

**Enbridge Line 6B MP 608 Pipeline Release
Supplement to Sampling and Analysis Plan
Air Sampling and Monitoring Plan
Ceresco Dam Dredging Operations
Ceresco, Michigan**

Enbridge Energy

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1. Purpose

Center for Toxicology and Environmental Health, L.L.C. (CTEH[®]) was requested to respond in support of site operations for the Enbridge Energy crude oil release on Monday, July 26, 2010. CTEH[®] is providing air monitoring, air sampling, and toxicology support to address public health concerns resulting from the crude oil spill and subsequent dredging operations. CTEH[®] has been conducting community air monitoring and sampling in communities to protect human health.

This work plan addresses air monitoring and sampling in the Ceresco community, and surrounding areas to ensure air quality is not adversely impacted by the dredging activities. The purpose of this sampling includes the following:

- Air monitoring and sampling in the community potentially impacted by the presence of crude oil and suspended particulates during work activities.
- Air monitoring and sampling throughout the community during remediation activities to evaluate the potential for exposure.
- Perform air monitoring and sampling in response to reports of odors in the community.
- Provide personnel monitoring for CTEH and EPA contractors performing air sampling and monitoring to protect against overexposure to chemicals in crude oil vapors and/or fumes.

CTEH[®] will conduct community air monitoring in support of Unified Command actions. Data from air monitoring and sampling will be evaluated to make decisions regarding the need for additional monitoring and sampling. Data will be reported to Unified Command, Enbridge representatives, and the USEPA, on a daily basis.

Two types of air monitoring will be conducted, analytical and real-time. These are discussed at greater length in the following sections of this report.

2. Air Monitoring

CTEH personnel will perform continuous air monitoring in and around the Ceresco community (Figure 1) using the MultiRAE Plus, UltraRAE, UltraRAE 3000, Gastec pump with benzene specific colorimetric tubes, and the TSI AM510. Real-time data using these instruments will be collected for volatile organic

compounds (VOCs), hydrogen sulfide (H₂S), benzene, and particulate matter (2.5um and 10um). A summary of the air monitoring equipment to be used is listed in Table 1.

Figure 1
Ceresco Community



Table 1
Real-Time Air Monitoring Equipment

AM510 with 2.5um impactor	Particulate	0.001 mg/m ³
AM510 with 10um impactor	Particulate	0.001 mg/m ³
MultiRAE 10.6 PID	VOCs	0.1 ppm
MultiRAE H ₂ S electrochemical sensor	H ₂ S	1 ppm
UltraRAE 3000 PID with benzene sep filters	Benzene	0.05 ppm
UltraRAE PID with benzene sep filters	Benzene	0.01 ppm
Gastec detector tube with pump	Benzene	0.05 ppm*

* Gastec detection limits are based upon detector tubes used

2.1 Monitoring Frequency and Coverage

CTEH personnel will conduct air monitoring within the Ceresco community, and surrounding areas, for the duration of dredging operations. Monitoring emphasis will be placed on community areas along the effected portion of the waterway, areas located downwind of the dewatering/soil staging area, and within the work zone.

Real-Time readings will be taken at various locations in and around the Ceresco community, as well as within the work zone. At each location a VOC, H₂S, PM₁₀, and PM_{2.5} reading will be recorded. Multiple readings in the same location will be used as one method to determine if detects from instantaneous readings from real-time instrumentation are due to transient elevations, spikes in air concentration, or if the concentrations are sustained. If sustained, further air monitoring and/or sampling would be initiated. In the case of benzene, readings will be taken in all areas with detectable VOCs or where odor is present.

3. Noise Monitoring

Noise monitoring will be conducted within the community as well as the work area.

The Questpro DX noise dosimeter will be utilized to determine real-time noise expose levels. The detection limit for this instrument is 40 dB. Noise readings will be used by Enbridge as well as various regulators to determine what, if any, actions should be taken to reduce community and/or worker noise exposure. Exposure values are listed in Table 2.

Table 2
Noise Exposure Levels

Noise Exposure Levels		
Sound Pressure Level (SPL)	90 dBA (100% dose)	85 dBA

4. Air Sampling

Analytical air sampling will be conducted in community areas near the Ceresco Dam dredging operations. Analytical samples will be taken in fixed community locations near dredging operations (Figure 2), around the de-watering/soil staging area (Figure 2), and as needed due to changing site conditions, odor complaints, wind direction, and in areas where elevated readings are recorded.

Air samples will be collected once at each location during a 12-hour period (5um Polyvinyl Chloride cassette), and once during a 24-hour period (evacuated canisters) each day. The criteria used in selecting sampling locations include proximity of residences to the Kalamazoo River, location of dredging operations, and location of potential receptors surrounding the de-watering/soil staging area. Air samples collected using 5um PVC cassettes will be analyzed for total dust according to NIOSH 0500, as well as for metals using NIOSH 7300 (Table 3). Evacuated canister samples will be analyzed for VOCs using EPA Method TO-15 (Table 4). Air Sampling Methods are summarized in Table 5. Each analytical method can be found in Appendix 1.

Figure 2
Analytical Air Sampling Locations

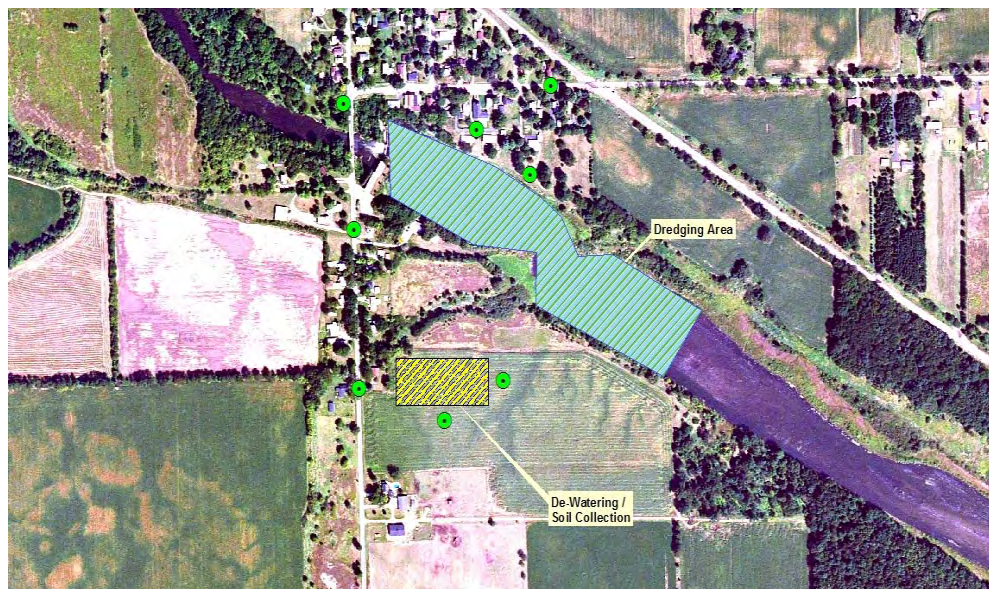


Table 3
Metal Analysis NIOSH 7300

NIOSH 7300 – Metals	
Aluminium	Molybdenum
Antmony	Nickel
Arsenic	Potassium
Barium	Phosphorus
Beryllium	Selenium
Cadmium	Silver
Calcium	Strontium
Chromium	Tellurium
Cobat	Tin
Copper	Thallium
Iron	Titanium
Lead	Tungsten
Lanthanum	Vanadium
Lithium	Yittarium
Magnesium	Zinc
Manganese	Zirconium

Table 4
Predominant Crude Oil VOCs Detected by TO-15

Benzene	Heptane, n-
Butane, 2-methyl-*	Hexane, n-
Cyclohexane	Naphthalene
Cyclohexane, 1,3-dimethyl-*	Nonane*
Cyclohexane, 1,3-dimethyl-, cis-*	Octane*
Cyclohexane, butyl-*	Octane, 4-methyl-*
Cyclohexane, ethyl-*	Pentane, 2-methyl-*
Cyclohexane, methyl-*	Toluene
Cyclohexane, propyl-*	Trimethylbenzene, 1,2,4-
Decane*	Trimethylbenzene, 1,3,5-
Dodecane*	Undecane*
Ethylbenzene	Xylene, m&p-
Ethyltoluene, 4-	Xylene, o-

*- Tentatively identified compound (TIC)

Table 5
Summary of Analytical Air Sampling Methods

Analyte	Analytical Method	Sample Media	Flow Rate (ml/min)
VOCs	EPA TO-15	Canisters	NA
Total Dust	NIOSH 0500	37mm PVC 5um	2000
Metals	NIOSH 7300	37mm PVC 5um	2000

Evacuated canisters will also be used to collect air samples to address community concerns about odors. Canister samples will consist of either grab or 24-hour collections. The collection time will be based on monitoring needs. For instance, a grab sample will be collected for confirmatory purposes in response to data from real-time instruments. Longer sampling times may be appropriate for evaluation of air concentrations over time. For example, 24-hour sampling would be appropriate for evaluating the potential for exposure at certain receptor sites like homes and schools.

All collected air samples will be sent to Galson Laboratories, an American Industrial Hygiene Association (AIHA) accredited laboratory, in East Syracuse, New York. Samples will be expedited for shipping and analysis. A 1 – 2 day turnaround is anticipated for data is anticipated.

5. Air Sampling Locations

Real-time and integrated sampling locations will be selected based on the presence of communities near impacted waterways (Figure 1) and in addressing specific community concerns. Manually logged real-time data will be collected and uploaded to the CTEH[®] data management system using MC55 handheld data collection devices.

6. Odor Investigations

A CTEH team will be available as an Odor Response Team. The Odor Response Team will be deployed as soon as possible after receiving odor complaints/concerns referred by the hotline, Enbridge, and

Unified Command staff. The response team will additionally include representatives USEPA and/or the Calhoun County Public Health Department, as available. Air monitoring equipment (e.g. MultiRAE Plus, AreaRAE, Gastec colorimetric detector tubes, and/or UltraRAE) will be used to evaluate the levels of VOCs and specific oil-related chemicals in the air. The evaluation of the results should follow the decision process described below.

7. Response to Detections

A decision process has been developed for the evaluation of air monitoring results for dust, VOCs, TO-15, and real-time detections for benzene. For VOC detections, a trigger level of 1 ppm will be used to designate the need for chemical-specific sampling. The decision process for the evaluation of benzene levels from Ultra RAE, GASTEC, and HAP analysis (Tedlar bag collection). If benzene levels are detected above 200 ppb, then confirmation with the HAP instrument should be employed. If benzene levels exceed 60 ppb, then an 8-24 hr time-weighted sample should be collected. For particulates, additional engineering controls will be utilized if real-time instrumentation detect concentrations that meet or exceed 75% of the National Ambient Air Quality Standards (NAAQS) for PM_{2.5} and/or PM₁₀ (Table 5).

**Table 5
National Ambient Air Quality Standards (NAAQS) for PM_{2.5} and PM₁₀**

	Primary Standard	
	Level	Averaging Time
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour ⁽¹⁾
Particulate Matter (PM _{2.5})	35 µg/m ³	24-hour

⁽¹⁾ Not to be exceeded more than once per year on average over 3 years.

8. Data Quality and Management

Integrated air samples will be sent to Galson Laboratories located in Syracuse, N.Y. Air sampling preliminary results will be provided to Enbridge Energy’s designated representative and the USEPA within 1-2 days of receipt by the laboratory. The expedited turnaround time for Galson is one business

day. All air sampling and air monitoring data will be provided to Unified Command in a format compatible with SCRIBE. The Quality Assurance Project Plan can be found in Appendix 2.

9. Project Organization

CTEH will be responsible for the following:

- Toxicological support
- Air data quality assurance/quality control
- Data evaluation and reporting

10. Calibration and Maintenance of Field Instruments

The calibration and maintenance of field equipment and instrumentation will be in accordance with each manufacturer's specifications or applicable test/method specifications, and will be recorded in CTEH calibration logs.

11. Chain of Custody (COC)

Each sample will be identified on a chain of custody record. The integrated sample numbering system will include site name, date, analyte, and identification code unique to each sample.

12. Sample Labels

Sample labels will be securely affixed to the sample container. They will clearly identify the particular sample and should include the following information:

- Sampling location
- Date and time the sample was collected.
- Analysis requested.
- Unique identifier

13. Packaging and Shipping

Packaging and shipping of samples will vary depending upon sample media, contaminant concentration, preservation technique, and sample container. The person packaging the samples is responsible to ensure that the sample packaging is in suitable condition for shipping.