STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

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In the matter of the application of **ENBRIDGE ENERGY, LIMITED PARTNERSHIP,** for authority to replace and relocate the segment of Line 5 crossing the Straits of Mackinac into a tunnel beneath the Straits of Mackinac, if approval is required pursuant to 1929 PA 16, MCL 483.1 *et seq*., and Rule 447 of the Commission's Rules of Practice and Procedure, R 792.10447, or the grant of other appropriate relief.	)	Case No. U-20763

At the July 7, 2022 meeting of the Michigan Public Service Commission in Lansing, Michigan.

PRESENT: Hon. Daniel C. Scripps, Chair
Hon. Tremaine L. Phillips, Commissioner
Hon. Katherine L. Peretick, Commissioner

ORDER

Background

On April 17, 2020, Enbridge Energy, Limited Partnership (Enbridge), filed an application (application) with supporting testimony and exhibits pursuant to Public Act 16 of 1929, MCL 483.1 *et seq*. (Act 16), and the Commission's Rules of Practice and Procedure, Mich Admin Code, R 792.10447 (Rule 447) requesting that the Commission grant Enbridge the authority for its project known as the Straits Line 5 Replacement Segment (Replacement Project), which involves constructing a replacement segment of the Line 5 pipeline (Line 5) that crosses the Straits of Mackinac (Straits). Enbridge sought *ex parte* approval of the application. In the alternative,

Enbridge requested a declaratory ruling confirming that it already has the requisite authority to construct the Replacement Project pursuant to the March 31, 1953 order in Case No. D-3903-53.1.

On April 22, 2020, the Commission issued an order in the instant case seeking comments on the threshold issue presented in the declaratory ruling request. The Commission also decided to hold Enbridge's application in abeyance while it considered the request for a declaratory ruling.

On June 30, 2020, the Commission issued an order in this case denying both *ex parte* approval of the application and the requested declaratory relief (June 30 order). The Commission also decided to read the record. June 30 order, p. 70. The Commission set this matter for a contested proceeding and invited the continued submission of comments.

On July 29, 2020, Enbridge filed a petition for rehearing of the June 30 order pursuant to Mich Admin Code, R 792.10437 (Rule 437). In the petition, Enbridge requested that the Commission rule on the petition for rehearing "at the time of the final order in the contested case hearing on its application, and only in the event that the Commission denies the application." Enbridge's petition for rehearing, p. 2, n. 2.

On August 12, 2020, a prehearing conference was held before Administrative Law Judge Dennis W. Mack (ALJ), at which intervention was granted to the Michigan Department of Attorney General (Attorney General); For Love of Water (FLOW); the Michigan Environmental Council (MEC), Grand Traverse Band of Ottawa and Chippewa Indians (GTBOC), Tip of the Mitt Watershed Council, and National Wildlife Federation (together, the MEC Coalition); Bay Mills Indian Community (Bay Mills); Environmental Law & Policy Center (ELPC) and Michigan Climate Action Network (MiCAN) (together, ELPC/MiCAN); Little Traverse Bay Bands of Odawa Indians (LTBB); Nottawaseppi Huron Band of the Potawatomi (NHBP); Michigan Laborers' District Council (MLDC); Michigan Propane Gas Association and the National Propane

Gas Association (together, the Associations); and the Mackinac Straits Corridor Authority (MSCA). Enbridge and the Commission Staff (Staff) also participated. On August 13, 2020, the ALJ adopted a schedule for the case.

On August 19, 2020, the MEC Coalition, the Staff, Bay Mills, and ELPC/MiCAN filed answers to Enbridge's petition for rehearing.

On August 24, 2020, the Commission held a public hearing on the application, where the Commissioners listened to oral comments from members of the public. Written comments have been filed in this docket throughout the pendency of the case.

On September 2, 2020, Enbridge filed a motion *in limine* (September 2 motion *in limine*). On September 23, 2020, responses to the September 2 motion *in limine* were filed by the Staff, ELPC/MiCAN, FLOW, the Attorney General, the Associations, and the MEC Coalition jointly with Bay Mills. On September 30, 2020, the ALJ held a hearing on the September 2 motion *in limine*.

On October 23, 2020, the ALJ issued a ruling granting the motion in part, and denying it in part (the initial ruling). On November 6, 2020, Bay Mills, the MEC Coalition, ELPC/MiCAN, FLOW, and the Attorney General[1] filed applications for leave to appeal the initial ruling under Mich Admin Code, R 792.10433 (Rule 433). On November 20, 2020, Enbridge, the Associations, the Staff, and MSCA filed responses to the applications for leave to appeal.

On December 9, 2020, the Commission issued an order in this case (December 9 order) remanding the September 2 motion in limine to the ALJ in light of Governor Gretchen Whitmer's November 13, 2020 issuance of a notice of revocation of the existing Line 5 easement in the

[1] The Attorney General did not file her own application, but filed a notice that she joins in the other four filed applications.

Straits (Notice), which took place during the briefing on the applications for leave to appeal. The ALJ thereafter set a revised schedule for the case.

On December 23, 2020, Enbridge filed a motion requesting approval to file supplemental direct testimony and exhibits and, on that same date, filed the proposed supplemental direct testimony and exhibits. On January 8, 2021, the Staff filed a response in support of Enbridge's motion. On January 11, 2021, the ALJ granted Enbridge's motion to file supplemental direct testimony and exhibits, which appear in the docket as filing #U-20763-0509.

Initial briefs on the remanded September 2 motion in limine were filed on January 15, 2021, and reply briefs were filed on January 29, 2021.[2] The ALJ held a hearing on the remanded September 2 motion in limine on February 5, 2021.

On February 23, 2021, the ALJ issued a ruling granting the remanded September 2 motion in limine in part and denying it in part, consistent with the initial ruling (the ruling on remand). On March 9, 2021, Bay Mills,[3] GTBOC, LTBB, and NHBP; ELPC/MiCAN; FLOW; and the MEC Coalition[4] filed applications for leave to appeal the ruling on remand under Rule 433. On March 23, 2021, MLDC, Enbridge, the Associations, the Staff, and MSCA filed responses to the applications for leave to appeal the ruling on remand.

[2] At the time of the briefing on remand, the alignment of certain parties changed. At the time of the filing of the second round of applications for leave to appeal, the alignment of certain parties changed again, as described below.

[3] For this stage of the proceeding, Bay Mills was joined by GTBOC, LTBB, and NHBP, and they refer to themselves as the Tribal Intervenors in the application for leave to appeal.

[4] At this stage of the proceeding, the MEC Coalition includes MEC, Tip of the Mitt Watershed Council, and the National Wildlife Federation.

On April 21, 2021, the Commission issued an order in this case (April 21 order) addressing both sets of appeals. The Commission granted the applications for leave to appeal and granted the requested relief in part and denied it in part.

On May 21, 2021, the Tribal Intervenors filed a petition for rehearing of the April 21 order pursuant to Rule 437. On June 11, 2021, Enbridge and the Associations filed answers to the Tribal Intervenors' petition for rehearing.

On September 14, 2021, direct testimony and exhibits were filed by LTBB, the Staff, MSCA, NHBP, Bay Mills, and ELPC/MiCAN.

On December 14, 2021, rebuttal testimony and exhibits were filed by Enbridge, the Staff, the Associations, Bay Mills, and ELPC/MiCAN.

On December 21, 2021, Enbridge filed motions to strike portions of the direct testimony of Dr. Charles E. Cleland, Peter A. Erickson, and Jacques LeBlanc, Jr.; portions of the direct testimony and exhibits of Frank Ettawageshik, Whitney B. Gravelle, Dr. Peter Howard, and John Rodwan; and portions of the direct and rebuttal testimony of Dr. Elizabeth A. Stanton. On that same date, Enbridge filed a motion to strike portions of the rebuttal testimony of Richard Kuprewicz. On January 11, 2022, NHBP, the Staff, Bay Mills, the Associations, and ELPC/MiCAN filed responses to the motions to strike.

On January 13, 2022, the ALJ issued a ruling on the motions (January 13 ruling), determining that: (1) Enbridge's motion to strike portions of Dr. Cleland's direct testimony and Exhibit BMC-35 is granted; (2) Enbridge's motion to strike portions of Mr. Kuprewicz's rebuttal testimony is denied, but Enbridge's requested alternative relief to file surrebuttal is granted; (3) Enbridge's motion to strike portions of Mr. LeBlanc's direct testimony is granted; (4) Enbridge's motion to strike portions of Ms. Gravelle's testimony and Exhibits BMC-1 through

BMC-5 is granted; (5) Enbridge's motion to strike portions of Mr. Ettawageshik's direct testimony and Exhibits BMC-17 through BMC-30 is granted; (6) Enbridge's motion to strike Dr. Howard's direct testimony, in its entirety, and Exhibits ELP-8 through ELP-10 is denied; (7) Enbridge's motion to strike portions of Mr. Erickson's direct testimony is granted; (8) Enbridge's motion to strike portions of Dr. Stanton's direct and rebuttal testimony is denied; and (9) Enbridge's motion to strike portions of Mr. Rodwan's direct testimony and Exhibit NHBP-3 is granted. *See*, January 13 ruling, pp. 16-18.

On January 19, 2022, Bay Mills filed a motion to file sur-surrebuttal of Mr. Kuprewicz (January 19 motion) or:

> in the alternative to take official notice under Rule 428, R. 792.10428 [of the Commission's Rules of Practice and Procedure], of a Joint Industry Report titled *Enhanced Girth Weld Performance for Newly Constructed Grade X70 Pipeline*—the exact grade of pipeline to be used in the Tunnel Project—and which was reviewed, approved, and signed by an Enbridge representative during the pendency of this contested case.

January 19 motion, p. 2. On January 20, 2022, the ALJ granted Bay Mills' motion to bind in the rebuttal, surrebuttal, and sur-surrebuttal of Mr. Kuprewicz and admitted Exhibits BMC-37 and BMC-43. On January 24, 2022, MSCA filed a motion to file sur-surrebuttal of Daniel M. Cooper. On that same date, the ALJ granted MSCA's motion to bind in the sur-surrebuttal of Mr. Cooper.

On February 18, 2022, Bay Mills,[5] LTBB, GTBOC, and NHBP; ELPC/MiCAN; Enbridge; FLOW; MLDC; MSCA; the Staff; and the Associations filed initial briefs. On March 11, 2022, the Tribal Nations, ELPC/MiCAN, Enbridge, FLOW, the MEC Coalition, the Staff, and the Associations filed reply briefs.

[5] For this stage of the proceeding, Bay Mills was joined by GTBOC, LTBB, and NHBP, and they refer to themselves as the Tribal Nations in their initial brief.

Discussion

As set forth in its title, the purpose of Act 16 "is to regulate the business of carrying or transporting, buying, selling, or dealing in crude oil or petroleum or its products" and "to provide for the control and regulation of all corporations, associations, and persons engaged in such business, by the Michigan public service commission . . . ." Section 1(2) of Act 16 states, in relevant part:

> A person exercising or claiming the right to carry or transport crude oil or petroleum, or any of the products thereof . . . by or through pipe line or lines . . . or exercising or claiming the right to engage in the business of piping, transporting, or storing crude oil or petroleum, or any of the products thereof . . . does not have or possess the right to conduct or engage in the business or operations, in whole or in part, or have or possess the right to locate, maintain, or operate the necessary pipe lines, fixtures, and equipment belonging to, or used in connection with that business on, over, along, across, through, in or under any present or future highway, or part thereof, or elsewhere, within this state, or have or possess the right of eminent domain, or any other right, concerning the business or operations, in whole or in part, except as authorized by and subject to this act.

MCL 483.1(2). In addition, pursuant to Section 8 of Act 16, the Commission has authority to make rules, regulations, and orders to give effect to and enforce the provisions of Act 16.

Thus, based on the language of Act 16, the Commission has broad jurisdiction over the construction and operation of pipeline facilities in Michigan and has the "authority to review and approve proposed pipelines, and to place conditions on their operations." March 7, 2001 order in Case No. U-12334 (March 7 order), p. 13 (citing *Lakehead Pipe Line Co v Dehn*, 340 Mich 25, 37; 64 NW2d 903 (1954)); *see also*, January 31, 2013 order in Case No. U-17020 (January 31 order), p. 5, and June 30 order, p. 59. Furthermore, "Act 16 provides ample authority to conduct a qualitative review of [an] application and to determine whether construction of the proposed pipeline system is necessary, reasonable, and in the public interest." March 7 order, p. 14. More specifically, when an application is filed pursuant to Act 16, the Commission must determine

whether: (1) the applicant has demonstrated a public need for the proposed pipeline system, (2) the project is designed and routed in a reasonable manner, and (3) the project meets or exceeds current safety and engineering standards. *See*, March 7 order, pp. 14-17.

1. Is the Proposed Tunnel and Pipeline Project Designed and Routed in a Reasonable Manner?

In this case, Enbridge filed an application and supporting exhibits pursuant to Act 16 and Rule 447 requesting that the Commission grant Enbridge authority to construct the Replacement Project, which is "a single, 30-inch diameter pipe . . . located within a concrete-lined tunnel below the lakebed of the Straits" to "replace the current crossing — consisting of two, 20-inch diameter pipes referred to as the Dual Pipelines" for the purpose of "alleviat[ing] an environmental concern to the Great Lakes raised by the State of Michigan relating to the approximate four miles of Enbridge's Line 5 that currently crosses the Straits . . . ." Application, pp. 1-2. For prong (2) of its Act 16 analysis, the Commission must determine whether Enbridge's proposed Replacement Project is designed and routed in a reasonable manner as a replacement for the dual pipelines. Particularly given that at least a portion of Enbridge's justification for the proposed tunnel and pipeline project is to alleviate environmental concerns connected with the dual pipelines, the Commission must have sufficient evidence on the record regarding the current condition, maintenance, and safety of the dual pipelines and the future maintenance and safety of the dual pipelines in order to effectively determine whether the tunnel and pipeline segment proposed for the Replacement Project are designed and routed in a reasonable manner, and whether the proposed Replacement Project fulfills the alleged purpose of reducing the environmental risk to the Great Lakes posed by the dual pipelines. Although there is information on the record regarding the current condition, maintenance, and safety of the dual pipelines and the future

maintenance and safety of the dual pipelines, additional evidence must be filed in the record for the Commission to complete prong (2) of its Act 16 analysis.

The Commission finds that the information set forth in subsections a-d regarding the current condition, maintenance, and safety of the dual pipelines and the future maintenance and safety of the dual pipelines has been provided on the record in this case.

a. The Agreement Between the State of Michigan and Enbridge Energy, Limited Partnership and Enbridge Energy Company, Inc.

On November 27, 2017, the State of Michigan, Enbridge, and Enbridge Energy Company, Inc., executed an agreement (First Agreement) regarding the segments of Line 5 that are located within the State of Michigan. The First Agreement requires that these segments "be operated and maintained in compliance with all applicable laws that are intended to protect the public health, safety, and welfare and prevent pollution, impairment, or destruction of the natural resources of the State of Michigan, including the unique resources of the Great Lakes[.]" Exhibit A-8, p. 1. In addition, the First Agreement states that "Enbridge will temporarily shut-down the operation of the Dual Pipelines while 'Sustained Adverse Weather Conditions,' as that term is defined in Appendix 1 to this Agreement, remain in effect in the Straits. The procedure that Enbridge is to employ during the presence of Sustained Adverse Weather Conditions is set forth in Appendix 1." *Id*., p. 4.

Sustained Adverse Weather Conditions (SAWC) are defined as "[c]onditions in which median wave heights in the Straits of Mackinac over a continuous 60-minute period are greater than 8 feet based on 'Near-real Time Data,' or in its absence 'Modeled Data.'" Appendix 1 to the First Agreement, Exhibit A-8, p. 8. Appendix 1 also describes the procedures for SAWC:

1. Enbridge or its consultant "will continuously monitor Near-real Time Data, or in its absence Modeled Data" to determine whether SAWC are occurring in the Straits;

2. When SAWC "are forecasted based on Forecasted Data, the Enbridge Monitor will inform the Control Center Operations Shift Supervisor" and the Control Center Operations will prepare for a potential unplanned shut down of Line 5 at the Straits;

3. If near-real time data or modeled data show that SAWC "are occurring at the Straits, the Enbridge Monitor will immediately contact the Control Center Operations Shift Supervisor;"

4. The "Control Center Operations Shift Supervisor will promptly call the Enbridge Great Lakes On-Call Manager to advise them" that SAWC are occurring at the Straits;

5. No later than 15 minutes after notification, the Great Lakes On-Call Manager shall request that Line 5 be shut down. However, "if real time conditions at the Straits determined by the Enbridge Great Lakes On-Call Manager" demonstrate that SAWC are not occurring, "the Great Lakes On-Call Manager will advise the Control Center Operations Shift Supervisor that Line 5 should not be shut down;"

6. "Unless advised otherwise by the Enbridge Great Lakes On-Call Manager as per step 5 above, Control Center Operations will perform a controlled emergency shut down of Line 5 and isolate the segment across the Straits[;]"

7. After Line 5 is shut down, "the Enbridge Monitor will continuously monitor Near-real Time Data" or modeled data to determine whether SAWC continue in the Straits;

8. "When Near-real Time Data, or in its absence Modeled Data, indicates the Sustained Adverse Weather Conditions no longer exist at the Straits, the Enbridge Great Lakes On Call Manager and Control Center Operations Admin On Call will authorize the restart of Line 5[;]" and

9. "Control Center Operations will safely restart Line 5."

Appendix 1 to the First Agreement, Exhibit A-8, pp. 8-9.

The First Agreement also states that "Enbridge will provide the State [of Michigan] with a copy of the report that is required to be prepared and submitted to the United States in accordance with Paragraphs 81-83 of the federal consent decree to assess the feasibility of installing an

alternative leak detection system at the Straits (the 'Consent Decree Report')." Exhibit A-8, p. 4.

Next, the parties agree that:

> by June 30, 2018, Enbridge will review and assess any additional technologies that are not assessed in the Consent Decree Report to determine whether such other technologies would provide a viable additional benefit over and above the technologies that are already in place on the Dual Pipelines or those that Enbridge plans to implement to detect leaks as a result of the Consent Decree Report. Enbridge will also assess at the same time any technologies not currently in place that would allow it to detect damage to the coating of the Dual Pipelines. To the extent that Enbridge identifies any studied technologies that provide a viable additional benefit to detect leaks or damage to the coating of the Dual Pipelines, Enbridge will: (i) by August 30, 2018, file the necessary applications to seek all authorizations and approvals necessary to install or apply such technologies; (ii) proceed with the installation or application of such technologies no later than 365 days after receiving all approvals and authorizations necessary for their installation, or, to the extent that no approvals or authorizations are required, as expeditiously as practicable following the identification of the technologies.

Id.

Furthermore, the First Agreement states that:

> No later than June 30, 2018, Enbridge will complete a report that assesses options to mitigate the risk of a vessel's anchor puncturing, dragging, or otherwise damaging the Dual Pipelines. That report will, at a minimum, assess the following options: (i) measures to enhance shipping communication and warning technologies; and (ii) the use of protective barriers to further protect the Dual Pipelines from any risks posed by a vessel anchor coming into direct contact with the Dual Pipelines. The report will assess the costs and engineering considerations associated with each alternative, as well as the potential environmental impacts that may result from the construction, operation, and maintenance of the alternatives. The report shall also identify a proposed timeline for seeking all regulatory approvals. Enbridge shall proceed with detailed design and installation of the most appropriate option within 180 days of receiving all authorizations and approvals necessary for the construction of that option.

Id., pp. 4-5.

The First Agreement states that it shall be effective until: (1) the Line 5 segment that crosses the St. Clair River is replaced, (2) Enbridge provides the State of Michigan with a report regarding the installation of an alternative leak detection system at the Straits and a review and assessment of

additional technologies not evaluated in the report, (3) Enbridge provides the State of Michigan with a report regarding the evaluation and implementation of measures to mitigate potential vessel anchor strikes, (4) Enbridge provides the State of Michigan with a report assessing the replacement of the Dual Pipelines in the Straits, and (5) Enbridge completes an evaluation of Line 5 water crossings at locations other than the Straits. The First Agreement will terminate automatically with "(i) the permanent discontinuation of service by Enbridge on the Dual Pipelines; or (ii) placing into operation a replacement pipeline or pipelines across the Straits that has been approved by the State pursuant to applicable permitting procedures." *Id*., p. 6. Finally, the First Agreement states that, until the agreement terminates automatically, the parties shall cooperatively facilitate the measures set forth in the agreement and Enbridge shall temporarily shut down Line 5 in the Straits during SAWC.

b. The Second Agreement Between the State of Michigan, Michigan Department of Environmental Quality, and Michigan Department of Natural Resources and Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc., and Enbridge Energy Partners, L.P.

On October 3, 2018, the State of Michigan, Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR), Enbridge, Enbridge Energy Company, Inc., and Enbridge Energy Partners, L.P., executed an agreement that "results from, and is intended to fulfill, the parties' obligations under Paragraph I.H." of the First Agreement (Second Agreement). Exhibit A-10, p. 1. Among other things, the Second Agreement reiterates that "the segments of Line 5 located within Michigan must be operated and maintained in compliance with all applicable laws that are intended to protect the public health, safety, and welfare and prevent pollution, impairment, or destruction of the natural resources of the State of Michigan, including the unique resources of the Great Lakes[.]" *Id*. In addition, the Second Agreement states that it supersedes the First Agreement in its entirety.

The Second Agreement states that "[u]ntil such time that the Dual Pipelines are replaced, Enbridge has and will continue to temporarily shut-down the operation of the Dual Pipelines while 'Sustained Adverse Weather Conditions,' as that term is defined in Appendix 1 to this Second Agreement, remain in effect in the Straits, using the procedure set forth in Appendix 1." Exhibit A-10, pp. 4-5. However, the parties stipulate that:

> should median wave heights in the Straits over a continuous 60-minute period exceed 6.5 feet in height based upon "Near-real time Data" or in its absence, "Modeled Data," as those terms are defined in Appendix 1, Enbridge shall ensure that at least one Enbridge employee is available and capable of traveling to the Line 5 North Straits valve station in less than 15 minutes.

Id., p. 5. The Second Agreement also states that the State of Michigan agrees to install radar technology to provide near real-time data to detect wave height in the Straits. The Second Agreement directs the State of Michigan to share this data with Enbridge so that it may be applied to the SAWC procedures as set forth in the Second Agreement and Appendix 1 to the Second Agreement.

Pursuant to Paragraph I.D. of the First Agreement, Enbridge agreed to evaluate underwater technologies to enhance leak detection and assess the coating condition of the dual pipelines. Accordingly, the Second Agreement states that "Enbridge will conduct a Close Interval Survey ('CIS') of the Dual Pipelines every two years, so long as the Dual Pipelines remain in operation. Enbridge plans to conduct a CIS on the Dual Pipelines in 2018, and shall complete the next CIS within two calendar years from the date on which that CIS is conducted by Enbridge, and then every two calendar years thereafter." Exhibit A-10, p. 5. Additionally, in the Second Agreement, the parties stipulate that "[t]he United States Coast Guard ('Coast Guard') has proposed the establishment of a Regulated Navigation Area pursuant to 33 CFR 165 in the Straits of Mackinac that would prohibit vessels from anchoring or loitering within that Area without Coast Guard

authorization." Exhibit A-10, p. 5. The Second Agreement states that Enbridge shall provide up to $200,000 for the acquisition and installation of video cameras at the Straits to assist the Coast Guard in enforcing this provision.

Next, the Second Agreement states that:

> Enbridge has in recent years undertaken a variety of additional measures to enhance the safety of Line 5 in Michigan and to improve its emergency preparedness and response capabilities. Such measures, as listed in Appendix 4 to this Agreement, include but are not limited to: (i) the purchase and placement of additional emergency response equipment; (ii) the positioning of permanent personnel in proximity to the Straits; and (iii) improvements to personnel response times to manually close valves in proximity to the Straits. Enbridge agrees that it will continue to implement the measures listed in Appendix 4 so long as it continues to operate the portions of Line 5 to which they apply.

Id., p. 8.

Finally, the parties agree that after the Replacement Project is complete and placed into service, Enbridge will permanently deactivate the dual pipelines. Specifically, the Second Agreement explains that:

> At a minimum, any portion of the Dual Pipelines that remains in place after deactivation shall be thoroughly cleaned of any product or residue thereof and the ends shall be permanently capped to the satisfaction of the State [of Michigan], which shall not be unreasonably withheld. The State [of Michigan] and Enbridge agree that decisions regarding the method of deactivation, including potential removal of the Dual Pipelines should take into account short- and long-term effects of the deactivation method options and associated sediment and water quality disturbance on natural resources, particularly fishery resources, in proximity to the Straits. The options include: (a) abandoning in place the entire length of each of the Dual Pipelines; or (b) removing from the Straits the submerged portions of each of the Dual Pipelines that were not fully buried in a ditch and placed under cover near the shoreline of the Straits at the time of initial construction.

Id., pp. 6-7.

The Second Agreement states that it shall be effective until: (1) the Line 5 segment that crosses the St. Clair River is replaced, (2) the measures to mitigate potential vessel anchor strikes are implemented, and (3) Line 5 water crossings other than the Straits are identified. However, the

parties stipulate that the following conditions remain in effect: (1) Enbridge will continue to work cooperatively with the State of Michigan "concerning the operation and maintenance of Line 5 located in the State of Michigan," (2) Enbridge will continue to temporarily shut down Line 5 in the Straits during SAWC pursuant to the circumstances and procedures set forth in the Second Agreement, (3) Enbridge will continue to conduct a CIS every two years so long as the dual pipelines are being operated, (4) Enbridge will continue to "maintain in force financial assurance mechanisms that meet or exceed the $1,878,000,000 estimate of Enbridge's potential total quantifiable response liability for a worst-case discharge from the Dual Pipelines that is identified in the Independent Risk Analysis[,]" and (5) Enbridge will continue to implement measures listed in Appendix 4 to the Second Agreement so long as the dual pipelines are operational. Exhibit A-10, pp. 3-4, 8.

c. The Third Agreement Between the State of Michigan, Michigan Department of Environmental Quality, and Michigan Department of Natural Resources and Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc., and Enbridge Energy Partners, L.P.

On December 19, 2018, the State of Michigan, MDEQ, MDNR, Enbridge, Enbridge Energy Company, Inc., and Enbridge Energy Partners, L.P., executed an agreement that "results from, and is intended to fulfill, the parties' obligations under Paragraph I.G. of the Second Agreement" (Third Agreement). Exhibit A-1, p. 1. The Third Agreement states that:

> 4.1 The State [of Michigan] agrees that Enbridge may continue to operate the Dual Pipelines, which allow for the functional use of the current Line 5 in Michigan, until the Tunnel is completed, and the Straits Line 5 Replacement segment is placed in service within the Tunnel, subject to Enbridge's continued compliance with all of the following:
> (a) The Second Agreement;
> (b) The Tunnel Agreement;
> (c) This Third Agreement;
> (d) The 1953 Easement; and
> (e) All other applicable laws, including those listed in Section V of the Second Agreement.

* * *

4.3 Additional measures to assure the integrity of Dual Pipelines:

(a) Enbridge will implement an enhanced inspection regime for the Line 5 Dual Pipelines beginning in 2024 or sooner as specified in Appendix 1, attached to his [sic] Third Agreement, and continuing while the Line 5 Dual Pipelines are still in use. If the Line 5 Dual Pipelines are still in use in 2026, Enbridge will conduct a hydrotest (or an equally reliable alternative technology for confirming integrity and material strength) of the Dual Pipelines unless the Tunnel and the Straits Line 5 Replacement Segment are expected to be completed and operational on or before December 31, 2026. Reports of the inspections will be made available to the State of Michigan for review. The inspection regime as described will be used to evaluate whether agreed upon technical criteria are being met. The enhanced inspection regime and the agreed upon criteria are specified in attached Appendix 1.

Exhibit A-1, pp. 4-5.

Regarding the pipeline coatings, Section 5.2 of the Third Agreement states that:

(a) Enbridge is committed to completing the implementation of the State [of Michigan]-approved plan for visual inspection of pipeline coatings at all locations on the Dual Pipelines where screw anchor supports have been installed. Enbridge will promptly repair the coating at any and all locations where Bare Metal is identified as a result of such visual inspection. Enbridge will take all reasonable efforts to complete implementation by October 30, 2019.
(b) Enbridge will, not later than March 31, 2019, submit to the State [of Michigan] for review and approval, a work plan to, in conjunction with the Close Interval Surveys required under Section I.D of the Second Agreement, visually inspect pipeline coatings at sites to be specified in the work plan along the Dual Pipelines and to repair the coating at any and all sites where Bare Metal is identified. The work plan will include a proposed implementation schedule. Enbridge will implement the State [of Michigan]-approved plan in accordance with the approved schedule.
(c) If at any time, any other area(s) of coating damage along the Dual Pipelines where Bare Metal is identified, Enbridge will repair the identified area(s) as soon as practicable thereafter. Enbridge will notify the State [of Michigan] within thirty (30) days after any Bare Metal is identified, and again thirty (30) days after the Bare Metal is repaired.
(d) The State [of Michigan] agrees, based upon currently available information, that Enbridge's compliance with the requirements under this Section 5.2 satisfies the requirements of Paragraph A (9) of the 1953 Easement.

Id., p. 6.

Furthermore, Section 5.3 of the Third Agreement provides specific requirements regarding the maximum span of unsupported pipe:

> (a) Based upon currently available information, there are no locations along the Dual Pipelines where the span or length of unsupported pipe exceeds the seventy-five (75) feet maximum specified in Paragraph (A) (10) of the 1953 Easement.
> (b) Until the Dual Pipelines are permanently decommissioned, Enbridge will continue to visually inspect the Dual Pipelines at least every two (2) calendar years to verify that no unsupported spans exceed the specified maximum. If at any time an unsupported span exceeding the maximum is identified, Enbridge will, within thirty (30) days after receiving the final report from the third-party contractor performing such inspection where a span exceedance is identified, submit to the State [of Michigan] for review and approval, a work plan to promptly eliminate the exceedance through installation of additional anchor supports or other suitable means. Enbridge will implement the work plan as soon as practicable after receiving all necessary federal or State permits or approvals required to conduct work to eliminate the exceedance.
> (c) As additional means of preventing exceedances of the maximum span, Enbridge will continue to implement the span management measures included in the federal Consent Decree, as amended, while the federal Consent Decree remains in effect.
> (d) The State [of Michigan] agrees, based upon currently available information, that Enbridge's compliance with the requirements under this Section 5.3 satisfies the requirements of Paragraph A (10) of the 1953 Easement.

Id., pp. 6-7.

Then, regarding the decommissioning of the dual pipelines, the Third Agreement states that:

> 7.1 Enbridge agrees that as soon as practicable following completion of the Tunnel and after the Straits Line 5 Replacement Segment is constructed and placed into service by Enbridge, Enbridge will cease operation of the Dual Pipelines and permanently deactivate the Dual Pipelines.
>
> 7.2 Consistent with Paragraphs E, H, and Q of the 1953 Easement, the procedures, methods, and materials for replacement, relocation, and deactivation of the Dual Pipelines are subject to the written approval of the State [of Michigan], which the State [of Michigan] agrees shall not be unreasonably withheld. At a minimum, any portion of the Dual Pipelines that remains in place after deactivation shall be thoroughly cleaned of any product or residue thereof and the ends shall be permanently capped to the satisfaction of the State [of

Michigan], which shall not be unreasonably withheld.

7.3 The State [of Michigan] and Enbridge agree that decisions regarding the method of deactivation, including potential removal of the Dual Pipelines should take into account short- and long-term effects of the deactivation method options and associated sediment and water quality disturbance on natural resources, particularly fishery resources, in proximity to the Straits. The options include:

(a) abandoning in place the entire length of each of the Dual Pipelines; or

(b) removing from the Straits the submerged portions of each of the Dual Pipelines that were not fully buried in a ditch and placed under cover near the shoreline of the Straits at the time of initial construction.

Id., pp. 7-8.

The Third Agreement shall be effective until: (1) the dual pipelines are decommissioned; (2) the State of Michigan terminates the Third Agreement after a material breach of the agreement, there are dispute resolution proceedings, and "the final judicial resolution of the dispute is in favor of the State [of Michigan]'s position that the Agreement should be terminated;" or (3) Enbridge terminates the Third Agreement because there is a court order or direction from a governmental entity directing Enbridge to shut down the dual pipelines or Enbridge has voluntarily shut down the dual pipelines. *Id*., pp. 9-10.

d. Other Information on the Record

On October 26, 2017, Dynamic Risk provided to the State of Michigan a report entitled "Alternatives Analysis for the Straits Pipelines" (Alternatives Analysis). Dynamic Risk states that the "[t]he scope of work addressed within the analysis includes an independent review of the risks associated with Enbridge Pipelines' existing Line 5 20-in. pipeline crossings of the Straits of Mackinac as well as a technical evaluation of each of the alternatives contemplated by the State [of Michigan][.]" Exhibit ELP-24, p. 4. According to the Alternatives Analysis, the principal threats to the dual pipelines are vortex-induced vibration (VIV), incorrect operations, anchor hooking, and

spanning stress; however, Dynamic Risk found anchor hooking to be the most significant threat, "representing more than 75% of the annualized total (all-threat) failure probability . . . ." *See*, *id*., p. 28.

To begin its analysis, Dynamic Risk considers the elements of maintaining the dual pipelines "as a baseline against which all other alternatives could be evaluated." *Id*., p. 6. One of the elements examined by Dynamic Risk is the coating on the dual pipelines. In the Alternatives Analysis, Dynamic Risk explains that the dual pipelines have a coal tar enamel (CTE) coating. Dynamic Risk notes that:

> There has been some evidence that the outer wrap has, at some locations, become separated from the underlying coating material. While separation of the outer wrap is not unusual in CTE coatings, and does not necessarily represent or correspond to an opening (or "holiday") in the corrosion coating which lies underneath the outer wrap, recent inspections associated with the biota investigations have identified three locations where such holidays were found. These three locations (two on the East Straits Crossing segment and one on the West Straits Crossing segment) collectively represent an area of 3.25 ft^2 (0.30 m^2) where coating had been removed, resulting in exposed bare pipe metal. One additional location exists at which inspection results are inconclusive, and remain under investigation at the time of writing. At least one of the coating holiday locations has been attributed to mechanical damage caused by activities related to screw anchor installation in 2014.
>
> While Enbridge reported that there was no evidence of corrosion at any of the coating holiday locations, the above information suggests that at least one of these locations existed at the time of the 2016 CPCM [cathodic protection current mapping] survey, implying that the findings of the CPCM tool may not be considered as definitive evidence that the coating in the Straits Crossing segments is well bonded to the pipe.
>
> At the time of writing of this report, the investigation of the nature, cause and full extent of the coating holidays is ongoing, so it would be inappropriate to speculate on any of the above aspects of the coating condition, and a more complete and definitive evaluation of coating condition will be available upon completion of the biota investigations (expected shortly after the delivery date of this report).

Exhibit ELP-24, p. 15. Dynamic Risk also states that, according to the 2016 CPCM, the "surface area of bare metal pipe requiring cathodic protection is small[,]" and notes that a "lack of evidence

of any external corrosion to date, based on in-line inspection and visual inspection, even at areas where coating holidays have been identified, is indicative of an effective CP [cathodic protection] system." *Id*., pp. 15-16.

Next, Dynamic Risk reviews threats related to the spanning of the dual pipelines, including "fatigue caused by vortex-induced vibration (VIV) at span locations" and "over-strain caused by stresses due to unsupported span length (gravity and water current drag forces)." Exhibit ELP-24, p. 16. Dynamic Risk states that:

> the recent 2016 Baker Hughes Geopig Inspection, and the 2016 Oceaneering tethered Phased Array / Time of Flight Diffraction weld zone inspection are most relevant to a determination of historical span-related damage. Inspection reports from these in-line inspections were reviewed with a particular focus on the sections of pipeline that lie on top of lake bed, where historical spans might have resulted in deformations.
>
> An evaluation of the above inspection data indicated that there is no evidence that historical spans have degraded the integrity of either the East or West crossing. Consequently, the spanning analysis was based on an existing span length data set obtained from seven underwater inspections of the East and West segments spanning the years 2005 – 2016, which serves as a conservative basis for developing a span length distribution for future years. The approach adopted for spanning is based on the knowledge that the pipeline segments exist in a dynamic environment in which both span length and water currents can change over time. Under such circumstances, there is a potential for extreme values of both water current velocity and span length to co-exist. Failure is often associated with extreme (albeit rare) combinations of conditions or events.
>
> * * *
>
> The threat of VIV was analyzed utilizing an amplitude response model in which input parameters of span length and upper-bound bottom-layer water currents along both the east and west Straits Crossing segments were represented as probability distributions. The span length distributions reflect observations that actual span lengths have exceeded (in some cases, by significant margins), the 75 ft. (23 m) maximum stipulated in the Line 5 easement agreement. Using a total of 100,000,000 simulations in a Monte Carlo analysis, the probability that fatigue life would be exceeded for each of several future time periods was determined up to the year 2053.

> As a separate analysis, a stress analysis was conducted that considered stresses arising from both gravity and drag forces in addition to those arising from operating pressure and temperature. As was done for the VIV analysis, input parameters of span length and upper-bound bottom-layer water currents along both the east and west Straits Crossing segments were represented as probability distributions. For the purposes of the spanning stress analysis, the probability of failure was defined as the fraction of simulations in which the maximum combined effective stress exceeded yield stress. Using a total of 100,000,000 simulations in a Monte Carlo analysis, the probability that the pipe's yield strength would be exceeded by the maximum combined effective stress was determined. Although there is ample strain capacity beyond yield (and therefore, failure does not occur when the maximum combined effective stress reaches yield stress), yielding was selected as a failure criterion because it defines the onset of plasticity, which in a dynamic environment could give rise to high amplitude fatigue.
>
> The analysis determined that the annual probability of failure associated with spanning-related threats was time-dependent, rising from 1.42×10^{-05} (3.1% of total, all-threat annual failure probability) in the year 2018 to 1.65×10^{-05} (3.5% of total, all-threat annual failure probability) in the year 2053.

Id., pp. 16-17. In the Alternatives Analysis, Dynamic Risk finds that VIV is the only time-dependent threat to the dual pipelines, and VIV increases the overall failure probability by about 0.4% between 2018 and 2053. *Id*., p. 14.

As noted above, Dynamic Risk finds that anchor hooking poses the greatest principal threat to the dual pipelines. In the Alternatives Analysis, Dynamic Risk explains that the dual pipelines:

> cross a busy shipping lane (see Figure 2-5), where they lie exposed on top of lakebed with no protective cover. They also are situated in water that is shallow, relative to the anchor chain lengths of most cargo vessels. Furthermore, a 20-in. diameter pipeline is small enough to fit between the shank and flukes of a stockless anchor for a large cargo vessel, and thus, is physically capable of being hooked.

Exhibit ELP-24, p. 123. Dynamic Risk contends that because the dual pipelines were laid on top of the lake-bed, they have a greater risk for anchor hooking than pipelines buried in at least 3.3 feet of cover.

In addition, Dynamic Risk analyzes data from the Nationwide Automatic Identification System (NAIS), which collects safety and security data from automatic identification system-

equipped vessels, including ship crossing, ship class, and ship displacement information. Dynamic Risk states that:

> An analysis of the NAIS data indicated that over the years 2014 – 2016, inclusive, the number of vessel transits for ships displacing 24,773 tonnes (27,308 tons) or more ranged from 1,155 to 1,457, averaging 1,319. The number of vessel transits for ships displacing 2,029 tonnes (2,237 tons) or more ranged from 1,627 to 1,966, averaging 1,807. Therefore, the average annual failure probability was determined to range between 2.506×10^{-04} and 3.433×10^{-04}. A failure of only one of the two pipelines was assumed.

Id., p. 148. Dynamic Risk characterizes the anchor hooking threat as a full-bore rupture (FBR). *See*, *id*., p. 130.

In the Notice, which was issued on November 13, 2020, the State of Michigan and MDNR assert that:

> in June 2020, Enbridge disclosed that both the east and west legs of the [Dual] Pipelines had been hit by external objects, apparently cables or anchors deployed from vessels operating near the [Dual] Pipelines, most likely in 2019. Those impacts damaged pipeline coatings and, at one location on the east Pipeline, severely damaged a pipeline support structure previously installed by Enbridge. Tellingly, none of the measures implemented by Enbridge since the April 2018 incident to mitigate the risk of anchor strikes was sufficient to prevent or even contemporaneously detect the recently disclosed impacts to the [Dual] Pipelines.

Exhibit ELP-18, pp. 6-7. Moreover, the Notice alleges that between 2003 and 2014, Enbridge was aware that heavy biota was accumulating on the dual pipelines which made it difficult, if not impossible, to perform a comprehensive evaluation of the integrity of the pipeline coating for much of the length of the dual pipelines. The Notice claims that "Enbridge did not undertake a thorough investigation of the pipeline coating/wrap until it implemented a May 2017 Biota Work Plan," and "in August 2017, Enbridge informed State officials that there were three small areas of bare metal exposed[.]" *Id*., p. 15. However, according to the Notice, subsequent inspections of the dual pipelines revealed "dozens more areas of coating damage." *Id*.

Enbridge provides a discovery response describing the measures and procedures that have been "implemented since the 2018 anchor strike to mitigate the risk of further anchor strikes to the Dual Pipelines." Exhibit S-6, p. 1. According to the discovery response:

> Enbridge states that it has implemented a comprehensive, state-of-the-art program to reduce the risk of a vessel's anchor striking, puncturing, dragging, or otherwise damaging the Line 5 Dual Pipelines. The program, known as the Enbridge Maritime Pipeline Protection Program ("EMP3"), establishes procedures to proactively monitor, observe, and communicate with vessels transiting the Straits to identify and address any vessel activity that may pose an anchor strike risk to the Line 5 Dual Pipelines.
>
> One component of the EMP3 is the "Coordinated System" that operates 24-hours per day, 365 days per year through the Enbridge Straits Maritime Operation Center ("ESMOC") located in Mackinaw City. The Coordinated System specifies actions that the ESMOC staff must complete to identify any vessel activity that may pose an anchor strike risk to the Line 5 Dual Pipelines and to resolve such risk, or if such risk cannot be resolved, to direct the shutdown of the Dual Pipelines. Specifically, the Protocols include requirements for: (a) the completion of shore-based and/or on-water observations to monitor vessels transiting the Straits to identify any anchor strike risk; (b) the continuous positioning of at least one patrol boat over the Line 5 Dual Pipelines (weather permitting) to monitor all vessel traffic operating in proximity to the Line 5 Dual Pipelines for any anchor strike risk; (c) the transmission of electronic messages to vessels via the Guardian:Protect system to notify vessels of the location of the Line 5 Dual Pipelines, and that they are entering a U.S. Coast Guard Regulated Navigation Area in the Straits where anchoring is prohibited absent agency approval under 33 CFR 165.944; (d) the hailing of vessels via maritime radio to ask vessels transiting the Straits to confirm that their anchors are secured prior to crossing over the Line 5 Dual Pipelines; (e) if an anchor strike risk is identified (e.g., a deployed anchor), measures to resolve that risk, such as asking the vessel to lift the anchor or change course; and (f) if the anchor strike risk cannot be resolved, requirements that the ESMOC immediately contact the Enbridge Operations Center to order the shutdown of the Line 5 Dual Pipelines.
>
> The Coordinated System was fully implemented on May 1, 2020 and modified: (i) on June 27, 2020 to include a 24-hour patrol boat over the Dual Pipelines (weather permitting) and a "check anchor" radio hail for vessels subject to the Coordinated System that could not be successfully observed (e.g., due to weather); and (ii) on October 13, 2020 to require a "check anchor" radio hail for all vessels subject to the Coordinated System. Enbridge implements such measures while the Dual Pipelines are in operation, and it intends to continue to implement such measures until the Dual Pipelines are permanently deactivated.

> In addition, as part of the EMP3, Enbridge developed, in conjunction with a maritime expert, Requirements for Contracted Vessels Conducting Activities in Proximity to the Line 5 Dual Pipelines ("Contractor Anchoring Requirements"). The Contractor Anchoring Requirements were implemented by Enbridge on November 30, 2020. The Contractor Anchoring Requirements specify the requirements for procedures, information, and plans required for all activities that are performed by vessels contracted by Enbridge to perform work in the Straits in proximity to the Line 5 Dual Pipelines. The Contractor Anchoring Requirements are designed to avoid an anchor or cable on a contractor's vessel from coming into contact with the Line 5 Dual Pipelines. The Contractor Anchoring Requirements are adhered to for all maintenance activities conducted on the Line 5 Dual Pipelines in 2021 onward.

Id., pp. 1-2.

In another discovery response, Enbridge states that "the unsupported span requirements for the Line 5 Dual Pipelines are set forth in Paragraph 68.b of the EPA [Environmental Protection Agency] Consent Decree, as amended by the 'Third Modification' . . . ." Exhibit S-8, p. 1. Enbridge explains that the Third Modification:

> establishes criteria for the inspection and installation of additional screw anchor pipeline supports ("supports") on the Line 5 Dual Pipelines. The Third Modification required Enbridge to install supports at specified locations and to perform visual inspections to identify areas requiring the installation of additional supports. Supports were required to be installed any time that subsequent visual inspections identified: (i) any unsupported span exceeding 65 feet; (ii) any span exhibiting a growth trend such that the span was projected to exceed 75 feet before the next required visual inspection; (iii) any span separated by a resting point on a sandy lake bottom that is less than 40 feet in length; (iv) any span separated by a resting point on a clay lake bottom that is less than 10 feet in length; and (v) any span separated by a resting point on a sandy lake bottom that is greater than 40 feet in length and the depth of cover on the pipeline is continuously less than 10% of the diameter of the pipe for a distance of at least 40 feet.
>
> In 2020, Enbridge completed the installation of all supports required under the Third Modification. Enbridge remains in full compliance with the unsupported span requirements under the EPA Consent Decree.
>
> The unsupported span requirements specified in the EPA Consent Decree are more stringent than those specified in the 1953 Easement. Accordingly, compliance with the EPA Consent Decree unsupported span requirements includes full compliance with paragraph A.(10) of the 1953 Easement, which requires that "[t]he maximum span or length of pipe unsupported shall not exceed seventy-five (75) feet."

Id., pp. 1-2.

e. Information Required for the Commission to Complete Prong (2) of its 1929 PA 16 Analysis

The Commission finds that the federal consent decree cited in the First Agreement, the subsequent modifications to the federal consent decree noted in Exhibit S-8, and the Consent Decree Report cited in Exhibit A-8 have not been provided on the record in this case. Additionally, pursuant to the First Agreement, Enbridge was to investigate additional technologies not discussed in the Consent Decree Report to detect leaks or coating damage on the dual pipelines. However, the Commission finds that this information also has not been provided on the record in this case. Furthermore, according to the First Agreement, Enbridge was to complete a report assessing options to mitigate the risk of a vessel's anchor damaging the dual pipelines. The Commission notes that the report has not been provided on the record in this case.

According to the Second Agreement, Enbridge has implemented near-term measures to enhance the safety of Line 5 and plans to continue these measures; however very few details describing these measures have been provided on the record in this case. Additionally, the Second Agreement notes that the State of Michigan planned to install radar technology to detect wave height and to share this data with Enbridge to determine whether SAWC exist. The Commission finds that there is no information on the record confirming whether the radar technology was installed, if it is in use, and whether information has been gleaned from the radar technology and shared with Enbridge.

The Second Agreement also states that Enbridge agreed to conduct an initial CIS in 2018, and was to conduct subsequent CISs every two years thereafter. Furthermore, in the Second Agreement the parties agreed that Enbridge would provide up to $200,000 for the installation of

video cameras in the Straits to assist the Coast Guard in monitoring vessel activity. The Commission finds that there is no information on the record confirming that the initial CIS was conducted, that the company performed subsequent CISs, or that video cameras were installed in the Straits.

According to the Third Agreement, Enbridge was to: (1) conduct an enhanced inspection regime for the dual pipelines, as set forth in Appendix 1 to the Third Agreement; (2) perform a visual inspection of the pipeline coatings; (3) submit a work plan to the State of Michigan to repair bare metal; and (4) repair the areas of bare metal as soon as practicable. Moreover, pursuant to the Third Agreement, Enbridge was to inspect the dual pipelines every two years to ensure that no unsupported span exceeds the specified maximum set forth in Paragraph A(10) of the 1953 Easement. The Commission finds that Appendix 1 to the Third Agreement, which contains specific details regarding the company's enhanced inspection regime for the dual pipelines, was not attached to the Third Agreement in Exhibit A-1. In addition, the Commission finds that the results of Enbridge's visual inspection of the coatings on the dual pipelines, the company's work plan, and the number and location of repaired areas of bare metal have not been provided on the record in this case. Furthermore, the results of Enbridge's biennial inspections to verify that no unsupported spans exceed the specified maximum have not been provided on the record in this case.

The Commission notes that Enbridge conducted biota investigations on the dual pipelines and was to submit a work plan to the State of Michigan. The results of the biota investigations and the work plan were not provided on the record in this case.

According to Enbridge, it has implemented the EMP3 program to reduce the risk of a vessel's anchor damaging the dual pipelines. The company provides some detail regarding EMP3, but it is unclear whether the explanation on the record is a partial or full description of the program.

The Commission finds that the aforementioned information and documents are crucial to developing a full record for prong (2) of the Commission's Act 16 analysis. Specifically, as part of the analysis conducted under prong (2), the Commission must be able to determine whether the Replacement Project is designed and routed in a manner that alleviates the many complications of maintaining and ensuring the safety of the dual pipelines and that the Replacement Project will significantly reduce or eliminate the environmental risk posed by the dual pipelines to the Great Lakes, which is Enbridge's stated purpose for the Replacement Project. 7 Tr 555-556; 9 Tr 1204. Therefore, pursuant to Mich Admin Code, R 792.10436 (Rule 436) of the Commission's Rules of Practice and Procedure, the record in this case is reopened for Enbridge to file the aforementioned information and documents, and any other relevant evidence regarding the current condition, safety, and maintenance and the future safety and maintenance of the dual pipelines because this evidence "is necessary for the development of a full and complete record." Rule 436(1). The record shall be reopened to receive testimony, exhibits, and rebuttal, but no briefing will be permitted.

2. Does the Project Meet or Exceed Current Safety and Engineering Standards?

In its application, Enbridge states that "[t]he [Replacement] Project involves relocating underground the portion of Line 5 that crosses the Straits, within a tunnel to be located at a depth of approximately 60 feet to 250 feet beneath the lakebed of the Straits." Application, p. 2. For prong (3) of its Act 16 analysis, the Commission must determine whether the Replacement Project meets or exceeds current safety and engineering standards. The Commission finds that some

information has been provided on the record regarding the safety and engineering of the proposed pipeline and tunnel project. However, additional evidence must be filed in the record for the Commission to complete prong (3) of its Act 16 analysis.

The Commission finds that the information set forth in subsections a-d regarding the safety and engineering of the proposed pipeline and tunnel has been provided on the record in this case.

a. Pipeline Engineering and Safety

Enbridge avers that the Straits Line 5 replacement pipe segment be designed, installed, operated, and maintained in accordance with the federal pipeline safety regulations set forth in 49 CFR 194 and 195. In addition, Aaron Dennis, an Engineer Specialist testifying on behalf of Enbridge, explains that:

> the replacement pipe segment will be manufactured specifically for this Project, in a manner that exceeds API [American Petroleum Institute] 5L Pipeline Specification Level 2 or "PSL 2". For example, Enbridge has higher standards for tolerances related to pipe roundness, wall thickness, hardness, toughness, and chemical composition, etc. Enbridge has also required extra inspection of the pipeline material at the manufacturing level to assure [sic] that Enbridge is receiving the pipe it specified, which includes quality inspection personnel.

8 Tr 800; *see also*, application, pp. 9-10 and Exhibit A-13, p. 12.

Mr. Dennis states that for the replacement pipe wall thickness, "Enbridge used a more conservative design factor than required by the applicable federal regulations." 8 Tr 800. He asserts that this provides added protection against damage, corrosion, and leaks, including pinhole leaks. Mr. Dennis states that "[t]he replacement pipe segment is also designed for a maximum operating pressure (MOP) of 1440 psig [pounds per square inch gauge]. By comparison, the normal operating pressure for replacement pipe segment will be approximately 480 psig." *Id*., p. 801; *see also*, Exhibit A-14, p. 5.

Next, Mr. Dennis testifies that "all pipeline appurtenances will be located outside the tunnel" and, "[w]ithout these appurtenances, there are no flanged, threaded, fillet weld, or even branch connections within the tunnel, which limits potential leak points. This also avoids the need to inspect, repair or replace such appurtenances within the confined space of the tunnel." 8 Tr 801. He contends that, "[t]o protect the pipeline corrosion coating system during installation, Enbridge will apply a sacrificial abrasion coating to provide additional protection." *Id*. Furthermore, he states that, because the pipeline will be contained in the tunnel, it will not be subjected to ultraviolet light, "which can contribute to coating degradation." *Id*., p. 802.

Amber Pastoor, Manager Project Services for Enbridge, testifies that:

> the replacement pipe segment is proposed to be installed by welding the pipe joints at the south side near the existing Mackinaw Station and incrementally placed into the tunnel by a combination of pushing and pulling methods, with the equipment and personnel primarily located outside the tunnel. Means of restraining the pipe from uncontrolled advance into the tunnel will be incorporated in the pipe installation equipment. The pipe will be supported on pipe supports in a manner that preserves the integrity of the pipeline coating and that maintains access for future maintenance. The pipeline will be anchored at approximately the mid-point of the tunnel to allow for thermal expansion to be directed to each end of the tunnel where above ground expansion loops will accommodate pipeline movement. The pipeline between the expansion loops and the tie-in locations will be buried and conventionally installed.

7 Tr 562.

In March 2017, a number of experts and companies in the pipeline industry launched the Joint Industry Project (JIP) to evaluate failures at girth welds in pipelines that were constructed using API 5L X70 line pipe and field welded using API 1104 qualified welding procedures. On May 29, 2020, the JIP completed a summary report of its findings and provided interim guidance for field welding and pipe purchase. In a letter of support for the JIP report, Enbridge notes that:

> The pipeline industry has recently experienced a high frequency of failures of newly built pipelines. The forensic work performed by the JIP demonstrated that girth weld undermatching was a primary contributor to the cause of failure, either

due to under-matched weld metal strength or excessively softened girth weld heat-affected zones relative to line pipe with excessively high longitudinal strength.

The recommendations contained within this report to avoid under matched welds are both obvious and intuitive: lower the pipe longitudinal strength, increase the weld metal strength and minimize weld HAZ [heat affected zone] softening. The recommendations regarding maximum longitudinal strength limits, minimum alloy content limits, and higher strength low hydrogen girth weld consumables will require industry-wide commitment. However, the commitment for change begins with pipeline operators to revise purchase specification requirements for X65/X70 line pipe and construction specifications to eliminate to [sic] current practice for E6010/E8010 girth welds.

* * *

Enbridge has already implemented the above changes to both the pipe purchase and construction specifications. Furthermore, Enbridge will strictly adhere to these changes with very little latitude for exceptions. As these changes are applied industry-wide, steel processing solutions will be developed to meet these requirements and construction contractors will become proficient with these higher strength consumables. Implementing these changes by owner/operators will go a long way towards eliminating these types of girth weld failure events.

Exhibit BMC-43, Appendix B; *see also*, 12 Tr 1886-1887.

Mr. Cooper, Senior Principal Engineer with HT Engineering, Inc., testifies on behalf of MSCA and asserts that the pipeline constructed for the Line 5 Replacement Project will not experience the same longitudinal strain as a pipeline buried in the ground. He explains that:

A buried pipeline is subject to strain created by ground movement and the interaction of thermal or pressure-related expansion and contraction of the pipe with frictional forces between the pipe and surrounding soil. No such environment exists for the replacement pipe segment within the tunnel. The replacement pipe segment in the tunnel is not buried and is not subject to ground movement or frictional forces and the temperature in the tunnel will be relatively stable. When the replacement pipe segment does expand or contract due to temperature or pressure changes, it will be on supports with rollers which will allow the replacement pipe segment to expand or contract freely toward or from the expansion loops located outside the tunnel. This is an entirely different environment and does not impose the type of longitudinal stress and strain experienced by buried pipe.

Second, as set forth in the Joint Industry Report (BMC-43), Enbridge states that it has already implemented the Joint Industry Report's recommendations intended to

> eliminate under-matched girth welds and minimize weld heat-affected zone softening. (Appendix B.)

12 Tr 1886-1887.

In addition, Mr. Dennis testifies that after the pipeline is placed in service, Enbridge will conduct periodic in-line inspections (ILI). He states that "[t]he ILI reports generated from these inspections will be analyzed to determine if any features are developing which may need to be addressed. The exterior of the replacement pipe segment and its coating will also be visually inspected periodically." 8 Tr 802. Furthermore, Mr. Dennis explains that because the pipeline will be located within the tunnel, there is no risk that excavation or other activities will damage the pipe. Mr. Dennis concludes that, "[g]iven the design, inspection, operation and maintenance of the replacement pipe segment, the likelihood of a release" of Line 5 products into the tunnel "is less than 0.000001." *Id*., p. 800.

During cross-examination, Mr. Dennis states that he provided "key inputs, such as project parameters, the length of the pipeline, key dimensions, [and] wall thickness" to Enbridge's integrity management team who then provided the 0.000001, or one in one million, risk of release probability figure. 8 Tr 820. However, Mr. Dennis attests that he did not examine the data used and did not assist with calculating the probability figure. *See*, 8 Tr 812-820. Bay Mills contends that it requested "all workpapers that were associated with this portion of [Mr. Dennis's] surrebuttal testimony" in a January 14, 2022 discovery request but "received none" from Enbridge. *Id*., p. 832; *see also*, BMC-45, Request No. 2(1). Bay Mills asserts that because the one in one million risk of release probability figure was provided late in these proceedings and Enbridge failed to provide workpapers explaining the details of the calculation, Bay Mills was unable to pursue the accuracy of the calculation and resulting probability figure.

Enbridge objects to the discovery request, stating that:

> it seeks information or documents protected by either the attorney-client or the attorney work product privileges. Enbridge further objects to this discovery request because it is overbroad and burdensome to the extent it seeks the production of "all" documents or communications. Without waiving these objections, Enbridge states:
>
> Documents and sources relied upon by Mr. Dennis are cited in the surrebuttal testimony. In addition, Mr. Dennis relied upon the following documents: Exhibit A-13 (The Tunnel Construction and Operation Report), Exhibit A-14 (Discovery Responses to Staff), the attached LP Contractor Safety Specifications - Confined Space Specification United States, the attached supplemental response to NHBP 2(5), and the attached response to Staff 3(17).

Exhibit BMC-45, Request No. 2(1); *see also*, 8 Tr 833-836.

b. Tunnel Engineering and Safety

On December 19, 2018, MSCA and Enbridge executed the Tunnel Agreement, which states that "[t]he Tunnel, subject to the design and engineering work including the Geotechnical Investigations required under this Agreement, is to . . . be designed and constructed in accordance with prevailing, state of the practice tunnel standards and specifications for a design life of no less than ninety-nine (99) years" and "be constructed of a suitable structural lining, providing secondary containment to prevent any leakage of liquids from the Line 5 Replacement Segment into the lakebed or Straits." Exhibit A-5, p. 10.

Pursuant to Section 5.3 of the Tunnel Agreement, Enbridge will provide sufficient funds for MSCA to "retain an Independent Quality Assurance Contractor with appropriate technical expertise to monitor the construction of the Tunnel and provide information to [MSCA]." *Id*., p. 9. The Tunnel Agreement also states that the Independent Quality Assurance Contractor shall have access to all construction documents and construction sites to complete standard of practice quality assurance.

According to the Tunnel Design and Construction Report for the Straits Line 5 Replacement Segment:

The tunnel would be constructed using a TBM [tunnel boring machine] and will be launched from the Mackinaw Station Portal ("MSP"). TBMs are technically sophisticated pieces of equipment used to excavate tunnels in all types of ground conditions. TBMs can be configured so that they are suited to conditions with high groundwater pressure, which is a condition expected for this Project.

* * *

The structural design of the tunnel ensures that it is designed to resist all applied loads without failure during its intended life, including, permanent loads, live loads, external water pressure loads, internal air pressure loads, earthquake effects, fire loads, and construction loads.

The tunnel durability has been evaluated to verify that it is expected to meet or exceed its required design life. This evaluation has been performed using current engineering practice standards for the evaluation of corrosion of reinforcement steel and degradation of concrete, considering the specific conditions expected in the tunnel environment. Factors considered include chemically induced degradation from the ground or groundwater, freeze-thaw, and chemical reactions in concrete based on humidity conditions and aggregate characteristics. The design requirements for durable materials have been incorporated in the construction specifications, and construction testing and inspection will be performed to verify that materials and installation meet specification requirements.

To verify tunnel integrity, a periodic in-service inspection program will be implemented. These inspections will verify the tunnel is performing as anticipated. Similar to how bridges and transportation tunnels are inspected, inspection protocols will be developed and implemented for the tunnel to ensure the on-going operability and integrity of the structure.

* * *

The tunnel will be lined with a PCTL [precast concrete tunnel lining]. The PCTL is installed in segments from the tail section of the TBM shield as the boring progresses, enabling continuous tunneling and safe working conditions. The PCTL is composed of six segments and incorporates high-strength rubber gaskets to limit water leakage. Refer to Figures 4 and 5 within Attachment 1 for the PCTL drawings.

The concrete lining of the tunnel will provide secondary containment, preventing any pipeline release of liquids from the tunnel into the Straits. In addition, the tunnel lining has been designed to be resilient against a hydrocarbon fire and any anticipated fire exposure condition. As described above, the concrete lining system includes high strength, high quality pre-cast concrete elements and durable, petroleum-resistant, high pressure resistant gaskets.

> Additionally, the tunnel will be constructed well below the lakebed of the Straits. Finally, existing groundwater pressure in the soil and rock pores around the tunnel further prevents any leaked liquids within the tunnel from migrating into the lakebed or Straits, since the pressure outside the tunnel will far exceed any leaked liquids pressure within the tunnel.

Exhibit A-13, pp. 9, 11-12; *see also*, Exhibit MM-7, p. 114.

Dr. Michael Mooney, Grewcock Chair Professor of Underground Construction & Tunneling at the Colorado School of Mines, testifies on behalf of MSCA and states that:

> The tunnel structure (lining) is comprised of nominally 15-inch-thick high strength concrete reinforced with steel fiber and steel rebar. The tunnel lining is comprised of segments that are fabricated (cast) in an environmentally controlled manufacturing plant (months in advance of their installation underground during tunnel construction). The precast segments are designed to be double-gasketed. When assembled, the double gasket design prevents groundwater infiltration above the allowable specified limits. The inner gasket, in addition to contributing to watertightness, will be petroleum resistant material and will not degrade if exposed to a product leak.

9 Tr 1205. He acknowledges that poorly designed and constructed concrete can degrade over time, allowing water infiltration. To neutralize this risk, Dr. Mooney asserts that the PCTL for the Replacement Project has been designed to "exhibit sufficient capacity even after estimated degradation[,]" and he states that procedures have been developed to seal leaks if they occur. *Id*., p. 1216. The procedures for sealing leaks in the PCTL and in the Mackinaw Station and North Straits portal permanent structures are set forth in Exhibit BMC-44, p. 310179-1 through 310179-9.

Although Ms. Pastoor provides a list of pipelines in six tunnels that transport hydrocarbons, she, Mr. Dennis, and MSCA acknowledge that they are unaware of any other underground tunnels in the world constructed in a manner specifically comparable to the Replacement Project that house pipelines to transport NGLs and light crude oil. 8 Tr 811; *see also*, Exhibit BMC-41, pp. 211-212 of 854, and Exhibit BMC-44, pp. 342-345 of 854.

On May 24, 2021, McMillen Jacobs Associates (MJA) provided a Technical Memorandum that evaluates the feasibility of Line 5 products escaping the tunnel in the event of a pipeline leak. To begin its analysis, MJA reviews the design, materials, construction, and surrounding environment for the tunnel:

- External Hydrostatic Pressure: The primary means keeping leaked liquids from escaping the tunnel is the significant external hydrostatic pressure outside of the tunnel. For smaller leaks, fluid pressures will be negligible compared to the external pressures. As there is no driving pressure to push liquids out of the tunnel, this pressure differential essentially eliminates potential for flow out of the tunnel. For larger leaks, where the tunnel could potentially fill and start to pressurize, pressure in the tunnel would need to match or exceed the external hydrostatic pressure to cause a net internal/driving pressure. This occurrence would only happen if the tunnel was completely filled, including the shafts, to match the lake level or higher. Also, fluids in the tunnel would likely be lighter (for propane or light crude) than water, requiring complete filling and pressurization of the tunnel. A rough estimate of the volume required to fill the tunnel is over 40 million gallons. The likelihood of a spill of this size is beyond the scope of this discussion.

- Gasketed Segmental Lining: The precast concrete segmental lining is being designed with a gasketed system. The gasket is designed to resist the maximum external hydrostatic pressure with an additional factor of safety accounting for uncertainty and long-term relaxation behavior of the rubber gaskets. These gaskets function to prevent leakage across the joints of the segments, with typical bypass leakage into the tunnel under design pressures of less than 0.5 to 1 gallon per minute per 1,000 feet of tunnel, for typical industry tolerances on build quality. Watertightness of this system is dependent on a high-quality build. If this lining system is not built with high precision, leading to larger steps and gaps at joints, and/or if significant cracking in the concrete occurs during tunneling, watertightness of this system is degraded. For a well-built tunnel, the gasketed lining should provide excellent confinement of any fluids within the tunnel from escaping.

- Annular Grout: As the segmental lining system is installed, a grout is injected between the outside of the lining and the ground. This grout is typically an accelerated cement-bentonite grout, with a thickness of roughly 4 to 6 inches. The purpose of this grout is to secure and provide confinement of the concrete segments within the tunnel bore. While intact grout is considered to have low hydraulic conductivity, this grout is not intended to provide watertightness. As it is relatively low strength, it is

likely to periodically crack, or be discontinuous behind the segments due to washout or overbreak. Therefore, this layer is not considered to provide reliable additional fluid containment but only a load sharing between the segments and the ground.

- Rock Cover: The current tunnel alignment is entirely within bedrock, with a minimum of approximately 30 to 40 feet of cover at the middle of the alignment, increasing to well over 150 feet for portions of the alignment. If the rock has relatively low hydraulic conductivity, it would provide another layer of containment for limiting potential of fluid escapes. However, hydraulic conductivity testing of the rock at tunnel depth was very limited, especially within the middle of the alignment. When tests were available, there were indications of zones of higher hydraulic conductivity within the bedrock. There is also evidence of highly fractured and brecciated rock within the rock formations that the tunnel passes through. For zones of rock with higher hydraulic conductivities, past experience has indicated that fluids can travel extensively through the rock mass under moderate to high flow gradients. While the rock can provide some secondary containment, the highly fractured nature of portions of the bedrock limits its reliability.

- Soil Cover: Soil cover above the bedrock varies from as low as 10 feet near the South Portal, to over 300 feet near the middle of the alignment. Soil gradation varies considerably above the bedrock, with interlayering of coarser and finer grained soils. As a whole, soil layers are likely to create a more torturous path for escaping fluids. However, the lack of a consistent aquitard layer for the majority of the alignment limits the reliability for containment.

The net external hydrostatic pressure and gasketed segmental lining system will provide the most effective means of secondary containment of the tunnel system. The combination of these two items results in a very low probability of fluids escaping from the tunnel, consistent with Enbridge's assessment. Annular grout, rock and soil cover may provide further secondary containment, in terms of overall extent (thickness) and creating a torturous or limited path of escape. However, these layers cannot be relied on to the same extent as the net external pressure and gasketed lining due to uncertainty in hydraulic conductivity and continuity of layers.

Exhibit S-16, pp. 2-3.

Next, MJA evaluates whether a pipeline leak of Line 5 product could escape the tunnel through the Mackinaw Station and/or North Straits portals on either side of the Straits. MJA notes that Table 2 in the Technical Memorandum "shows the amount of fluid required to fill the tunnel

to various elevations and gives an approximate time it would take to fill the tunnel to that level based on an assumed flow rate of approximately 23 MGD [million gallons per day], given as the estimated pipeline flow." Exhibit S-16, p. 5. MJA states that:

> The calculations in Table 2 are based on a Tunnel Inside Diameter of 20 feet-10 inches and factor in the 30-inch pipeline and another 10% of the total face area subtracted to account for miscellaneous other items in the tunnel. Due to the lower elevation of the North Shaft compared to the South Shaft, it is anticipated that the North Shaft would begin to fill before fluid reaches the South Shaft. A fluid height of 600 feet was chosen as the stopping point for this exercise because, at that elevation, fluid would escape out of the top of the North Shaft before completely filling the South Shaft. It would take approximately 50 hours for the tunnel to fill to this point, assuming all 23 MGD are leaking out of the pipeline and into the tunnel. During this maximum condition, the pressure of the fluid at the lowest elevation of the tunnel would be equivalent to approximately 522 feet of water head. Considering the external hydrostatic pressure at this point exceeds 560 feet, even in the worst possible case, the external water pressure will exceed the internal fluid pressure. Thus, the risk of spilling at the North Shaft is more than developing internal pressures that exceed external pressures.

Id., p. 6.

c. Electrical Equipment and Risk of Fire and/or Explosion

During rebuttal, Mr. Kuprewicz introduced testimony stating that, "[f]rom an engineering standpoint, there is a potential for a release into the Straits from the tunnel by way of a catastrophic explosion." 10 Tr 1326. He explains that in the event of a pipeline leak into the tunnel, vapors would be released from the hydrocarbon product. Mr. Kuprewicz contends that:

> In this scenario, the vapor release would quickly settle in low spots given the tunnel elevation profile. Then all that is required to create an explosion is an electrical spark within the air/fuel cloud. An ignition can be caused either by the equipment maintained within the tunnel (e.g. the sump pump), or brought in with a worker, or even by static electricity —to create an explosion. Although the tunnel's design includes a ventilation system (see Exhibit A-11)—and that system is important to have—it is not infallible and cannot completely eliminate risk, especially given the large diameter of the tunnel which hinders the ability for the ventilation system to sweep released vapor from the tunnel.

Id., pp. 1327-1328.

Mr. Kuprewicz notes that all electric equipment in the tunnel will comply with Class 1, Division 2 Occupational Safety and Health Administration (OSHA) specifications, which is the minimum standard with which Enbridge must comply. However, he asserts that "[t]he more stringent Class 1 Division 1 specifications intended to avoid the source of an electrical ignition would be a more appropriate measure" to prevent an explosion. *Id*., pp. 1328-1329.

In surrebuttal, Mr. Dennis responds to Mr. Kuprewicz's rebuttal testimony stating that "[t]here is no credible scenario that would result in an explosion within the tunnel." 8 Tr 799. He contends that for an explosion to occur, three extraordinary events must occur simultaneously:

> (1) there must be a release; (2) the release must be sufficient to create an explosive atmosphere; and (3) there must be an ignition source. While it is theoretically possible for these events to occur, the tunnel and replacement pipe segment have been designed and will be constructed, operated, inspected, and maintained to prevent the occurrence of these events, thereby effectively eliminating the possibility of any explosion.

Id. Mr. Dennis also asserts that, in the unlikely event that product is released into the tunnel, there will be leak detection systems and procedures to shut down the pipeline.[6]

Mr. Dennis contends that the equipment and instrumentation in the tunnel will be Class 1, Division 2 pursuant to OSHA regulations and, therefore, "are designed not to arc or spark and will not serve as an ignition source. Thus, even in the extremely unlikely scenario of a release which then went undetected long enough to create an explosive atmosphere, there is still not an ignition source within the tunnel." *Id*., p. 803. Furthermore, he asserts that there will be procedures to prevent personnel from introducing an ignition source in the tunnel. Mr. Dennis explains that:

> The tunnel itself is a confined space and people will be excluded from entry, absent a planned and permitted process. Pursuant to Enbridge and OSHA standards, at a minimum this process will include the issuance of safe work permit, a hazard assessment, development of a confined space entry plan, plan for appropriate air monitoring, appropriate PPE [personal protective equipment] being provided to

[6] The leak detection and shut down systems are discussed in the next section of the order.

> those entering the tunnel, a rescue plan, a rescue team on standby, and a confined space attendant near but outside the tunnel to communicate with and check on the safety of those within the tunnel.
>
> Before entering the tunnel, the ventilation system will be turned on and air recirculated within the tunnel. As air leaves the tunnel through the ventilation system, it will be tested for the NGL vapor and oil vapor. This is in addition to the other detection systems described earlier. No entry will be allowed into the tunnel unless it is safe. At a minimum, one of the safety requirements is that the tunnel will not have a flammable vapor in excess of 10 percent of its LEL [lower explosive limit]. Thus, entry will permitted [sic] only when vapor is well below the level in which ignition is possible.
>
> The electric tunnel service vehicle is also rated as Class 1, Division 2. As an additional precaution, the vehicle and each person entering the tunnel will be equipped with a monitoring device to detect NGL vapor and oil vapor. Evacuation will occur if the atmosphere is unsafe. As an additional precaution, no entry will be allowed within the tunnel and no maintenance would be performed when NGLs are being transported within the replacement pipe segment.

Id., pp. 803-804.

On February 26, 2021, the Staff sent a discovery request to Enbridge inquiring whether a release of hydrocarbon vapors in the tunnel could result in an explosion that could damage the tunnel and cause a release of Line 5 products into the Great Lakes. Enbridge responds, in relevant part, that:

> The Great Lakes Tunnel ("Tunnel") and its pipeline and ventilation systems have been designed to mitigate the risk of a fire or explosion, and to suppress and extinguish ignited hydrocarbons within the Tunnel. As explained in Exhibit A-13, the Line 5 Replacement Segment will be continuously monitored by the Enbridge Control Center to identify any changes in pressure or flow on the pipeline that could be indicative of a release. If pressure or flow changes trigger a release alarm, the Enbridge Control Center will shut down the pipeline and isolate the Line 5 Replacement Segment by closing remotely controlled valves, thereby limiting the amount of product released. The Tunnel provides secondary containment of any released product, which will be cleaned from the Tunnel. Initial removal of released product will be via pumps, which are intrinsically safe in Class I, Divisions 2 conditions, so as to mitigate the possibility of a fire or explosion. 'Intrinsically safe' equipment is certified in accordance with the National Electric Code requirements of the National Fire Protection Association ("NFPA") 70.

In addition, gas monitors and liquid hydrocarbon detection systems will be installed to detect and notify the Enbridge Control Center of any pipeline product within the Tunnel that could result in a fire or explosion. Should any pipeline product be detected by this equipment, the Enbridge Control Center will shut down the pipeline and: (i) utilize the ventilation system to remove the vapors from the Tunnel to prevent any buildup of pressure, thereby preventing ignition and safely managing the vapors outside of the Tunnel; or (ii) close the ventilation system to deprive the Tunnel of oxygen to extinguish or prevent a fire. In addition, there are no ignition sources within the Tunnel as it is classified as a NFPA Class 1, Division 2 space requiring all equipment and for example, the electrical components for all monitoring and detection system hardware, to be intrinsically safe. A fire prevention plan will also be implemented that will establish the policies, procedures, and limitations for personnel conducting work within the Tunnel to avoid or mitigate the possibility of a fire or explosion from ignition sources used for operation or maintenance activities.

As a further level of protection, the Tunnel has been designed and constructed to withstand damage resulting from a high-intensity fire resulting from the ignition of released pipeline product in the Tunnel. The Tunnel lining will incorporate monofilament polypropylene fibers within the concrete to allow the concrete to resist spalling during a fire. In the event of a fire, the polypropylene fibers melt and cause an expansion resulting in a network of microcracks. These microcracks relieve the pressure that develops due to the vaporization of moisture within the concrete. To provide the required resistance of the lining to fire, required dosage for polypropylene fibers is to be between 1.7 to 3.4 pounds per cubic yard (1 to 2 kg/m3 [kilogram/cubic meter]), and the dosage is verified by fire tests. Fire tests will be performed on samples of the Tunnel concrete lining material in accordance with an industry-accepted fire testing procedure for concrete tunnel linings, 2008-efectis-R0695, to verify acceptable performance. The samples will be exposed on one face to a fire loading equivalent to the Rijkswaterstaat (“RWS”) fire curve for two hours. The samples will also be subject to the maximum design working stress in one direction. The samples subjected to the testing will be no less than 1,500 square inches and the thickness will match the thickness of the finished precast Tunnel lining. The test must demonstrate that the spalling of the surface exposed to the fire load is no greater than 0.75 inches in any area. In order to resist explosive spalling of concrete, in addition to the use of polypropylene fibers, concrete with specified minimum compressive strengths of 6,000 psi [pound-force per square inch] and a water-cement ratio less than or equal to 0.42 is required.

In the event of a fire resulting from ignition of released pipeline product in the Tunnel, the lining design and the required performance of the lining in fire tests would limit damage such that local collapse should not occur. Therefore, the Tunnel will maintain its integrity and provide secondary containment to prevent the release of hydrocarbons into the surrounding geologic substrate and their migration into the waters of the Straits. Further, the extent of damage is anticipated to be repairable.

Exhibit BMC-45, Request No. 3(17); *see also*, 8 Tr 803-804, 9 Tr 1206-1207, and Exhibit MM-7, p. 163.

d. Leak Detection Systems and Shut Down Procedures

The Tunnel Design and Construction Report states that:

> The pipeline leak detection is comprised of two layers. The first layer is computation pipeline monitoring [CPM] where the Enbridge Control Center constantly monitoring [sic] pressure, temperature, flow and other key data to quickly identify and respond to unexpected changes. The second layer is an external leak detection system installed within the tunnel and is comprised of gas monitors and liquid hydrocarbon detection systems.
>
> To mitigate the risk of a fire/explosion, multiple points of gas detection will be installed. Specifically, there will be three detectors installed at nine locations within the tunnel and near and at the tunnel entrances. Hydrocarbon leak detection will be installed at the MS [Mackinaw Station] and NS [North Straits] shaft sumps and tunnel sump. These devices will communicate directly with the Enbridge Control Center, where they will be monitored 24/7/365 by a dedicated team of specially trained Enbridge staff members, in accordance with PHMSA [Pipeline and Hazardous Materials Safety Administration] control room management requirements under 49 C.F.R. Part 195. A strobe light shall be mounted on the outside wall near the doorway, clearly visible from a distance. The strobe shall be activated when gas is detected.

Exhibit A-13, p. 15; *see also*, 9 Tr 1246. In addition, Appendix 4 of the Second Agreement states that the replacement pipeline in the tunnel will be:

> equipped with automatic shut-off valves which will close within three minutes should a threshold pressure loss occur in the pipelines. These closures would be independent of and could not be overridden by any Control Center action. In the unlikely event that communications with the Control Center is [sic] lost due to a power outage and the backup generator fails, and the automatic valves fail to operate properly, valves can be closed manually.

Exhibit A-10, p. 20.

Mr. Dennis further explains that:

> the Enbridge control center will have its full array of tools to monitor the replacement pipe segment and the authority to manually shutdown the pipe. These tools are able to detect a release of 2% or more of the shipped volume. In the

> extremely unlikely event of a smaller release, sometimes referred to as a pinhole release, Enbridge will have monitors at the ends of and middle of the tunnel to detect NGL vapors and oil vapors. These monitors will detect a concentration of less than 20% of the lower explosive limit (LEL). LEL is the lowest concentration of a flammable vapor in air that will allow ignition to occur.

8 Tr 803. In addition, the Tunnel Design and Construction Report states that the Mechanical Control System Supervisory Control and Data Acquisition will allow Enbridge to both locally and remotely control the monitoring of the "tunnel ventilation fans, dampers, tunnel sump pumps, gas and leak detection system, oil water separator system and miscellaneous heating ventilation, and air conditioning ('HVAC') related equipment." Exhibit A-13, p. 18.

In the event of a product leak or fire, the Tunnel Design and Construction Report states that "Enbridge will comply with all emergency response requirements established by PHMSA under 49 C.F.R. Part 194." Exhibit A-13, p. 16. The Tunnel Design and Construction Report also provides some detail regarding Enbridge's emergency preparedness and response procedures for a product leak:

> Liquid hydrocarbon leak detection is being provided at the tunnel low point within the drainage sump. In the event of a leak, the leak detection system will be activated to provide an audible and visual alarm to the Enbridge Control Center.
>
> - In the event of a product leak, Enbridge will implement its PHMSA-approved emergency response plan(s) applicable to the replacement pipe segment to timely and efficiently respond to and mitigate the consequences of a product leak from the replacement pipe segment within the tunnel. Enbridge, its contractors, and emergency responders work together to evaluate and respond to a pipeline release. For example, as part of any response: Enbridge personnel may shut down or isolate sections of the pipeline or facility.
> - Local emergency responders may oversee public safety measures like securing the scene.
> - Enbridge will work with applicable agencies to remediate any impacts caused by a release.

Id., p. 17.

In response to a discovery request from NHBP, Enbridge explains that monitoring of real-time pressure readbacks on the Line 5 pipe segment within the tunnel will occur 24 hours per day, 7 days per week, 365 days per year "using computerized models and qualified operators." Exhibit BMC-45, Request No. 2(5). Specifically, Enbridge states that:

a. Low pressure readbacks or alarms are addressed automatically at the Line 5 Straits crossing. There are automatic shutoff valves on both sides of the Straits which will automatically close within three minutes should a low threshold pressure event occur. This closure would be automatic, independent of — and could not be overridden by — Enbridge's Control Center. See Enbridge's Exhibit A-10 at App. 4-2.

b. At the Line 5 Straits crossing, a high pressure readback or alarm would automatically shut-off all operating pumps at the pump stations serving the Straits segment. The control room operator would then manually close the appropriate valves on the pipeline, both upstream and downstream.

c. Given the automatic system responses to a low pressure readbacks or alarms, the risk of misinterpretations of pressure drops by the control room operator is eliminated.

Id.; *see also*, 8 Tr 802.

If there is a fire in the tunnel while maintenance personnel are present, the Tunnel Design and Construction Report states that the ventilation system will be activated in a manner to provide fresh air to maintenance personnel while they are evacuated.

> This will require manual control of the fan plant based on information supplied by the personnel about the location of the fire and the egress direction they choose. Allowing persons to evacuate safely and leaving the communications system on-line to facilitate any emergency messages from the personnel in the tunnel.
>
> Once personnel are safely evacuated a decision will need to be made by the local control center whether to secure the air lock and switch-off the ventilation system to starve the fire of oxygen or to let it continue to burn.

Exhibit A-13, p. 17.

In rebuttal, Mr. Kuprewicz argues that Enbridge is relying too greatly on the CPM system to detect a release of Line 5 product within the tunnel. He states that:

> Based on my knowledge and expertise with pipeline safety measures, CPM-based released detection approaches defined in federal pipeline safety regulation are not reliable enough nor rapid enough for timely indication of leak detection of the pipeline segment in the unique siting/placement within a tunnel.
>
> The Tunnel Project primarily relies on CPM as the first level of defense with little emphasis on the importance and criticality of a secondary system, and with zero regard for how human error impacts the monitoring and effectiveness of this "secondary" approach. Staff does not take into account Enbridge's failure to include critical details in Exhibit A-13, including the type, location, independency, calibration, maintenance frequency, and reliability of the gas detection approach. Such a second system should be given greater priority over CPM-based release detection approaches for the tunnel segment, especially given the confined space of the tunnel and the risks associated with a possibility of not only a crude oil, but a possible propane release. This second leak detection system should incorporate mandatory (even automatic) pipeline shutdown/isolation and tunnel ventilation procedures, so it should be very important that the system be designed to not generate false signals/alarms.

10 Tr 1332-1333. Mr. Kuprewicz recommends that Enbridge provide more specific information about its CPM program and, for its secondary leak detection system, the company should incorporate an automatic pipeline shutdown system, proper sensitivity for the sensors, and adequate ventilation procedures. 10 Tr 1376-1379. He also explains that "location and independency, not just redundancy, independency of your sensors is very important. Now, it's not that hard to design that into a system. I've seen no evidence that gives me confidence that that's been done here." *Id*., p. 1387. Mr. Kuprewicz contends that if Enbridge correctly constructs the pipeline and tunnel and installs a sufficient number of vapor sensors that are properly designed and placed in appropriate locations in the tunnel so that they provide a strong signal in the event of a leak, the detection system will be highly reliable and effective.

e. Information Required for the Commission to Complete Prong (3) of its 1929 PA 16 Analysis

Dr. Mooney testifies that "[t]he primary purpose of the [tunnel project] will be to house the replacement portion of the Line 5 pipelines that cross the Straits, providing secondary containment

in the event of a pipeline leak." 9 Tr 1204. In addition, he asserts that "[t]he secondary containment provided by the tunnel will eliminate the chance that leaking product reaches the water of the Great Lakes. This is a notable reduction in environmental risk from the current dual pipeline configuration on the lakebed." *Id*. As a part of the Commission's Act 16 analysis under prong (3), there must be sufficient evidence on the record for the Commission to determine whether the Replacement Project meets or exceeds current safety and engineering standards so as to prevent a release of Line 5 products from reaching the water of the Great Lakes.

Mr. Dennis testifies that the likelihood of a release of Line 5 products into the tunnel is 0.000001. However, the Commission finds that Enbridge did not provide record evidence of the data and methodology used to calculate the Replacement Project's alleged one in one million risk of release, and therefore the parties and the Commission are unable to review the calculation.

The Commission notes that, late in the proceedings during rebuttal, Mr. Kuprewicz raised a concern regarding a potential risk of explosion in the tunnel. Enbridge has provided information regarding the safety of the Class 1, Division 2 electric equipment that will be housed and used in the tunnel, which meets the minimum OSHA requirements. However, the Commission finds that information regarding the feasibility of exceeding the minimum OSHA standards and designing the electric equipment in the tunnel to Class 1, Division 1 or other methods of reducing the risk of ignition is necessary to enable the Commission to determine whether the potential risk of explosion in the tunnel may be further reduced or eliminated.

In addition, Enbridge has provided evidence that the PCTL is designed to resist spalling and prevent tunnel collapse from a high-intensity fire. However, there is no information on the record regarding the concrete's ability to withstand the effect of a high-pressure air impact from an explosion. And, although there is information on the record describing Enbridge's plans to seal

and repair inconsequential cracks and leaks in the PCTL, the Commission finds that there is no information on the record regarding the procedure for full replacement of a PCTL segment (or segments) in the event of severe cracking or acute damage from a high-intensity fire or explosion and how this replacement procedure might affect the Line 5 pipe segment within the tunnel.

Finally, the Commission notes that Enbridge provides some detail regarding its CPM and leak detection systems, however the information is scattered among several exhibits and volumes of testimony and the record lacks a cohesive explanation of the company's leak detection system and its shut-down procedures. The Commission thus finds that Enbridge shall file the following additional information that specifically describes:

1. Enbridge's CPM system;

2. Enbridge's secondary leak detection system for the Replacement Project and whether it incorporates an automatic shut-down system;

3. How quickly the detectors can sense the threshold amount of NGL vapors or oil vapors before signaling an alarm;

4. The data and the methodology demonstrating that the ventilation system planned for the Replacement Project is adequate for the diameter of the tunnel;

5. The process for activation of the ventilation system in the event of a release of Line 5 products in the tunnel;

6. How quickly the valves in the Straits replacement segment will be manually closed in the event of power loss or if communication is lost with the Control Center;

7. The conditions, thresholds, and activation points for the shutdown of the pipeline;

8. The data and methodology used to calculate the asserted one in one million likelihood of release;

9. The feasibility of designing the electric equipment in the tunnel to a more stringent standard, such as Class 1, Division 1; and

10. Information on the procedure for repair or replacement of a PCTL segment (or segments) in the event of severe cracking or acute damage from a high-intensity fire or explosion and how this repair or replacement procedure might affect the Line 5 pipe segment within the tunnel.

Parties are also free to submit evidence with other relevant information regarding Enbridge's leak detection system and shutdown process. The Commission finds that the aforementioned information and documents are crucial to developing a full record for prong (3) of the Commission's Act 16 analysis. Therefore, pursuant to Rule 436, the record in this case is reopened for Enbridge to file the aforementioned information and documents, and any other relevant evidence because this evidence "is necessary for the development of a full and complete record." Rule 436(1). The record shall be reopened to receive testimony, exhibits, and rebuttal, but no briefing will be permitted.

The Commission will continue to read the record in this proceeding. The Commission will also continue to defer to the ALJ for the setting of the schedule for the filing of testimony, exhibits, and rebuttal evidence, including an opportunity for cross-examination, consistent with the process adopted by the Commission throughout this proceeding.

THEREFORE, IT IS ORDERED that the record in this case is reopened to receive testimony, exhibits, and rebuttal as described in this order.

The Commission reserves jurisdiction and may issue further orders as necessary.

Any party desiring to appeal this order must do so in the appropriate court within 30 days after issuance and notice of this order, pursuant to MCL 462.26. To comply with the Michigan Rules of Court's requirement to notify the Commission of an appeal, appellants shall send required notices to both the Commission's Executive Secretary and to the Commission's Legal Counsel. Electronic notifications should be sent to the Executive Secretary at mpscedockets@michigan.gov and to the Michigan Department of the Attorney General - Public Service Division at pungp1@michigan.gov. In lieu of electronic submissions, paper copies of such notifications may be sent to the Executive Secretary and the Attorney General - Public Service Division at 7109 W. Saginaw Hwy., Lansing, MI 48917.

MICHIGAN PUBLIC SERVICE COMMISSION

Daniel C. Scripps, Chair

Tremaine L. Phillips, Commissioner

Katherine L. Peretick, Commissioner

By its action of July 7, 2022.

Lisa Felice, Executive Secretary

PROOF OF SERVICE

STATE OF MICHIGAN)

Case No. U-20763

County of Ingham)

Brianna Brown being duly sworn, deposes and says that on July 7, 2022 A.D. she electronically notified the attached list of this **Commission Order via e-mail transmission**, to the persons as shown on the attached service list (Listserv Distribution List).

Brianna Brown

Subscribed and sworn to before me
this 7th day of July 2022.

Angela P. Sanderson
Notary Public, Shiawassee County, Michigan
As acting in Eaton County
My Commission Expires: May 21, 2024

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