

**Enbridge Line 6B MP 608 Pipeline Release**

**Marshall, Michigan**

**Drinking Water Well Supplement to the**

**Sampling and Analysis Plan**

**Prepared: September 27, 2010**

**(Revised October 7, 2010)**

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## List of Acronyms/Definitions

**Company** – Enbridge Energy, Limited Partnership

**EDD** – Electronic Data Deliverable

**FOSC** – Federal On-Scene Coordinator

**MDNRE** – Michigan Department of Natural Resources and Environment

**PCB** - Polychlorinated Biphenyl

**PNA** - Polynuclear Aromatic Hydrocarbon

**Remediation** – Future long term corrective actions beyond those included as an initial response

**Response** – The initial response to remove and/or abate visible oil and/or sheen that is either currently affecting navigable waterways and/or poses the threat of release of a visible oil and/or sheen to navigable waterways.

**SAP** – Sampling and Analysis Plan

**SCRIBE** - U.S. EPA's database for warehousing environmental data

**SOSC** – State On-Scene Coordinator

**SVOC** - Semivolatile Organic Compound

**U.S. EPA** – United States Environmental Protection Agency

**VOC** - Volatile Organic Compound

**Wells** –All private and public drinking water wells

**Well Water Sampling Supplement to Sampling and Analysis Plan  
Marshall Response to Pipeline Release**

**September 27, 2010**

**(Revised September 28, 2010)**

This Drinking Water Well Supplement (Supplement) to the Sampling and Analysis Plan (SAP) is prepared in response to US EPA's Supplement to the Order for Compliance under Section 311(c) of the Clean Water Act (the Order) dated September 23, 2010. Section 18.g of the Order requires Enbridge Energy, Limited Partnership (the Company) to perform sampling of all private and public drinking water wells (Wells) located within 200 feet of the high water levels observed during the July 27, 2010 rains for such time and in such a manner as directed by U.S. EPA. This Supplement will be implemented in conjunction with response plans described herein. Changes to the Supplement will be anticipated to reflect the changing conditions during the response and the information collected as the work progresses.

# 1.0 Introduction

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This Drinking Water Well Supplement (Supplement) to the Sampling and Analysis Plan (SAP) is prepared in response to U.S. EPA's Supplement to the Order for Compliance under Section 311(c) of the Clean Water Act (the Order) dated September 23, 2010. Section 18.g of the Order requires the Company to perform sampling of all private and public drinking water wells (Wells) located within 200 feet of the high water levels observed during the July 27, 2010 rains for such a time and in such a manner as directed by U.S. EPA.

This Supplement summarizes the procedures used to identify:

- Wells eligible for sampling,
- Sampling procedures and analytical parameter list,
- Sampling frequency and the methodology used to implement a reduced sampling frequency and target sampling parameter list, and
- Reporting requirements.

This Supplement is an interim plan for drinking water wells. No reduction in the analytes for drinking water will be considered before October 31, 2010 at which time Enbridge may make a renewed request for a reduced analyte list, if appropriate. Additional analyses for constituents that are not found in crude oil, but that could be potentially mobilized from sediments by the presence of crude oil, will be conducted at a reduced frequency. Additional analyses will also be conducted on drinking water well samples where crude oil constituents were detected in previous sampling events.

Eligible Wells sampled as of September 21, 2010 are show in Figure 1. Validated Sampling events as of September 21, 2010 are shown in Figure 2 and are for samples analyzed under this program. The Well Sampling Work Flow diagram presented in Figure 3 is a summary of the well identification, sampling, and data validation process. Sections 2 through 5 of this Supplement provide additional detail for all activities.

## 2.0 Well Identification

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As a result of the release, the U.S. EPA and other stakeholders want to determine if crude oil constituents have impaired groundwater in the vicinity of the Spill Release Area and affected water bodies. The Michigan Department of Natural Resources and Environment (MDNRE) and local county health departments (e.g., Calhoun County, Kalamazoo County, etc.) are providing the Federal On-Scene Coordinator (FOSC) with a list and description of wells within the affected area. However, realizing that departmental lists may not accurately reflect all Wells within the impacted area, the Company, or its contractors, will be conducting a visual survey to identify private wells located within 200-feet of the high water levels observed during the July 27, 2010 rains (in accordance with the direction of the local Public Health Departments) on either side of the affected water bodies (e.g. Talmadge Creek, Kalamazoo River, and Morrow Lake). The survey is anticipated to be conducted house-to-house, from the shore if access is allowed, and from boats, canoes, and/or other watercraft as needed. Drinking water well identification activities conducted to date included only wells located within 200 feet of the banks of the Kalamazoo River, which may or may not include potential impacts outside of the banks of the river. The Company will develop a procedure to identify drinking water wells located within 200 feet of the areas impacted by crude oil, as required by the Order. The Company will submit this procedure within seven days of approval of this plan by U.S. EPA.

Other sources of information will be utilized to assist in locating wells, including:

- Township tax records for property owner names and addresses,
- Electronic database searches, and
- Mailings to all affected property owners asking for information about their wells.

The well identification process includes components of MDNRE's guidance document entitled *Decision Tree for Determining the Existence of Private Water Wells*.

Information gathered from the private well surveys will supplement information obtained from property queries and database searches and is anticipated to include location, coordinates, depth to zone of extraction (if known), and age. A Well Validation and Registry Work Order (well validation) form (Appendix A) will be used to document the collected information. The locations of the wells will be plotted on maps based on coordinates recorded during the survey. Wells identified

during the visual survey and obtained from agency-provided lists will be sampled, pending approval from the well-owners, within the 200-foot impacted area.

Records of site visits or other efforts to contact the property owner will be documented on the well validation form shown in Appendix A. The Company, or its contractors, will notify the local Public Health Department(s) if they are unable to contact the property owner after three attempts to confirm the presence of a well or if access is refused.

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## 3.0 Sampling

### 3.1 Sample Event Scheduling

In addition to sampling the wells identified in the visual survey, other wells may also be sampled to address citizen calls to the Company Call Center in accordance with the “Environmental Procedure Call Center Operations” protocol. All owners/operators of the identified wells will be contacted in order to obtain permission to sample their respective wells. Permission may be verbal or written. In either case, the information will be documented on the Well Sampling Work Order form provided in Appendix A.

The Company Lands and Right of Way Department will provide the call scripts, door hangers, and media cards to facilitate consistent interaction with owners and occupants. Examples of these documents are presented in Appendix B.

### 3.2 Sample Frequency

Wells will be sampled on at least a biweekly basis until at least October 31, 2010, at which time Enbridge may seek permission from the U.S. EPA to revise the sampling schedule. Beginning after October 31, 2010, it is proposed that after two sampling events for each well, the data will be evaluated by the U.S. EPA (and other appropriate agencies) to determine if the crude oil constituents have been detected. If the data indicates the water from these wells do not contain concentrations of constituents potentially related to the oil spill, the sampling frequency will be reduced to once per month for three months and then continue on a quarterly schedule upon approval by the public health department. The local public health departments will be presented, at a minimum, a well identification and sampling data summary report, Preliminary Hydrogeological Assessment Report, and Submerged Oil Removal Report by October 31, 2010. Quarterly sampling would continue at a well until approval to cease sampling activities is received from the U.S. EPA, the public health department, or other applicable regulatory agency(ies) (e.g. MDNRE).

### 3.3 Sample Parameters

#### 3.3.1 Initial Sampling Parameter List

The initial well water sampling parameter list through October 31, 2010 for all identified wells, and for the first two sampling events of any identified well is presented in Table 4.4 of the previously approved SAP. The analyses for potable water will be compliant with Table 4.4 of the previously

approved SAP and will be performed using certified laboratories for drinking water methods (EPPA 524.2 and 25) for VOCs and SVOCs. Each well identified within the 200-foot buffer (as measured from the outer high water mark resulting from the July 27, 2010 rain event) will have at least two sampling events conducted for these parameters. Many of these parameters are not constituents of crude oil, including, but not limited to, arsenic, lead, and PCBs. The constituents detected in a crude oil sample collected by MDNRE on August 6, 2010 are provided below in Table 3.1.

**Table 3.1 Constituents Detected in Crude Oil as per MDNRE Analysis**

<b>Constituent</b>	<b>Sample 1 (mg/kg)</b>	<b>Sample 2 (mg/kg)</b>
<b>Volatile Organic Compounds (VOCs)</b>		
Benzene	910	1100
Ethylbenzene	220	260
Total Xylenes	1410	1650
Toluene	1700	2000
1,2,3-Trimethylbenzene	44	58
1,2,4-Trimethylbenzene	340	410
1,3,5-Trimethylbenzene	170	190
Cyclohexane	1900	2200
Isopropylbenzene	51	57
n-Propylbenzene	91	100
p-Isopropyl toluene	35	40
Sec-Butylbenzene	33	35
<b>Metals</b>		
Mercury	0.0003	0.0003

<b>Constituent</b>	<b>Sample 1 (mg/kg)</b>	<b>Sample 2 (mg/kg)</b>
Beryllium	0.4	0.8
Iron	30	7.7
Molybdenum	ND	9.3
Nickel	59	67
Titanium	2.8	3.2
Vanadium	130	140
<b>Semivolatile Organics (SVOCs)</b>		
2-Methylnaphthlane	130	150
Naphthalene	63	72
Phenanthrene	82	86

### 3.3.2 Proposed Target Sampling Parameter List

After October 31, 2010 the Company will implement a target sampling parameter list, shown in Table 3.2 (prior to October 31,2010 there will be no reduction in the frequency or analytes), for individual wells within the 200-foot buffer zone based on the following:

- Completion of two sampling events with results indicating no detected constituents related to crude oil,
- Completion of a hydrogeological assessment for the Kalamazoo River, and
- Approval of the target sampling parameter list by the appropriate public health departments.

**Table 3.2 Target Sampling Parameter List for Well Water**

<b>Volatile Organic Compounds (VOCs)</b>	<b>Part 201 Generic Cleanup Criteria and Screening Levels in ppb</b>
Benzene	5.0(A)
Cyclohexane	*
Ethylbenzene	74(E)
Total Xylenes	280(E)
Toluene	790 (E)
1,2,3-Trimethylbenzene	*
1,2,4-Trimethylbenzene	63(E)
1,3,5-Trimethylbenzene	72(E)
Isopropylbenzene	800
n-Propylbenzene	80
p-Isopropyl toluene	*
Sec-butylbenzene	80
<b>Metals</b>	

Mercury	2.0 (A)
Beryllium	4.0 (A)
Molybdenum	73
Nickel	100(A)
Titanium	*
Vanadium	4.5
Iron	300(E)
<b>SVOCs</b>	
2-methylnaphthalene	260
Naphthalene	520
Phenanthrene	52

Residential & Commercial I Drinking Water Criteria & RBSLs are from MDEQ Table 1. Groundwater: Residential and Industrial-Commercial Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk based Screening Levels (RBSLs), Footnotes designated by letters in parentheses are explained in footnote pages that follow the criteria tables in the above January 23,2006 guidance document.

\*These constituents are not listed in the above referenced January 23, 2006 Residential & Commercial Drinking Water Criteria Table.

## 4.0 Reporting Requirements

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The Company will report the following well water information on a periodic basis to the agencies identified by U.S. EPA.

- The Company will prepare a map and spreadsheet detailing the location of the Wells and indicating whether or not the well was sampled less than two times or two times or more, wells where crude oil constituents were detected, and other applicable information. This information will be updated periodically and be available for review by the agency. This information will be available on September 29, 2010. This information will be updated on a weekly basis for the presentation to the Health Team.
- The results of the analyses will be provided to the landowner and resident, (if different from the landowner) within 5 days of receiving validated data. Additionally, the validated results will be provided to the appropriate County Health Department with 2 days of receipt. and the FOOSC, if requested.
- Individual laboratory result reports for Wells testing positive for a crude oil constituent will be shared with U.S. EPA, MDNRE and public health agencies.
- The Company will provide to U.S. EPA, and the local public health agencies, a summary of wells sampled the previous day that includes well location, time sampled, date laboratory data will be available, and proposed sampling for that day on a daily basis.
- Data will be added to a scribe project routinely. Updated as samples are collected and validated data is received. Local project will be uploaded to scribe.net.

## 5.0 Milestones

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Figure 2 summarizes the significant milestones for the drinking water well sampling program conducted to date and planned future milestones.

## Figures

# **Appendix A**

## **Well Sampling Work Orders**

## **Appendix B**

### **Well Identification Sample Correspondence**