Enbridge response to United States Army Corps of Engineers (the Corps) Information Request

Issued to Enbridge - October 19, 2018

Response Provided – November 19, 2018

IR ID	IR Description	Enbridge Response
a	We understand that the pipeline would not be lifted during installation of the proposed anchor supports. Explain the mechanism by which the proposed anchors would fulfill the project purpose of providing support to the pipeline if the pipeline is not lifted during installation. Provide any analysis of the support effectiveness of the proposed anchors.	The screw anchor support mechanism ("screw anchor") was designed in such a way that each support can be installed without lifting the pipeline during the installation process. Once installation is complete, the screw anchors fully support the pipeline. Specifically, as shown in Enbridge's permit application to the Corps, the screw anchor installation process involves drilling two helical piles into the lakebed. A saddle is then installed around the bottom of the pipe, and a spacer is installed over the top of the pipe. The saddle/spacer combination then connects to the piles installed into the lakebed through a support beam. The entire mechanism, which surrounds the circumference of the pipe and firmly connects the pipe to the lakebed through the piles, ensures that the pipe will stay in place after installation, preventing pipe movement. The screw anchor design allows for onsite assembly with no lateral or vertical loads required to be imposed on the pipeline during installation. Enbridge started to use screw anchors to support the Line 5 Dual Pipelines' crossing of the Straits of Mackinac (Straits) in 2002 - 2003. The lateral and vertical support provided by the screw anchor is designed to exceed the maximum applied loading on the pipeline. As such, screw anchor supports have largely replaced grout bags that were used to provide support to the Line 5 Dual Pipelines prior to that time. Since 2002 - 2003, screw anchor supports have been installed along the Dual Pipelines' crossing of the Straits for purposes of decreasing the length of unsupported pipe spans, thereby providing additional structural support to the pipeline along the Straits lakebed.
b-i	Discuss the extent to which the change in support method has been coordinated with and evaluated by the Pipelines and Hazardous Materials	PHMSA does not regulate the use of grout bags or screw anchors that may be used for buoyancy control or for purposes of pipeline support. Accordingly, PHMSA was not engaged with respect to the use of screw anchors within the Straits at the time that Enbridge began using screw anchors as a support method in 2002 - 2003. PHMSA regulation 49 CFR §195.110 does require that pipe be supported

	Safety Administration (PHMSA).	in such a way that the support does not cause excess localized stresses on the pipe, and that, in designing attachments to pipe, the added stress to the wall of the pipe must be computed and compensated for. Enbridge has confirmed that the screw anchor supports comply with this regulation, as well as ASME B31.4, Section 403, which specifies pipeline design requirements. PHMSA is fully aware of Enbridge's use of screw anchors as a method to support the Line 5 Dual Pipelines' crossing of the Straits. On October 27, 2018, a PHMSA inspector reviewed video of screw anchor installations taken by the Line 5 execution team divers and remotely operated vehicles (ROV) alongside a representative of the Michigan Public Service Commission. Additionally, another PHMSA inspector observed staged screw anchor installation equipment during PHMSA's June 19, 2018 visit to the Line 5 Straits execution works barge (to observe dent repair work). PHMSA has not expressed any concern or recommendations with respect to the use of screw anchors to support the Line 5 Dual Pipelines.
b-ii	Enbridge has a federal permit responsibility to maintain its authorized structures in good condition. Past anchor installation activities appear to have damaged the pipeline's protective coating. Provide detail on how you propose to ensure that the proposed anchors do not damage the pipeline during installation and in the subsequent period of operation. Discuss the frequency and methods of anticipated future monitoring activities to evaluate and address potential	Per Enbridge's summary of Ballard Marine Construction's ("BMC") screw anchor installation procedure: "Enbridge has contracted Ballard Marine Construction ("BMC") to install the anchors on the Straits of Mackinac lakebed. BMC is a marine infrastructure and utility contractor with over 40 years of experience. BMC's record of safety and success on over 10,000 individual projects has allowed it to grow [its] global reputation as an industry leader for clients in the pipeline, nuclear, hydroelectric, salvage, submarine cable, and public infrastructure industries." For details on how Enbridge proposes to ensure that the proposed anchors do not damage the pipeline during installation, please refer to **Enbridge's summary of the BMC Screw Anchor Installation Procedure**. This procedure was approved by the State of Michigan in Fall 2017 as an appropriate method by which screw anchors are to be installed so as to prevent and/or minimize coating damage to the Line 5 Dual Pipelines during the screw anchor installation process. BMC considers the procedure to be confidential business information and BMC has directed Enbridge to not disclose the procedure to any third-party. Accordingly, Enbridge has prepared the enclosed Summary of BMC's procedure. Additionally, on May 4, 2018, Enbridge provided the State of Michigan with an updated screw anchor installation procedure that included work instructions for the marine contractor to confirm the condition of the coating at each screw anchor support installation location. The contractor was required to note and report any coating damage for further analysis and repair as necessary. Please refer to the enclosed **Line 5 Coating Inspection During Screw Anchor Installation** document for details of the coating inspection procedure before, during, and after installation. As mentioned above, the **Line 5 Coating Inspection During Screw Anchor**

	pipeline coating damage caused by the screw anchors at the time of installation and in subsequent years of operation.	Installation document provides a step-by-step process that ensures consistent and efficient inspection of the coating of the Line 5 Dual Pipelines during each screw anchor installation. Regular corrosion monitoring, using in-line inspection methods, will provide Enbridge information on the condition of the pipeline coating while the line is in operation.
b-iii	Provide data on the existing clearance of the pipeline above the lakebed, in terms of the average and maximum values for each leg of the dual pipelines and for all proposed anchor locations. Provide similar information for the previously installed anchors. Alternatively, provide a profile drawing for each leg of the dual pipelines, showing this information. Provide an analysis of the extent to which the proposed anchors and the associated lengths of pipeline spanning the lakebed may increase susceptibility to anchor strikes or the vulnerability of the pipeline to damage if it is hooked by an anchor, relative to segments of the pipe that are resting on the lakebed. Discuss the practicability of alternative structures	Please refer to the enclosed 2018 Line 5 Straits Span Management Spreadsheets for information on the existing clearance of the pipeline above the Straits lakebed, including average and maximum values for each leg of the Dual Pipelines and for all proposed screw anchor installation locations. The 1953 Easement issued by the State of Michigan, which authorizes the Line 5 Dual Pipelines' crossing of the Straits of Mackinac, requires Enbridge to maintain the Dual Pipelines in a manner that prevents any unsupported span of the Dual Pipelines from exceeding 75'. In addition, the Consent Decree entered into between Enbridge and the US Environmental Protection Agency (EPA) specifies additional criteria for the installation of screw anchor supports on the Dual Pipelines. Enbridge and EPA have agreed to a modification to the Consent Decree concerning the criteria for screw anchor installation. A copy of the proposed modification is available at https://www.justice.gov/enrd/consent-decree/file/1086941/download. That modification is awaiting court approval, and is expected to be approved by the court in early 2019. Enbridge's current application to the Corps requests authorization to install screw anchors in accordance with the criteria specified in that forthcoming modification to the Consent Decree. Regular visual assessments are conducted by Enbridge to ensure the maximum span criteria under the Easement and Consent Decree are not exceeded, as span lengths fluctuate over time due to lakebed soil erosion and deposition cycles as a result of water flow velocities. This natural process modifies the lakebed conditions and accordingly modifies sediment coverage of the Line 5 Dual Pipelines and unsupported span lengths. The screw anchors, including their installation, does not make the pipeline more or less susceptible to being struck or hooked by an anchor given the minimal amount of sediment needed to be removed in order to install the saddle. Sediment erosion, which might make the pipeline more susceptible to a vessel anchor strike, is entirely a matter of natural water flows. Screw anchors are installed to provide vertical and lateral support to the pipeline to maintain structural support and meet regulatory requirements relative to the fluctuating span lengths; and thus serve only as a risk mitigation measure. Enbridge has been working closely with the State of Michigan to

	or methods that may reduce the vulnerability of the pipeline to anchor strike damage.	understand the risk of a ship anchor striking or hooking the pipeline. A report published by Enbridge to the State of Michigan on June 30, 2018 provides an assessment of alternative options to mitigate the risk of a vessel's anchor puncturing, dragging or otherwise damaging Enbridge's existing dual Line 5 pipelines across the Straits of Mackinac. Appendix 4 of that report consists of a report prepared by C-FER Technologies titled "Evaluation of Anchor Strike Prevention and Protection Measures for the Line 5 Crossing of the Mackinac Straits." The C-FER Technologies report includes discussion and analysis that considers the presence of the screw anchor supports. The report can be found publically at the following link: **https://mipetroleumpipelines.com/document/enbridge-reports-november-2017-agreement** In addition, on October 1, 2018, the U.S. Coast Guard and Department of Homeland Security issued a final rule "Regulated Navigation Area; Straits of Mackinac, Mackinaw City, MI" (Docket Number USCG–2018–0563), which became effective on October 31, 2018. This final rule prohibits vessels from anchoring or loitering within the Straits area without Coast Guard authorization, thus reducing the risk of an anchor strike. Enbridge provided support and feedback through the Coast Guard's rulemaking process. Further, in order to assist the Coast Guard in monitoring compliance with that regulation, Enbridge has agreed in its Second Agreement entered with the State of Michigan on October 4, 2018 to provide one-time funding of up to $200,000 to be used for the acquisition and installation of video cameras at the Straits.
c	Water Quality & Aquatic Organisms: The proposed excavation by pumping and water jetting would result in suspension and dispersal of sediment, which may adversely impact water quality and aquatic organisms. Discuss the practicability of alternative methods or measures that could minimize the suspension and dispersal of	The installation of the screw anchor supports may require the removal of lakebed sediment from underneath the pipe in order to allow for the installation of the saddle below the pipe. Enbridge's application to the Corps identified the following methods for the removal of the minimal amount of lakebed sediment necessary to install the saddle underneath the pipe: (i) water pumping; (ii) water jetting; and (iii) the use of hand tools. The three proposed options provide BMC with the flexibility needed to utilize the most appropriate method based on each screw anchor installation site. For example, water pumping is the preferred method for sandy areas, and water jetting is preferred for clay bottom areas. Water pumping will cause less suspended solids than water jetting. Excavating sand creates less suspended solids than clay. Hand tools may also be needed where water pumping or water jetting is not appropriate. Enbridge's observations at the Straits suggest that suspended solids settle out of the water column in a short period of time and having the flexibility to select the preferred excavation option for a given site is the best means to manage and minimize any impact resulting from suspended solids at the water depth of the installation activities.

	sediment. Address the potential for the lakebed sediment to contain contaminants, and provide any available sediment testing data.	Enbridge cannot install the screw anchor supports at all locations required by the Consent Decree without the ability to remove lakebed sediment from underneath the pipe. Thus, no alternative exists to the removal and disturbance of soil that may result in temporary suspension or dispersion of such sediment in the water column. Any potential impacts to water quality, including aquatic organisms, will be only temporary. Enbridge is not aware of any specific lakebed sediment studies that have been done in the vicinity of the Line 5 Dual Pipelines' crossing of the Straits; however, the Great Lakes Environment Assessment and Mapping (GLEAM) project has mapped several environmental stressors and lakebed sediment contaminant levels for the entire Great Lakes using data from Canadian and American sources. With respect to lakebed sediments, the GLEAM project has mapped three parameters (copper, mercury, and PCBs), two of which are listed impairments for both Lake Huron and Lake Michigan. Based on maps produced by GLEAM, the Straits of Mackinac have a relatively low concentration of these three parameters compared to the Great Lakes as a whole. Summary fact sheets for each of these are attached, and further information can be found at http://greatlakesmapping.org/great_lake_stressors/1 Installation of pipeline anchors and completion of other pipeline inspection activities within the Straits of Mackinac are not expected to introduce contaminants or exacerbate those contaminants that may already exist in the bottom sediments of the Project area.