Approval Pending

Enbridge Line 6B MP 608

Marshall, MI Pipeline Release

2012 Morrow Lake Delta and Morrow Lake Monitoring and Management Work Plan

Prepared for the United States Environmental Protection Agency

Enbridge Energy, Limited Partnership

Submitted: August 28, 2012

1.0 INTRODUCTION 1

1.1 Regulatory Framework 1

1.2 Purpose and Objective 2

2.0 2012 MORROW LAKE DELTA AND MORROW LAKE MONITORING 2

2.1 2012 Poling Activities 2

2.1.1 Procedures 2

2.2 E 4.0 Containment System 3

2.2.1 E 4.0 Containment System Monitoring 3

3.0 REFERENCES 4

FIGURES

Figure 1 2012 Morrow Lake Delta and Morrow Lake Poling Locations and E 4.0 Containment System

Figure 2 2012 Spring Submerged Oil Reassessment Flow Chart

ATTACHMENT

Attachment A E 4.0 Curtain Monitoring Log

LIST OF ACRONYMS

CWA	Clean Water Act
Enbridge	Enbridge Energy, Limited Partnership
GPS	Global Positioning System
Line 6B	The pipeline owned by Enbridge Energy, Limited Partnership that runs just south of Marshall, Michigan
MDEQ	Michigan Department of Environmental Quality
MP	Mile Post
U.S. EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This work plan has been developed upon written request on August 8, 2012 by the United States Environmental Protection Agency (U.S. EPA). The plan contains elements presented in the *Addendum to the Response Plan for Downstream Impacted Areas, August 2, 2010 (Revised August 17, 2010 per U.S. EPA August 17, 2010 letter), Supplement to Source Area Response Plan, and Supplement to Response Plan for Downstream Impacted Areas, Referred to as Operations and Maintenance Work Plan Commonly referred to as "Consolidated Work Plan from Fall 2011 through Fall 2012"* approved by the U.S. EPA on December 21, 2011 (Enbridge, 2011) for the Enbridge Energy, Limited Partnership (Enbridge) Line 6B Mile Post (MP) 608 oil release which occurred near Marshall, Michigan on July 26, 2010.

1.1 Regulatory Framework

As required by the U.S. EPA Removal Administrative Order Under Section 311(c) of the Clean Water Act (CWA), issued on July 27, 2010 to Enbridge Energy Partners, L.P., Docket Number: CWA 1321-5-10-001, all oil assessment, containment, and recovery activities will be performed in accordance with Section 311(c) of the CWA, 33 U.S.C. § 1321(c), as amended by the Oil Pollution Act of 1990 and 33 U.S.C. §2701 et seq. Paragraph 18 of the Removal Administrative Order and Paragraph 6 of the Supplement require, among other things, that Enbridge perform the following actions in response to the Line 6B release:

- Assess all oil-impacted areas and media,
- Contain all oil,
- Remediate/recover all submerged oil,
- Recover all oil sheen,
- Remediate all oil-containing soils,
- Remediate all oil-containing sediments, and
- Perform operations and maintenance activities as directed by the U.S. EPA.

In addition to the requirements cited above, all activities will be performed in accordance with all federal, state, and local regulations.

1.2 Purpose and Objective

The activities in this work plan are designed around monitoring and managing the potential movement of submerged oil into and within Morrow Lake Delta and Morrow Lake related to the Line 6B release. The objectives of the work plan are to monitor submerged oil movement and evaluate the effectiveness of the E 4.0 Containment System. Activities and monitoring tasks described herein will be performed within Morrow Lake Delta and Morrow Lake.

2.0 2012 MORROW LAKE DELTA AND MORROW LAKE MONITORING

2.1 2012 Poling Activities

Enbridge will conduct poling activities as part of the scope of work in Morrow Lake Delta and Morrow Lake at the fixed locations shown in *Figure 1*. Monitoring frequency will be once per month or after event driven river flow rates exceed 800 cubic feet per second at the Battle Creek gaging station (Station ID:04105500). The results of poling activities within Morrow Lake Delta and Morrow Lake will be used to assess the effectiveness of E 4.0 Containment System and the potential migration and distribution of additional submerged oil from Morrow Lake Delta into Morrow Lake.

2.1.1 Procedures

Poling will be performed using procedures developed and utilized during the 2012 Spring Submerged Oil Reassessment. The following poling data will be collected in accordance with the *Sediment Poling Standard Operating Procedure* submitted to U.S. EPA on May 11, 2012 (Enbridge, 2012):

- Measure water depth,
- Measure sediment, just above sediment, and surface water temperatures,
- Measure the soft sediment depth (first and second push techniques),
- Determine bed characteristics,
- Determine the presence/absence of submerged oil, and
- Collect global positioning system (GPS) coordinates.

A determination of the relative amount of submerged oil at each poling location will be made by using a pole with a 6-inch diameter disk to agitate the soft sediment. After agitation, the amount of oil/sheen observed at the water surface will be characterized using the 2012 Spring Submerged Oil

Reassessment Flow Chart shown in *Figure 2*. If "moderate" or "heavy" indications of submerged oil are observed, the area may be delineated with additional poling.

A GPS unit will be used to document the coordinates for each poling location using a differential GPS unit with sub-meter accuracy. The horizontal coordinate system will be the Michigan State Plane Coordinate System, South zone, referenced to the North American Datum 83, in international feet.

2.2 E 4.0 Containment System

The E 4.0 Containment System consists of six segments (Locations A through F) in a gate style surface containment boom along with X-TEX curtain extending from the surface boom to the bottom of the water column leaving 50% of the water column open to flow. The gate style boom allows for navigation around the boom between Morrow Lake Delta and Morrow Lake. The intended purpose of the E 4.0 Containment System is to reduce downstream migration of potential submerged and floating crude oil. The location of the E 4.0 Containment System is presented in *Figure 1*. Enbridge has secured a Michigan Department of Environmental Quality (MDEQ) Permit (# 12-39-0027-P) for the containment system.

2.2.1 E 4.0 Containment System Monitoring

The following monitoring activities will be performed on a monthly basis to monitor the effectiveness of the E 4.0 Containment System:

- Poling, and
- Turbidity measurements.

Poling data and turbidity measurements will be collected in Morrow Lake Delta along the E 4.0 Containment System where sediment curtain is present. Poling will be performed approximately 5 feet upstream of the sediment curtain and 10 to 20 feet downstream of the sediment curtain at approximate intervals of 25 feet between locations. Turbidity measurements will be collected approximately 50 feet upstream of the sediment curtain and 75 feet downstream of the sediment curtain at approximate intervals of every 25 to 50 feet.

The following monitoring activities will be performed on a daily basis to maintain the E 4.0 Containment System:

- Measure and maintain the boom and curtain,

- Measure water depth,
- Monitor the inclination of the anchor system,
- Monitor the flow rates from United States Geological Survey Battle Creek gaging station 04105500, and
- Video the sediment curtain and mud-line.

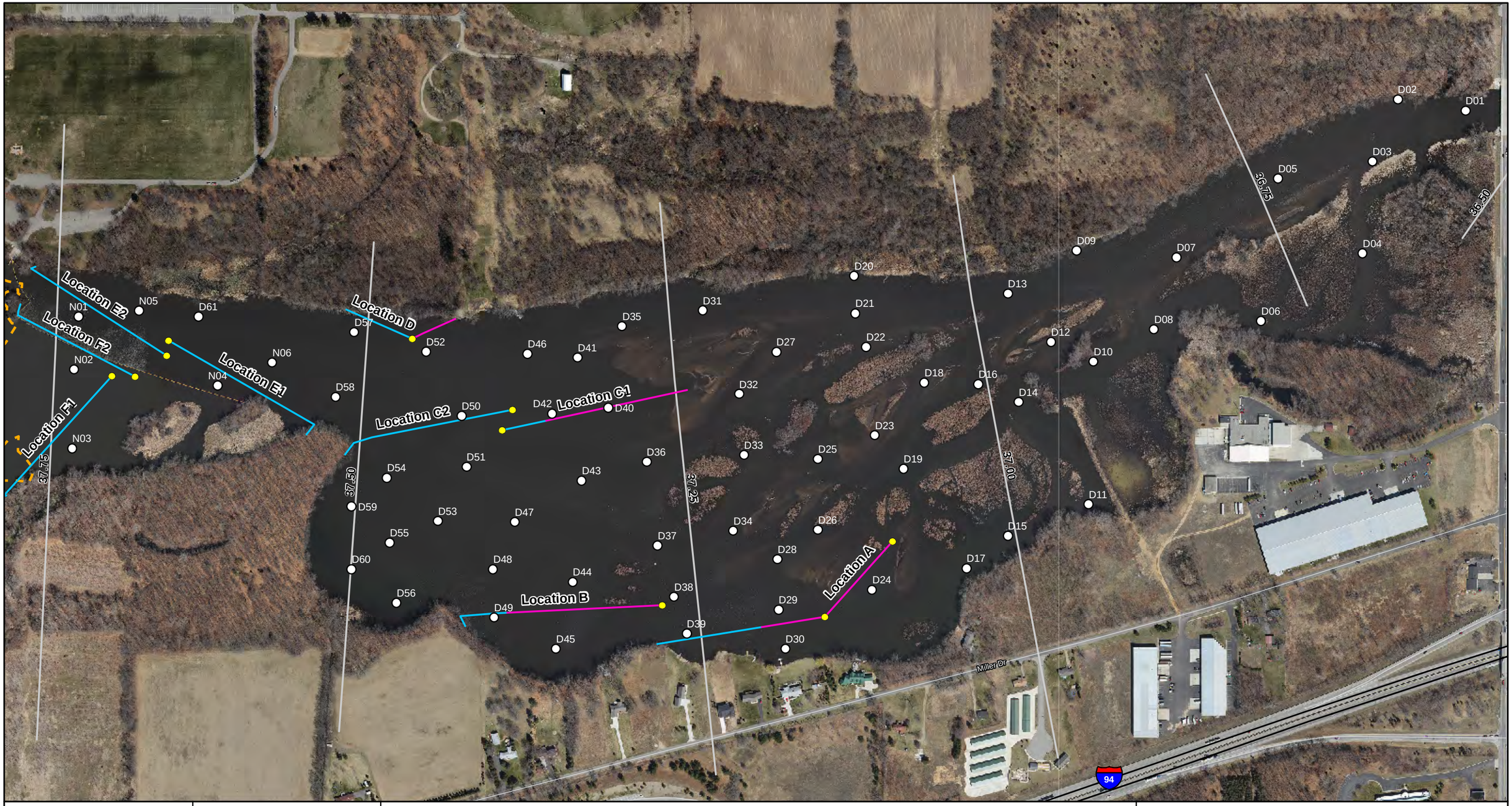
Monitoring and maintenance activities will be recorded on daily data log sheets which is included as *Attachment A*.

3.0 REFERENCES

Enbridge, 2011. Enbridge Line 6B Pipeline Release, Marshall, Michigan*; Addendum to the Response Plan for Downstream Impacted Areas, August 2, 2010 (Revised August 17, 2010 per U.S. EPA August 17, 2010 letter), Supplement to Source Area Response Plan, and Supplement to Response Plan for Downstream Impacted Areas, Referred to as Operations and Maintenance Work Plan commonly referred to as Consolidated Work Plan from Fall 2011 through Fall 2012*. December 21, 2011.

Enbridge, 2012. Enbridge Line 6B Pipeline Release, Marshall, Michigan; *Sediment Poling Standard Operating Procedure.* May 11, 2012

Figures



ENBRIDGE

Drawn:	NS	8/28/2012
Approved:	EE	8/28/2012
Project #:	60246209	

Map Location

Legend

- Poling Monitoring Location
  - D - Morrow Lake Delta
  - M - Morrow Lake
  - N - Morrow Lake Neck
- **E 4.0 Containment System**
  - X-TEX Sediment Curtain
  - No Curtain
  - Anchor Point
- Approximate Sediment Fan Area
- Quarter Mile Grid Segment

N

0 200 400 800

Scale in Feet

FIGURE 1
2012 MORROW LAKE DELTA AND MORROW LAKE
POLING LOCATIONS AND E 4.0 CONTAINMENT SYSTEM
SHEET 1 OF 2

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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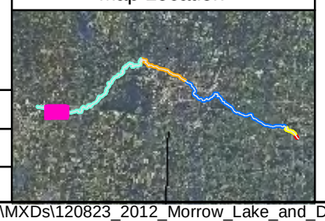
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	8/28/2012
Approved:	EE	8/28/2012
Project #:	60246209	

Map Location



Legend

- Poling Monitoring Location
  - D - Morrow Lake Delta
  - M - Morrow Lake
  - N - Morrow Lake Neck
- **E 4.0 Containment System**
  - X-TEX Sediment Curtain
  - No Curtain
  - Anchor Point
- Approximate Sediment Fan Area
- Quarter Mile Grid Segment

N

0 350 700 1,400

Scale in Feet

FIGURE 1
2012 MORROW LAKE DELTA AND MORROW LAKE
POLING LOCATIONS AND E 4.0 CONTAINMENT SYSTEM
SHEET 2 OF 2

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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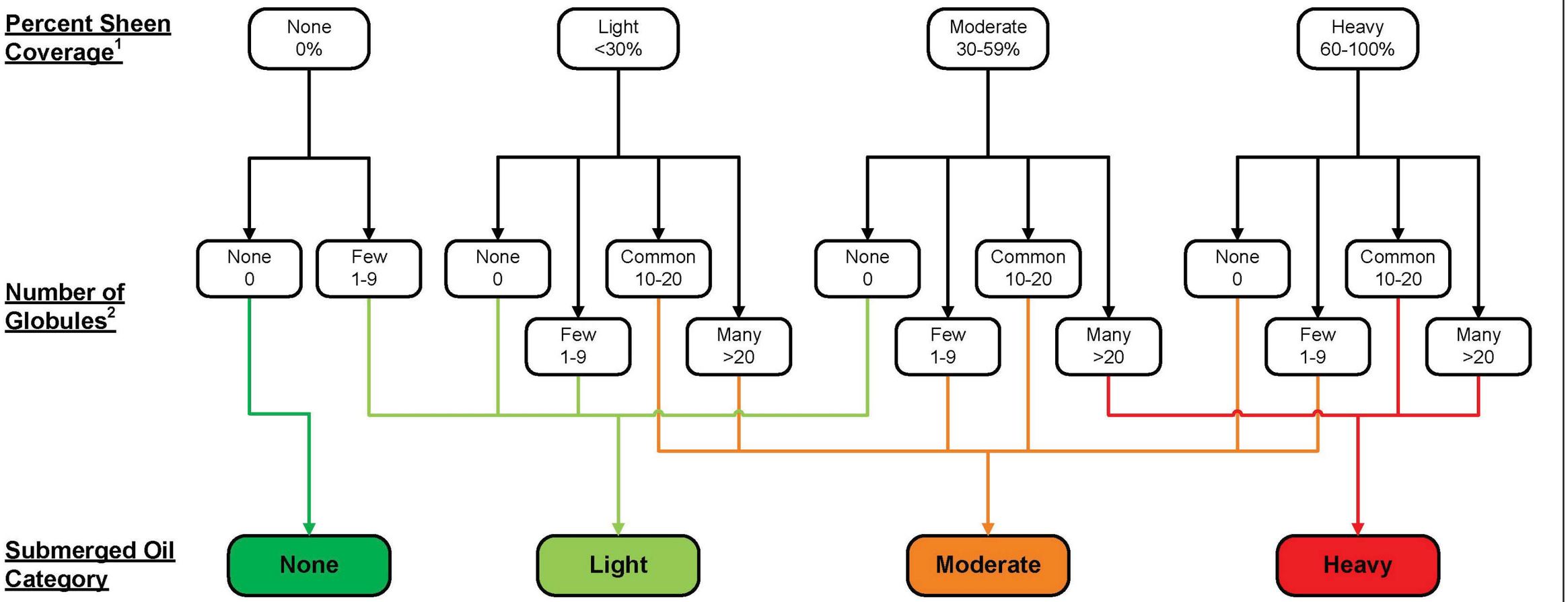
Aerial Photography Date: April 2011

Submerged Oil Field Observation Flowchart



Notes:
1. Percent coverage per square yard
2. Number of globules per square yard

ENBRIDGE Drawn: CM 4/26/2012 Approved: DBR 4/26/2012 Project #: 106-4186	1. Percent sheen coverage per square yard. 2. Number of globules per square yard. 3. Globules are balls of oil larger than 4 millimeters. Flecks are particles of oil less than 4 millimeters. 20 flecks are equal to 1 globule. % = Percent	FiGURE 2 2012 SPRING SUBMERGED OIL REASSESSMENT FLOW CHART ENBRIDGE LINE 6B MP 608 MARSHALL, MI PIPELINE RELEASE ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Attachment A

E 4.0 Curtain Monitoring Log

E 4.0 Curtain Monitoring

Date: _____

Location ID	Time of Inspection & Video	Video Taken (Y/N)	Video File ID	Curtain on Bottom	Anchor Inclination	Total Water Depth	Total Curtain Height	Comments

General Comments: * Note any deficiencies or repairs completed.