UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

March 14, 2013

Via Email and UPS

Enbridge Energy, Limited Partnership
c/o Mr. Rich Adams
Vice President, Operations
Superior City Centre
Second Floor
1409 Hammond Ave.
Superior, Wisconsin 54880

Re: Order pursuant to §311(c) of the Clean Water Act (Docket No. CWA 1321-5-13-001) for Recovery of Submerged Oil from the Enbridge Line 6B Discharge near Marshall, MI

Dear Mr. Adams:

Today, the United States Environmental Protection Agency (U.S. EPA) is issuing a final Administrative Order (Order) to Enbridge Energy, Limited Partnership and its affiliates (Enbridge) concerning further response actions on the areas of the Kalamazoo River affected by the July 25, 2010 Enbridge Line 6B oil discharge (AR 1720). EPA issues this Order pursuant to the authority under Section 311(c) of the Federal Water Pollution Control Act, 33 U.S.C. § 1321(c), as amended (commonly referred to as the Clean Water Act (CWA)).

On October 3, 2012, U.S. EPA transmitted a proposed Order to Enbridge (AR 1152). Enbridge provided written comments and additional information to U.S. EPA regarding the proposed Order. U.S. EPA also received comments from members of the public. U.S. EPA carefully considered all of the comments submitted on the proposed Order and has made some modifications to the proposed Order in response to those comments.

The final Order is enclosed with this letter. A USB electronic storage device containing a copy of the Administrative Record supporting the Order and an Index to the Administrative Record are attached to the Order. In this letter, U.S. EPA explains why it is requiring the response actions identified in the Order. Also enclosed with this letter is U.S. EPA's Response to Comments (RTC) received on the proposed Order (AR 1718).

I. Background

A. Executive Summary of Final Order

U.S. EPA has determined that, in order to prevent continued migration of submerged oil to downstream areas of the Kalamazoo River, containment and dredging of submerged oil in the three impoundment areas of Ceresco, Battle Creek Mill Ponds, and Morrow Lake Delta/Fan

should be implemented. The proposed Order did not specifically emphasize the need for recovery via dredging from the Morrow Lake Delta/Fan, but did include all of Morrow Lake and its Delta and Fan in the areas covered by the proposed Order. Since then, U.S. EPA's continuing observation of oil migration into the Fan from the Morrow Lake Delta has shown that the North and South Coves of the Fan contain oil that should be recovered by dredging (AR 1708, 1709). The Order also requires Enbridge to dredge sediment traps that have already exceeded the trigger amounts set by the Sediment Trap Monitoring and Maintenance Plan (July 2012) (AR 1704), modifies that plan to require dredging, makes other modifications to that plan, and requires Enbridge to otherwise continue to comply with that plan. Re-installation of the containment system at E-4.0 in the Morrow Lake Delta shall occur upon permit acquisition from the Michigan Department of Environmental Quality (MDEQ). Depending upon project design and permit timing, U.S. EPA may determine that any additional containment may best be implemented concurrently or integrated with dredging operations. The Order requires Enbridge to install, monitor and maintain other containment devices and equipment, perform submerged oil reassessment and continue scientific data collection in support of modeling activities.

U.S. EPA has determined that these cleanup actions are the most consistent with protecting public health and welfare and the environment. As described below, U.S. EPA's determination is based on the field data collected and the various studies done in connection with the 2010 oil discharge, and on the Administrative Record, and is in accordance with the National Contingency Plan (NCP).

B. Administrative Record and Opportunity for Comment

Prior to issuing the enclosed Order, U.S. EPA took extensive measures to provide Enbridge an opportunity to comment on a draft version of the Order. U.S. EPA appended a draft Administrative Record Index to the proposed Order and transmitted a copy of the draft Administrative Record to Enbridge along with the proposed Order. The draft Administrative Record included over 1150 documents upon which U.S. EPA considered or relied in issuing the proposed Order. The draft Administrative Record was also made available to the public, along with the proposed Order, via U.S. EPA's website and local repositories located in Marshall and Battle Creek, Michigan. Additionally, U.S. EPA issued a press release on October 3, 2012 announcing its issuance of the proposed Order (AR 1157).

In the cover letter transmitting the proposed Order (AR 1152), U.S. EPA invited Enbridge to request a conference to discuss the proposed Order. U.S. EPA also invited Enbridge within 30 days to submit written comments or other information that it believed U.S. EPA should consider prior to issuing the Order. Two additional technical studies were completed after the proposed Order was received by Enbridge. U.S. EPA formally transmitted a Final Biodegradability Study (AR 1296, 1597) to Enbridge on October 30, 2012 and transmitted Dr. Kenneth Lee's report resulting from the UV-Epifluorescence Study (AR 1277) to Enbridge on November 1, 2012. U.S. EPA provided Enbridge an extension to the comment deadline in order to comment on both reports. U.S. EPA was able to afford Enbridge this extraordinary level of participation and comment for several reasons. First, the primary work required by the Order (dredging) is work the Agency believes is best commenced in the spring, after winter ice conditions are no longer present. Further, given the complexity and likely cost of the work required and the need for a

high level of coordination and consultation with MDEQ and the U.S. Army Corps of Engineers in the planning process, U.S. EPA also thought it prudent to have input from Enbridge prior to issuing the Order.

C. Enbridge Comments and Meetings

Enbridge requested a conference with U.S. EPA to discuss the proposed Order. The conference was held on October 23, 2012, at the offices of U.S. EPA Region 5 in Chicago, Illinois. Representatives from Enbridge, U.S. EPA and MDEQ attended the meeting. In that conference, Enbridge presented its views on the proposed Order and current status of the Line 6B oil discharge cleanup to U.S. EPA. Following the meeting, Enbridge submitted written comments to U.S. EPA in three installments. Enbridge submitted the bulk of its written comments to U.S. EPA on November 2, 2012 (AR 1304), submitted written comments on the Final Biodegradability Study on November 8, 2012 (AR 1332), and submitted written comments on the UV-Epifluorescence Study on November 13, 2012 (AR 1351). In its written comments, Enbridge requested a second meeting with U.S. EPA. This conference was held on December 19, 2012 and was again attended by representatives of U.S. EPA, Enbridge and MDEQ. On February 27, 2013, after the deadline established for submitting comments, Enbridge sent additional comments to U.S. EPA (AR 1713). U.S. EPA has responded to the comments provided by Enbridge and members of the public in the RTC (AR 1718).

II. Detailed Discussion of Rationale

A. Location, Mapping and Identification of Submerged Oil

Since the discharge, Enbridge and U.S. EPA have conducted extensive field work to identify the location and relative distribution of harmful quantities of oil (sheen and sludge as defined in 40 C.F.R.§ 110.3). The sheen and sludges are all associated with submerged oil in the river. The location and mapping of oil sheen and sludge, together with other observations of sheen and globules and analytical results, confirm that the three impoundment areas (Ceresco, Battle Creek Mill Ponds and Morrow Lake Delta/Fan) have continued to accumulate heavy and moderate categories of submerged Line 6B oil as it moves within the Kalamazoo River. A map generally depicting these impoundment areas is enclosed with this letter.

1. Poling

After the Line 6B oil discharge, it became clear that the Line 6B oil was becoming submerged in the Kalamazoo River, making it difficult to find and recover. Sludges are formed when submerged oil becomes mixed with the river bottom's sediment and organic matter. Enbridge proposed using a field technique known as "poling" in order both to locate the submerged oil in the river and to determine the lateral or aerial extent of the oil. Poling involves manually agitating soft sediments using a pole with an attached disc. When the sediments are agitated, submerged oil rises to the surface in the form of oil sheen and globules. A team, composed of mostly Enbridge personnel with oversight from U.S. EPA and sometimes including MDEQ personnel, categorized the submerged oil at each location as "heavy," "moderate," or "light." Enbridge also developed and implemented a Standard Operating Procedure for poling in order to

ensure consistency in implementation (AR 1159). These categories have standard definitions, which were established based upon the amount of sheen and number of oil globules (AR 1159). To date, over 29,000 poling points have been mapped through this process (AR 0027, AR 0044, AR 0052, AR 0945, AR 1056, and AR 1714).

Examination of chronological results from the poling assessments, with supporting data on river flow conditions, surficial sheen and oil manifestation, and recovery history provides evidence that the location and extent of submerged oil accumulations are changing over time.

By way of example, following the agitation efforts undertaken in 2011, only 25% of poling locations between MP 5.35 and 5.85 (immediately upstream of Ceresco Dam) were classified as heavy or moderate (AR 1702). In contrast, at that same time, some of the areas between MP 4.5 and 5.25 (upstream of MP 5.35-5.85) still had moderate and heavy poling designations from bank to bank (AR 1702). By Spring 2012, however, that same area (MP 4.5 - 5.0) no longer had any bank to bank moderate or heavy designations and had fewer heavy or moderate designations overall (AR 1703). Yet, MP 5.0 to 5.85, which had previously had only 25% heavy or moderate designations, demonstrated a substantial increase in locations classified as moderate or heavy at that time (AR 1703). U.S. EPA believes that the relative patterns demonstrated by two rounds of poling in the same locations, which had just undergone extensive recovery actions, is reliable evidence that submerged oil migrated downstream.

2. Sheen Mapping

Throughout 2012, U.S. EPA and Enbridge comprehensively monitored for and mapped oil globules and sheen that appeared on the river surface throughout the 38 miles of Kalamazoo River impacted by the discharge. Sheen can appear spontaneously, or as a result of disturbances (such as by work boats, recreational boats or by poling). There was a strong correlation between the locations of the moderate and heavy poling results (which indicate the presence of sludges) and those areas where oil globules and sheen were consistently observed on the surface of the river (AR 1060, AR 1151). Together, the poling data and the sheen mapping substantiate that the two harmful quantity of oil indicator parameters defined in 40 C.F.R. § 110.3 (sheen and sludge) are present within the Kalamazoo River.

3. Forensic Identification of Enbridge Line 6B Oil

Recognizing that residual background hydrocarbons exist within the Kalamazoo River, U.S. EPA and Enbridge developed forensic chemistry techniques to differentiate them from Enbridge Line 6B oil in the river. The application of this forensic analytical chemistry further demonstrates that sheen and globules generated during poling and observations of spontaneous sheens are Enbridge Line 6B oil and cannot be attributed to the presence of other background contamination in the Kalamazoo River (AR 1540). This finding further supports U.S. EPA's determination that poling results and sheen observations can be used with confidence to identify the location and monitor changes in the distribution of submerged Line 6B oil over time. Recent chemical analysis done regarding the quantification of Line 6B oil is largely consistent with the poling data and sheen observations (AR 1717).

B. Submerged Oil Mobility

The mapping of the location of Line 6B oil since 2010 confirms that the three impoundment areas have continued to accumulate moderate and heavy categories of submerged oil as it moves within the Kalamazoo River, even under low flow conditions (AR 0945, AR 1056, AR 1057, AR 1058, AR 1059, AR 1151). This mapping also shows that most other sections of the impacted length of river upstream of these impoundments no longer contain large areas of moderate or heavy submerged oil. These results are expected as submerged oil tends to settle in the lower flow impoundments rather than in the upstream higher flow areas of the river. Accumulation of submerged oil in these impoundments under low flow conditions, the relative absence of oil in the higher flow upstream areas, and potential for those accumulations to be washed away by high flow events is evident. Moreover, these results are consistent with geomorphological application of the spatial connection of submerged oil to depositional settings along the river and preliminary velocity predictions from hydrodynamic modeling performed to date by Enbridge (AR 1151).

Geomorphologic analysis and the preliminary hydrodynamic model predict that high flow conditions and possible dam operations could cause more submerged oil to migrate from the Delta into Morrow Lake and the Kalamazoo River downstream of the Morrow Lake Dam. Since June 2011, repeated poling assessments conducted in Morrow Lake revealed a progressive advance of submerged Line 6B oil from the Morrow Lake Delta towards the Morrow Lake Dam, nearly two miles downstream from the Delta. These poling assessments show that submerged oil can now be detected throughout the 2 mile long, 700 acre expanse of the lake. By contrast, only 189 acres showed submerged oil impact in Fall 2011. In Spring 2012, the area of impact had progressed to 325 acres (AR 0476).

C. Biodegradation of Line 6B Oil

U.S. EPA performed a limited bench-scale study on the biodegradability of Line 6B oil. The purpose of the study was to determine the maximum biodegradation of Line 6B via natural attenuation under optimum conditions. The study demonstrated that, under optimum conditions, the maximum amount of oil removed via biodegradation would be limited to roughly 25%. (AR 1597).

Based on the findings of the biodegradation study, U.S. EPA concludes that natural attenuation of Line 6B oil via biodegradation is not an appropriate response action because at least 75% of the remaining Line 6B oil would persist and could migrate and/or disperse further downstream. U.S. EPA has, therefore, determined that active recovery of the remaining submerged oil in the impoundments is the appropriate response action at this time.

D. Consistency with NEBA Recommendations

In 2012, the Federal On Scene Coordinator (FOSC) charged U.S. EPA Scientific Support Coordinators (SSCs) and supporting scientists with evaluating the potential effects of oil recovery on ecological systems within the Kalamazoo River. This effort resulted in the conceptual design of the Net Environmental Benefit Analysis (NEBA) (AR 0963).

The FOSC also requested that the NEBA be applied to each submerged oil tactical area containing moderate and heavy accumulations of submerged oil. NEBA applications were conducted in May 2012, July 2012, and December 2012 (AR 0321, 0963, 1710).

Enbridge has performed short term aquatic toxicity tests (AR 1696). These tests did not conclusively identify strong indications of toxicity. Consideration of this led the SSCG to adopt the conservative presumption, only for the purposes of the development and application of the NEBA, that the oil had little or no aquatic toxicity.

While it was not the purpose of the NEBA process to make response action decisions, the process provided useful information about ecological impact and potential environmental benefit that the FOSC considered along with other factors when determining the most appropriate response action. U.S. EPA has reviewed the NEBA documents and has determined that its decision is consistent with the recommendations contained therein (AR 0963, 1710).

E. Other Factors

While the Michigan Department of Community Health has determined that human exposure to Line 6B oil will not likely result in serious human health effects, it recommends that the public avoid contact with the oil. Furthermore, recreational use of the river, such as by motorboats or canoes, can result in sheening. Removal of the submerged Line 6B oil from the river will minimize exposure to the public.

U.S. EPA also considered the negative aesthetic impacts of ongoing surface sheening of Line 6B oil; active recovery will reduce those impacts. Visual and physical aesthetic impacts also may constitute violations of state water quality standards. MCL 324.3109(1); Rule 323.1050, Rule 323.1100. Discharges of oil which violate state water quality standards constitute harmful quantities of oil pursuant to 40 C.F.R. § 110.3(a).

Failure to recover oil from the impoundments now, where it is available for recovery, may result in more complicated and more costly recovery efforts in the future if the oil migrates from or is washed downstream from the areas where it is now located.

F. Evaluation of Active Recovery Options

For all of the reasons explained above, U. S. EPA has determined that containment and active recovery, as opposed to monitoring and natural attenuation, is the most appropriate response action going forward. U.S. EPA prefers dredging over other active recovery options for the reasons discussed below.

1. Dredging

Dredging is appropriate in each of the impoundments and the sediment traps because these areas continue to exhibit increased locations poling as moderate or heavy. In the fall of 2010, Enbridge dredged the heaviest submerged oil accumulations at the Ceresco impoundment. The

dredging was effective in removal of moderate and heavy submerged oil from the target areas. An estimated 1400 gallons of oil were recovered from approximately 5600 cubic yards of dredged material. The dredging was performed in a controlled manner without significant impact to downstream areas or to the community (AR 0027). While the Ceresco dredging was successful, continuing migration since that dredging has resulted in the impoundments accumulating oil again. Dredging under this Order will likely substantially reduce the future risk of appreciable downstream migration from the impoundments. This is because successive poling reassessments demonstrate that no significant accumulation of moderate or heavy poling currently remain in the river above the Ceresco impoundment and other moderate and heavy footprints outside the dredge areas can be managed though the sediment traps.

2. Agitation

Agitation of sediments contaminated with submerged oil was performed during the fall of 2010 and all of 2011 throughout the river including all three major impoundment areas. The State of Michigan's Water Resource Division has indicated that it will not grant permits for future applications of agitation because of potential negative ecological impacts from turbidity and sedimentation. Agitation was not considered to be a viable recovery tactic in the NEBA applications and is not considered appropriate for active recovery in the impoundments.

3. Sheen Management

Sheen management is a recovery option in which the river is monitored for the appearance of sheen. When a sheen was observed, Enbridge would collect the sheen. Sheen management was the only recovery tactic implemented in 2012. Because this option was only implemented when and where sheen appeared, sheen management has resulted in no reduction of submerged oil footprint in the impoundments and in only nominal amounts of oil being recovered (AR 1024). Therefore, U.S. EPA prefers dredging, which has proven to be an effective method of removing the source oil, over sheen management.

H. Modification of the 2012 Sediment Trap Monitoring and Maintenance Plan

The Order modifies the 2012 Sediment Trap Monitoring and Maintenance Plan to require Enbridge to dredge the sediment traps which have exceeded the submerged oil trigger amounts specified in the plan. Five of the sediment traps already exceed those triggers; three of those traps are in the impoundments and two are outside those areas. U.S. EPA believes the sediment traps should be dredged, rather than cleaned out by agitation as previously required under the plan, because dredging has proved to be an effective recovery method and for the reasons discussed above. Enbridge will be required to obtain necessary permit authorization from MDEQ for the sediment trap work required by the Order.

The Order also modifies the plan in other minor respects, requires Enbridge to immediately comply with the plan, and requires Enbridge to continue complying with the plan once dredging is complete. If the triggers are reached in the sediments after the dredging required by this Order, those traps will be cleaned out by dredging.

III. Conclusions

A. Containment of Submerged Oil

The Order requires Enbridge to reinstall the E-4.0 containment system structures to prevent submerged oil in the Morrow Lake Delta from further migrating into Morrow Lake. The Order also requires Enbridge to prevent downstream migration of submerged oil from the impoundments until dredging is complete.

B. Dredging of Submerged Oil

The NCP states "[a]s appropriate, actions shall be taken to recover the oil or mitigate its effects. Of the numerous chemical or physical methods that may be used, the chosen methods shall be the most consistent with protecting public health and welfare and the environment." 40 C.F.R. § 300.310(b).

U.S. EPA has determined that active recovery is the response action most consistent with protecting public health and welfare and the environment. The demonstrations that this oil will not appreciably biodegrade, the 2012 ineffectiveness of sheen management throughout the impoundments, and previous successful dredging at Ceresco all point to dredging as the appropriate method of recovery. Three separate NEBA applications confirm that dredging within the impoundments should be evaluated further. U.S. EPA has done that evaluation and has determined that until these currently recoverable accumulations are dredged, they must be contained so that they are not washed downstream and made more difficult to recover.

IV. Coordination with Other Agencies and Stakeholders

U.S. EPA has coordinated closely with MDEQ regarding the work required by the Order. MDEQ has also participated closely in the NEBA process, including the NEBA applications to the impoundments. U.S. EPA and MDEQ have discussed the permitting requirements for containment and dredging required by the Order (AR 1345).

In addition, U.S. EPA has met and coordinated with the following other agencies and stakeholders as follows:

- Concerned citizens who have expressed their views on plans for additional cleanup within the Kalamazoo River (AR 1154, AR 1155, AR 1156, AR 1423, AR 1673);

- Local, state and Federal health departments regarding public health and public safety aspects of the discharge and the ensuing cleanup actions;

- Representatives of local water resource commissions, watershed protection organizations, and emergency management organizations in the City of Battle Creek, Calhoun and Kalamazoo Counties to make them aware of U.S. EPA's ongoing concerns regarding residual submerged oil in the river (AR 1189, 1204, 1205, 1240, 1254, 1282, 1292, 1343, 1456, 1546, 1562, 1632, 1651 and 1689);

- Representatives of the Kalamazoo River Watershed Council, who assisted U.S. EPA in developing and applying the NEBA (AR 0321, 0963, and 1710);

- The United States Geological Survey Water Science Centers from Wisconsin, Michigan and Nebraska have provided scientific support to U.S. EPA with respect to the NEBA, forensic chemistry and submerged oil transport (AR 0321, 0963, 1151, 1160, and 1710);

- U.S. Fish and Wildlife Service (FWS), which has worked closely with U.S. EPA to develop and apply the NEBA. FWS is also a lead member of the Natural Resource Trustee group (AR 0321, 0963 and 1710);

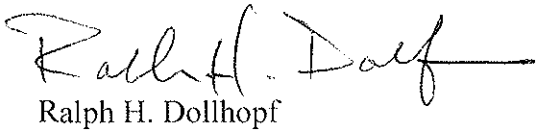
- The U.S. Army Corps of Engineers, which is assisting U.S. EPA in evaluating dredging and containment strategies (AR 1711); and

- Scientists from Environment Canada and Ministry of Oceans and Fisheries, who have supported U.S. EPA's understanding of diluted bitumen chemistry, fate and behavior in the environment (AR 1277).

The Order is consistent with the concerns expressed by the various organizations identified above. Additionally, U.S. EPA intends to continue to fulfill its NCP obligations to coordinate with the Trustees and to consult with MDEQ throughout the development of work plan discussions which will follow the issuance of the Order.

If you have any questions regarding this letter, please contact me immediately at (312) 301-0559, Karen L. Peaceman at (312) 353-5751 or Charles Mikalian at (312) 886-2242.

Sincerely,



Ralph H. Dollhopf
Federal On-Scene Coordinator

CC: Karen L. Peaceman, U.S.EPA, ORC
Charles Mikalian, U.S. EPA, ORC
Sheila McAnaney, U.S. EPA, ORC
Richard Karl, U.S. EPA
David Coburn, Steptoe & Johnson
William Hassler, Steptoe & Johnson
Dan Wyant, MDEQ
William Creal, MDEQ
Robert Wagner, MDEQ
Records Center, U.S.EPA, Region V

Enclosures (5)

Enbridge Line 6B Oil Discharge Site