Enbridge Line 6B MP 608 Pipeline Release

Marshall, Michigan

Supplement to Sampling and Analysis Monitoring Plan

Ceresco Dam River Dredging

Enbridge Energy

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Figures and Tables

1.0 BACKGROUND

Region 5 EPA directed Enbridge Energy to dredge the Kalamazoo River in the area directly upstream of the Ceresco Dam where submerged crude oil was identified on the stream bed. Dredging of the river bed to remove submerged oil collected in river bed sediment will be performed. The collected sediment will be pumped to a nearby de-watering bed and stored in a water permeable membrane. Water collected from the sediment will be analyzed for benzene, toluene, ethyl benzene, and xylenes (BTEX). When analysis of the water documents BTEX concentrations are below NPDES permit levels, the water will be discharged back into the Kalamazoo River.

The Work Plan for Permanent Recovery of Submerged Oil and Oil-Contaminated Sediments at Priority Locations and Ceresco Dam Dredging submitted as Attachment to the Supplemental Modification of the Response Plan for Downstream Impact Area and the Source Area Response Plan dated October 3, 2010 describes the method for dredging including equipment to be used for this effort. Figures 1 and 2 attached to this document show equipment areas.

Sampling requirements for NPDES permit compliance is as follows:

Parameter	Minimum Limits for Quality and Concentration	Maximum Limits for Quality and Concentration	Frequency of Analysis	Sample Type
Intermediate Total BTEX	-	(report)	Weekly	Grab
Final Effluent BTEX	-	20 ug/L	Weekly	Grab
Total Lead	-	(report)	Weekly	Grab
Dissolved Oxygen	4.0 mg/l	-	Weekly	Grab
pH	6.5	9.0	Weekly	Grab
Equipment and Outfall Inspections	-	(report)	3X Weekly	Visual

These test parameters are in accordance with, the NPDES Wastewater Discharge General Permit for Petroleum Contaminated Wastewater Permit Certificate of Coverage Number MIG081158.

2.0 PURPOSE

This supplement to the Sampling and Analysis Plan (SAP) approved on August 2, 2010, and revised August 17, 2010, serves to document the surface water sampling associated with the dredging operations. Surface water samples will be collected upstream of the dredging operation, near the operations, and downstream of the operation to assess water quality associated with the clean up operation. Samples will be submitted for analysis at the end of each operational day as a batch. Analysis will be conducted by Trace Analytical of Muskegon, Michigan. Identified sampling locations are included in Figure 3 attached to this document.

3.0 WATER SAMPLING

Surface water samples will be collected in laboratory supplied certified clean glassware with method appropriate preservatives as needed. Sample time, location, and conditions are recorded according to the approved Sampling and Analysis Plan. Each sample is given a unique identification number using the nomenclature outlined in the sampling plan.

A toal of three samples locations will include one sample 500 feet upstream of dredging operations, one sampledownstream of operations but upstream of the dam and one sample downstream of the dam just west of the final containment measures. Samples will be collected at stream mid-depth from boat or other means amenable to collection.

Samples will be collected at mid-operational shift during days 1 through 7 while active dredging activities are occurring. Analytical results turn around time (TAT) will be next day. Sampling frequency after seven (7) consecutive days will be determined by EPA OSC in consult with Enbridge..

Sample IDs and information are recorded on a Chain of Custody and sample custody is relinquished to the laboratory for analysis.

4.0 WATER QUALITY MONITORING

Water quality parameters (pH, dissolved oxygen, specific conductivity, and temperature) will also be measured and recorded during collection of each sample as prescribed in the Sampling and Analysis Plan. Parameters will be collected from the same depth and at the same time as each surface water sample during dredging operations and subject to the actionable values describe in Table 1. Oil sheen observed during surface water collection will be documented. In addition, oil sheen observed being generated from dredging operations will be immediately reported to Enbridge and Tetra Tech, who will determine the necessary actions to prevent further release of sheen from the dredge area.

In addition to the water quality parameters collected with each sample, water quality parameters will also be collected at one established location, downstream of dredging operations using a Eureka Environmental Manta 2 Multiprobe (Manta) or similar device. It is expected that a Manta will be deployed from a downstream location. Deployment locations and monitoring depth (shallow/surface, mid-depth, or deep) will be determined with input from Company personnel and state and federal agencies. The Manta will electronically log the water quality parameters at 15 minute intervals, 24 hours a day, and deliver the data through cellular telemetry to a web-based database accessible to the interested parties. The Manta will be calibrated in accordance with manufacturer's specifications and in accordance with the calibration SOP (included in Appendix A) and can be set to alert (via text and/or email) appropriate individuals should surface water quality parameters fall outside specified ranges established by state and federal agencies (i.e., "actionable" values). The proposed actionable background turbidity will be obtained daily from the upstream dredging operations.

Water quality parameters and proposed actionable values are presented in Table 1

Table 1
Water Quality Parameters and Proposed Actionable Values

Parameter	Proposed Actionable Value	Units
Temperature	NA[1]	°C
pH	6.5 < x > 9.0	
Specific Conductivity	NA[1]	S/cm
Dissolved Oxygen	4.0	mg/L
Turbidity	2x background levels	NTU

[1]NA-Not Applicable

Dredging areas are identified in Figure 3 attached to this document.

5.0 ANALYSIS

Trace Analytical will analyze each sample using EPA and Standard Methods listed in Table 2.

Table 2: Analysis Parameters and Methods

Parameter	Method
Volatile Organic Compounds (VOCs)	SW846 8260
Semi-Volatile Organic Compounds (SVOCs)	SW846 8270
Gasoline Range Organics (GRO)	SW846 8015
Diesel Range Organcis (DRO)	SW846 8015
Oil Range Organics (ORO)	SW846 8015
Polychlorinated Biphenyls (PCBs)	SW846 8280
Michigan Metals and Titanium	SW846 6010, 7470
Total Organic Carbon (TOC)	SM5310
Hardness	SM2340
Total Suspended Solids (TSS)	SM2540

Laboratory instrument calibration will be maintained in conformance with EPA standards with commercially produced standards.

Appropriate quality control samples will be periodically analyzed in accordance with the approved Data Quality Management plan to ensure data defensibility.

Appendix A

Manta 2 Multiprobe Calibration Procedures

Sensor Specific Calibrations

pH

Use a two-point calibration using two (2) buffers, 7.00 and 10.0.

1. Rinse the sensors in DI water, discarding rinse into the decon bucket.
2. Rinses sensors with the first buffer (7.00).
3. Fill cup with the 7.00 buffer and upright the probe to immerse the sensors.
4. Follow the calibration instructions and discard the used solution into the decon bucket.
5. Rinse the sensors with DI water. Discard rinse into decon bucket.
6. Rinse sensors with the second buffer (10.0).
7. Fill calibration cup with 10.0 buffer and upright probe to immerse the sensors.
8. Follow the calibration instructions on the instrument calibration screen and discard the used solution into the decon bucket.

Specific Conductivity

Use a one (1) point calibration.

1. Rinse the sensors with DI water, discarding rinse into decon bucket.
2. Fill the calibration cup with the standard (appropriate to waters being sample). For our purposes, 12,586 S/cm is the standard to be used.
3. Follow the calibration instructions on the instrument calibration screen and discard the used solution into the decon bucket.

Turbidity

Use a two-point calibration, a zero and an approximate standard dependent upon water(s) to be tested. For our purposes, we will use a standard solution of 400 NTU.

To Zero;

1. Rinse sensors twice with deionized water. Partially fill the calibrations cup with DI water, close and shake vigorously. Discard rinse into decon bucket.
2. Fill the calibration cup with the zero turbidity standard, replace lid and upright the Multiprobe to immerse the sensor in the solution.
3. Follow the calibration instructions on the instrument calibration screen and discard the used solution into the decon bucket. .

To set the second point, repeat the steps above using a 400 NTU standard solution. Discard used solutions into your decon bucket.

Dissolved Oxygen (DO)

Calibrate by setting the sensor's saturation point. Be sure to set the local Barometric Pressure before calibrating DO.

1. Take a 1-liter jar and fill halfway with distilled water, screw on cap, and shake vigorously for one (1) minute.
2. Remove cap and let jar stand for one (1) minute. This lets the tiny air bubbles float out of the top.
3. Fill the calibration cup until the sensor is immersed in the aerated water, cap and upright.
4. Wait a few minutes for the temperature and reading to equilibrate.

5. Follow the calibration instructions on the instrument calibration screen and discard the used solution into the decon bucket.

Fluorometer CDOM

Use a two-point calibration.

To Zero;

1. Rinse sensors twice with deionized water. Partially fill the calibrations cup with DI water, close and shake vigorously. Discard rinse into decon bucket.
2. Fill the calibration cup with the zero standard, replace lid and upright the Multiprobe to immerse the sensor in the solution.
3. Follow the calibration instructions on the instrument calibration screen and discard the used solution into the decon bucket.

To set the second point, repeat the steps above using a relative standard solution. Discard used solutions into your decon bucket.

Figure 1: Equipment Areas Map

Figure 2: Equipment Areas Map

Figure 3: Sample and Dredge Locations Map