

US EPA ARCHIVE DOCUMENT

**Enbridge Line 6B MP 608 Pipeline Release
Marshall, Michigan
Source Contamination Removal and Verification Summary Report
Talmadge Creek Section 10
Stationing 95+00L to 105+00L and 92+00R to 101+50R**

US EPA ARCHIVE DOCUMENT

**Enbridge Energy
September 25, 2010**

Talmadge Creek Source Contamination Removal and Verification Summary Report

Section 10 of 10 – Stationing (95+00L to 105+00L) and (92+00R to 101+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 10 of 10 (Stationing left bank of Talmadge Creek: 95+00L to 105+00L and Stationing right bank of Talmadge Creek: 92+00R to 101+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 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 10 as described in the table below.

Section Number	Stationing
10	Left Bank: 95+00L to 105+00L Right Bank: 92+00R to 101+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 4105 - 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;
- 1,10,5-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 11021-5-10-001) pursuant to §1011(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 4105 (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

Talmadge Creek Source Contamination Removal and Verification Summary Table: Section 10

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	10	95+00L - 95+50L	L	A	N	N	N	109	9/14/2010	1653	Y	9/14/2010	1653	Y
B4	10	95+50L - 96+00L	L	A	NR*	NR	NR*	9.7	9/14/2010	1654	Y	9/14/2010	1654	Y
B4	10	96+00L - 96+50L	L	A	N	N	N	83.5	9/14/2010	1648	Y	9/14/2010	1648	Y
B4	10	96+50L - 97+00L	L	A	N	N	N	78.5	9/14/2010	1643	Y	9/14/2010	1643	Y
B4	10	97+00L - 97+50L	L	A	N	N	N	NR	9/14/2010	1049	Y	9/14/2010	1049	Y
B4	10	97+50L - 98+00L	L	A	N	N	N	NR	9/14/2010	1046	Y	9/14/2010	1046	Y
B4	10	98+00L - 98+50L	L	A	N	N	N	NR	9/14/2010	1036	Y	9/14/2010	1036	Y
B4	10	98+50L - 99+00L	L	A	N	N	N	NR	9/14/2010	1022	Y	9/14/2010	1022	Y
B4	10	99+00L - 99+50L	L	A	N	N	N	NR	9/14/2010	1629	Y	9/14/2010	1629	Y
B4	10	99+50L - 100+00L	L	A	N	NR	N	NR	9/14/2010	1010	Y	9/14/2010	1010	Y
B4	10	100+00L - 100+50L	L	A	NR*	NR	NR*	0.0	9/13/2010	1319	Y	9/13/2010	1319	Y
B4	10	100+50L - 101+00L	L	A	N	N	N	NR	9/14/2010	1619	Y	9/14/2010	1619	Y
B4	10	101+00L - 101+50L	L	A	N	N	N	0.0	9/13/2010	1112	Y	9/13/2010	1120	Y
B4	10	101+50L - 102+00L	L	A	N	N	N	0.6	9/13/2010	1052	Y	9/13/2010	1055	N
B4	10	102+00L - 102+50L	L	A	N	N	N	0.0	9/13/2010	1046	Y	9/13/2010	1046	Y
B4	10	102+50L - 103+00L	L	A	N	N	N	0.0	9/13/2010	1035	Y	9/13/2010	1041	Y
B4	10	103+00L - 103+50L	L	A	N	N	N	0.3	9/17/2010	1520	Y	9/17/2010	NR	Y
B4	10	103+50L - 104+00L	L	A	N	N	N	1.6	9/17/2010	1400	Y	9/17/2010	NR	Y
B4	10	104+00L - 104+50L	L	B	NA	NA	NA	NA	NA	NA	NA	9/20/2010	NR	Y
B4	10	104+50L - 105+00L	L	NR	N	Y	Y*	10.7	9/17/2010	NR	Y	9/21/2010	1315	Y

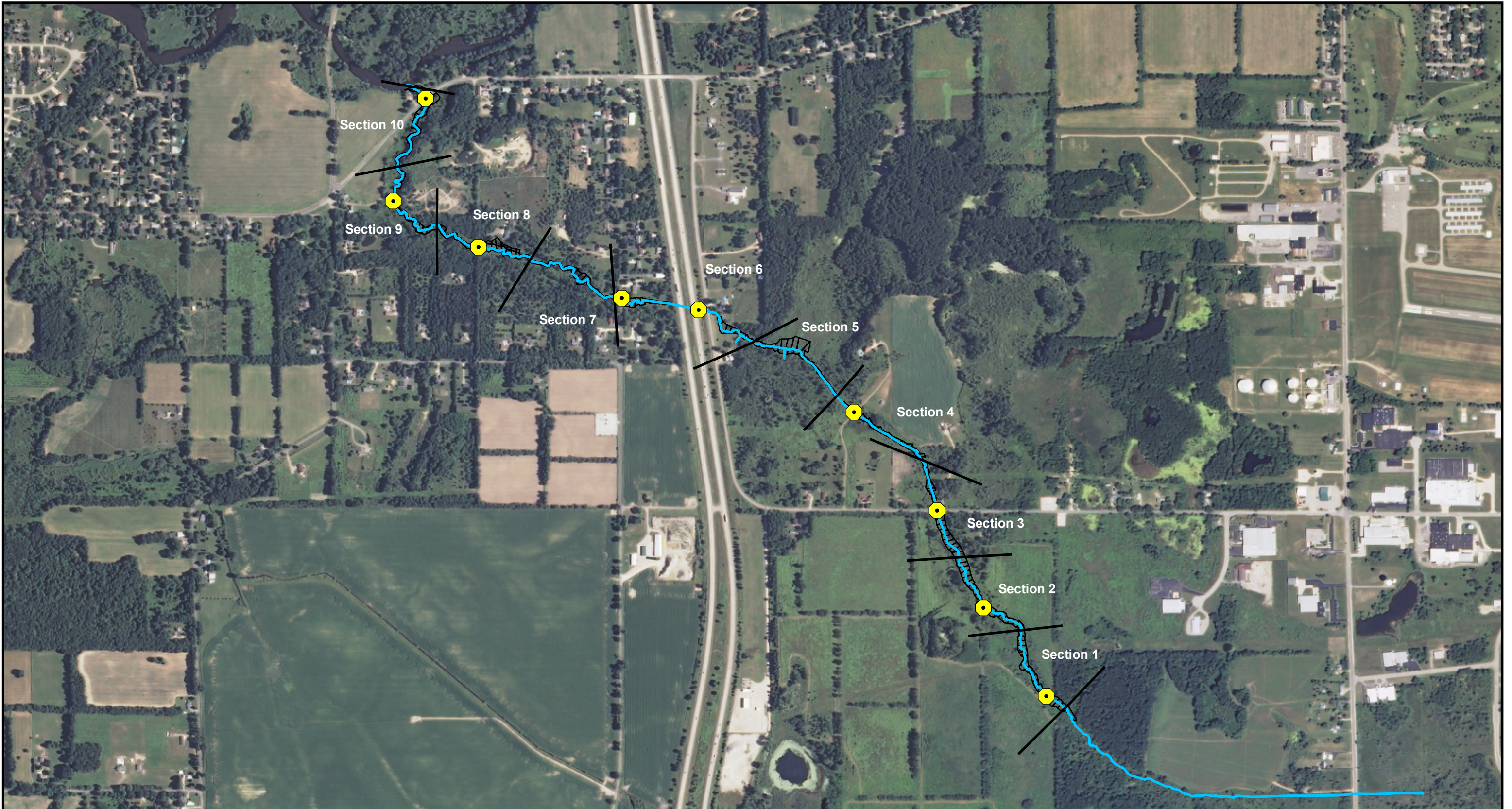
Talmadge Creek Source Contamination Removal and Verification Summary Table: Section 10

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	10	92+00R - 92+50R	R	A	NR*	NR	NR*	NR	9/14/2010	1141	Y	9/14/2010	1141	Y
B4	10	92+50R - 93+00R	R	A	N	N	N	NR	9/14/2010	1133	Y	9/14/2010	1133	Y
B4	10	93+00R - 93+50R	R	A	N	N	N	NR	9/14/2010	1127	Y	9/14/2010	1127	Y
B4	10	93+50R - 94+00R	R	A	N	N	N	0.0	9/13/2010	1730	Y	9/13/2010	1730	Y
B4	10	94+00R - 94+50R	R	A	N	N	N	9.5	9/13/2010	1746	Y	9/13/2010	1746	Y
B4	10	94+50R - 95+00R	R	A	N	N	N	0.0	9/13/2010	1803	Y	9/13/2010	1803	Y
B4	10	95+00R - 95+50R	R	A	N	N	N	0.0	9/13/2010	1811	Y	9/13/2010	1811	Y
B4	10	95+50R - 96+00R	R	A	N	N	N	0.0	9/13/2010	1824	Y	9/13/2010	1824	Y
B4	10	96+00R - 96+50R	R	A	N	N	N	0.0	9/13/2010	1837	Y	9/13/2010	1837	Y
B4	10	96+50R - 97+00R	R	A	N	N	N	NR	9/14/2010	0951	Y	9/14/2010	1001	Y
B4	10	97+00R - 97+50R	R	A	N	N	N	NR	9/14/2010	0929	Y	9/14/2010	0933	Y
B4	10	97+50R - 98+00R	R	A	N	N	N	NR	9/14/2010	0924	Y	9/14/2010	0927	Y
B4	10	98+00R - 98+50R	R	A	N	N	N	NR	9/14/2010	0921	Y	9/14/2010	0921	Y
B4	10	98+50R - 99+00R	R	A	N	N	N	NR	9/14/2010	0845	Y	9/14/2010	0845	Y
B4	10	99+00R - 99+50R	R	B	N	N	N	1.4	NA	NA	NA	9/19/2010	1300	Y
B4	10	99+50R - 100+00R	R	Special Condition EPA Approval								9/21/2010	NR	Y
B4	10	100+00R - 100+50R	R	B	NA	NA	NA	NA	NA	NA	NA	9/21/2010	1830	Y
B4	10	100+50R - 101+00R	R	A	N	N	N	0.0	9/17/2010	1500	Y	9/17/2010	1500	Y
B4	10	101+00R - 101+50R	R	A	N	N	N	0.3	9/17/2010	1455	Y	9/17/2010	1455	Y
B5	10	Not Stationed See Figure 2	R	Special Condition EPA Approval								9/18/2010	1840	Y

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 – 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.
- EPA Approval

Figures



0 500 1,000 Feet

Legend




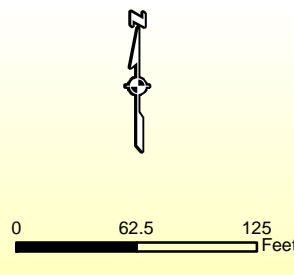
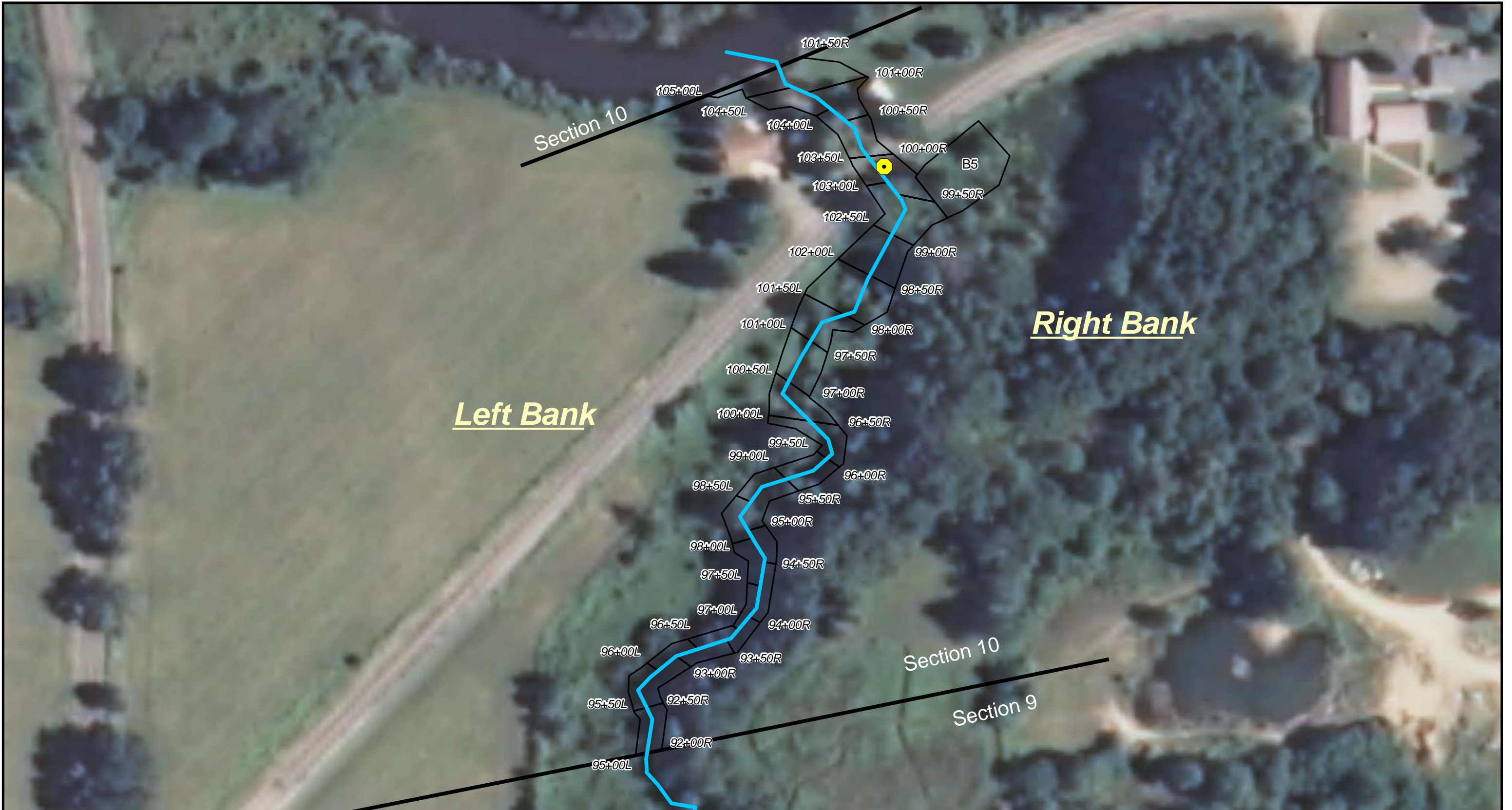
-  Culverts
-  Section Lines
-  Talmadge Creek

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

SEPTEMBER, 2010



- Legend**
- Culverts
 - Talmadge Creek
 - Section Lines
 - Environmental Clearance Areas
- 01+00L

SEPTEMBER, 2010

FIGURE 2
SECTION 10 STATION LOCATIONS
TALMADGE CREEK
LINE 6B MP 608
MARSHALL, MICHIGAN

Field Photographs

Field Photographs – Section 10



95+00L – 95+50L: Looking upstream (September 14, 2010)



95+50L – 96+00L: Looking upstream (September 14, 2010)

Field Photographs – Section 10



96+00L – 96+50L: Looking upstream (September 14, 2010)



96+50L – 97+00L: Looking downstream (September 14, 2010)

Field Photographs – Section 10



97+00L – 97+50L: Looking toward Talmadge Creek (September 14, 2010)



97+50L – 98+00L: Looking toward Talmadge Creek (September 14, 2010)

Field Photographs – Section 10



98+00L – 98+50L: Looking downstream (September 23, 2010)



98+50L – 99+00L: Looking downstream (September 14, 2010)

Field Photographs – Section 10



99+00L – 99+50L: Looking downstream (September 14, 2010)



99+50L – 100+00L: Looking downstream (September 14, 2010)

Field Photographs – Section 10



100+00L – 100+50L: Looking upstream (September 14, 2010)



100+50L – 101+00L: Looking upstream (September 22, 2010)

Field Photographs – Section 10



101+00L – 101+50L: Looking downstream (September 22, 2010)



101+50L – 102+00L: Looking toward Talmadge Creek (September 22, 2010)

Field Photographs – Section 10



102+00L – 102+50L: Looking upstream (September 23, 2010)



102+50L – 103+00L: Looking upstream (September 22, 2010)

Field Photographs – Section 10



103+00L – 103+50L: Looking from Talmadge Creek (September 22, 2010)



103+50L – 104+00L: Looking across Talmadge Creek (September 22, 2010)

Field Photographs – Section 10



104+00L – 104+50L: Looking across Talmadge Creek (September 22, 2010)



104+50L – 105+00L: Looking downstream toward Kalamazoo River (visible in background)
(September 22, 2010)

Field Photographs – Section 10



92+00R – 92+50R: Looking across Talmadge Creek (September 14, 2010)



92+50R – 93+00R: Looking across Talmadge Creek (September 14, 2010)

Field Photographs – Section 10



93+00R – 93+50R: Looking upstream across Talmadge Creek (September 14, 2010)



93+50R – 94+00R: Looking upstream (September 13, 2010)

Field Photographs – Section 10

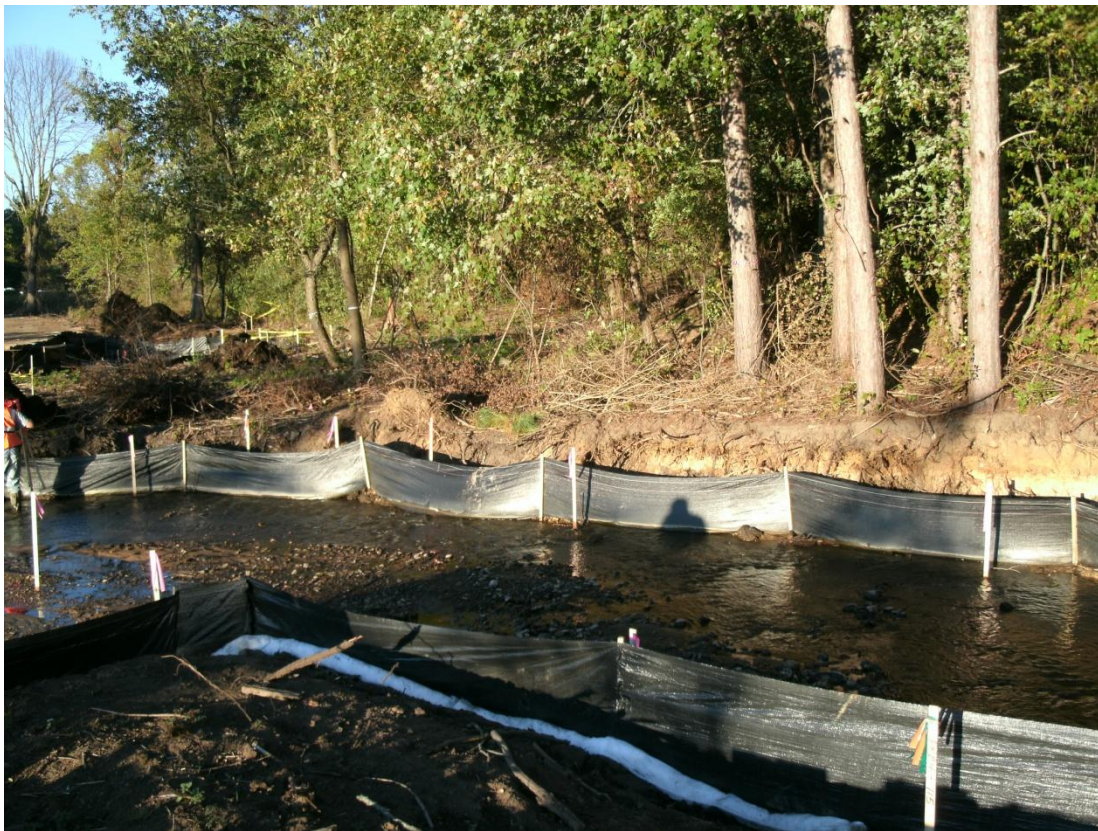


94+00R – 94+50R: Looking downstream (September 13, 2010)



94+50R – 95+00R Looking downstream (September 13, 2010)

Field Photographs – Section 10



95+00R – 95+50R: Looking downstream from across Talmadge Creek (September 13, 2010)

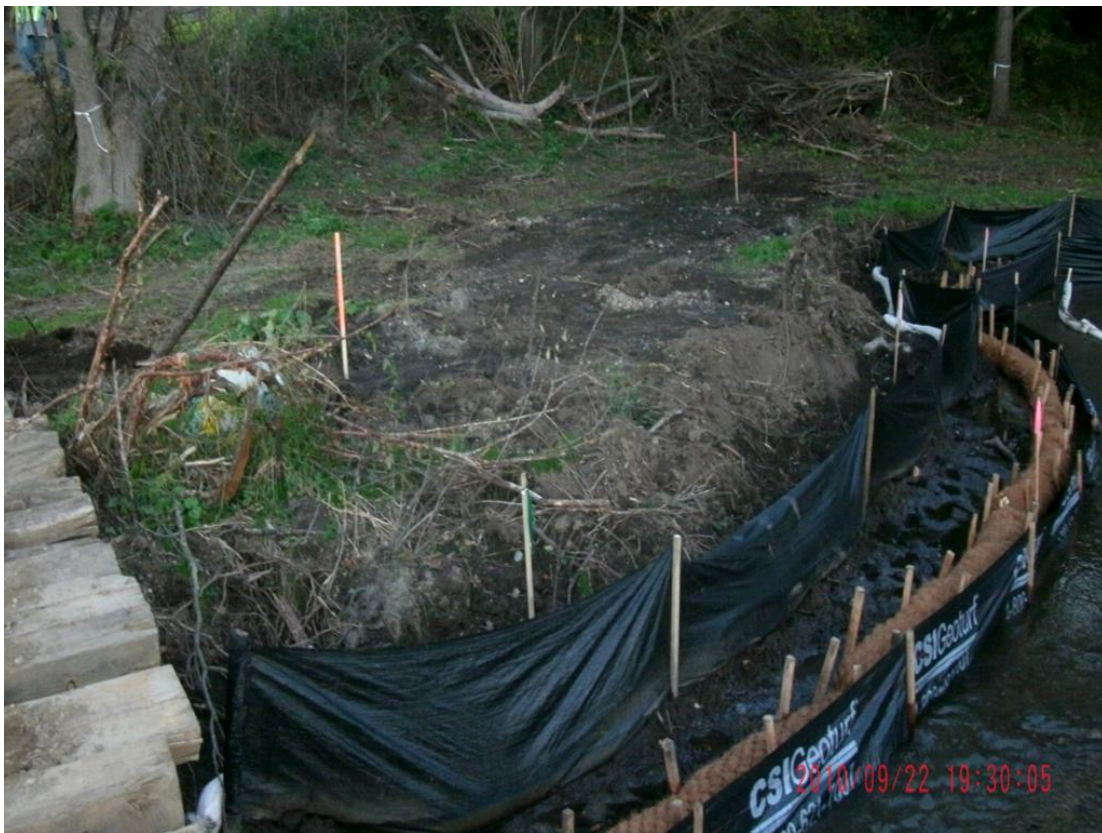


95+50R – 96+00R: Looking from across Talmadge Creek (September 13, 2010)

Field Photographs – Section 10



96+00R – 96+50R: Looking from across Talmadge Creek (September 13, 2010)



96+50R – 97+00R: Looking upstream (September 22, 2010)

Field Photographs – Section 10



97+00R – 97+50R: Looking toward Talmadge Creek (September 22, 2010)



97+50R – 98+00R: Looking downstream (September 23, 2010)

Field Photographs – Section 10



98+00R – 98+50R: Looking downstream (September 14, 2010)



98+50R - 99+00R: Looking upstream from across Talmadge Creek (September 14, 2010)

Field Photographs – Section 10



99+00R – 99+50R: Looking upstream (September 22, 2010)



99+50R – 100+00R: Looking upstream with A Drive North visible in background (September 23, 2010)

Field Photographs – Section 10



100+00R – 100+50R: Looking from Talmadge Creek (September 21, 2010)



100+50R – 101+00R: Looking downstream toward the Kalamazoo River (September 22, 2010)

Field Photographs – Section 10



101+00R – 101+50R: Looking downstream across Talmadge Creek toward the Kalamazoo River (September 22, 2010)

Field Notes

Project Name: Marshall Line 58 MP608 Pipeline Release
 Date: 9/14/10
 Project Number: 22131003
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ¹	Free Phase Oil Observed	odor ²			Sheen Test Rainbow Sheen Observed	Headspace ³ 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	M							S	EPA
95700 to 95750		(A) P C	Y	(N)	(N)	(L)	(M)	(S)	1653	MPD		1001 9-17-10 MPD		
Comments: <u>Narrow undisturbed area. Mini excavator used to excavate test pit. TP will also be O.P. FILED 9/19/10 CJS</u>														
94750 to 95700		(A) B C	Y	(N)	(N)	(L)	(M)	(S)	1729	APD		9451 9-17-10 MPD		
Comments: <u>NARROW EXCAVATION AREA - MINI USED TO PROTECT SILT FENCE TP ALSO O.P. FILED 9/19/10 CJS</u>														
91750 to 92700		(A) B C	Y	(N)	(N)	(L)	(M)	(S)	1725	APD		9174 9-17-10 MPD		
Comments: <u>TO LEAVE ROOM FOR MINI TO GET BPA TP ALSO O.P. FILED CJS 9/19/10</u>														

- (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 MIP608 Pipeline Release
 Project Number: 22131003

Date: 9/14/10
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ⁽¹⁾	Free Phase Oil Observed	Odor ²			Sheen Test Rainbow Sheen Observed	Headspace ³ 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	M							S	EPA
96+00 L to 97+00 L		A B C	Y (N)	N	L	M	S	78.5	1643	MR				
Comments: <u>Narrow undisturbed area</u>														
98+00 L to 98+50 L		A B C	Y (N)	N	L	M	S	23.5	1648	MR				
Comments: <u>Narrow FILLED 9/14/10 CJS</u>														
95+50 L to 96+00 L		A B C	Y (N)	N	L	M	S	9.7	1654	MR				
Comments: <u>Narrow FILLED 9/14/10 CJS</u>														

(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: 9/14/10
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ^a	Free Phase Oil Observed	Odor ^b	Shreen Test Rainbow Shreen Observed	Headspace ^c 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
97800L 100 978100L		A B C	Y (N)	(N) L M S	Y (N)		1036		1036	MRS 9-17-10 1036		MR
Comments: <u>Narrow undisturbed area. TP will also be OP.</u>												
97700L 100 977100L		A B C	Y (N)	(N) L M S	Y (N)		1046		1046	MRS 9-17-10 1046		MR
Comments: <u>Narrow undisturbed area. TP will also be OP.</u>												
97700L 100 977100L		A B C	Y (N)	(N) L M S	Y (N)		1049		1049	MRS 9-17-10 1049		MR
Comments: <u>Narrow undisturbed area. TP will also be OP.</u>												

(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
 Date: 9/14/10
 Project Number: 22131003
 Completed By: Page Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ²	Free Phase Oil Observed	Odor ²	Sheen Test Rainbow Sheen Observed	Headspace ³ 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
160+50 L to 161+00 L		(A) C	Y N	(N) L M S	Y (N)		1619	Mud	1619	Mud	10/23 9-17-10 MR	
Comments Note: narrow excavator area. mini excavator used to dig test pit to probe silt fence. TP will also be OP.												
99+00 L to 99+50 L		(A) B C	Y N	(N) L M S	Y (N)		1629	Mud	1629	Mud	10/26 9-17-10 MR	
Comments Note: location directly under road - narrow undisturbed area. TP will also be OP.												
98+50 L to 99+00 L		(A) B C	Y N	(N) L M S	Y (N)		1022	Mud	1022	Mud	10-24-10 9-17-10 MR	
Comments Note: narrow undisturbed area. 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 residues in ppm above background
 ND = No Detection

Project Name: Marshall Line 6B MP608 Pipeline Release

Project Number: 2213-003

Date: 9/19/10
 Completed By: Roger Beck

Creek Section	Photo ID	Methods Used to Indicate Vertical Limit ²	Free Phase Oil Observed	Odor ²	Sheen Test Rainbow Sheen Observed	Headspace ³ ppm	Time of Test Pft	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	Enterfidge
97+00R to 97+50R		(A) B C	Y (N)	(N) M S	Y (N)		0929	[Signature]	0933	[Signature]		
97+50R to 97+00R		(A) B C	Y (N)	(N) L M S	Y (N)		0931	[Signature]	1001	[Signature]		
97+00R to 97+50R		(A) B C	Y (N)	(N) L M S	Y (N)		1010	[Signature]	1010	[Signature]		

Comments: Narrow undisturbed area. TP will also be O.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 68 MP608 Pipeline Release
 Project Number: 22131003
 Date: 9/13/10
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ¹	Free Phase Oil Observed	Odor ²			Sheen Test Rainbow Sheen Observed	Headspace ³ 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							EPA	Embridge	
101+50 to 101+50L		A	Y	N	N	N	Y	0.0	1172	NR	1120	NR	1041	9-17-10	NR
100+50 to 100+50L		A	Y	N	N	N	Y	0.0	1319	NR	1319	NR	NR	NR	NR
Comments: <u>Narrow excavation TP will be OP</u>															
84+50 to 85+00R		A	Y	N	N	N	Y	0.0	1354	NR	1358	NR	NR	NR	NR
Comments: <u>9-16-10 OP - free product. 1144</u> <u>9-19-10-OP - free product visible - 11:22 - 2:00 PM</u>															

- (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
NO = No Detection

Project Name: Marshall Line 6B MPE08 Pipeline Release
 Project Number: 72131003

Date: 9/13/10
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ¹	Free Phase Oil Observed	Odor ²	Sheen Test Reinbow Sheen Observed	Headspace ³ 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
102+50 L to 103+00 L		(A) C	Y (N)	(N) L M S	Y (N)	0.0	1035	MR	1041	MR	1048 9-17-10 MR	
102+50 L to 102+55 L		(A) B C	Y (N)	(N) L M S	Y (N)	0.0	1046	MR	1046	MR	1048 9-17-10 MR	
Comments: Narrow spot excavation area between creek and new road. TP will also be o.p.												
102+50 L to 102+55 L		(A) C	Y (N)	(N) L M S	Y (N)	0.6	1057	MR	1055	MR	1058 9-17-10 MR	
Comments: 9/17/10 - OP Freeproduct 1044 Remove oil, suck down, apply fabric to mat road side, backfill												

(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

Site Name: Marshall Line 68 MP608 Pipelining Release

Site Number: 22131003

Date: 9-19-18
Completed By: Peter Stephen
Creek Section: 1011506 to 10200

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 (if Applicable)	Observations and Time	Time of Trench Excavation	48-hour Follow-up Inspection (if Applicable)	Observations and Time	EPA	Backfill Approval	Eubridge
		A	C	Y	N	Y	N	L	M	S										

- Area failed observation 48 hr test visible FP
 1400 - Youngs begins dewatering ab. pit + exc. area
 1415 - completes vac work, being excavating to 6" below gw
 1615 - completes exc. activities

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

Project Name: Marshall Line 68 MP608 Pipeline Release Creek Section
 Project Number: 2213-1003 103902 to 103504
 Date: 9-17-10
 Completed By: Peter Stephens

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 (If Applicable)	Observations and Time	Time of Trench Excavation	48-hour Follow-up Inspection (If Applicable)	Backfill Approval	Enbridge
T-1003	1524	Y	N	N	N	0.3	15:00	13:55	9-17-10				
<p>1510 - colled soil to be used for sheen test. - test shows no sheen, FP, or odor</p> <p>1520 complete test pit</p> <p>9/19/10 - 1611 - Free Product! 9/21/10 Borm will be installed (day) EPA does not anticipate requiring additional digging Eric Pauli requested deeper excavation occur on 9/21/10 @ 1800</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

Project Name: Marshall Line 6B MP608 Pipeline Release

Project Number: 22131003

Date: 9-17-10
 Completed By: Peter Stephens
 Creek Section: 103501 to 104001

Photo ID	Method Used to Indicate Vertical Limit	Photo ID	Free Phase Oil Observed	Odor	Shine 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	EPA	Backfill Approval	Enbridge
	A B C	1402	Y	(N) (M) (S)	Y	(N)	1.6	14:00	MLG 2-10-10		MS	1413	7-19-10	MR	

Notes:
 1354 - collected soil for sheen test
 - test comes back w/ no odor, FP, or sheen
 1355 - Begin digging
 1402 - Complete test pit, pile sand bags around hole
 - Take photo

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

Name: Marshall Line 6B MP608 Pipeline Release

Number: 22131003

Date: 9-20-10

Creek Section

Completed By: Peter Stephens

1047-001 to 1047-500

oto ID	Method Used to Indicate Vertical Limit ¹	Photo ID	Free Phase Oil Observed		Odor ²		Sheen Test Rainbow Sheen Observed		Headspace ³ 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
			Y	N	N	I	M	S					Y	N	

0815 - begin hand digging to loosen soil, Area fail 48 hr test pit
 * Add silt fence + clay berm to prevent river from flowing into exc.

1045 - Vac truck is not working, taking way too long. Get a loader in to load soils into w/ mini exc.

1445 - get tree on river left just before conu. w/ Kalamazoo river ~~etc removed~~
 load out + begin digging again
 - digging area to 6" below GW + wherever we see FP

- continue digging towards K200 river into 1047-500 -> 1047-001

(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 MPE08 Pipeline Release Creek Section

Project Number: 22131003 Date: 9-17-10

Completed By: Peter Stephens 104506 to 104506L

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 (If Applicable)	Observations and Time	Time of Trench Excavation	48-hour Follow-up Inspection (If Applicable)	Observations and Time	EPA	Enbridge	Backfill Approval
1408	B/C	1415	Y	(N)	Y	2.4	1410								
Notes: 1408 - collect soil for sheen test															
1405 - start test job															
1410 - complete ob/test pit. tape off, sand bag															
- take photo															
9/18/10 - Free product!															

- (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

Project Number: 22131003 Date: 9-17-10

Completed By: Peter Stephens Backfill Approval: 10450L to 10500L

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 (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		Y	N	N	10.7	-	<i>[Signature]</i>		9/21/10			104+0	104+50
Notes: 1415 collect soil for sheen test														
<p>(1) silt fence in rainbow sheening + odor noted.</p> <p>(2) Pump, and backfill per EPA 9/21/10 @ 12:10 REMOVE berm leaving 2' trench = observation trench</p> <p>(3) side silt observation pit with fabric, the backfill</p> <p>(4) Left in place for 48 hrs after backfilling</p> <p>(5) Meeting with Adam from Enbridge & Dennis from EPA, John from Weston</p> <p>(6) if oil observed again, remove oil, pump down, excavate further</p> <p>(7) Remove berm and contaminated soil</p> <p>(8) Completely backfill observation pit / entire disturbed area</p> <p>(9) Sign off WITH EPA <i>[Signature]</i></p> <p>★ No 48 hour observation trench will be installed.</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
 Project Number: 27131003

Date: 9/14/10
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ²	Free Phase Oil Observed	Odor ²			Sheen Test Rainbow Sheen Observed	Headspace ³ 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							EPA	Enbridge
93+00 to 93+50R		A B C	Y	N	N	L	M	S	1127	MWD		1138 9-17-10 MK		
Comments: <u>Narrow undisturbed area across creek from rd road. TP will also be OP.</u>														
97+00 to 97+50R		A B C	Y	N	N	L	M	S	1133	MWD		1141 9-17-10 MK		
Comments: <u>Undisturbed area across creek - access for only one test pit. TP will also be OP</u>														
97+00 to 97+50R		A B C	Y	N	N	L	M	S	1141	MWD		1141 9-17-10 MK		
Comments: <u>Undisturbed area across creek - access for only one test pit. TP will also be OP</u>														

- (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: 9/13/10
 Completed By: Roger Bech

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ^a	Free Phase Oil Observed	Color ^b	Sheen Test Rainbow Sheen Observed	Headspace ^c ppm	Time of Test Pit	6-hour Follow-up Inspection Observations and Time (If Applicable)	Time of Trench Excavation	Backfill Approval	
										EPA	Embridge
94+50 to 94+50R		A B C	Y N	N L M S	Y N	0.0	1730	Dis Method			
<p>Comments Note: Pooled trachabee bucket in bub mud filled up hole. No visible impact. Staked location. Status of hole digging effort OK'd by Eric Palfi of Weston. Location is narrow excavation across creek - no access for test pit.</p>											
94+50 to 94+50R		A B C	Y N	N L M S	Y N	9.5	1746	Dis Method			
<p>Comments Hole with water - wedge shaped that is location is narrow excavation across creek - no access for test pit.</p>											
94+50 to 94+50R		A B C	Y N	N L M S	Y N	0.0	1803	Dis Method			
<p>Comments Wedge shaped hole with water. Location is narrow excavation across creek - no access for test pit.</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
 Project Number: 22131003

Date: 9/13/10
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ¹	Free Phase Oil Observed	Odor ²	Sheen Test Rainbow Sheen Observed	Headspace ³ 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
95+50.10 to 95+50.12		A B C	Y (N)	(N) M S	Y (N)	0.0	1811	MD 9-17-10 MR				
Comments: Test pit across creek - access for only one test pit. TP will also be OP.												
95+50.10 to 96+00.4		A B C	Y (N)	(N) M S	Y (N)	0.0	1824	MD 9-17-10 MR				
Comments: Station across creek - access for only one test pit. TP will also be OP.												
96+00.10 to 96+50.1		A B C	Y (N)	(N) L M S	Y (N)	0.0	1837	MD 9-17-10 MR				
Comments: Station across creek - access for only one test pit. TP will also be OP.												

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

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

Date: 9/14/10
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Instrate Vertical Limit ²	Free Phase Oil Observed	Odor ²			Sheen Test Rainbow Sheen Observed	Headspace ³ 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)	(M)							(S)	EPA
97+00R to 97+50R		(A) B C	Y (N)	(N)	(M)	(S)	Y (N)	0929	<i>[Signature]</i>	0933	<i>[Signature]</i>			
97+50R to 97+00R		(A) B C	Y (N)	(N)	(M)	(S)	Y (N)	0951	<i>[Signature]</i>	1001	<i>[Signature]</i>			
97+00R to 97+50R		(A) B C	Y (N)	(N)	(M)	(S)	Y (N)	1010	<i>[Signature]</i>		<i>[Signature]</i>			

Comments: Narrow undisturbed area. TP will also be O.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

Project Name: Marshall Line 68 MP608 Pipeline Release
 Date: 9/14/10
 Project Number: 22131003
 Completed By: Roger Beck

Creek Section	Photo ID	Method Used to Indicate Vertical Limit ¹	Free Phase Oil Observed	Odor ²	Sheen Test Rainbow Sheen Observed	Headspace ³ 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
98+50 to 99+00	012	(A) B C	Y (N)	(N) L M S	Y (N)	0845	MD	MD		MD 9/17/10		
Comments: <u>Narrow undisturbed area. TP will also be O.P.</u>												
98+50 to 98+50		(A) B C	Y (N)	(N) L M S	Y (N)	0845	MD	MD		MD 9/17/10		
Comments: <u>Narrow undisturbed area. TP will also be O.P.</u>												
97+50 to 98+00		(A) B C	Y (N)	(N) L M S	Y (N)	0924	MD	MD		MD 9/17/10		
Comments: <u>Narrow undisturbed area. TP will also be O.P.</u>												

- (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

hole 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 (if Applicable)	Observations and Time	Time of Trench Excavation	48-hour Follow-up Inspection (if Applicable)		Sedfill Approval
											EPA	Enbridge	
0730	A/C		Y	N	Y	N	1.4					JM	

0730 - waiting on Weslin + Barr, Brian T (Enbridge) indicates he wants us to scrape out cont. soil + shingle at base of sand bays then get out pit + dig. Full Bach said bays + prep area

0830 - Barr visits ~~construct sheen test~~ notice FP once we do an initial scrape - continue scraping + finding pocket of FP will vac out cont. water + then berm up along creek. will continue chasing FP towards A Drive.

0915 begin vacing Sheen off of water where berm will go, meet w/ Adam E + Brian T to discuss plans. Decide to continue chasing cont. across berm + then move across A drive to exc. failed areas.

1020 go ~~more~~ more bucket widths towards A Drive + called a sample for sheen test ~~then~~ sheen test -> no sheen, product or odor. Begin berming up area adjacent to creek so we can dig down 6" below gw. Install silt fence between berm + creek.

1300 Begin exc. area down to 6" below GW

1355 - completes exc. let Brian (AECOM) know we are ready for backfill

EPA signed off for 48 hr observation from BS 99+0 to 99+500

- (1) Depth of Contamination (A) 10250 - 10300L - T=0m
- (2) Groundwater (B) 10200 10250 - T=500 ppm
- (3) Confining Layer (C) 10150 10200 - ob tailed
- PID readings in ppm above background
- ND = No Detection

Project Name: Marshall Line 68 MP608 Pipeline Release

Date: _____

Creek Section

M1+50R to 1D0+0R

Project Number: 22131003

Completed By: _____

Photo ID	Method Used to Indicate Vertical Limit	Free Phase Oil Observed			Odor	Shim Test Rainbow Shim 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)	Best/M Approval		
		A	B	C		N	L	M	S						Y	N	EPA

Notes:
9/21/10
Road segment centre segment under road
Guidance approved per roadway delineation procedure *[Signature]*

- (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 Pipelining Release

Date: 9-21-10

Creek Section

Project Number: Z2131003

Completed By: Peter Stephens 1001448 R to 1001501 R

Photo ID	Method Used to Indicate Vertical Limit ¹	Photo ID	Free Phase Oil Observed	Odor ²	Shear Test (Rainbow Shear) Observed	Headspace ³ ppm	Time of Test Pit	6-hour Follow-up Inspection Observations and Time (if Applicable)	Time of Trench Excavation	42-hour Follow-up Inspection Observations and Time (if Applicable)	Enbridge
	①										

NOTE: - begin exc activities, area failed initial shear test

0925 - continue finding large pockets of FP, have to remove ramp on bridge to continue digging towards 1001501.

0955 - Brian T (enbridge) asks us to stop work + more work upstream to work in the area where new mat road is being layed.

9/21 Dig to B

Dig out visib. contamination
 Leave Berm in place
 Backfill completely

French excavated @ 1045 on 9/21 to be per Enbridge + Tom Peterson from Enbridge

Observation french dug @ dunnis from EPA request 24 hr observation french complete on 9/21 @ 1830

No R covered observed @ 9/22/10 9:38 AM

(1) Depth of Contamination (A)
 Groundwater (B)
 Confined 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

Project Number:

22131003

Date: 9-17-10

Creek Section

Completed By: Peter Stephens

16100R to 10150R

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 (If Applicable)	Observations and Time	Time of Trench Excavation	48-hour Follow-up Inspection (If Applicable)	Observations and Time	Backfill Approval	Enbridge
1458	Y	N	N	1 M S Y	N	0.3	1455	1455	7-18-10		MSR	9-16-10		MR
<p>Notes: 1440 collect soil for sheen test - shows no sheen, odors, or FP will dig test pit 1455 - complete pit, stable perimeter - take photo</p>														

(1) Depth of Contamination (A)

Groundwater (B)

Confining Layer (C)

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

PID readings in ppm above background

(3) ND = No Direction

990 + 9950 Y

85 Creek Section
Pond area of
Crossing A Drive

Date: 9-19-10
Completed By: Peter Stephens

Name: Marshall Line SB MP608 Pipeline Release
Number: 22131003

Method Used to Indicate Vertical Limit	Photo ID	Free Phase Oil Observed	Odor	Sheen Test Rainbow Sheen Observed	Headspace ppm	Time of Test #1	6-hour Follow-up Inspection (If Applicable)	Observations and Time	Time of Trench Excavation	48-hour Follow-up Inspection (If Applicable)	Observations and Time	EPA	Enbridge
A/C	—	Y (N)	(N) UMS	Y (N)	8.6					9/24/10			

Collect sample per Eric (westin) Brian + Adam (Enbridge) request to start clock for EPA approval for area.

*Sheen test comes back w/ no signs of sheen, FP, or odor
Frank completed berm on 9-18-10 @ 18:40

- Dennis Matlock w/ EPA walked through on 9-18-10 w/ Brian + gave approval for the process being completed
D. Matlock

Excavation completed to B
Establish berm
40hr OP behind berm
Cul blind 99+0 + 99+5

- (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