MR
80+00R to 80+50R		A B C	Y	(N) L M S	Y (N)	0.8	1654	Admitted		ND 9-16-10	1118	MR

Comments: Narrow irregular excavation due to stream bend. TP excavation near 80+00R Flag due to space restriction. TP will also be OP

- (1) Depth of Contamination (A) Groundwater (B) 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 6B MF508 Pipeline Release

Date: 9/12/10

Completed By: Roger Beck

Project Number: 22131003

Creek Section	Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Free Phase Oil Observed	Odor <sup>2</sup>					Sheen Test Rainbow Sheen Observed	Headspace <sup>3</sup> ppm	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)	Backfill Approval	
				A	B	C	N	L							M	S
80+500 to 81+000 R		A B C	Y	N	N	L	M	S	Y	N	0.6	1723	UR	1727	UR	
Comments																
81+000 to 81+500 R		A B C	Y	N	N	L	M	S	Y	N	1.0	1749	UR	1752	UR	
Comments																
81+500 to 82+000 R		A B C	Y	N	N	L	M	S	Y	N	1.3	1756	UR	1758	UR	
Comments																

- (1) Depth of Contamination (A) Groundwater (B) Confining Layer (C)
- (2) None (N), Light (L), Moderate (M), Strong (S)
- (3) PID readings in ppm above background  
ND = No Detection

Project Name: Marshall Line 68 MP508 Pipeline Release

Date: 9/12/16  
 Completed By: Roger Beck

Project Number: 22131003

Creek Section	Photo ID	Method Used to Indicate Vertical Limit <sup>1</sup>	Free Phase Oil Observed	Odor <sup>2</sup>	Shreen Test Rainbow Shreen Observed	Headspace <sup>3</sup> ppm	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)	Backfill Approval	
											EPA	Enbridge
82-104-0 82508		(A) B C	Y N	N L M S	Y N	0.7	1815	MR		MR		
Comments: Narrow excavation - TP will also be OP												
to												
Comments												
to												
Comments												

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