

**An Analysis of The Enbridge Financial Assurances
Offered to the State of Michigan**

On Matters Related To

**The Operation of The Enbridge Line 5 Pipeline
At the Straits of Mackinac**

Prepared For

**The State of Michigan
The Michigan Department of Attorney General
The Michigan Department of Environment, Great Lakes and Energy
The Michigan Department of Natural Resources**

By

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Section I Executive Summary

To avoid unfunded response costs and property and personal injury damages arising from a rupture of Enbridge Line 5 at the Straits of Mackinac (Straits), the State of Michigan, the Michigan Department of

Attorney General, the Michigan Department of Environment, Great Lakes, and Energy and the Michigan Department of Natural Resources (the State) has commissioned this risk financing analysis to evaluate the ability of Enbridge companies to pay for the costs and damages that a rupture of Line 5 may cause.

This report presents an analysis of the current and future ability of various Enbridge companies to pay up to \$1.878 billion in U.S. dollars for costs and damages arising from the potential release of petroleum products from the 66-year-old, Enbridge owned and operated, dual pipelines running under the Straits of Mackinac (Line 5).

In 1953 the State of Michigan granted an easement to a U.S. subsidiary company of Enbridge, Inc. to build and operate two pipelines under the Straits of Mackinac. Enbridge, Inc. is a Canadian company with global operations. Enbridge, Inc. is not a party to the Easement, only the company that was granted the Easement (Grantee) and its successors are obligated by its terms.

The Easement requires the Grantee of the Easement, and its successors, to indemnify the State for all costs and damages caused to persons or property arising out of the company's operations at the Straits and to maintain a liability insurance policy, bond or surety, in form and substance acceptable to the State, in the amount of at least \$1,000,000.

Beginning in 2017, representatives of Enbridge companies and representatives from the State of Michigan entered into three agreements (The Agreements) relating to Line 5 in Michigan. Within the Second and Third Agreements, certain Enbridge business entities (Signatories) agreed to provide Financial Assurances to the State of Michigan up to \$1.878 billion U.S. dollars. The 1953 Easement does not have a provision for using the assets of the Signatories, which is essentially self-insurance, to back-up the indemnity requirements. To the contrary, the 1953 Easement makes specific reference to requiring the Grantee and its successors to maintain comprehensive general liability insurance, bonds or surety on the dual pipelines. In 1953 none of these specified financial instruments would have contained pollution exclusions. The effects of pollution exclusions are accounted for in our recommended insurance requirements.

Upon analysis of the financial resources of Enbridge, Inc. in August of 2019, we find that Enbridge, Inc. currently has the capability to fund \$1.878 billion for the potential damages caused by a petroleum product release from Line 5. However, we do not recommend the acceptance of Enbridge, Inc. assets as evidence of Financial Assurance unless Enbridge Inc. becomes a signatory to The Agreements with the State.

Due to the corporate structure of Enbridge, Inc., only the assets of the Signatories are obligated by The Agreements. We have reached this conclusion based on the sworn November 9th, 2018 testimony of Mr. Chris Johnston. That testimony was provided in an evidentiary hearing for the Minnesota Public Utilities Commission (PUC). The PUC hearing pertained to the siting of a new Enbridge Line 3 which is not related to Line 5.

However, important insights into the corporate structure of Enbridge that is directly related to Line 5 can be gleaned from this testimony. Mr. Johnston is the Chief Financial Officer of Enbridge Energy Partners, L.P. Enbridge Energy Partners L.P. is the largest U. S. based operation of Enbridge, Inc. and is an actual Signatory to the Agreements. Enbridge Energy Partners L.P. is also the successor company to the Enbridge company that was granted the Easement in 1953. As the CFO of the U.S. operations of Enbridge, Inc. and the lead Signatory to the Agreements, Mr. Johnston is a credible expert on the company structure of Enbridge, Inc. and its U.S. operations.

In the Minnesota PUC hearing, Mr. Johnston testified that Enbridge, Inc. is not contractually obligated to stand behind the indemnity agreements of a subsidiary. The 2018 10-K report of Enbridge, Inc. indicates that the Signatory's to the Agreements on Line 5 are all subsidiaries of Enbridge, Inc.

The State of Michigan is only holding an indemnity obligation from the Signatories in the Second and Third Agreements and the Easement; those companies are Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc. and Enbridge Energy Partners, L.P. Therefore, unless Enbridge, Inc. becomes a signatory to the Agreements, the financial resources of Enbridge, Inc. in Canada should not be used to verify the \$1.878 billion financial assurance amount as required in the Agreements.

Only the Signatories and their respective successors are obligated by these Agreements. Therefore, only the assets of the Signatories to the Agreements should be used to verify the financial assurance amount.

The Signatories and the flow of revenues and liability within the Enbridge corporate structure is detailed in the schematic in Appendix A. What this schematic shows is that while revenues flow up to the parent company of a subsidiary, liabilities stay at the subsidiary level. This is the typical corporate structure of a parent company with operating subsidiaries and is reflective of Enbridge, Inc. and its subsidiaries.

Based on the last historical publicly available financial information on the Signatories, which is found in the 2018 September 10-Q of Enbridge Energy Partners L.P., the Signatories did not have \$1.878 billion in liquid assets, credit facilities and insurance for the damages arising from a rupture of Line 5.

The liquid financial resources of the Signatories based on September of 2018 10-Q information are shown in Appendix C. We used September 2018 for this comparison of assets between the Signatories and Enbridge Inc. because it is no longer possible to evaluate the financial resources of Enbridge Energy Partners L.P. using publicly available information.

Enbridge Energy Partners, L.P. no longer produces its own financial statements for public review. As described in the Enbridge, Inc. 2018 10-K, an unnamed wholly owned subsidiary of Enbridge, Inc. purchased all of the stock of Enbridge Energy Partners, L.P. at the end of 2018. At that point in time Enbridge Energy Partners, L.P. became a wholly owned subsidiary of Enbridge, Inc. Because there would be no further public trading in the stock of Enbridge Energy Partners, L.P., the subsidiary no longer produces its own 10-K or 10-Q reports for the U.S. Securities and Exchange Commission.

We noted that in October 2019, the assets of Enbridge, Inc. were used in the Financial Assurance Verification Form supplied to the State as required under the Second and Third Agreements. However, Enbridge, Inc. is not a party to the 1953 Easement or a Signatory to the subsequent Agreements. Based on the testimony of Mr. Johnston, the contribution of funds under an indemnity agreement made with a subsidiary would appear to be to be a purely voluntary endeavor for Enbridge, Inc.

We did not evaluate the cost recovery provisions in the environmental laws of the United States in the light of foreign corporation status of Enbridge, Inc. for this report.

Based on our research for this report, we recommend enhancing the indemnity obligations for the operators of Line 5 at the Straits. To accomplish this goal, in summary we recommend:

1. Obtaining an indemnity obligation from Enbridge, Inc., the Canadian based holding company of the Signatories to the Second and Third Agreements.
2. Being more specific on the source of the information to be provided on the Financial Assurance Verification Form, which was agreed to in the Second and Third Agreements.
3. Requiring more specific types and amounts of liability insurance on the dual pipelines, with the State named as an Additional Insured on those policies.

4. Develop a pre-agreed upon process to eliminate the loss exposure arising from Line 5 operation if the available prescribed assets of the Signatories dip below \$1.878 billion U. S. dollars at any point in the future.
5. Based on more recent third-party projected cost studies, further evaluate the adequacy of the \$1.878 billion minimum level of financial assurance.

Section II Our Scope of Work

ARMR.Net has been directed to evaluate if Enbridge entities have the resources to pay up to \$1.878 billion for the costs and damages caused by a release of petroleum products from the dual pipelines at the Straits of Mackinac.

To this end this report will:

1. Evaluate the risk bearing capacity and financial resources available to respond to, remediate, and pay compensation for all damages that could result from a worst-case release of petroleum products from Line 5 at the Straits of Mackinac and to satisfy the indemnification obligations under the 1953 Easement and subsequent Agreements.
2. Evaluate the adequacy and reliability of the Financial Assurance Verification Form provided by Enbridge business entities to the State of Michigan in 2019 and, to make recommendations to create a reliable and resilient Financial Assurance Verification Form, including detailed insurance specifications.
3. Provide perspective on the scope, adequacy, and dependability of the indemnity obligations assumed by the Grantee of the 1953 Easement.
4. Provide perspective on the projected ability of Enbridge business entities to satisfy the indemnity agreement to the State of Michigan over the next 7 to 10 years.

Section III Findings

Our findings are:

1. Estimates on the potential costs arising from a release of petroleum products from Line 5 at the Straits range from an Enbridge supplied estimate of \$300 million, to a \$1.878 billion estimate from

the *Independent Risk Analysis for the Straits Pipeline* analysis, to a \$45 billion¹ estimate from a Michigan State University study on the projected costs.

Our report does not analyze the accuracy or reliability of the various potential cost estimates of a petroleum product release from Line 5. However, the range of possible damage costs arising from a release of petroleum products from Line 5 strikes us as extremely broad, and \$1.878 billion is on the low end of the possible range. The higher range cost studies appear to have been prepared after the \$1.878 billion financial assurance threshold amount was agreed to in the Second Agreement. In light of the wide range of possible damage costs in the various studies, we question the reliability of the \$1.878 billion risk funding target used for this study. But we offer no opinion on the \$1.878 billion being the right amount.

2. If Line 5 ruptured today, Enbridge, Inc. has the financial capacity to voluntarily pay up to \$1.878 billion to fund an environmental clean-up and to compensate victims. However, based on the historical financial records, the U.S. based Signatories would not have enough resources to fund a loss event of this magnitude; without a voluntary financial bailout from the Canadian parent company.
3. With 275 operating subsidiaries listed in the Enbridge, Inc.'s 2018 10-K report, the Enbridge corporate structure enables the Canadian holding company Enbridge, Inc. to avoid liability for the U.S. based subsidiary's liabilities.² The original Grantee of the 1953 Easement was required to indemnify the State. All of the Signatories³ to the 1953 Easement and the First, Second and Third Agreements are U.S. companies. The State of Michigan is not contractually indemnified by the Canadian company Enbridge, Inc.

In the absence of a contractual indemnity from Enbridge, Inc. only the assets of the obligated parties (The Signatories) should be used for the completion of the Financial Assurance Verification Form.

The financial resources of the U.S. based Signatories are impossible to verify using publicly available information because after 2018 these companies no longer file 10-K or 10-Q financial statements. The Signatory companies are 100% controlled subsidiaries of Enbridge, Inc. today. Therefore, receiving an indemnity obligation from Enbridge, Inc. is essential to facilitate objective verification of the \$1.878 billion of financial resources based on publicly available financial reports.

4. The Financial Assurance parameters agreed to in the Second and Third Agreements⁴ lack the specificity to be accurate, reliable and easily verifiable by a third party. Therefore, we recommend modifications to the metrics used in the 2018 Financial Assurance Verification Form as shown in Appendix C.
5. The Enbridge business model is facing new challenges that could affect the ability of the firm overtime to pay for clean-up costs and other damages caused by a release of petroleum products from Line 5 at the Straits.

Even among its peers in the oil and gas business, Enbridge, Inc. and its Subsidiaries face unique risks and challenges in their business model which have the potential to adversely impact the risk bearing ability of the firm over time.

¹ "Oil Spill Economics: Estimates of the Economic Damages of an Oil Spill in the Straits of Mackinac in Michigan" – Addendum A – 11/20/2018 by Nathan Brugnone, MS and Robert B. Richardson, Ph.D.

² Chris Johnston Testimony pg. 73 lines 2-6. Evidentiary Hearing – Line 3 Volume 6A – 11/9/2017

³ Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc. and Enbridge Energy Partners, L.P.

⁴ Included in Appendix B

These risks and challenges include:

- To earn its profits, Enbridge transports crude oil that is primarily extracted from tar sands in northern Alberta. Crude oil extracted from tar sands (bitumen) has a unique set of environmental issues not associated with other sources of crude oil. The extracted synthetic crude oil is transported through thousands of miles of high-pressure pipelines, some of those lines, like Line 5, are at the end of their useful life cycle and need to be decommissioned or removed and replaced. Although Line 5 does not transport tar sands derived crude oil, the overall business of Enbridge, Inc. is heavily weighted to transporting tar sands derived products. The general financial well-being of Enbridge, Inc. and therefore its ability to pay for the costs and damages caused by petroleum releases through self-insurance is heavily dependent on the market viability of tar sands oil.
- To reach consumer markets, the Enbridge lines run across land in the United States that is subject to American Indian treaty rights. Resistance to the use of tar sands oil by non-government organizations including Native Americans, is making maintaining and replacing old lines or creating new routes for existing lines across lands subject to treaty rights increasingly difficult for the company.
- The U.S. demand for tar sands derived crude oil is expected to decrease over time.⁵ Most of the historical sales of tar sands derived oil has been to consumers in the United States. However, new forms of extracting oil, including fracking, has created an excess supply of crude oil and natural gas in the United States. Tar sands derived oil competes in a global market for crude oil. Many producers of crude oil have lower production costs, have lower transportation costs to bring crude oil to the market of end users and have a smaller total carbon footprint per barrel than tar sands derived oil.
- With the U.S. market saturated with local supply, the Enbridge, Inc. 2018 10-K references future plans to supply crude oil to India and China⁶. These countries are a long distance from the tar sands of Alberta. The distance to these consumer markets add transportation costs and carbon footprint loading to tar sands derived crude oil that the competitors of Enbridge entities do not have.

These risks and challenges entwined within the Enbridge business model cannot be eliminated through good management of its core business. We expect that over time these operational challenges in the Enbridge business model will have an even greater impact on the financial results of Enbridge entities in a carbon constrained world, which in our opinion is likely. Although Enbridge, Inc. could self-insure a \$1.878 billion petroleum product clean-up in the Straits this year that does not mean the company will be able to do so in the foreseeable future. Therefore, it will be necessary for the State of Michigan to monitor the financial condition of the relevant Enbridge business entities annually over the operational life of Line 5 through the Straits.

Section IV Background Information on Enbridge Operations and The Obligations To The State of Michigan

⁵ 2019 CAPP Forecast page 13 section 3.3 International

⁶ Enbridge, Inc 2018 10-K pg. 16

Enbridge, Inc. is one of the largest firms in Canada. It has a complex corporate structure listing 275 operating subsidiaries in its 2018 10-K report to the U.S. Securities and Exchange Commission.

Enbridge, Inc. is a profitable company, earning approximately \$2.475 billion U.S.⁷ in profits and generating \$7.877 billion U.S.⁸ in cash in 2018. We will be using Canadian dollars to U.S. dollars at a conversion rate of .75 for simplicity in this report.

The core business of Enbridge is highly dependent on the market demand for tar sands derived oil. We did note in conducting the research for this report that the future business forecasts for Enbridge tend to focus on the future supply of tar sands derived oil with little or no mention of the future demand for this source of fossil fuel⁹. If demand for tar sands derived oil decreases over time, the ability of Enbridge to self-insure for damages resulting from a rupture of Line 5 would also decrease, potentially relatively rapidly.

The History Of The Indemnity Obligation In The 1953 Easement and, The First Agreement, Second Agreement and Third Agreement

On April 23, 1953 the State of Michigan and Lakehead Pipeline Company, Inc. (Lakehead) a subsidiary of Enbridge, Inc. in Canada entered into an Easement that allowed Lakehead to construct, lay and maintain pipelines over, through, under and upon certain lake bottom lands for the purpose of transporting petroleum and other products.

Per the 1953 Easement, in paragraph J., Lakehead agrees to indemnify and hold harmless the State of Michigan *“from all damage or losses caused to property (including property belonging to or held in trust by the State of Michigan), or persons due to or arising out of the operations or actions of Lakehead, its employees, servants and agents”*.

Within Paragraph J. of the 1953 Easement, Lakehead agrees to the following relative items for this report:

1. Maintaining a comprehensive bodily injury and property liability policy, bond or surety in the amount of at \$1,000,000, and
2. A surety bond in the sum of \$100,000 that is in force for the life of the agreement.

Both of these items must be in place for as long as Lakehead and its successor companies operate the pipelines and until the abandonment of the Dual Pipes installed across the Straits is completed.

The 1953 Easement and the Second and Third Agreements do not enable the State of Michigan to access the assets of Enbridge, Inc. under an indemnity agreement. Only the assets of the actual Grantee of the 1953 Easement and its successors and the Signatories to the Second and Third Agreements are contractually obligated to back the indemnity obligations; those signatories do not include Enbridge, Inc., the holding company in Canada. We reached this conclusion based on prior sworn testimony of the CFO of Enbridge Energy Partners, L.P. on November 9, 2017 in Minnesota. Per Mr. Johnston’s testimony, Enbridge, Inc. is not obligated to pay for the liabilities of its U. S. based operating subsidiary companies, nor will a contract with a subsidiary of the company obligate Enbridge, Inc. to the terms of the contract¹⁰.

⁷ Enbridge, Inc.’s 2018 10-K Consolidated Statements of Comprehensive Income

⁸ Enbridge, Inc.’s 2018 10-K Consolidated Statements of Cash Flow

⁹ Chris Johnston Testimony pg. 59 lines 7-11. Evidentiary Hearing – Line 3 Volume 6A – 11/9/2017

¹⁰ Chris Johnston Testimony pg. 73 lines 2-6. Evidentiary Hearing – Line 3 Volume 6A – 11/9/2017

There have been multiple name changes, consolidations and mergers in the Enbridge business operations over the years. Appendix A provides a Corporate Organizational Chart showing current and historical Signatories to the Easement and subsequent Agreements. The schematic also shows how profits and liabilities flow through the Enbridge organizational structure. Typical of corporate structures involving a parent company and subsidiaries, profits flow upstream to the parent company and liabilities stay planted at the subsidiary level.

The 1953 Easement has been supplemented with Agreements three times in recent years, with the First Agreement occurring in 2017. In just over a year, there were two other Agreements between the State of Michigan and the Enbridge Signatories.

The First Agreement was made on November 27, 2017 between the State and Enbridge Energy, Limited Partnership and Enbridge Energy Company, Inc. (formerly known as Lakehead Pipeline Company, Inc.), which is referred to as “Enbridge” for this section. The First Agreement was to “provide clarity as to the State’s expectations concerning the safety and integrity of Line 5”.

Most of the agreed to requirements were for Enbridge businesses to do evaluations of and to produce reports/analyses of Line 5, including the Dual Pipelines. The Agreement included action items to help prevent a spill and develop response plans in the event there was a spill. It also included a requirement that Enbridge would look into alternative methods to crossing the Straits.

The Second Agreement was made on October 3, 2018 between the State of Michigan, the Michigan Department of Environmental Quality, and the Michigan Department of Natural Resources, referred to as the “State” in this section, and Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc. and Enbridge Energy Partners, L.P. referred to as “Enbridge” for this section.

The Second Agreement updated, supplemented and superseded the First Agreement. Under the Second Agreement, Enbridge either clarified or provided the information they agreed to provide in the First Agreement. The Second Agreement also added two new parameters to the First Agreement. The two new parameters were financial assurance and continuation of additional measures to enhance the safety of Line 5 in Michigan.

The Second Agreement included a provision addressing Paragraph J. in the 1953 Easement that required Enbridge to indemnify the State and to carry at least \$1,000,000 of comprehensive general liability insurance, bond or surety for liability for bodily Injury or property damage and a surety bond for \$100,000. To address the indemnity requirements in the 1953 Easement the Enbridge Signatories agreed to provide assurances that it had and would maintain \$1.878 billion of liquid financial assets to pay for an oil spill from Line 5.

It should be noted that under the 1953 Easement there is no mention of using company self-insurance, in lieu of liability insurance, a bond or surety to back up the indemnity obligations in the lease.

The \$1.878 billion U.S. dollar threshold amount was the estimated quantifiable damages from a most likely worst-case scenario found by the *Independent Risk Analysis for the Straits Pipelines*.¹¹ Enbridge agreed to provide evidence of the minimum of \$1.878 billion in liquid assets to the State on a Financial Assurance Verification Form. See Section VI of this report for a discussion on this form.

The Second Agreement stipulated that if Signatories to the Agreement verified that there was access to \$1.878 billion, the Signatories would be compliant with paragraph J. in the initial 1953 Easement. It is

¹¹https://mipetroleumpipelines.com/sites/mipetroleumpipelines.com/files/document/pdf/Straits_Independent_Risk_Analysis_Final.pdf

note-worthy that Enbridge, Inc. is not a signatory to this agreement and that the Second Agreement does not make changes the 1953 Easement itself.

In the first Financial Assurance Verification Form supplied by Enbridge representatives, the assets of Enbridge, Inc. were used to show that the Signatories to the Agreement had liquid assets to meet the \$1.878 billion threshold amount of financial resources as set forth in the Second Agreement. As previously noted, Enbridge, Inc. is not obligated by contract to the State of Michigan to contribute any money to an oil spill in the Straits of Mackinac.

The Third Agreement was signed on December 19, 2018.

In this agreement the Signatories agreed to an annual adjustment of \$1.878 billion financial assurance level based on the inflation based on the Producer Price Index (PPI) on October 1, 2019. The PPI measures the increased cost to make/supply a product. It is our understanding that the State of Michigan currently considers the Third Agreement to be null and void. For the purposes of this report that would mean the escalation clause for the amount of financial assurance to be maintained by the Signatories would not be effective.

Section V Recommendations

1. The State of Michigan needs to obtain an indemnity agreement from Enbridge, Inc. in Canada to pay for all costs and damages associated with a potential rupture of Line 5. It is not insignificant that Enbridge, Inc. is a foreign corporation based in Canada. Money held in Canada may not be as accessible as assets held by a company in the U.S. would be. We have not investigated or evaluated the complications that Enbridge, Inc. being a foreign corporation may create in an indemnity agreement with the State of Michigan.
2. The Financial Assurances Verification Form with our recommended metrics should be evaluated by the State at least annually, and should the Signatories fail to provide the required amount of Financial Assurances at any point in time, a clear path to the elimination of the hazard associated with operating Line 5 should be predetermined and agreed upon. A recommended revised Financial Assurance Verification Form is discussed in Section VI in this report and the evaluation metrics for completing the Form are provided in Appendix C.
3. The recommended amounts and types of Liability Insurance including modern and verifiable insurance requirements are Shown in Section VII.
4. In light of the more recent studies on the projected damages costs resulting from a rupture of Line 5 at the Straits, the \$1.878 billion financial assurance threshold requirement should be reevaluated.

In our opinion, \$1.878 billion as the threshold amount for financial assurance appears based on the available studies to be on the low end of the range of potential damage costs resulting from a rupture of Line 5 under the Straits. There are economic impact studies from 2018 concluding that the damages incurred from a rupture of Line 5 at the Straits could cost \$45 billion including clean-up costs, natural resources damages and economic damages¹². In sharp contrast, Enbridge representatives estimated the clean-up cost of a Line 5 rupture at only \$300 million, which represents a deviation in projected costs of over 1300-fold at the \$45 billion cost projection. We

¹² "Oil Spill Economics: Estimates of the Economic Damages of an Oil Spill in the Straits of Mackinac in Michigan" – Addendum A – 11/20/2018 by Nathan Brugnone, MS and Robert B. Richardson, Ph.D.

have not been tasked with evaluating the reasonableness of the potential damage cost estimates for a breach of Line 5 at the Straits of Mackinac, nor are we qualified to do so. However, a 1300-fold differential between the high and low cost estimates is too much of a range for a reliable risk financing planning report. We have assumed \$1.878 billion was the right number for our report but have little confidence that is the right projected cost number given the wide range of projected costs and where \$1.878 billion falls within the range.

Section VI Financial Assurance Verification Form

Paragraph J. in the 1953 Easement requires that the Enbridge Signatories indemnify the State of Michigan and that the Signatories maintain comprehensive general liability insurance, a bond or surety to back that obligation.

The 1953 Easement does not mention the use of self-insurance to back up the indemnity obligation to the State. The use of self-insurance was agreed upon by the parties to the Second Agreement. In that Agreement, the Signatories agreed to file with the State the Financial Assurance Verification Form on an annual basis. The template for this agreed upon verification form is shown in Appendix C.

The 2019 Financial Verification Form in Appendix C. includes the items that will be reviewed each year under the current agreement:

1. Cash
2. Credit Facility (available liquidity as at [date])
3. Other Resources Available in 30-60 days (explain)
4. Insurance
5. Surety Bonds
6. Parent/Affiliate Guarantees (from Parent Co. to Authorization Holder)
7. Other Financial Resources (explain)

Based on the October 2019 Verification Form that representatives of Enbridge provided under the Second Agreement, Enbridge only included information on numbers 1 through 4 above, and for that reason, those are the financial assurances that we have evaluated for this report.

The submitted 2019 Verification Form shows that Enbridge, Inc. has \$9.45 billion U.S. dollars of short-term financial assurance mechanisms and \$940 million in general liability insurance that includes time element/sudden and accidental pollution coverage. In total, these amounts are well in excess of the required \$1.878 billion U.S. of financial assurance in the Second Agreement.

In the 2019 Verification Form, Enbridge, Inc., although not being a signatory to the 1953 Easement or to any of the Agreements, represented the following financial resources:

Cash: \$0.525 billion – As shown in Enbridge, Inc.'s 10-Q2

Credit Facility: Available Letters of Credit \$4.2 billion – As shown in Enbridge, Inc.'s 10-Q2

Other Resources: Accounts Receivable \$4.725 billion – As Shown in Enbridge, Inc.'s 10-Q2

Insurance: General Liability insurance \$940 million

No separate information on the financial resources of the Signatories to Second Agreement was provided. We have previously discussed the importance of having Enbridge, Inc. as a signatory to the indemnity agreement in Section's I and III of this report.

Evaluating the Financial Assurance Verification Form Each Year

The financial assurances of the Signatories should be verified annually from the information contained in audited financial statements. If Enbridge, Inc. was a Signatory, the company's 10-K report should be used to evaluate compliance with the financial assurance requirements.

The evaluated criteria in the Financial Assurance Verification Form are found in these areas of the Enbridge, Inc. 10-K today:

1. Cash or equivalent – Part 1, Section 1, Financial Statements: Consolidated Statement of Financial Positions
2. Credit Facilities (Available credit for the next 12 months) – Part 1, Section 1, Financial Statements: Debt, Credit Facility
3. Accounts receivable and other – Part 1, Section 1, Financial Statements: Consolidated Statement of Financial Positions (accounts receivable and other)
4. Specified Insurance - Specified insurance will be verified by referencing the Certificate of Insurance that must be provided as shown in the recommended insurance requirements in Appendix E.

If the Signatories are not publicly traded in the U.S., an audited Statement of Financial Position for the Signatory Enbridge company or companies could be used to prepare the Financial Assurance Verification form.

The Property Plant and Equipment Assets Are Not Useful Measures for Financial Assurance

Enbridge, Inc. does have assets owned by subsidiary companies in the U.S. in the form of property, plant and equipment. These assets could potentially be attached to satisfy a judgement against the firm. However, for the reasons stated below, we have made no accounting of these fixed assets in our evaluation of the ability of the Signatories to fund \$1.878 billion in losses as a result of a rupture of Line 5.

In our evaluation of the financial resources available to the Enbridge Signatories to pay for oil spills, we noted that generally accepted accounting principles tend to overvalue pipeline assets and to undervalue the environmental legacy liabilities of firms in the oil pipeline business. This is especially true when a pipeline is not transporting oil to produce profits.

Pipeline assets like other forms of fixed assets have a book value based on what was paid for the pipeline, minus depreciation. In contrast to most types of fixed assets, a pipeline permanently not pumping oil has no value to anyone¹³. In fact, the cash value of an idle pipeline can be less than zero, if the costs to decommission or remove the idle pipes are taken into account. Those kinds environmental

¹³ Chris Johnston Testimony pg. 125 Lines 19-20 Evidentiary Hearing – Line 3 Volume 6A – 11/9/2017

legacy costs for its U.S. subsidiaries are not being accounted for in the Enbridge financial statements. This creates a situation where the book value of a pipeline company's assets is not reflective of their actual cash market value. Cash and insurance proceeds are what is needed to pay for an oil spill clean-up and other damages.

The future costs of removing idle pipelines from the ground are not immaterial and may be unavoidable new costs in the Enbridge business model in the near future. For example, in the negotiations over the replacement of Line 3 in Minnesota, the Public Utility Commission made the removal of the old Line 3 at the discretion of the landowners, a condition of the permit for the new Line 3.

In another example of pipeline removal costs, in a lawsuit filed by the Bad River Band of Chippewa in Wisconsin, which is discussed further in Appendix J, the Band seeks the complete removal of the existing Line 5 on their reservation.

The removal of pipes from the ground is expensive. Enbridge testimony in Minnesota on the replacement of Enbridge Line 3 was that it costs on average \$855 per foot to remove pipelines from the ground¹⁴. At \$855 per foot it would cost approximately \$23 billion to remove all the Enbridge companies buried pipes in the U.S. alone. The \$23 billion in potential environmental legacy costs is not shown as a liability in the firm's books, nor is the firm required to do so by generally accepted accounting rules, or by the U.S. regulations in effect on pipelines.

For these reasons, the value of property, plant and equipment, as shown in the Consolidated Statements of Financial Position,¹⁵ is not an accurate picture in time of the firm's ability to pay for environmental damages that it may cause as a result of a rupture in Line 5. Therefore, we have left the fixed assets of Enbridge businesses out of the Financial Assurance Verification form.

Section VII Recommended Insurance

Insurance is an efficient financial mechanism to pay for otherwise unaffordable loss events. One of the benefits of insurance from the State's perspective is liability insurance coverage survives the bankruptcy of the named insured. In addition, the insurance underwriting process itself produces a benefit for all the stakeholder's in Line 5 by engaging global knowledge sharing on the risks of pipelines through the international reinsurance marketplace.

We recommend that at a minimum Enbridge, Inc. carries a Minimum of \$900,000,000 in Liability insurance. This Liability insurance can be a combination of ISO Comprehensive General Liability Insurance with coverage for sudden and accidental pollution liability and Environmental Impairment Liability (EIL) coverage. The minimum amount of EIL coverage that must be maintained within the \$900,000,000 is \$25,000,000 covering Line 5 at the Straits. The EIL insurance requirement includes an option for a \$50,000,000 policy aggregate limit of liability if the EIL coverage applies to more than just Line 5 at the Straits. The master insurance coverage on Enbridge, Inc. can be used to fulfill this insurance requirement.

¹⁴ Chris Johnston Testimony pg. 30 Lines 7-9 Evidentiary Hearing – Line 3 Volume 6B – 11/9/2017

¹⁵ Enbridge Inc.'s 2018 10-K

The recommended insurance requirements for Line 5 at the Straits take into account past public court testimony provided by Enbridge representatives regarding the scope of the liability insurance currently carried by the firm.

Reconciling The Insurance Required In The 1953 Easement to Modern Insurance Coverage

Comprehensive general liability insurance is a key component in the Financial Assurance Verification Form. Ideally, 100% of the worst-case loss exposure of Line 5 could be insured. However, there is likely not enough liability insurance in the world to fund a \$1.878 billion pollution loss resulting from a rupture of Line 5.

Previous sworn testimony provided by Enbridge in Wisconsin and Minnesota is that the firm purchases as much comprehensive general liability insurance as it can in the world insurance marketplace. In the 2018 10-K report, that was \$940,000,000 in general liability insurance. We find this Enbridge testimony credible. Therefore, liability insurance with coverage for pollution releases from Line 5 can only supplement the other sources of funds available to Enbridge entities to meet the agreed upon \$1.878 billion financial assurance amount.

The scope of the recommended liability insurances and the annual verification process of that insurance by the State during the operation of Line 5 is addressed within the insurance recommendations in Appendix E.

The recommended insurance requirements in Appendix E take into account the 1953 Easement language requiring comprehensive general liability insurance, and the general liability insurance that Enbridge has testified in recent court proceedings that it carries today. The recommended insurance requirements also encompass modern methods to verify the types and amounts of liability insurance that Enbridge carries.

Enbridge has provided testimony in Wisconsin and Minnesota that the information contained within the company's insurance policies is a trade secret. We respect that Enbridge would want to keep its trade secrets out of the public eye and have accommodated Enbridge on this point in the insurance recommendations. In place of an annual review of its actual insurance policies, we recommend that the prescribed Certificate of Insurance as shown in Appendix E be used to evidence the liability insurance carried by Enbridge, Inc. Providing a Certificate of Insurance to interested parties is the customary way that evidence of insurance is provided by businesses. The prescribed Certificate of Insurance is designed to make the compliance with the insurance requirements easy for the State to verify.

The Requirement for Comprehensive General Liability Insurance In The 1953 Easement

The 1953 Easement makes a specific reference to comprehensive general liability insurance. In 1953 "comprehensive" general liability insurance in the U. S. and Canada was not referring to a specific insurance industry standard policy form. Also in 1953 there was no reference to coverage for pollution as a cause of loss in the common general liability insurance policies sold to businesses in that time frame. Pollution exclusions and exceptions to pollution exclusions in general liability insurance policies developed decades later in the insurance business.

The title of "comprehensive" general liability insurance and having coverage for pollution liability took on a specific meaning in 1973. In that year the Insurance Services Offices (ISO), the largest standard policy form setting organization in the U.S., created the ISO Comprehensive General Liability insurance policy form as the new industry standard general liability insurance policy.

In addition to a new official name for the policy, there were a number of changes in coverage that were incorporated into Comprehensive General Liability policy form. One the most significant changes to the

industry standard Comprehensive General Liability policy was a new exclusion for losses arising from the release or escape of pollutants was added to the policy. The pollution exclusion in the policy had an exception built into it, the exclusion would not apply if the release or escape of pollutants was sudden and accidental.

In 1973 for the first time in history, Comprehensive General Liability insurance with coverage for sudden and accidental pollution liability took on specific meaning in the insurance business.

The scope of Enbridge, Inc.'s general liability insurance coverage for sudden and accidental pollution liability was the subject of legal proceedings in multiple Wisconsin courts for over three years. A core issue in these legal proceedings was does Enbridge carry general liability insurance that meets Wisconsin Statute 59.70 (25). This statute prohibits a county in Wisconsin from requiring additional insurance on an interstate pipeline if the pipeline company carries the requisite insurance as specified in the statute.

The Wisconsin statute reads:

“INTERSTATE HAZARDOUS LIQUID PIPELINES. A county may not require an operator of an interstate hazardous liquid pipeline to obtain insurance if the pipeline operating company carries comprehensive general liability insurance coverage that includes coverage for sudden and accidental pollution liability.” (emphasis added)

The underlined part of this statute is an exact match to the ISO Comprehensive General Liability insurance policy in both name and scope of coverage for sudden and accidental pollution liability. This is the only industry standard general liability insurance policy that provides an exact match to the Wisconsin statute.

After more than three years in multiple Wisconsin courts, on June 27, 2019, based on the sworn testimony of Enbridge representatives that the company carries liability insurance that meets the requirements of this statute, the Wisconsin Supreme Court ruled that Enbridge carries the insurance specified in Wisconsin Statute 59.70 (25).

To avoid years of potential litigation in Michigan courts over the scope of Enbridge's trade secret comprehensive general liability insurance coverage, the recommended insurance requirements for Line 5 as shown in Appendix E specifically mirror the scope of insurance coverage required in Wisconsin Statute 59.70 (25).

The standard ISO Comprehensive General Liability insurance policy form is shown in Appendix F for reference. The coverage in the Comprehensive General Liability insurance policy for sudden and accidental pollution events can clearly be seen as an exception to the exclusion f. in the policy.

Exclusion f. in the Comprehensive General Liability policy reads;

Exclusions

This insurance does not apply:

- f. to bodily injury or property damage arising out of the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants into or upon land, the atmosphere or any water course or body of water; but this exclusion does not apply if such

discharge, dispersal, release or escape is sudden and accidental;
(emphasis added)

Contrary to the common perception that these policies would only provide coverage for a fast or quick pollution event, due to precedent case law developed over decades of insurance coverage litigation, the coverage provided under the ISO Comprehensive General Liability policy is not limited to fast or quick pollution releases measured with the passage of time.

The coverage for pollution liability under a Comprehensive General Liability policy is extraordinarily broad. Comprehensive General Liability insurance policies have paid for pollution claims where the pollution events took place over decades.

As long as Enbridge, Inc. carries ISO Comprehensive General Liability insurance that automatically includes coverage for sudden and accidental pollution liability under Exclusion f., the need for true Environmental Impairment Liability insurance on Line 5 is diminished a great deal. The relatively low amount of Environmental Impairment Liability in the recommended insurance requirements reflects the expansive coverage provided for pollution losses in the ISO Comprehensive General Liability insurance policy.

Planning For Contingencies

It is common practice for large companies like Enbridge to purchase insurance policies that cover all of the company's operations. This practice introduces the possibility that a loss in Canada for example could exhaust the available insurance coverage for a subsequent loss at Line 5. The recommended insurance requirements anticipate this contingency.

We recommend that Enbridge, Inc. must at all times maintain a minimum of \$300,000,000 of recoverable insurance limits including coverage for sudden and accidental pollution releases arising from Line 5 at the Straits. Within that \$300,000,000 of liability insurance at least \$25,000,000 must be in the form of Environmental Impairment Liability insurance. Enbridge, Inc. may use a combination of ISO Comprehensive General Liability with sudden and accidental pollution liability and Environmental Impairment Liability insurance coverage to meet the insurance requirements set forth in Appendix F. The \$300,000,000 of recoverable insurance limits can be specific to Line 5 at the Straights.

Ideally, we would require \$1.878 billion in Environmental Impairment Liability insurance to cover a rupture in Line 5 and not be dependent upon a General Liability insurance policy that excludes pollution unless the pollution event is sudden and accidental, or relying on self-insurance in any way to back up an indemnity obligation to the State. However, the global insurance marketplace for genuine environmental insurance does not have \$1.878 billion in capacity. Our recent survey of the insurance marketplace for genuine Environmental Impairment Liability insurance showed market capacity was just over \$400,000,000 in potential limits of liability. Not all of that environmental liability insurance would be available for purchase on a crude oil pipeline. The recommended insurance requirements reflect the practical constraints in the global insurance business and are designed to be achievable.

Why Environmental Impairment Liability Insurance Is Required in Addition to Comprehensive General Liability Insurance

Environmental Impairment Liability insurance fills the coverage gaps created by pollution exclusions in general liability insurance policies.

The general liability insurance policies sold in 1953 did not contain pollution exclusions. Therefore, any general liability insurance policy that has a pollution exclusion of any type would not fulfill the minimum insurance requirements in the 1953 Easement calling for “comprehensive general liability”.

Since the early 1970’s, virtually all general liability insurance policies in North America, including Canada, have contained pollution exclusions. Therefore, to meet an insurance specification written in 1953 for general liability insurance on a pipeline which would have been silent on pollution as a cause of loss, it is necessary to purchase Environmental Impairment Liability (EIL) insurance to fill the coverage gap created by the pollution exclusion in all general liability insurance policies sold today. Even the ISO Comprehensive General Liability insurance policy has a pollution exclusion as previously discussed.

The recommended insurance requirements shown in Appendix E. include a specification for \$25,000,000 of Environmental Impairment Liability (EIL) insurance on Line 5. According to the Consumer Price Index, the present value of \$1,000,000 in 1953 is \$23,000,000 today. We recommended \$25,000,000 Environmental Impairment Liability to match the insurance industry custom of increasing insurance limits in \$5,000,000 increments.

Since the Comprehensive General Liability insurance that Enbridge carries today has a pollution exclusion, technically the EIL coverage limits should match the general liability policy limits if the exact terms of the 1953 Easement were followed. We have not recommended this approach in the insurance requirements because such a requirement would be impossible to comply with.

It should be noted that the \$1,000,000 limit of liability in the 1953 Easement insurance requirement was intended to set the minimum amount of required insurance. The idea behind requiring Comprehensive General Liability insurance in the Easement was to back the indemnity obligations of the Signatories. The stakeholders in the Second Agreement have acknowledged that the loss exposure from Line 5 is much greater than \$25,000,000.

The Advantages Of Purchased Insurance

The requirement for actual insurance which is not self-insurance in the 1953 Easement should not be overlooked. A requirement for some amount of purchased insurance versus self-insurance insurance, which is allowed for in the Second Agreement, will enable the State to receive real time feed-back on if the global insurance market thinks Line 5 is insurable or not. The insurability of the line will serve as “the canary in the coal mine” risk indicator for the State.

The Environmental Impairment Liability insurance requirement acts as a form of expert independent third party risk evaluation. If Line 5 is low risk, Enbridge should have ready access to environmental insurance that is relatively low cost from a insurance market place with over \$400 million in limits of liability capacity. If Enbridge is unable to purchase this relatively low amounts of Environmental Impairment Liability insurance, that situation would provide an early warning sign to the State of Michigan that professional risk evaluators (insurance underwriters) feel that Line 5 at the Straits is too risky to insure.

Another early warning is provided by requiring the State to receive 60 days’ Notice of Cancellation or Non-Renewal on the Comprehensive General Liability and Environmental Impairment Liability policies. If an insurance policy is cancelled or nonrenewed in the future, the State will get an early warning that the underwriters have changed their minds about the insurability of Line 5 at the Straits.

By requiring that the State of Michigan be an Additional Insured under the liability insurances on Line 5, the State of Michigan gains the additional benefit of having direct access to very broad and reliable insurance coverage for pollution damages arising from Line 5.

Section VIII The Long Term View On The Operation of Line 5

This section of the report discusses some of the business challenges that Enbridge business entities will face during the foreseeable future of Line 5 at the Straits. These challenges in what could be a relatively short period of time have the potential to undermine the ability of Enbridge to pay through self-insurance the costs associated with a release of petroleum products from Line 5.

Changes in social norms and a heightened awareness of the human impact on the planet is affecting the Enbridge business model in profound ways that the company has not had to deal with in the past. For example, in two permit applications that would have been routine for Enbridge 10 to 20 years ago; one was a building permit to add a pumping station to an existing pipeline, and one was a permit to replace an existing line; Enbridge had to fight local resistance to the Enbridge development plans all the way to the State Supreme Courts in Wisconsin and Minnesota. When routine business maintenance matters require the State Supreme Court to resolve disputes with neighbors, the writing is on the wall that there are fundamental challenges to the old business model of Enbridge company's underfoot.

The Coal industry's experience with challenges to its core business value proposition illustrates what the impact of changing environmental awareness and concerns in the general population can do across an entire segment of the energy economy. Coal as a source of fossil fuel is relatively dirty compared to natural gas. Natural gas is in over supply in the U.S., it costs little to produce, and it is relatively cheap to transport and use. Coal does not compete well against natural gas over pollution concerns, its carbon footprint or on cost. After over a 100 years of robust business, furnishing most of the energy needs in the US, "Approximately 44% of U.S. coal now comes from companies that have declared bankruptcy sometime in the last four years."¹⁶ All fossil fuel-based companies will be subject to the same economic pressures over time as society moves to reduce the greenhouse footprint of energy sources and gravitate to use relatively clean sources of energy.

In the spectrum of potential crude oil supplies, tar sands derived crude oil displays some common traits with coal. The profits of Enbridge are closely tied to the consumption of tar sands derived crude oil which has unusually high environmental impacts relative to other sources of fossil fuels. Therefore, the robust business results of Enbridge in the past and therefore the firm's ability to self-insure environmental risks may not endure indefinitely into the future.

The Enbridge Business Model Incorporates Systemic Risks Which Cannot Be Avoided

Some of the challenges to the Enbridge business model are detailed below:

1. The risk of a rupture of Line 5 at the Straits is in an extremely high consequence location for an inland oil pipeline with potential damage costs well in excess of all available funding sources for Enbridge entities.
2. The relatively high carbon loading associated with tar sands derived crude oil and the corresponding work of environmentalists to completely eliminate the use of tar sands derived oil as a fossil fuel

¹⁶ Varinsky, Dana (December 9, 2016) Business Insider, Nearly Half of U.S. Coal is Produced by Companies that have Declared Bankruptcy – and Trump won't fix that; <http://www.businessinsider.com/us-coal-bankruptcy-trump-2016-12>

source is already having impacts on the operations of Enbridge, Inc. As a source of fossil fuel, tar sands derived oil is relatively inefficient on a total carbon footprint basis. This is because it takes a relatively high amount of fossil fuel derived energy to heat the water, to produce the steam needed, to produce a gallon of tar sands derived crude oil, to put into the pipeline. For this reason, people concerned about the greenhouse effect of carbon dioxide are mobilizing in increasing numbers to completely eliminate tar sands oil consumption.

Appendix H illustrates an activist group chartering buses to protest the Enbridge pipeline terminal in Duluth, Minnesota. Michigan is mentioned in the announcement. These activities by forward thinking environmentalist will make it more difficult for Enbridge to earn money trading in and transporting tar sands oil in the future.

3. The relative distance to end users of the petroleum products that Enbridge transports is not competitive on a cost basis to other sources of crude oil closer to the end users. The Enbridge, Inc. 2018 10-K mentions that demand from India and China will lead to future demand for the services of Enbridge¹⁷. We have no expertise in oil markets, but shipping relatively expensive tar sands derived crude oil on ships to India and China does not make sense to us. Both countries are heavily focused on renewable energy sources, they are both a great distance from northern Alberta, and there are ample supplies of crude oil that cost much less to get out of the ground closer to India and China.

The shortest route to China from Alberta is through British Columbia. However, Enbridge lines do not run west, nor is it likely that Enbridge will ever be able to build a new line to the west of Alberta to ship product for the China market.

The existing Trans Mountain Pipeline which does run west from the tar sands was built in 1953, extending 715 miles from Alberta across the Rocky Mountains to Vancouver, British Columbia. It carries 300,000 barrels per day.

The proposed expansion plan for the existing Trans Mountain Pipeline to ship tar sands derived oil to the west was opposed by 59 Canadian tribes and First Nations, and 22 local governments in British Columbia. The First Nations undertook several lawsuits in opposition to the expansion. At the same time the collapse in global oil prices in 2014 made it unlikely that earlier projections of tar sands oil production would any longer come to fruition. Kinder Morgan, the lead investor, confirmed the project may be “untenable”.¹⁸ In 2018, in efforts to overcome the financial and legal challenges to the expansion, the Canadian government had to step in to finance the expansion project.¹⁹

Considering the difficulties encountered in expanding an existing pipeline to carry tar sands oil to the west, it does not appear as if Enbridge could build a new pipeline of its own. Without an Enbridge pipeline to the west, the only way Enbridge will be transporting oil for the China market is through U.S. ports to the South and East. Looking at a globe, moving oil to the south and east of Alberta is not the most direct way to move product to China. Transporting oil thousands of additional miles to reach end users adds hard dollar and potential carbon footprint costs to the tar sands oil that the competitors of Enbridge oil supplies would not have. Therefore, the viability of the business expansion plans to ship tar sands derived oil to China are questionable in our opinion.

¹⁷ Enbridge, Inc 2018 10-K pg. 16

¹⁸ <https://www.reuters.com/article/us-kinder-morgan-cn-results/kinder-morgan-says-investment-in-oil-pipeline-expansion-may-be-untenable-idUSKBN1HP2YD>

¹⁹ <https://www.reuters.com/article/us-canada-energy/trans-mountain-oil-pipeline-expansion-may-start-in-september-idUSKCN1TK207>

India as a consumer of tar sands oil from Alberta also does not make a lot of sense to us. Oil from the middle east requires about half the production cost of tar sands oil, and middle east oil has the potential to be in over supply when the producing countries want it to be. Middle east oil is also much closer to the end users in India than the northern Alberta tar sands.

4. Other sources of crude oil have a lower cost of production. Using steam to extract the oil from sand adds costs to produce a barrel of tar sands derived crude oil. As shown in Appendix I, tar sands oil has a relatively high cost of production when compared to alternative sources of crude oil. If the market price of crude oil dips below \$44 a barrel for an extended period of time, the supply of tar sands derived oil would be expected to decrease, adversely affecting Enbridge's revenues and profits.
5. The extractive process for tar sands oil in Alberta is basically surface mining, which has extreme and long lived local environmental impacts on the land. This is another reason that environmentalists thousands of miles away seek to totally eliminate the use of tar sands derived oil products.
6. Indian Treaty Rights including eviction actions for Line 5 at the Bad River Indian Reservation in Wisconsin, as discussed in Appendix J of this report, illustrates how quickly contemporary treaty rights can alter a business plan for Enbridge.

The major feeder pipelines from Canada cross into the United States into lands that are subject to treaties formed in the 1800's. These treaties give Native Americans certain rights to the lands. In more contemporary times, various Native American Bands in the United States have perfected those rights in court. As a result of the precedent and evolving case law on Treaty Rights, Enbridge faces legal challenges in the U. S. as the firm attempts to replace pipelines that were installed more than 50 years ago across land that is subject to treaties with Native Americans.

The right of ways and easements used by Enbridge to access U.S. markets and international shipping ports are being challenged by Native Americans in yet untested legal theories regarding treaty rights. Treaty rights established in courts over the past 20 years have the potential to severely restrict the ability of Enbridge to move product and therefore earn revenues in a relatively short period of time.

Of particular importance for this report, if Line 5 is shut down at the Bad River Reservation in Wisconsin as further discussed below, unless and until Enbridge is able to re-route Line 5 around the reservation there will be no throughput of oil in Line 5 in Michigan including at the Straits of Mackinac.

In our opinion, the 10-K financial reports of Enbridge, Inc. tend to downplay the potential effects of Treaty Rights on its business model. For example, Enbridge comments on its replacement for Line 3 on page 73 of the 2018 10-K,

“United States Line 3 Replacement Program

The MNPUC approved the Certificate and Route Permit and denied petitions to reconsider the decisions. All related Certificate conditions have been finalized and are being addressed. In addition, agreement was reached with the Fond du Lac Band of Lake Superior Chippewa granting a new 20 year easement for the entire Mainline including the Line 3 Replacement Project through their Reservation. The remaining permit applications have been submitted to the various federal and state agencies, including the United States Army Corps of Engineers (Army Corps), the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency and other local government agencies in Minnesota.

We anticipate that the agencies will process all of these applications in the coming months, and with timely approvals continue to expect an in-service date for the project before the end of 2019”.

From this project update, which was not untrue when it was written just ten months ago, a reader of the 2018 10-K would conclude the replacement of Line 3 would be coming on-line shortly.

However, the reality is the permit for the replacement Line 3 was appealed at the Minnesota Supreme Court. There were also two other actions opposing Line 3 filed at the Minnesota court of appeals, one of the appeals had been made by the Minnesota Department of Commerce. The emergence of three appeals after the PUC approval paints a different picture of the Line 3 replacement permitting process than what is expressed in the 10-K from just 10 months ago.

In another example of a disclosed risk in the 2018 10-K that does not fully reflect the developing reality 10 months later, the 2018 10-K discusses a dispute between the Bad River Band of Chippewa.

“On January 4, 2017, the Tribal Council of the Bad River Band of Lake Superior Tribe of Chippewa Indians (the Band) issued a press release indicating that the Band had passed a resolution not to renew its interest in certain Line 5 easements through the Bad River Reservation. Line 5 is included within our mainline system. The Band’s resolution calls for decommissioning and removal of the pipeline from all Bad River tribal lands and watershed and could impact our ability to operate the pipeline on the Reservation. Since the Band passed the resolution, the parties have agreed to ongoing discussions with the objective of understanding and resolving the Band’s concerns on a long-term basis.”

In their lawsuit, The Bad River Indian Band in Wisconsin alleges that Enbridge Line 5 since 2013 has been trespassing on its reservation property. If the lawsuit is successful, not only would Enbridge forgo the revenues derived by shipping petroleum products in Line 5, the cost to remove just 10 miles of existing Line 5 pipe within the reservations could cost \$855 per foot or \$45,000,000²⁰.

The 10-month-old Enbridge, Inc. 10-K report does not reflect the potential removal costs or the gravity of the eviction lawsuit at the Bad River Reservation.

In its report to shareholders Enbridge says it may need to reroute Line 5 around the reservation. It does not mention how difficult that can be. Based on the Enbridge experience in permitting a new Line 3 through Indian treaty rights-controlled territories in Minnesota, getting a replacement route for Line 5 will not be as easy as it was 50 years ago.

Section IX Qualifications of the Author

This report has been authored by David J. Dybdahl, CIC, CPCU, ARM, MBA with the help of researchers.

Mr. Dybdahl has extensive experience in environmental risk management and insurance. He holds a bachelor’s and a master’s degree in risk management and insurance from the University of Wisconsin Madison, where he has been a guest lecturer on environmental risk management and insurance topics for over 35 consecutive years.

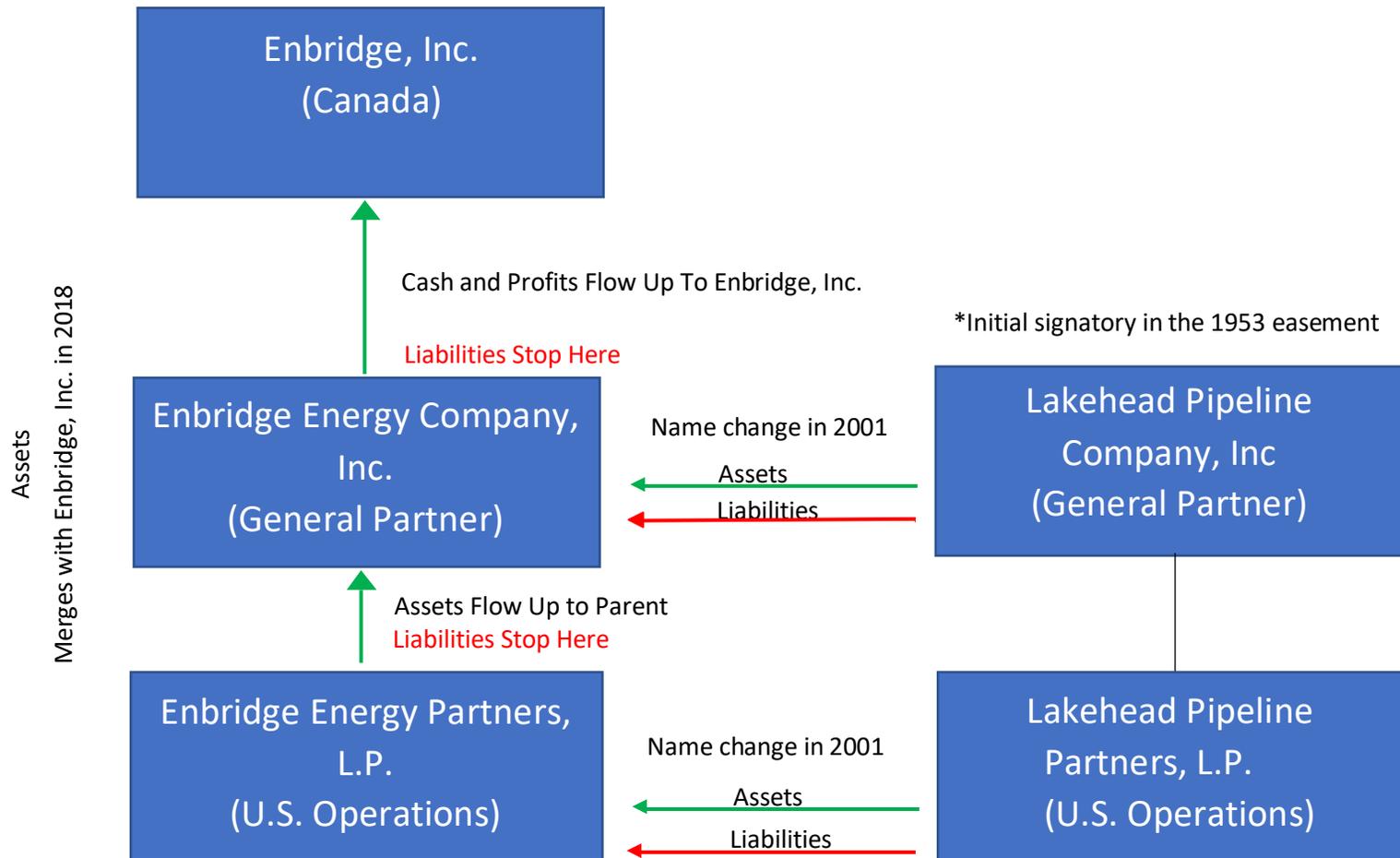
²⁰ Chris Johnston Testimony regarding the cost to remove pipelines from the ground pg. 30 Lines 7-9 Evidentiary Hearing – Line 3 Volume 6B – 11/9/2017

He has authored the chapters on environment insurance and risk management in over 30 insurance text books including the chapter on Environmental Insurance in the Chartered Property and Casualty Underwriter (CPCU) 4, *Commercial Liability, Risk Management and Insurance* textbook, and authored and edited the chapters "Environmental Loss Control" in the *Associate in Risk Management (ARM)* textbook and the chapter on environmental claims in the *Associate in Claims* textbook. His Curriculum Vitae is attached in Appendix D.

Mr. Dybdahl's past consulting work includes advising and providing technical information on environmental insurance to the U.S. Department of Defense, the U.S. Environmental Protection Agency, the U.S. Department of Justice and the U.S. Department of Energy. Directly related to this work for The State of Michigan, he was the author of An Insurance and Risk Management Report on the Proposed Enbridge Pumping Station which was prepared for The Dane County Zoning and Land Regulation Committee and submitted for review on April 8, 2015 and he prepared in 2018 the Risk Financing and Insurance report on the replacement of Enbridge Line 3 for the Department of Commerce in the State of Minnesota. Many of the risk and insurance topics associated with Enbridge Line 61 in Dane County and Line 3 in Minnesota parallel the risks and insurance topics associated with Line 5 in Michigan.

Mr. Dybdahl has served as an expert witness in both state and federal courts on over two billion dollars in litigated and arbitrated insurance coverage cases involving mostly environmental damage losses. In his profession as an insurance broker, he has placed thousands of environmental insurance policies into the global insurance marketplace. These environmental insurance policies insured risks ranging from mold in a single-family home, to the clean-up operations of the Chernobyl nuclear disaster in the Ukraine for the World Bank in London. He has worked with environmental insurance products on a day to day basis for over 35 years.

Appendix A



In the Minnesota proceedings of the PUC, Judge O'Reilly asks, "the Applicant cannot bind Enbridge, Inc. its parent, ultimate parent company, to any financial issues in this case?" Mr. Johnston's response, "That's correct"

Appendix B

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.

This Second Agreement is entered between the State of Michigan, the Michigan Department of Environmental Quality, and the Michigan Department of Natural Resources (collectively referred to herein as “the State”), AND Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc., formerly known as Lakehead Pipe Line Company, Inc., and Enbridge Energy Partners, L.P. (collectively referred to herein as “Enbridge”) concerning those segments of Enbridge’s Line 5 pipeline (“Line 5”) that are located within the State of Michigan. This Second Agreement results from, and is intended to fulfill, the parties’ obligations under Paragraph I.H. of the first Agreement between the State and Enbridge, entered November 27, 2017 (“First Agreement”), in which the parties agreed to pursue a further agreement to address Line 5’s crossing of the Straits of Mackinac (“Straits”).

WHEREAS, the segments of Line 5 located within Michigan extend 547 miles, from the border of Wisconsin near Ironwood, Michigan to Marysville, Michigan, where it crosses the St. Clair River to the border with Sarnia, Ontario (“St. Clair River Crossing”);

WHEREAS, 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;

WHEREAS, the continued operation of Line 5 through the State of Michigan serves important public needs by providing substantial volumes of propane to meet the needs of Michigan citizens, supporting businesses in Michigan, and transporting essential hydrocarbon products, including Michigan-produced oil to Michigan and regional refineries and manufacturers;

WHEREAS, the State issued an “Easement” to Lakehead Pipeline Company, Inc. (“Lakehead”), subsequently renamed Enbridge Energy Company, Inc., on April 23, 1953 pursuant to Act No. 10, PA 1953 “for the purpose of erecting, laying, maintaining and operating” an approximate 4-mile segment of Line 5 across the Straits upon determining that such crossing would “be of benefit to all of the people of the State of Michigan and in furtherance of the public welfare”;

WHEREAS, in accordance with the Easement, Enbridge constructed two parallel pipelines, each 4.09-miles long (referred to herein as the “Dual Pipelines”) across the Straits in

1953 (referred to as the “Straits Crossing”), and since that time continues to operate and maintain such pipelines consistent with the terms of the Easement as part of Line 5 to transport light crude oil, synthetic crude oil, and natural gas liquids;

WHEREAS, on September 3, 2015, Enbridge and the State entered an agreement under which Enbridge affirmed that it does not and will not transport heavy crude oil through the Dual Pipelines;

WHEREAS, the State and Enbridge recognize that the Straits Crossing and the St. Clair River Crossing (collectively “Crossings”) are located in the Great Lakes and connecting waters that include and are in proximity to unique ecological and natural resources that are of vital significance to the State and its residents, to tribal governments and their members, to public water supplies, and to the regional economy, and the Crossings are also present in important infrastructure corridors;

WHEREAS, the State and Enbridge recognize that other important ecological and natural resources are located near other segments of Line 5 that cross or approach other waters of the State that are also of vital significance to the State and its residents, to tribal governments and their members, to public water supplies, and to the regional economy;

WHEREAS, in the First Agreement, the State and Enbridge established additional measures with respect to certain matters related to Enbridge’s stewardship of Line 5 within Michigan and the transparency of its operation;

WHEREAS, in accordance with Paragraph I.A. of the First Agreement, Enbridge has enhanced its coordination with the State concerning the operation and maintenance of Line 5 located in the State of Michigan;

WHEREAS, in accordance with Paragraph I.B. of the First Agreement, Enbridge timely requested pre-application consultations and applied for all U.S. and Canadian authorizations and approvals necessary to replace Line 5’s crossing of the St. Clair River by the use of a horizontal directional drill method;

WHEREAS, under the circumstances specified in Paragraph I.C. and Appendix 1 to the First Agreement, Enbridge has discontinued Line 5 operations in the Straits during sustained adverse weather conditions;

WHEREAS, Enbridge has completed its evaluation of underwater technologies to enhance leak detection and technologies to assess coating condition of the Dual Pipelines and has

submitted the results of such evaluations to the State, in accordance with Paragraph I.D. of the First Agreement;

WHEREAS, Enbridge has submitted to the State an evaluation of measures to mitigate potential vessel anchor strike, in accordance with Paragraph I.E. of the First Agreement;

WHEREAS, Enbridge has submitted to the State an evaluation of alternatives to replace the Dual Pipelines, in accordance with Paragraph I.F. of the First Agreement;

WHEREAS, Enbridge has worked in coordination with the State to identify and evaluate water crossings by Line 5 and to assess measures to minimize the likelihood and/or consequences of a release at each water crossing location, in accordance with Paragraph I.G. of the First Agreement;

WHEREAS, the evaluations carried out pursuant to the First Agreement have identified near-term measures to enhance the safety of Line 5, and a longer-term measure – the replacement of the Dual Pipelines – that can essentially eliminate the risk of adverse impacts that may result from a potential release from Line 5 at the Straits;

WHEREAS Enbridge has recently implemented and committed to continue additional measures to enhance the safety of Line 5; and

WHEREAS, the State acknowledges that the stipulations specified in this Second Agreement are intended to further protect ecological and natural resources held in public trust by the State of Michigan, and that the terms of this Second Agreement will both protect the ecological and natural resources held in public trust by the State and provide clarity as to State's expectations concerning the safety, integrity, and operation of Line 5.

NOW, THEREFORE, the parties agree as set forth below.

I. STIPULATIONS

Enbridge and the State agree to the following measures, which are designed, among other things, to increase coordination between the State and Enbridge concerning the operation and maintenance of Enbridge's Line 5 pipeline located in the State of Michigan, including further enhancing the safety of its operation and reducing the risk of adverse impacts that may result from a potential release from Line 5 at the Straits in the interest of the citizens of Michigan.

A. Continued Coordination Between the State and Enbridge: In order to continue coordination with the State concerning the operation and maintenance of Line 5 located in the

State of Michigan, and to facilitate the implementation of the measures described at Paragraphs B-K below, the parties agree as follows:

1. The State will further provide designated representatives to participate in the stewardship and transparency consultations and communications to be carried out under this Second Agreement.
2. Enbridge will work cooperatively with the State to: (a) make available to the State's representative data and other materials generated under this Second Agreement, including but not limited to geologic, engineering, or other technological information concerning Line 5 located in the State of Michigan and Enbridge's implementation of the measures described herein; and (b) all requested information in Enbridge's possession concerning the operation, integrity management, leak detection, and emergency preparedness for Enbridge's Line 5 pipeline located in the State of Michigan. The State recognizes, and to the extent provided by applicable law will accommodate, Enbridge's interest in protecting from disclosure critical energy infrastructure and other confidential information protected from disclosure by law.
3. Enbridge and representatives designated by the State agree to meet semi-annually to discuss any changes to engineering parameters, risks, new technologies, and innovations pertaining to the operation and maintenance of Line 5 located within the State of Michigan. One such semi-annual meeting shall include subject matter experts from Enbridge and the State to review matters relating to pipeline integrity, emergency response and preparedness for Line 5 located within the State of Michigan.

B. Replacement of Line 5 St. Clair River Crossing: Consistent with Paragraph I.B. of the First Agreement, Enbridge timely met its obligations under the First Agreement by filing applications seeking all state, U.S. federal and Canadian authorizations and approvals necessary for the replacement of the St. Clair River Crossing by use of a horizontal directional drill ("HDD") method. No later than 180 days after obtaining all state, U.S. federal, and Canadian authorizations and approvals necessary to replace Line 5's crossing of the St. Clair River by the use of a HDD method, Enbridge will initiate the work identified in the applications necessary to replace that segment of Line 5.

C. Discontinuation of Line 5 Operations in the Straits During Sustained Adverse Weather Conditions: Until 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. Additionally, 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. Enbridge will notify the State when the Line 5 Dual Pipelines have been shut down due to “Sustained Adverse Weather Conditions” and again when the Line 5 Dual Pipelines are restarted. Further, the State is planning to install radar technology that will provide additional near real-time data regarding wave height at the Straits. The State and Enbridge agree that when those data become available, they will be shared with Enbridge and applied to the procedures set forth in Appendix 1 and this Paragraph. Any modification to Appendix 1 to account for the use of radar technology data shall not require a written Amendment to this Second Agreement under Section II below.

D. Underwater Technologies to Enhance Leak Detection and Technologies to Assess Coating Condition of the Dual Pipelines: Based upon the evaluation performed pursuant to Paragraph I.D. of the First Agreement, 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.

E. Implementation of Measures to Mitigate Potential Vessel Anchor Strike: The 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. 83 Federal Register 37780 (August 2, 2018). In order to assist the Coast Guard in monitoring compliance with that regulation, Enbridge agrees to provide one-time funding of up to \$200,000 to be used for the acquisition and installation of video cameras at the Straits.

F. Replacement of Dual Pipelines in a Straits Tunnel: Pursuant to Paragraph I.F. of the First Agreement, Enbridge prepared and submitted to the State the report entitled Alternatives for replacing Enbridge’s dual Line 5 pipelines crossing the Straits of Mackinac (June 15, 2018) (“Alternatives Analysis”). That Alternatives Analysis concluded that construction of a tunnel beneath the lakebed of the Straits connecting the upper and lower peninsulas of Michigan, and the placement in the tunnel of a new oil pipeline, is a feasible alternative for

replacing the Dual Pipelines, and that alternative would essentially eliminate the risk of adverse impacts that may result from a potential oil spill in the Straits (hereinafter "Straits Tunnel"). The State and Enbridge agree to promptly pursue further agreements discussed under Paragraph I.G below for the design, construction, operation, management, and maintenance of the Straits Tunnel in which a replacement for the Dual Pipelines could be located ("Line 5 Straits Replacement Segment").

G. Further Agreements for a Straits Tunnel: The State has proposed that, together with housing the Line 5 Straits Replacement Segment, the Straits Tunnel could accommodate multiple utilities, including but not necessarily limited to: electric transmission lines, and facilities for transmitting data and telecommunications (collectively "Utilities"). The State and Enbridge agree to initiate discussions, as soon as practicable, to negotiate a public-private partnership agreement with the Mackinac Bridge Authority ("Authority") with respect to the Straits Tunnel for the purpose of locating the Line 5 Straits Replacement Segment and, to the extent practicable, Utilities in that Tunnel (hereinafter "Tunnel Project Agreement"). The Tunnel Project Agreement shall include provisions under which the Authority will provide property necessary for the construction of the Straits Tunnel, in return for which Enbridge would: (a) fund the design and construction of the Straits Tunnel; (b) construct the Straits Tunnel; and (c) construct the Line 5 Straits Replacement Segment to be located within the Tunnel. Such agreement shall also provide that the Authority shall: (a) obtain or support Enbridge in obtaining the necessary permits, authorizations, or approvals necessary for the construction and operation of the Tunnel and the Line 5 Straits Replacement Segment; and (b) upon completion of the construction of the Straits Tunnel, the Authority shall assume ownership of the Straits Tunnel. Simultaneous with the execution of such agreement, the Authority would execute a lease or other agreements to: (a) authorize Enbridge's use of the Straits Tunnel for the purpose of locating the Line 5 Straits Replacement Segment for as long as the Line 5 Straits Replacement Segment shall be in operation by Enbridge; (b) provide that Enbridge will operate and maintain the Straits Tunnel during the term of the lease on terms to be agreed; and (c) specify the conditions under which Utilities may gain access to the Straits Tunnel. Provided that the agreements discussed in this Paragraph I.G. are executed by the Authority and Enbridge, the State and Enbridge would simultaneously enter into an agreement expressly confirming Enbridge's rights to operate the Dual Pipelines under the terms of the Easement during the construction of the Straits Tunnel and Line 5 Replacement Straits Segment, subject to compliance with the terms of the agreements described in Paragraph I.G. and applicable laws. Any failure to reach the further agreements contemplated by this Paragraph I.G. shall not alter any existing rights Enbridge has under the Easement.

H. Permanent Deactivation of the Dual Pipelines: Enbridge agrees that following completion of the Straits Tunnel and after the Line 5 Straits Replacement Segment is constructed

and placed into service by Enbridge within the Straits Tunnel, Enbridge will permanently deactivate the Dual Pipelines. Consistent with Paragraphs E, H, and Q of the Easement, the procedures, methods, and materials for replacement, relocation, and deactivation of the Dual Pipelines are subject to the written approval of the State, which the State agrees shall not be reasonably 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, which shall not be unreasonably withheld. The State 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.

I. Line 5 Water Crossings Other Than the Straits: Pursuant to Paragraph I.C. of the First Agreement, Enbridge prepared and submitted to the State the Report entitled *Enhancing Safety and Reducing Potential Impacts at Line 5 Water Crossings* (June 30, 2018) (“Water Crossing Report”). As described in the Water Crossing Report, Enbridge and representatives of the State jointly identified and prioritized a total of 74 Line 5 water crossings in Michigan other than the Straits and organized them into 11 area groupings, detailed in Tables 1 and 2 in Appendix A to the Report. The Water Crossing Report assessed available mitigation measures to: (a) minimize the likelihood of potential releases (leak prevention); and (b) reduce the consequences of potential releases if they were to occur. Based on that assessment, the Report identified a series of specific Action Items to address both of those objectives and proposed time frames for their implementation (Report, pp 18- 24). They include measures related to: (a) Enbridge’s Mainline Integrity program; (b) Enbridge’s Geohazard Management Program; (c) Pipeline Damage Prevention; (d) Emergency Response; and (e) Environmental Management. As reflected in the Water Crossing Report, the Action Items include, among other things, measures that are intended to increase by an order of magnitude Enbridge’s leak prevention safety targets for certain water crossings.

In addition to completing all of the Action Items identified in the Report, the parties have agreed upon two projects at water crossings on which preparatory work shall immediately begin. These specific mitigation measures to be implemented in the near term at certain locations as are specified in Appendix 2 of this Second Agreement.

Enbridge shall implement the Action Items as described in the Report, and as supplemented in this Second Agreement and the Summary contained in Appendix 2 to this Second Agreement, provided that the State and Enbridge may mutually agree in writing to modify Action Items, as well as any

tangible follow-up actions, tasks, or mitigation measures associated with the Action Items, as necessary to accommodate site conditions and industry best practices. Any such modifications do not require a written Amendment to this Second Agreement under Section II below. To the extent they differ: (i) the terms of any modification to the Action Items takes precedence over this Second Agreement; (ii) the terms of this Second Agreement takes precedence over those of Appendix 2; and (iii) those terms of Appendix 2 take precedence over those of the Report.

J. Financial Assurance: The State commissioned the final *Independent Risk Analysis for the Straits Pipelines* (Meadows, et al., September 15, 2018) (hereinafter “Independent Risk Analysis”) to assess a worst-case discharge from the Dual Pipelines, including the cost of responding to that worst-case discharge. Enbridge strongly disagrees with the methods and conclusions of the Independent Risk Analysis report, and nothing in this Second Agreement shall be construed to constitute Enbridge’s acceptance of those methods and conclusions. Enbridge nonetheless agrees that, so long as it continues to operate the Dual Pipelines, the Enbridge entity or entities that own and operate Line 5, or the parent companies of such Enbridge entity(ies), will 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. To demonstrate compliance with this requirement, on an annual basis Enbridge will file with the State updated financial assurance information in a format similar to that provided in Appendix 3. Enbridge further agrees that, upon the request by the State, it will on an annual basis, make available to the State for inspection and review information regarding the amount, availability, and changes to liability insurance that it maintains. The State agrees that Enbridge’s compliance with the requirements under this Paragraph I.J. satisfies its financial assurance obligations specified under Paragraph J of the Easement.

K. Continuation of Additional Measures to Enhance the Safety of Line 5 in Michigan: 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.

II. AMENDMENT

The State or Enbridge may propose in writing that this Second Agreement be amended. The State and Enbridge agree to consult in good faith in an effort to reach agreement on any proposed

amendment. Except as provided in Paragraph I.G., any amendment agreed to by the State and Enbridge shall be effective on the date that any written amendment is executed by the State and Enbridge.

III. DISPUTE RESOLUTION

The State and Enbridge agree that, should any dispute arise under this Second Agreement, the State and Enbridge shall in good faith attempt to resolve the dispute through informal negotiations. If the parties are unable to informally resolve such a dispute, either party may initiate proceedings in a court of competent jurisdiction to resolve the dispute.

IV. TERM AND TERMINATION

The terms of this Second Agreement shall remain in effect until the commitments in Paragraphs I.B., I.E. - I.I. above are fulfilled, except that the obligations in Paragraphs I.A., I.C., I.D., I.J., and I.K. shall continue, subject to the terms set forth in those Paragraphs, unless and until the Second Agreement terminates automatically. This Second Agreement shall terminate automatically upon the voluntary discontinuation of service by Enbridge of Line 5 through the State of Michigan.

V. COMPLIANCE WITH APPLICABLE LAW

The State and Enbridge acknowledge and agree that Enbridge's operation of Line 5 remains subject to the requirements of all applicable state and federal law, the Easement, the September 3, 2015 Agreement with the State that prohibits Enbridge from transporting heavy crude oil on Line 5 within the State of Michigan, and the terms of any easement granted by the State for Line 5 and agree that nothing in this Second Agreement is intended to relieve Enbridge of its obligation to comply with or waive any rights that Enbridge and the State may have under such laws or to supersede or displace applicable state law, regulation or requirement, or any federal law, regulation, or requirement that is applicable to the operation or maintenance of Line 5, including but not limited to the Pipeline Safety Act (including its preemption provisions); the Protecting Our Infrastructure of Pipelines and Enhancing Safety Act of 2016 (Public Law 114- 183); any regulation or order issued by PHMSA or any other federal agency; or the Consent Decree entered into between Enbridge and the United States in *United States v. Enbridge Energy, Limited Partnership, et al.*, No. 1:16-cv-914, ECF No. 14 (E.D. Mich., entered May 23, 2017), which specifies certain investigation, integrity management, leak detection, valve placement, and emergency response measures to prevent discharges of oil or hazardous substances into or upon the waters of the United States or adjoining shorelines.

VI. ENTIRE AGREEMENT

This Second Agreement constitutes the whole of the Agreement between the parties concerning those portions of Enbridge's Line 5 located in the State of Michigan. This Second Agreement supersedes in its entirety the First Agreement.

VII. EXECUTION

This Second Agreement may be executed in counterparts without the necessity that the Parties execute the same counterpart, each of which will be deemed an original, but which together will constitute one and the same agreement. The exchange of copies of this Second Agreement by electronic or hard-copy means shall constitute effective execution and delivery thereof and may be used in lieu of the original for all purposes.

VIII. NO THIRD PARTY BENEFICIARIES

This Second Agreement is intended for the exclusive benefit of the parties hereto and their respective successors. Nothing contained in this Second Agreement shall be construed as creating any rights or benefits in or to any third party. This Second Agreement does not give rise to a private right of action for any person other than the parties to this Second Agreement.

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FOR THE STATE OF MICHIGAN

Name: Rick Snyder Title:

Governor

Dated: _____

Title: Director, Michigan Department of
Natural Resources
Dated:

Name: Heidi Grether
Title: Director, Michigan Department of
Environmental Quality
Dated:

Appendix 1

Enbridge Line 5 – Sustained Adverse Weather Conditions Procedure

This Appendix is designed to facilitate an effective emergency response to a potential release incident by specifying procedures for a systematic approach by Enbridge to temporarily shut down Line 5 in the Straits of Mackinac during Sustained Adverse Weather Conditions. Enbridge shall maintain a record of its use of the procedure and make it available to the State. If an alternate source of near-real time wave height data such as the radar system planned by the State becomes available following the execution of this agreement, Enbridge and the State will work cooperatively to revise this Appendix to account for the alternative data source.

Definitions:

Sustained Adverse Weather Conditions: Conditions 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.”

Near-real Time Data: The wave height data derived from Buoy 45175 (Mackinac Straits West) of the Great Lakes Research Center of Michigan Technological University’s Upper-Great Lakes Observing System (UGLOS) and/or alternate data sources such as radar data, as mutually agreed by the State and Enbridge through a modification of this Appendix.

Modeled Data: Modeled wave height data based on real-time data inputs that is available on the NOAA Great Lakes Coastal Forecasting System (GLCFS) Nowcast model at a representative point in the Straits.

Forecasted Data: Data available on the NOAA Great Lakes Coastal Forecasting System Forecast model at a representative point in the Straits.

Enbridge Line 5 Procedures – Sustained Adverse Weather Conditions

Step #	Action
1	Enbridge or Enbridge Consultant (collectively “Enbridge Monitor”) will continuously monitor Near-real Time Data, or in its absence Modeled Data, to identify Sustained Adverse Weather Conditions at the Straits.
2	When Sustained Adverse Weather Conditions are forecasted based on Forecasted Data, the Enbridge Monitor will inform the Control Center Operations Shift Supervisor, at which point the Control Center Operations will prepare for the potential that an unplanned shut down of Line 5 at the Straits may be required.

3	When Near-real Time Data, or in its absence Modeled Data, indicate that Sustained Adverse Weather Conditions 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 Sustained Adverse Weather Conditions exist at the Straits.
5	The Enbridge Great Lakes On-Call Manager will request, no later than 15 minutes after being notified in Step 4 above, that the Control Center Operations shutdown Line 5. If real time conditions in the Straits determined by the Enbridge Great Lakes On-Call Manager indicate Sustained Adverse Weather Conditions do not exist, the Great Lakes On-Call Manager will advise the Control Center Operations Shift Supervisor that Line 5 should not be shutdown. In that event, the Enbridge Monitor will continue to monitor conditions as per Step 1 for changes that indicate that Sustained Adverse Weather conditions may be present and the other Steps in this Appendix shall be followed should the Enbridge Monitor determine that such conditions are present.
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	While shut down, the Enbridge Monitor will continuously monitor Near-real Time Data, or in its absence Modeled Data, to identify the continuance of Sustained Adverse Weather Conditions at 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.
9	Control Center Operations will safely restart Line 5.

Communications Protocol:

Enbridge shall immediately notify the State of Michigan as follows: (i) when 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, and Enbridge has acted to 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; (ii) when Line 5 has been temporarily shut down in the Straits of Mackinac due to Sustained Adverse Weather Conditions, as per Step 6 above; and (iii) when Line 5 has been safely restarted in the Straits of Mackinac, as per Step 9 above. Any notification required under this provision shall be made by email to a specified email address provided to Enbridge by the State of Michigan.

Appendix 2

Action Items for Water Crossings Other than the Straits

A. Additional Near-Term Items

1. Mitigate potential geohazard at the following water crossings:
 - a. Point Aux Chenes (3)-restore depth of cover and stabilize bank to prevent further erosion:
 - i. Work with State Technical Team to select method, design and schedule within 3 months from the effective date of this Agreement.
 - ii. Apply for all necessary permits within 6 months from the effective date of this Agreement.
 - iii. Complete construction of mitigation measures within 12 months after receipt of permits.
 - b. Tributary to Paint River – Address exposed section of pipeline:
 - i. Work with State Technical Team to select method, design and schedule within 3 months of the effective date of this Agreement.
 - ii. Apply for all necessary permits within 6 months from the effective date of this Agreement.
 - iii. Complete construction of mitigation measures within 12 months after receipt of permits.
2. Accelerated field work to evaluate crossings with potential need for geohazard remediation. Additional information to be gathered for the following crossings within 6 months from the effective date of this Agreement:
 - a. Whitefish River - MP 1358
 - b. Rapid River – MP 1356
 - c. Tributary to Southwest Branch Fishdam River – MP 1373
 - d. Elm Creek – MP 1691
 - e. East Branch Black River – MP 1442
 - f. East Mile Creek – MP 1436
 - g. Paquin Creek – MP 1448
 - h. Pointe Aux Chenes River (1) – MP 1466
 - i. West Branch Paquin Creek – MP 1447
 - j. West Mile Creek – MP 1436
 - k. Red Creek – MP 1563

Based on evaluations, remedial measures, if needed, may include: depth of cover restoration; bank and bed armoring; or pipeline lowering or replacement. These remedial measures will be implemented as follows:

- i. Work with State Technical Team for method selection, design and schedule within 6 months from the effective date of this Agreement.
- ii. Apply for all necessary permits within 12 months from the effective date of this Agreement.
- iii. Complete construction of remedial measures within 12 months after receipt of permits.

B. Action Items in Report

Preventive and Mitigative Measures	Time to Complete (months)	Number of locations
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Leak Prevention Measures

1. Increase Safety Targets Within Grouping Areas	6	All
2. Engineering Assessment	12	4
3. Baseline Geohazard Assessment	18	17
4. Depth of Cover/Bathymetric Survey	18	31
5. Perform Detailed Scour Study	18	7
6. Replacement/Lowering	TBD	TBD
7. Outreach to local government officials involved in construction activities near waterbodies	6	All

Consequence Mitigation Measures

8.	Review Emergency Response Training and Exercise Communication Plan	6	All
9.	Establish Additional Emergency Response Tactical Control Points	12	10
10.	Collaborative Review of Emergency Response Tactical Control Points	9	All
11.	Update Environmental Sensitivity Maps with State Sensitivity Data	12	All
12.	Review Emergency Response Aquatic Invasive Species Inspection Procedure	12	All
13.	Conduct Baseline Environmental Studies - Rare Wetland Communities	18	20

Biology Mitigation Studies

14.	Fisheries	18	12
15.	Freshwater Mussels	18	31
16.	Biological Integrity	18	11

Appendix 3
Enbridge Financial Assurance Verification Form for Calendar Year [Insert]

	Enbridge Inc. (EI)	Enbridge Energy Partners, L.P. (EEP)	Total	Timing of Access (business days - estimate)
Cash	\$ (as per EI's consolidated Q_ 20_ balance sheet– cash & cash equivalents)		\$	1 day
Credit Facility (available liquidity as at [date]) Note 1	\$	\$	\$	1-3 days
Other Resources Available in 30-60 Days (explain)	\$ (as per EI's consolidated Q_ 20 balance sheet – accounts receivable and other)		\$	30-60 days
Total Short-Term	\$	\$	\$	
Insurance	General Liability Insurance, includes Time Element Reporting Pollution (sudden and accidental) coverage currently US\$[Insert] Note 2			Note 3
Surety Bonds				
Parent/Affiliate Guarantees (from Parent Co. to Authorization Holder)				
Other Financial Resources (explain)				
Total Other				

Notes:

1. Enbridge utilizes the commercial paper markets in both Canada and the U. S.as a cost effective source of short term liquidity. The commercial paper programs are fully backstopped by the Credit Facilities and the availability of such is reflected net of any commercial paper outstanding.
2. The reflected insurance amount represents the limit for coverage that is maintained by EI for the specified calendar year, and for which EEP is named as an insured under that policy, thereby enabling EEP to obtain insurance recoveries for events covered under the policy. The insurance amount is reviewed and renewed on an annual basis and is subject to insurance market conditions and experience that may impact the breadth and limit of coverage available.
3. The insurance coverage maintained by EI provides any Enbridge entity covered under that policy, such as EEP, with eventual recovery of monies which that Enbridge entity has paid because of its legal liability for direct third- party bodily injury and property damage caused by the release and that financial recovery can extend over a period of months and years.

Appendix 4

Enhanced Safety and Emergency Response Capabilities

Enbridge has, in recent years, undertaken a variety of additional measures to enhance the safety of Line 5 and to improve its emergency preparedness and response capability at the Straits of Mackinac, in the Great Lakes, and throughout Michigan. Enbridge agrees that it will continue these measures so long as it continues to operate the portions of Line 5 to which they apply. These measures include, but are not limited to:

Equipment:

- a. Enbridge recently strengthened its already robust emergency response capabilities for the Great Lakes by adding more than \$7 million of emergency response equipment to be staged at the Straits of Mackinac. This equipment can be deployed in the Straits and throughout the Great Lakes as necessary. The new equipment includes, but is not limited to:
 - 10,000 feet of Sea Sentry Boom - heavy duty open water containment boom which is fit for service in the presence of ice and rough waters. This boom can withstand wave action to eight feet.
 - 1,000 feet of Fire Boom, necessary for an in situ burning response.
 - Lamor Ice Skimmers (the first deployment in North America)
 - Nofi Current Busters
- b. The company holds annual boom deployment exercises in the Great Lakes.
- c. Valve Closure Gang boxes, which includes the necessary equipment to execute a manual valve closure, have been located at North Straits valve site and pre-located at each pump station along Line 5.

Personnel:

- d. Enbridge established a Pipeline Maintenance (PLM) Crew at St. Ignace adding five employees in addition to the Enbridge employee permanently based in the Straits of Mackinac area. This crew augments crews already stationed along Line 5 in Ironwood, Escanaba, Indian River, and Bay City.
- e. Enbridge recently agreed to purchase a building in St. Ignace that will house its local operations employees. The new facility is less than 10 minutes from the North Straits valve site.
- f. Enbridge has implemented Incident Command System (ICS) role specific training for its Regional team and Operations Leadership individuals.

Response time:

- g. The company improved personnel response time for manual closing of valves at the North Straits valve site to under an hour, and with a target time of no more than 45 minutes – no matter what time of day or weather condition. Manual closing of the valves would be necessary only if all other redundant systems on Line 5 at the Straits would fail. The redundant systems include:
 - 1) Dedicated 24/7 remote operational control of the pipelines from the Enbridge Control Center. All valves can be remotely opened and closed by the

Control Center. If there is a power failure at the North Straits site resulting in communications loss with the Control Center, an automatic back-up generator on-site will restore power and allow communications with the Control Center.

- 2) The pipelines at the Straits are 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 lost due to a power outage and the backup generator fails, and the automatic valves fail to operate properly, valves can be closed manually.

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.

This Third Agreement is entered between the State of Michigan, the Michigan Department of Environmental Quality, and the Michigan Department of Natural Resources (collectively referred to herein as "the State"), AND Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc., formerly known as Lakehead Pipe Line Company, Inc., and Enbridge Energy Partners, L.P. (collectively referred to herein as "Enbridge") concerning those segments of Enbridge's Line 5 pipeline ("Line 5") that are located within the State of Michigan. This Third Agreement results from, and is intended to fulfill, the parties' obligations under Paragraph I.G. of the Second Agreement between the State and Enbridge, entered October 3, 2018 ("Second Agreement"), in which the parties agreed to pursue further agreements to address Line 5's crossing of the Straits of Mackinac ("Straits").

WHEREAS, the Second Agreement affirms 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, and requires specified measures to further protect ecological and natural resources held in public trust by the State of Michigan;

WHEREAS, the Second Agreement remains in effect and the parties wish to supplement it pursuant to Paragraph I.G. of that Agreement by entering into this Third Agreement addressing the operation, replacement, and decommissioning of the existing Dual Pipelines at the Straits, conditioned upon and in conjunction with, an Agreement between Enbridge and the Mackinac Straits Corridor Authority ("Authority") to design, construct, operate, and maintain a utility tunnel at the Straits to accommodate a replacement for the Dual Pipelines and other utilities ("Tunnel Agreement");

WHEREAS, on December 19, 2018, Enbridge and the Authority entered into the Tunnel Agreement.

The Parties hereby agree as follows:

Article 1 Definitions and Interpretation

1.1. Definitions

- (a) "1953 Easement" means the "Straits of Mackinac Pipe Line Easement [granted by the] Conservation Commission of the State of Michigan to Lakehead Pipe Line Company, Inc. (Lakehead) executed April 23, 1953.
- (b) "Authority" means the Mackinac Straits Corridor Authority.
- (c) "Bare Metal" means any area on the Dual Pipelines where the metal pipe is visually exposed and in direct contact with water.
- (d) "Day" means a calendar day unless expressly stated to be a business day. In computing any period of time under this Third Agreement, where the last Day would fall on a Saturday, Sunday, or U.S. federal holiday or Michigan state holiday, the period shall run until the close of business of the next business day.
- (e) "Dual Pipelines" means the 4.09-mile portion of Enbridge's Line 5 pipeline consisting of two 20-inch diameter seamless pipelines that cross the Straits.
- (f) "Enbridge Board of Directors" means the Enbridge Inc. Board of Directors.
- (g) "Enbridge" means Enbridge Energy, Limited Partnership or its successors and assigns.
- (h) "Government Approval" means all permissions, consents, approvals, certificates, permits, licenses, agreements, registrations, notices, exemptions, waivers, filings, and authorizations (whether statutory or otherwise) required by law.
- (i) "Heavy Crude Oil" means any liquid petroleum with an American Petroleum Institute gravity index of less than 22 degrees, including, but not limited to, diluted bitumen.
- (j) "Line 5" means the Enbridge light crude and natural gas liquids pipeline that extends from Superior, Wisconsin, through the Upper Peninsula of Michigan to the Lower Peninsula of Michigan and then across the U.S.-Canada international boundary to Sarnia, Ontario, Canada.
- (k) "PPI" means the Producer Price Index for Finished Goods published each year by the U.S. Department of Labor, Bureau of Labor Statistics or any lawful successor agency thereto.
- (l) "Second Agreement" means the agreement entered on October 3, 2018 between the State of Michigan, the Michigan Department of Environmental Quality, and the Michigan Department of Natural Resources AND Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc., and Enbridge Energy Partners, L.P.
- (m) "State of Michigan" means the State of Michigan and the Departments of Environmental Quality and Natural Resources.
- (n) "Straits of Mackinac" or "Straits" means that segment of water between the

upper and lower peninsulas of Michigan that connects Lake Michigan and Lake Huron.

- (o) "Straits Line 5 Replacement Segment" means that segment of 30-inch pipe that is to be constructed, operated, and maintained within the Tunnel to connect to Enbridge's existing Line 5 pipeline on either side of the Straits so as to serve as a replacement to the Dual Pipelines.
- (p) "Tunnel" has the meaning set forth in the description provided in Section 6.1 of the Tunnel Agreement.
- (q) "Tunnel Agreement" means the agreement entered into on December 19, 2018 between Enbridge and the Mackinac Straits Corridor Authority.

1.2. In this Third Agreement unless the context otherwise requires:

- (a) the words "including," "includes," and "include" will be read as if followed by the words "without limitation";
- (b) the meaning of "or" will be that of the inclusive "or," that is meaning one, some or all of a number of possibilities;
- (c) a reference to any Party includes each of their legal representatives, trustees, executors, administrators, successors, and permitted substitutes and assigns, including any Person taking part by way of novation;
- (d) a reference to this Third Agreement or to any other agreement, document, or instrument includes a reference to this Third Agreement or such other agreement, document or instrument as amended, revised, supplemented or otherwise modified from time to time;
- (e) a reference to any Governmental Entity, institute, association or body is: (i) if that Governmental Entity, institute, association or body is reconstituted, renamed or replaced or if the powers or functions of that Government Entity, institute, association or body are transferred to another organization, a reference to the reconstituted, renamed or replaced organization or the organization to which the powers or functions are transferred, as applicable; and (ii) if that Governmental Entity, institute, association or body ceases to exist, a reference to the organization which serves substantially the same purposes or objectives as that Governmental Entity, institute, association or body;
- (f) words in the singular include the plural (and vice versa) and words denoting any gender include all genders;
- (g) headings are for convenience only and do not affect the interpretation of this Third Agreement;
- (h) a reference to this Third Agreement includes all Schedules, Appendices, and Exhibits;
- (i) a reference to a Section or Schedule is a reference to a Section or Schedule of or to the body of this Third Agreement;
- (i) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding

meaning.

Article 2 Representations

2.1. Authority - Signatories for each Party represent that they have authority to enter into this Third Agreement.

Article 3 Relationship to Tunnel Agreement

3.1 Agreements Mutually Dependent - This Third Agreement is premised upon the existence, continued effectiveness of, and Enbridge's compliance with the Tunnel Agreement, under which Enbridge is required to design, construct, and operate and maintain the Tunnel to accommodate the Straits Line 5 Replacement Segment that will replace the Dual Pipelines.

Article 4 Continued Operation of Dual Pipelines Pending Completion of Tunnel and Activation of Line 5 Replacement Segment

4.1 The State 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.

4.2 Provided that Enbridge complies with Section 4.1 above, the State agrees that:

- (a) The work done and to be done at the water crossings pursuant to the Second Agreement adds protections to the health, safety, and welfare of Michiganders and increases protection for Michigan's environment and natural resources.
- (b) Enbridge's compliance with Article 5 below demonstrates compliance with the specified conditions of the 1953 Easement.
- (c) The replacement of the Dual Pipelines with the Straits Line 5 Replacement Segment in the Tunnel is expected to eliminate the risk of a potential release from Line 5 at the Straits.
- (d) In entering into this Third Agreement, and thereby authorizing the Dual Pipelines to continue to operate until such time that the Straits Line 5 Replacement Segment is placed into service within the Tunnel, the State has acted in accordance with and in furtherance of the public's interest in the protection of waters, waterways, or bottomlands held in public trust by the State of Michigan.

- (e) Based on currently available information, the State is not aware of any violation of the 1953 Easement that would not be addressed and cured by compliance with Section 4.1 and Article 5 of this Agreement.

4.3 Additional measures to assure 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 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 Line 5 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.

- (b) Enbridge agrees that it will not assert that these additional measures required under this Third Agreement or the measures regarding Line 5 water crossings other than the Straits required under Paragraph I.I. of the Second Agreement are preempted by federal law or otherwise unenforceable.

Article 5 Compliance with 1953 Easement

5.1 Financial Assurance:

- (a) Until the Dual Pipelines are permanently decommissioned, Enbridge will maintain compliance with the requirements of Paragraph I.J of the Second Agreement, supplemented and modified as follows:
 - (i) The \$1,878,000,000 minimum amount will be annually adjusted for inflation based on the PPI on October 1, 2019 and each year thereafter.
 - (ii) Enbridge will file with the State updated financial assurance information on an annual basis in a format consistent with Appendix 3 to the Second Agreement, beginning thirty (30) days after the effective date of this Third Agreement.
 - (iii) Enbridge will promptly notify the State in writing of any material change concerning the financial assurance information provided under Section 5.1(a)(ii). A material change shall be any change in the financial status of Enbridge that may prevent Enbridge from complying with Section 5.1(a)(i).

- (b) The State agrees that if Enbridge meets the requirements under Section 5.1 (a) of this Third Agreement, Enbridge will be deemed to satisfy its financial assurance obligations specified under Paragraph J of the 1953 Easement.

5.2 Pipeline Coatings:

- (a) Enbridge is committed to completing the implementation of the State-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 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-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 exists is identified, Enbridge will repair the identified area(s) as soon as practicable thereafter. Enbridge will notify the State within thirty (30) days after any Bare Metal is identified, and again thirty (30) days after the Bare Metal is repaired.
- (d) The State 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.

5.3 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 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 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.

Article 6 Construction and Operation of Straits Line 5 Replacement Segment

6.1 Enbridge will design, construct, operate, and maintain the Straits Line 5 Replacement Segment within the Tunnel:

- (a) At its own expense; and
- (b) In compliance with all applicable laws and regulations and the terms of the Tunnel Agreement and the Tunnel Lease to be issued by the Authority under the Tunnel Agreement.
- (c) Nothing under this Third Agreement shall be construed to provide the State with authority over the design, operation, or maintenance of the Straits Line 5 Replacement Segment.

6.2 Enbridge will not transport Heavy Crude Oil through the Straits Line 5 Replacement Segment.

6.3 When Enbridge ceases use of the Straits Line 5 Replacement Segment, it will permanently deactivate the Straits Line 5 Replacement Segment in compliance with all applicable laws and regulations and Section 3.3 of the Tunnel Lease.

Article 7 Permanent Deactivation of Dual Pipelines

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, which the State 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, which shall not be unreasonably withheld.

7.3 The State 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.

Article 8 Delay Events

8.1 Enbridge's performance under this Third Agreement shall be excused as a result of any Delay Event. For purposes of this Third Agreement, "Delay Event" is defined as any event arising from causes beyond the control of Enbridge, any entity controlled by Enbridge, or any of Enbridge's contractors, that delays or prevents the performance of any obligation under this Third Agreement, despite Enbridge's best efforts to fulfill the obligation. "Best efforts to fulfill the obligation" includes using best efforts to address the effects of any such event: (a) as it is occurring; and (b) following its occurrence, such that the delay and any adverse effects of the delay are minimized.

8.2 Automatic Delay Events - The Parties agree that the following circumstances automatically constitute a Delay Event:

- (a) The inability to undertake activities required under this Third Agreement due to the need to obtain a Government Approval or other legal authorization required to undertake such activities.
- (b) Acts of God, war, terrorist acts, pandemics, strikes, civil disturbances, and other causes beyond the reasonable control of Enbridge.
- (c) Unavailability of necessary materials or equipment because of industry-wide shortages.
- (d) An injunction or other judicial or governmental order preventing the timely performance of the obligation.

8.3 Other Delay Events - The Parties further agree that any other circumstance included within the definition of Delay Event in Section 8.1 may on a case-by-case basis be determined by Enbridge and the State to constitute a Delay Event.

8.4 Notice - If a Delay Event occurs, Enbridge will notify the State of the Delay Event within a reasonable time after Enbridge is aware that a Delay Event has occurred. The notice will describe the Delay Event, the anticipated duration of the Delay Event, if known, and the efforts taken by Enbridge to minimize the delay and any adverse effects of the delay.

8.5 Disputes - Any dispute between the Parties relating to the existence or duration of a Delay Event will be resolved in accordance with Article 9, DisputeResolution.

Article 9 Dispute Resolution

9.1 Except as otherwise specified in this Third Agreement, the Parties agree to the following procedures to resolve all disputes between them arising under this Third Agreement.

9.2 Informal Dispute Resolution - First, designated representatives of the Parties will engage in good faith efforts to informally resolve the dispute for a period of up to sixty (60) days, provided that the Parties may mutually agree in writing to extend that period.

9.3 Optional Mediation - If the dispute is not resolved informally through Section 9.2, the Parties may, through mutual written agreement, select a neutral mediator to facilitate the resolution of the dispute. Unless otherwise agreed, the parties will equally share the costs of the mediator's services.

9.4 Judicial Dispute Resolution - If the dispute is not resolved informally through Section 9.2, or, if applicable, through Section 9.3, either Party may submit the dispute to a court of competent jurisdiction for resolution.

Article 10 Termination

10.1 Term. This Third Agreement shall remain in effect until such time that the Dual Pipelines are decommissioned, unless terminated in accordance with 10.2 or 10.3 below.

10.2 Termination by the State. The State may terminate this Agreement if: (i) after being notified in writing by the State of any material breach of this Agreement, Enbridge fails to commence remedial action within ninety (90) days to correct the identified breach or fails to use due diligence to complete such remedial action within a reasonable time thereafter; (ii) the dispute resolution procedures of Article 9 are followed with respect to the breach; and (iii) the final judicial resolution of the dispute is in favor of the State's position that the

Agreement should be terminated.

10.3 Termination by Enbridge. Enbridge may terminate this Agreement:

- (a) By written notice to the State if: (i) Enbridge has involuntarily ceased operation of the existing Line 5 Dual Pipelines as a result of a court order or at the direction of a Governmental Entity at any point during the design or construction of the Tunnel; or (ii) Enbridge has voluntarily chosen to permanently cease operations on the existing Line 5 Dual Pipelines at any point during the design or construction of the Tunnel;
- (b) If: (i) after being notified in writing by Enbridge of any material breach by the State of this Agreement, which shall include but not be limited to any unreasonable impairment by the State of Enbridge's ability to construct the Tunnel or construct, operate, and maintain the Straits Line 5 Replacement Segment within the Tunnel in accordance with the Tunnel Agreement and the Lease, the State has failed to commence remedial action within ninety (90) days to correct the identified breach or impairment or failed to use due diligence to complete such remedial action within a reasonable time thereafter; (ii) the dispute resolution procedures of Article 9 are followed with respect to the breach; and
(iii) the final judicial resolution of the dispute is in favor of Enbridge's position that the Agreement should be terminated.

10.4 Survival.

The assurances provided in Section 4.2 above shall survive in the event of termination of this Third Agreement, under Sections 10.3(6) and (c).

Article 11 Amendment

This Third Agreement may be amended only through written agreement executed by authorized representatives of both Parties.

Article 12 Notices

12.1 Unless otherwise agreed to by the Parties, all notices, submissions, or communications required under this Agreement must be in writing and served either by personal service, by prepaid overnight courier service or by certified or registered mail to the address of the receiving Party set forth below (or such different address as may be designated by such Party in a notice to the other Party, from time to time). Notices, consents, and requests served by personal service shall be deemed served when delivered. Notices, consents, and requests sent by prepaid overnight courier service shall be deemed served on the day received, if received during the recipient's normal business hours, or at the beginning of the recipient's next business day after receipt if not received during the recipient's normal business hours. Notices, consents, and requests sent by certified or registered mail, return receipt requested,

shall be deemed served ten (10) business days after mailing.

As to the State of Michigan:

Attn: Deputy Director
Michigan Department of Environmental Quality
525 W. Allegan
Post Office Box Lansing,
MI48909-7528

Attn: Natural Resource Deputy
Michigan Department of Natural
Resources 525 W. Allegan
Post Office Box 30028 Lansing,
MI 48909-7528

As to Enbridge:

Attn: Vice President of U.S. Operations, Liquids Pipelines
7701 France Avenue South, Suite 600-Centennial Lakes Park I
Edina, MN 55435

With a copy to Corporate Secretary
5400 Westheimer Court
Houston, TX 77056

With a copy to Director of Great Lakes Region
222 Indianapolis Blvd., Suite 100
Scherverville, IN 46375

With a copy to Associate General Counsel U.S. Law 26
East Superior Street, Suite 309
Duluth, MN 55802

And an emailed copy to legalnotices@enbridge.com

12.2 Notice of any change by a Party of the designations or addresses listed in Section
12.1 above will be promptly provided to the other Party

Article 13 No Third-Party Beneficiaries

13.1 This Third Agreement is intended for the exclusive benefit of the Parties hereto and their respective successors. Nothing contained in this Third Agreement shall be construed as creating any rights or benefits in or to any third party. This Third Agreement does not give rise to a private right of action for any person other than the Parties to this Third Agreement.

Article 14 Miscellaneous

14.1 Approvals under this Third Agreement - Each Party agrees that whenever this Third Agreement provides for it to approve, concur with, or jointly act with the other Party, such approval, concurrence, or joint action will not unreasonably be withheld.

14.2 Good Faith - The Parties agree to act in good faith in the interpretation, execution, performance, and implementation of this Third Agreement.

14.3 Execution. This Third Agreement may be executed in counterparts without the necessity that the Parties execute the same counterpart, each of which will be deemed an original, but which together will constitute one and the same agreement. The exchange of copies of this Tunnel Agreement by electronic or hard-copy means shall constitute effective execution and delivery thereof and may be used in lieu of the original for all purposes.

14.4 Governing Law. This Third Agreement shall be construed, interpreted, and applied in accordance with the laws of the State of Michigan without reference to its conflict of laws rules.

14.5 Entire Agreement. This Third Agreement and Schedules hereto, contain all covenants and agreements between the State and Enbridge relating to the matters set forth in this Third Agreement.

14.6 Severability. If any provision of this Agreement will be held illegal, invalid, or unenforceable by a court of competent jurisdiction, the same will not necessarily affect any other provision or provisions herein contained or render the same invalid, inoperative, or unenforceable, and the Parties will expeditiously negotiate in good faith in an attempt to agree to another provision or provisions (instead of the provision which is illegal, inoperative or unenforceable) that is legal, operative, and enforceable and carries out the Parties' intentions under this Agreement.

Article 15 Assignment

15.1 Either Party may assign, charge, or transfer its rights or obligations under this Third Agreement provided that it obtains the written consent of the other Party.

FOR THE STATE OF MICHIGAN

A handwritten signature in black ink, appearing to read "Rick Snyder", is written over a horizontal line. A vertical line extends upwards from the right end of the horizontal line.

Name: Rick Snyder (/)

Title: Governor

Dated: .

A handwritten signature in black ink, appearing to read "Keith Creagh", is written over a horizontal line.

(Keith Creagh)

Title: Director, Michigan Department of Natural Resources

Dated:

Name:

Title: Director, Michigan Department of Environmental Quality

Dated:

FOR ENBRIDGE ENERGY, LIMITED PARTNERSHIP BY:
ENBRIDGE PIPELINES (LAKEHEAD) L.L.C.
AS MANAGING GENERAL PARTNER

Name:
Title: Vice President, U.S. Operations

Dated:

Name: John Swanson
Title: Vice President, Major Projects, Execution

Dated:

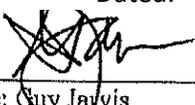
Name: Al Monaco
Title: Authorized Signatory for Enbridge Pipelines (Lakehead) L.L.C.

Dated:

FOR ENBRIDGE ENERGY COMPANY, INC,

Brad Shambaugh
Title: Vice President, U.S. Operations
Dated:

Name: John Swanson
Title: Vice President, Major Projects, Execution
Dated:



Name: Guy Jarvis
Title: Executive Vice President – Liquids Pipelines
Dated: 12/19/2018

FOR ENBRIDGE ENERGY PARTNERS, L.P.
BY: ENBRIDGE ENERGY MANAGEMENT, L.L.C. AS DELEG
TE OF ITS GENERAL PARTNER



Name: Brad Shamla
Title: Vice President, U.S. Operations
Dated:

Name: John Swanson
Title: Vice President, Major Projects, Execution
Date

1

Appendix 1

Enbridge Dual Pipelines Inspection and Operational Requirements Through Decommissioning

A

Description	Existing Requirement	May 2017 Consent Decree Requirements	Proposed Requirements of Michigan
Visual Inspection	§195.412 Inspection of rights-of-way and crossings under navigable waters; inspect surface conditions at intervals not exceeding 3 weeks, but at least 26 times each calendar year; except for offshore pipelines, inspect each crossing under a navigable waterway to determine the condition of the crossing at intervals not exceeding 5 years	Subsection VII.E., Paragraphs 68.c. and 68.f. require visual inspection of the pipelines by July 31, 2016 and at intervals not to exceed 24 months thereafter until termination of the Consent Decree.	Starting in 2024, visual inspection (ROV, AUV) of the lines once per calendar year, completed by July 31.
Span Management Program	§195.110 External Loads- Provide support for anticipated external loads; supports must not cause excess localized stresses	Current requirements are set forth under Subsection VII.E., Paragraph 68, and any modification thereto.	Consistent with Consent Decree requirements and to begin when Consent Decree ends.
Pipeline Movement Investigation		If a crack feature requiring repair is identified, Subsection VII.E., Paragraph 72 requires an investigation to determine whether the cause of cracking is related to pipeline movement; if so, Enbridge must develop and complete corrective measures as soon as practicable, but no later than 270 days after completing the investigation.	Consistent with Consent Decree requirements and to begin when Consent Decree ends.
Quarterly Inspection Using Acoustic Leak Detection Tool		Subsection VII.E., Paragraph 73 requires quarterly inspection using an acoustic tool capable of detecting small leaks and, if a leak is found, requires shutdown, isolation and repair of the leaking line	Consistent with Consent Decree requirements and to begin when Consent Decree ends.

¹The May 2017 Consent Decree, as referenced herein, refers to the Consent Decree entered in *United States v. Enbridge Energy, Limited Partnership, et al.*, No. 1:16-cv-914, ECF No. 14 (E.D. Mich.) on entered May 23, 2017, and any modifications thereto.

Description	Existing Requirements PHMSA - 49 CFR part 195	May 2017 Consent Decree Requirements	Proposed Req1, requirements State of Michigan
Pressure Testing	§195.452Q)(5)(ii)- Pressure test conducted in accordance with 49 CFR Part 195, Subpart E is an acceptable Integrity Assessment method	Subsection VII.C. requires submittal of testing plan and schedule to U. S.EPA and sets out specific test procedures; hydrostatic pressure testing of the Line 5 Dual Pipelines was successfully completed in 2017	Conduct hydrostatic pressure test or equally reliable alternative technology to confirm pipeline integrity and material strength in 2026
Cathodic Protection	§195.571- Cathodic protection must comply with NACE SP 0169, which requires protection levels of -850 mV (CSE)		Starting in 2024, maintain cathodic protection levels at or below -950 mV (CSE)
Close Interval Survey			Starting in 2024, conduct CIS once every year, not to exceed 15 months
Integrity Assessment Intervals	§195.452(j)(3) - Five years, not to exceed 68 months	Subsection VII.D.(VI) - For crack inspections, no more than one-half of the shortest remaining life of any unrepaired crack feature; for corrosion inspections, no more than one-half of the shortest remaining life of any corrosion feature; no more than five years	Starting in 2024, annual geometry, corrosion and circumferential crack inspections and assessments, using best available technology.
Temporary Pressure Reduction or Pipeline Shutdown	§195.452(h)(l)(i) and (ii) - Pressure reduction based on calculated safe operating pressure of anomaly or, if this cannot be calculated, 80% of the highest sustained operating pressure in the 60 days prior to the ILi; use to provide safety for Immediate Repair Conditions and other repairs for which schedules cannot be met; notify PHMSA if pressure reduction will exceed 365 days	Subsections VII.D.(III), (IV) and (V) establish requirements and timing for identification of ILi report features requiring excavation based on calculated burst pressure, remaining life, and other unique characteristics, and for establishing pressure restrictions to provide safety until digs and repairs are complete	Consistent with Consent Decree requirements and to begin when Consent Decree ends.

Description	Existing Requirements PHMSA- 49 CFR Part 195	May 2017 'Consent Decree' Requirements	Proposed Requirement State of Michigan
Schedules for Evaluation and Remediation of ILI-indicated Anomalies	See below	Subsection VII.D.(V) sets out criteria and timelines governing excavation, repair and imposition of pressure restrictions for crack features (Table 1, pp 55-56), corrosion features (Table 2, pp 60-62), dents and other geometric features (Table 4, pp 67-68), and intersecting or interacting feature types (Table 5, pp 70-71)	Consistent with Consent Decree requirements and to begin when Consent Decree ends.
<ul style="list-style-type: none"> Metal loss greater than 80% of nominal wall regardless of dimensions 	§195.452(h)(4)(i)(A)- Immediate Repair Condition		Starting in 2024, immediate Repair Condition and pipeline shutdown
<ul style="list-style-type: none"> Metal loss greater than 50% of nominal wall regardless of dimensions 	New Requirement		Starting in 2024, immediate Repair Condition and pipeline shutdown
<ul style="list-style-type: none"> Calculated burst pressure less than established maximum operating pressure (MOP) at anomaly location 	§195.452(h)(4)(i)(B)- Immediate Repair Condition - Suitable remaining strength calculation methods include, but are not limited to, ASME/ANSI 831G and PRCI PR-3-805 (R-STRENG)		Starting in 2024, immediate Repair Condition and pipeline shutdown
<ul style="list-style-type: none"> Dents 	§195.452(h)(4)(i)(C)- Immediate Repair §195.452(h)(4)(i)(D)- Immediate Repair §195.452(h)(4)(i)(E)- Immediate Repair §195.452(h)(4)(ii)(A)- 60-day Repair §195.452(h)(4)(ii)(B)- 60-day Repair §195.452(h)(4)(iii)(A)- 180-day Repair §195.452(h)(4)(iii)(B)- 180-day Repair §195.452(h)(4)(iii)(C)- 180-day Repair		Starting in 2024, immediate Repair Condition and pressure restriction of 80% of last 60-day high pressure.
<ul style="list-style-type: none"> Calculated safe operating pressure less than established MOP at anomaly location 	§195.452(h)(4)(iii)(D)- 180-Day Repair Condition - Suitable remaining strength calculation methods include, but are not limited to, ASME/ANSI 831G and PRCI PR-3-805 (R-STRENG)		Starting in 2024, immediate Repair Condition and pipeline shutdown

Description	Existing Requirements PHMSA 49 CFR Part 195	May 2017 Consent Decree' Requirements	Proposed Requirements State of Michigan
<ul style="list-style-type: none"> An area of general corrosion with a predicted metal loss greater than 50% of nominal wall 	§195.452(h)(4)(iii)(E)-180-Day Repair Condition		Starting in 2024, immediate Repair Condition and pipeline shutdown
<ul style="list-style-type: none"> Predicted metal loss greater than 50% of nominal wall that is located at a crossing of another pipeline, or is in an area with widespread circumferential corrosion, or is in an area that could affect a girth weld 	§195.452(h)(4)(iii)(F)-180-Day Repair Condition		Starting in 2024, immediate Repair Condition and pipeline shutdown
<ul style="list-style-type: none"> A potential crack indication that when inspected is determined to be a crack 	§195.452(h)(4)(iii)(G)-180-Day Repair Condition		Starting in 2024, immediate Repair Condition and follow Consent Decree requirements for crack remediation
<ul style="list-style-type: none"> A gouge or groove greater than 12.5% of nominal wall thickness 	§195.452(h)(4)(iii)(I)-180-Day Repair Condition		Starting in 2024, immediate Repair Condition
<ul style="list-style-type: none"> Anomalies in addition to those listed above that could impair the integrity of the pipeline 	§195.452(h)(4)(iv) - Other Repair Conditions - schedule for remediation as appropriate (per engineering analysis); see §195.452 Appendix C for guidance concerning other conditions to evaluate		Follow PHMSA requirements

Immediate Repair Condition - Upon learning of an immediate repair condition indicated by in-line inspection, Enbridge agrees to make the condition safe by operating pressure reduction or pipeline shutdown (see Inspection and Operational Requirements Table), and to notify the State of the condition within 24 hours. Enbridge will proceed with planning, permitting, inspection, and necessary repair of the condition as expeditiously as practicable subject to permitting requirements and weather/ice conditions in the Straits of Mackinac. Once the feature is fully assessed, repaired or mitigated, Enbridge will notify the State and may return the pipeline to normal operating pressures.

Appendix C

**Most Recent Enbridge Financial Assurance Verification Form -
Source; Enbridge, Inc's 2019 10-Q2**

	Enbridge, Inc.	Availability (business days - estimate)
Cash or cash equivalents	\$.525 billion	1 day
Credit Facility (available liquidity)	\$ 4.2 billion	1-3 days
Other Resources available in 30-60 Days (explain)	\$ 4.725 billion	30-60 days
Total Short - Term	\$ 9.45 billion	
Insurance	\$940,000,000 (Comprehensive General Liability with sudden and accidental pollution liability coverage)	

Notes:

1. Converted dollar amounts from Canadian dollars to U.S. dollars - .75 conversation
2. Assumed Enbridge, Inc. is a signatory
3. Assuming specified insurance – Enbridge did not include their insurance in the 10-K
4. Can't find Enbridge Energy Partners, L.P.'s available credit facility availability in Enbridge, Inc.'s to 10-K's credit facility

Recommended Enbridge Financial Assurance Verification Form - (Year) 10-K

	Enbridge, Inc.	Enbridge Energy, Limited Partnership	Enbridge Energy Company, Inc	Enbridge Energy Partners, L.P.	Availability (business days - estimate)
Cash or cash equivalents					1 day
Credit Facility (available liquidity)					1-3 days
Accounts receivable and other					30-60 days
Total Short - Term					
Comprehensive General Liability with sudden and accidental pollution coverage					
Environmental Impairment Liability Minimum of \$25,000,000					
Total					

Notes:

1. If Enbridge, Inc. is a Signatory, then only the Enbridge Inc. column needs to be completed.
2. All non-insurance dollar amounts should be represented in U.S. dollars in billions
3. Cash or cash equivalents can be located in the 10-K provided in Part 1, Section1, Financial Statements: Consolidated Statement of Financial Positions
4. Credit facility (available liquidity) can be located in the 10-K in Part 1, Section1, Financial Statements: Debt, CreditFacilities
5. Accounts receivable and other can be located in the 10-K in Part 1, Section 1 Financial Statements: Consolidated Statement of Financial Positions
6. Specified insurance must be verified by the Certificate of Insurance which is signed by a state licensed insurance agent that holds a Charter Property and Casualty Underwriter professional designation.

Sample Financial Assurance Verification Form For the Signatories Alone

**This Sample was completed based on the last available 10-Q Report of the Signatories
As filed with the United States Securities and Exchange Commission in September 2018**

	Current Signatories			
	Enbridge Energy, Limited Partnership	Enbridge Energy Company, Inc	Enbridge Energy Partners, L.P.	Availability (business days - estimate)
Document	Not Filed with the U. S.SEC	Not Filed with the U. S.SEC	2018 10-Q3	
Cash	Not Available	Not Available	\$ 11	1 day
Credit Facility (Available Liquidity)	Not Available	Not Available	\$ 555	1-3 days
Other Resources Available (30-60 days)	Not Available	Not Available	\$ 57	30-60 days
Total Short-Term			\$ 623	
Insurance	Not available to verify in the Enbridge Partners 10-K			

Notes:

1. This is what a 2018 Financial Assurance Verification Form from the Signatories would have looked like based on the last available 10-K reports of the Signatories.
2. The last financial report of any of the Signatories was filed with the SEC was from September 2018.
3. Amounts shown are converted from Canadian dollars to U.S. dollars - .75 conversion
4. Amounts are in millions

Appendix D

Curriculum Vitae

David J Dybdahl Jr. CPCU, ARM, MBA

July 1, 2019

Personal Information

Address 4901 Pinecone Circle
Middleton, Wisconsin 53562

Contacts

Direct line (608) 836-9567
Mobile (608) 513-6101
Home (608) 798-1676
E-mail dybdahl@armr.net

II. Work Experience

1999 to Present

American Risk Management Resource Network, LLC. Principal,

ARMR.Network is a specialty environmental insurance brokerage firm and Managing General Agency with underwriting authority of \$5,000,000. Our customized insurance products are sold through hundreds of insurance agencies in the United States and Canada. Over the past 32 years I have worked on the placement of literally thousands of environmental insurance policies both as the placing broker and as the Global Environmental Practice Leader of Willis, the third largest insurance brokerage firm in the world.

Insurance and risk management consulting assignments at ARMR.Network include; providing risk management support services to county and state governments on oil pipelines, writing the insurance specifications and conducting the insurance compliance reviews for the bidders on five hundred million dollars of fixed price environmental remediation services, serving as an expert witness on disputed environmental insurance claims with amounts in dispute totaling over 2.3 billion dollars, compiling the history of the environmental insurance market complete with reconstructive pricing and underwriting guidelines for individual risks from 1980 to date, creating business plans for environmental insurance sales in insurance brokerage firms, developing new insurance products complete with policy forms, pricing models and underwriting guidelines, environmental risk management consulting on insurance issues associated with mold damages, proof of financial responsibility financial product efficacy analysis for the federal government, facilitating culture change in insurance brokerage operations and internet based knowledge sharing platforms.

Consulting projects have been completed for a broad range of clients including the U. S.EPA, U.S. Justice Department, U.S. Army Corps of Engineers, U.S. Army Environmental Center, Los Angeles County School District, The California Solid Waste Board, Arthur J Gallagher, Wells Fargo, The World Bank, The State Of Minnesota Department of Commerce and numerous other fact and expert witness assignments associated with environmental risks and insurance.

1999 to Present

The Society of Environmental Insurance Professionals, Founder

The Society of Environmental Insurance Professionals was created in 1999 to enhance the use of environmental insurance as a risk management tool. I created the organization by developing the business plan and soliciting the cooperation and financial support from the leading underwriters and brokers of environmental insurance. ERRA produces educational seminars on current environmental risk management issues, produces newsletters, and hosts an internet based environmental risk resources library.

ERRA is a federally registered not for profit 501, c. 3. educational organization and has been approved in over thirty states for continuing education credits in insurance and law.

2002 International Risk Group, President

IRG is the insurance branch of a leading brownfield development corporation.

2001 Aon, Mid West Environmental Insurance Director

I worked as an environmental risk management resource in the environmental practice of the second largest insurance brokerage firm in the world.

1990 to 1999

Willis Global Environmental Practice, Managing Director

I created the first functioning fully staffed environmental resource group in a major brokerage firm. The Willis Environmental Practice served as a technical resource to the insurance brokers of Willis. Our activities in the environmental practice included broker training, joint client calls, gathering market intelligence, assembling pricing benchmarks, trouble shooting on difficult insurance placements and claim issues, managing insurance company relationships, and quality assurance on hundreds of environmental insurance placements. Over this time period the Global Environmental Practice at Willis produced over \$250,000,000 in environmental insurance premiums for thousands of clients.

Willis pioneered the development of multi-disciplined technical resource supported environmental insurance Practice Group in the insurance brokerage business. Employing environmental engineers, lawyers, industrial hygienists and environmental insurance experts, the Environmental Practice was able to deliver specialized environmental risk management expertise to the field offices, which enabled Willis brokers to develop innovative solutions to complex environmental risk management problems.

During this time frame the book of environmental business grew from less than one million dollars in commissions in 1990 to over fourteen million dollars in 1999. The Willis environmental practice consistently outperformed the overall environmental insurance industry in terms of growth on an annual basis. The basic design of the multi-disciplined resource supported environmental practice has set the standard for the insurance brokerage industry and has been copied by the major competitors of Willis. Significant environmental insurance placement innovations that were pioneered in the Willis Environmental Practice between 1990-1999 included designing and placing the insurance on the Clean-Up of Chernobyl on a wrap up for contractors working for the World Bank in London, designing the first contractor controlled, fully insured liability buy out for a superfund site, insuring the Clean-Up of the Oak Ridge, TN. nuclear weapons facility for Bechtel, insuring the Clean-Up of the Hanford, WA nuclear weapons facility for Fluor Daniel, insuring the design professional liability and environmental liabilities of the Los Angeles County Mass Transit Authority subway/light rail construction project and designing and implementing the first contract specific, fully cost reimbursed environmental liability insurance wrap up programs for EPA superfund contractors.

1998 to 1999

Willis Corroon America, Chief Knowledge Officer

I worked on a team to create a corporate knowledge sharing culture and intranet platform at Willis. In this role I was the corporate staff person in charge of coordinating all of the specialty Practice Groups within the firm. As the Chief Knowledge Officer, I served on the twenty person executive committee of Willis Corroon Americas.

1983 to 1990

Corroon and Black, Insurance Brokers, Vice President

As a retail insurance broker in Milwaukee, Wisconsin I built and serviced a multi-line book of commercial insurance business. Most accounts were in the environmental services sector with a particular emphasis on EPA Superfund contractors and waste transporters.

From 1985 through 1989 I qualified for the "Exceptional Producer" award, the company's highest sales performance award. Only 1% of the sales force qualified for this award in five consecutive years.

In 1986 I developed the first professional liability insurance policy to specifically insure environmental loss exposures for engineers working on environmental remediations.

In 1986 I pioneered the development of the Contractors Pollution Liability product line working as a consultant to the EPA's Superfund Contractors Indemnification Task Force.

1982 to 1983

Frank B Hall, Insurance Broker, Producer

This was an all lines insurance production position. I specialized in group programs for environmental insurance.

1980 to 1982

Risk Treatment Services, Consultant

RTS performed captive management services for twelve Colorado based captive insurance companies. My responsibilities there included review of state financial filings for insurance company operations and feasibility studies.

As an insurance consultant to Johns Manville in asbestos litigation in 1981 I reconstructed their insurance program from 1932 to 1980 and answered interrogatories for the ensuing insurance coverage litigation. Insurance archiving for historical insurance coverage on toxic tort claims later became a profession onto itself.

III. Recent Consulting, Expert and Fact Assignments

Review the procurements of Fixed Price Remediation's for the U.S. Army Environmental Center. The contract value was \$500,000,000. Washington DC and Omaha.

Develop a business plan to create a specialty wholesale insurance broker on a national scale, projects in Colorado and Illinois.

Insurance Product Development: develop risk evaluation models, design insurance policy forms and underwriting guidelines for environmental insurance covering mold and products liability related damages. New York.

Evaluated cost proposals for fixed price remediation insurance packages, private clients in Texas and California

Expert on insurance coverage issues related to cost cap/stop loss environmental insurance policies, two cases, New Jersey/ California

The availability and pricing of environmental insurance on a property transfer in 1995, Illinois

The availability of environmental insurance from 1987 to 1995 for insurance recovery allocations on uninsured years, Alabama

The availability of environmental insurance from 1987 to 1997 for uninsured years, Washington

The availability of environmental insurance on a property transfer in 1997 and 1998, risk advisor's professional liability claim for \$189,000,000, California

Environmental insurance coverage and cost comparison between bidders for a brownfield development, premiums ranged from \$14,000,000 to \$90,000,000, California

Analyze carrier insolvency and the efficacy of proof of financial responsibility mechanisms. Washington, DC, U.S. Environmental Protection Agency/ U.S. Department Of Justice

Analyze the efficacy of proof of financial responsibility mechanisms. Washington, DC U. S.EPA/U. S.DOJ, California Solid Waste Board

Alleged brokerage negligence in the procurement of closure and long-term care insurance. South Carolina

Defend alleged broker negligence in the procurement of environmental insurance. California, Missouri, Florida

Provide insurance coverage litigation support for a disputed cost cap insurance claim. Federal Court, New York, Insurance coverage litigation support on a cost cap policy Illinois, Engineers Professional Liability insurance coverage litigation, New Jersey.

Provide expert risk management testimony on a pipeline in Wisconsin and Minnesota

IV. Expert Witness Cases

McClandless Fuels, Inc.

v.

Progressive Fuels, Inc., et al.

April 2001

Superior Court, New Jersey Law Division, Gloucester County Docket No. C-107-91

For the defense, on the availability of the environmental insurance.

Steadfast Insurance Company

v.

Santa Clarita, LLC.

May 2001

Superior Court of the State of California, County of Los Angeles

For the defense, as a witness provided by the insurance broker.

South Carolina Department of Health

v.

Commerce and Industry Insurance Company, et al.

December 2002

U.S. District Court for the District of South Carolina, Charleston Division

For the plaintiff, coverage under GL policies for proof of financial responsibility certificates of insurance.

Illinois Department of Transportation

v.

Harris Bank Barrington, NA. et al.

Cook County Illinois, Case no. 99 L 51227

October 2002

For the Plaintiff, Estimate the cost of environmental insurance in prior years.

Frazier Exton Development, LP

v.

Kemper Environmental, et al.

U.S. District Court, New York,

Manhattan September 2003

For the Defense, the coverage provided in an environmental insurance policy

Safety-Kleen Corporation, et al.

v.

MIMS International, Inc

March 2003

U.S. District Court for the District of South Carolina, Columbia Division

For the plaintiff, Insurance company solvency issues on proof of financial responsibility.

Global Oil Production, LLC.
v.
Evanston Insurance Company et al.
December 2003
Superior Court of Los Angeles, Central District
For the defense, Insurance agent professional liability.

David A. Jungerman
v.
Neal S. Clevenger
v.
Oliver Insurance Agency, Inc. et al.
December 2003
Circuit Court of Jackson County, Missouri, at Independence
For the defense, Insurance agent professional liability.

Safety-Kleen Corp., et al.
v.
MIMS International Inc. (D.S.C.)
Expert for the plaintiff regarding the availability of financial assurance insurance for hazardous waste sites
March 2004

Indian Harbor Insurance Company
v.
The Lampson & Sessions Co.
United States District Court
Southern District of New York
03-CV-9861 (JGK)
For the defense regarding errors in a rewritten policy form being transferred to a new insurance company.
June 2005

Ispat Inland Inc
v.
Kemper Environmental, Ltd.
For the defense regarding the application process for environmental insurance
October 2006

Southern New Jersey Rail Group
v.
Lumbermans
Civ. No 06-4946
Witness for the defense regarding a denied loss based on the extension of a policy term

Republic Services, Inc.
v.
American International Specialty Lines Insurance Company
United States District Court
Southern District of Florida
Ft. Lauderdale Division
Case Number 07-21991
Expert for the plaintiff in a denied claim involving environmental insurance on a landfill.
February 2009

Rogers Corporation

v.
Chartis Specialty Insurance
January 2014
For the Defense, The covered loss under the Pollution Legal Liability policy.

NYSEG
v.
Century
Expert for the defense on historical Environmental Insurance Availability
March 2016

Hexcel Corporation
v.
Allianz Underwriters Insurance Company
Expert for the defense on historical Environmental Insurance Availability
March 2016

Illinois Union Insurance Company
v.
Sunflower Development, LLC
Expert for the plaintiff to explain how remediation stop loss and environmental impairment liability insurance interface
May 2016

LIU International Underwriters
v.
Texas Brine
Expert for the plaintiff determining if underlying insurance policies were paid to the attachment point
November 2016

Indian Harbor Insurance Company
v.
Texas Brine
Expert for the plaintiff in a denied claim involving environmental insurance on a Brine Storage Pit
November 2016

King County
v.
Travelers Et. AL
Expert for the defendant on the availability of historic Environmental Insurance
February 2019

Novum Structures, LLC
v.
Aon Risk Services Central, Inc
Expert for the defendant in a denied claim involving the purchase of appropriate insurance coverage
June 2019

V. Publications

R&R Magazine, Insuring Your Risk in Master Service Agreements, May 13, 2019

International Risk Management Institute, Avoid Common Errors with Environmental Risks and Insurance, April 2019

The Rough Notes Company, Inc., Environmental Impairment Liability, February 26, 2019

International Risk Management Institute, Avoid Insurance Broker Professional Liability Losses from Environmental Risk, January 2019

R&R Magazine, Today's Insurance Market for Restoration and Remediation Contractors, January 1, 2019

The Rough Notes Company, Inc., Opportunities in Contractors Pollution Liability, December 28, 2018

The Rough Notes Company, Inc., The Longest Exclusion, October 29, 2018

R&R Magazine, Managing the Risks in Master Service Agreements, Part 1, October 18, 2018

ASLI 164, Surplus Lines Insurance Products, 4th ed., 2018

R&R Magazine, Claim Frequency Kills Part 2, August 2018

R&R Magazine, Claim Frequency Kills Part 1, July 2018

International Risk Management Institute, The Sudden and Accidental Pollution Coverage Myth, June 2018

International Risk Management Institute, Insuring Farmers for Environmental Damage Claims, March 2018

International Risk Management Institute, Insuring Indoor Environmental risks in Commercial Property, January 2018

CPCU 520, Commercial Liability Insurance and Risk Management, 3rd ed., 2017

International Risk Management Institute, Avoiding Insurance Coverage Litigation for Pollution Losses, September 2017

International Risk Management Institute, Mold Tops Environmental Impairment Policy Claims, June 2017

R&R Magazine, CAT Claims: Financial Ruin or Financial Success, April 2017

International Risk Management Institute, Avoid Common Mistakes That Lead to Uninsured Environmental Loss, March 2017

R&R Magazine, Get Paid Faster on Insurance Restoration Jobs, January 2017

International Risk Management Institute, Environmental Risks and Insurance: Looking Back and Forward, January 2017

R&R Magazine, A \$20K Vase Broken: Where is Your Insurance Coverage? November 2016

International Risk Management Institute, Changing Environmental Insurers: Use Caution, October 2016

R&R Magazine, Modern Marketing of Insurance Agencies, September 2016

International Risk Management Institute, A Big Picture on Environmental Insurance, July 2016

R&R Magazine, Knowing the Risks & reaping the Rewards of Biohazard Cleanup, July 2016

R&R Magazine, Working with Restoration Networks, June 2016

R&R Magazine, Lower Insurance Costs by Working with Restoration Networks, April 2016

IA Magazine, What to Look for in an Environmental Liability Insurance Policy, January 2016

IA Magazine, 8 Environmental Coverage Mistakes-and How to Avoid Them, January 2016

R&R Magazine, The Best Risk Management Tool for Mold Remediation, December 2015

International Risk Management Institute, Environmental Insurance: Just the Facts, October 2015

R&R Magazine, The Bright Future of Roofing Restoration, October 2015

International Risk Management Institute, A User's Guide to Pollution Exclusions and Environmental Insurance, September 2015

R&R Magazine, Part Two: Fixing Gaps in Your Liability Insurance Policies, August 2015

R&R Magazine, Part One: Fixing Gaps in Your Liability Insurance Policies, July 2015

International Risk Management Institute, Avoiding Common Insurance Certificate Errors, July 2015

R&R Magazine, Managing the Risks of Disinfectants, May 2015

R&R Magazine, How to Get Paid When Lenders Are Loss Payees, March 2015

International Risk Management Institute, State Supreme Court Changes the Game on Pollution Exclusions and Environmental Insurance, March 2015

IA Magazine, Pollution Exclusions Hit the Family Farm, February 2015

R&R Magazine, Insuring Bio-Remediation Work, January 2015

ASLI 164, Surplus Lines Insurance Products, 3rd ed., 2014

International Risk Management Institute, Insurance Coverage for Losses Arising from the Ebola Virus, December 2014

R&R Magazine, The Super Bright Future of Restoration Contracting, October 2014

R&R Magazine, Roof Repair Leads to \$1 Million Mold Claim: An Insurance Claim Case Study, October 2014

Property Casualty 360, What Every Adjuster Should Know About Fungi/Bacteria Exclusions, September 2014

International Risk Management Institute, Contractors Environmental Liability Insurance: Claims-Made versus Occurrence, July 2014

International Risk Management Institute, Common Myths about Contractors Environmental Insurance, June 2014

R&R Magazine, Having Trouble Getting Paid for Category 3 Water Jobs? Part II, May 2014

R&R Magazine, Having Trouble Getting Paid for Category 3 Water Jobs? March 2014

International Risk Management Institute, Rational CPL Insurance Specifications, March 2014

R&R Magazine, Why Every Restoration Firm Needs Professional Liability Insurance, February 2014

International Risk Management Institute, Contractual Risk Transfer for Contamination Risks, January 2014

ASLI 164, Surplus Lines Insurance Products, 2nd ed., 2013

R&R Magazine, Beware! Your Category 3 Water Jobs Are Likely Uninsured, November 2013

R&R Magazine, A Two-Step Solution to Managing the Risk of Subcontractors, September 2013

International Risk Management Institute, Revealing the Dark Secrets of Category 3 Water Exclusions, September 2013

R&R Magazine, Roofing: A New Opportunity for Professional Restorers? July 2013

R&R Magazine, Bailees Insurance: What Every Restoration Firm Needs to Know, May 2013

R&R Magazine, Who's Got Your Back? March 2013

R&R Magazine, The IICRC Standards: An Important Risk Management Tool, January 2013

R&R Magazine, Tis' the Season for Insurance Renewal, November 2012

R&R Magazine, Helping with the Hurricane Sandy Aftermath? Here's Insurance Information You Need to Know, November 2012

R&R Magazine, A Cleaning/Restoration Contractor's Insurance Needs: Debunking the Urban Myths, October 2012

R&R Magazine, Managing Risks in Contracts, July 2012

Brownfields Insurance Article, History and Uses of Environmental Risk Insurance, July 2012

R&R Magazine, Marketing Your Restoration Business through Claims Networks, May 2012

R&R Magazine, Risk Management and Insurance Mega Trends in 2012, January 2012

R&R Magazine, Are You Feeling Lucky? November 2011

R&R Magazine, A perfect Insurance Storm is Brewing: Brace for a Wild Ride, May 2011

Environmental Claims Journal, Dirt is a Pollutant, Water is too! March 2011

Business Insurance Magazine, Environmental Liability Cover Creates Certainty in M&A Deals, February 2011

R&R Magazine, Special Insurance Needs for Cleaning, Drying and Restoration Contractors, January 2011

R&R Magazine, Buy Your Insurance Like A Pro, October 2010

R&R Magazine, Things Your Insurance Agent Has Not Told You, August 2010

R&R Magazine, 5 Ways Adjusters and Contractors Can Stay in Sync, March 2010

R&R Magazine, Chinese Drywall: Unprecedented Growth and Risk for Restorers, January 2010

R&R Magazine, Should I Make A Claim On My Liability Insurance? September 2009

R&R Magazine, Macro Insurance Industry Trends and the Restoration Contractor, August 2009

CPCU, Commercial Liability Insurance and Risk Management, 7th ed., 2008

IICRC S520 Standard and Reference Guide for Professional Mold Remediation 2nd edition Institute of Inspection, Cleaning and Restoration Certification, August 2008

The Risk Report *Environmental Risks, Insurance, and Pitfalls* volume XXXI No.4 International Risk Management Institute, Inc. 2008

Practical Risk Management Environmental Insurance, June 2008

Practical Risk Management Underground Storage Tank Insurance, June 2008

Scotsman Guide, On the Lookout for Insurance Exclusions, April 2008

Restoration Industry, General Liability Insurance & Mold, April 2008

R&R Magazine, Ten Ways to Save Money And Buy Better Insurance, March 2007

ASLI 164, Surplus Lines Insurance Products, 1st ed., 2006

Mold and Water Intrusion: Successfully Litigating Mold Claims Massachusetts Continuing Legal Education, Inc, 2006

Association of Specialists in Cleaning and Restoration, There Is Less Gold in Mold for Restoration Contractors, August 2006

Scotsman Guide, Staying off Mold, Co-author, August 2006

Cleaning Specialist Magazine, Mold Risk Management for Restoration Contractors, March 2006

John Liner Letter How Lenders Were Left Unsecured for Mold Related Damages
November 2006

Surplus Lines Insurance Products, Environmental Insurance, American Institute for Chartered Property and Casualty Underwriters. 2006

CPCU, Commercial Liability Insurance and Risk Management, 6th ed., 2005

ARM 55, Risk control, 1st ed., 2005

Cleaning Specialist Magazine, Insurance and the Restoration Contractor, April 2005

Cleaning Specialist Magazine, Mold Forces Restoration Contractors to Face a New insurance Reality, March and April 2005 editions

Commercial Liability Risk Management and Insurance, CPCU Textbook, Chapter 11, Environmental Insurance, 1999, 2002, revised in 2005

Associate in Risk Management textbook, I was the contributing author on the Environmental Loss Control chapter, which is part of the course material for the Associate in Risk Management professional designation revised in 2005.

Environmental Claims Journal, A User's Guide to Real Environmental Insurance, Article 23/Vol. 12, No. 4, June 2004

Environmental Claims Journal, The Risk Advisors Survival Guide to Mold Exclusions, winter 2003

CPCU Agent and Broker Solutions, Mold Exclusions + Broker E and O Exposure, June/ August/September 2003 editions

Journal of Property Management, Under Coverage, Mold and Terrorism Exclusion's, May /June 2003

CPCU, Commercial Liability Insurance and Risk Management, 5th ed., 2001

Coverage Corner, Environmental Impairment Liability, Society of Environmental Insurance Professionals, Spring 2001

The Effects of Technology on Traditional Roles and Relationships in the Insurance Industry, CPCU Society, 1999, Information Technology Section

IICRC S500 Standard and Reference Guide for Professional Water Damage Restoration 2nd edition Institute of Inspection, Cleaning and Restoration Certification, 1999

CPCU 520, Commercial Liability Insurance and Risk Management, 4th ed., 1998

CPCU 520, Commercial Liability Insurance and Risk Management, 3rd ed., 1996

John Liner Review, Pollution Exclusions and Environmental Insurance, 1994

Associated General Contractors Environmental Risk Management Handbook, Insurance Issues chapter, 1993

Design Professionals Handbook of Business and Law, Part VI Dealing with Hazardous Waste and Environmental Issues, co-author, 1991

Environmental Risk Management – A Desk Reference, Chapter 24, an Integrated Risk Financing Approach to Remedial Action Contracting, 1991

Risk Management Magazine, Action-Reaction, Why the insurance industry will not be able to avoid superfund claims with new pollution exclusions. 1987

I am widely quoted as an authority in environmental insurance and have been quoted in the Wall Street Journal, New York Times, Business Insurance, National Underwriter, Independent Agent, Rough Notes and numerous other trade publications.

VI. Educational Background

School Attended	Majors	Degree	Year
The National Alliance	Certified Insurance Counselor and Faculty	CIC	2019
American Institute For CPCU	Chartered Property and Casualty Underwriter	CPCU*	1985
Insurance Institute of America	Associate in Risk Management	ARM*	1981
University of Wisconsin Madison **	Risk Management and Finance	MBA	1981
University of Wisconsin Madison	Risk Management	BBA	1978

* I have since become the contributing author of the textbook materials on environmental insurance and risk management for these courses. The original course materials with edits have been used in over 30 text books on insurance

** I created the environmental risk management and insurance module for the liability insurance and risk management course in the School of Business at UW-Madison. I have presented this lecture at the UW for thirty-two consecutive years.

Recent Professional Development Courses Attended

Certified Insurance Counselor 3 day courses; Insurance Company Operations, Property Insurance, Liability Insurance, Package Insurance Products,

Society Of Environmental Professionals annual meetings, 2016, 2017, 2018, 2019

Environmental Risk Resources Association, Environmental Insurance Forums, six in total, in 2001, 2002, 2003, 2004, 2005

University of Wisconsin-Madison, College of Engineering, Adjusting water damage claims with an Emphasis on Mold, 2003

Milwaukee School of Engineering,
Mold-Contamination of Buildings: Causes and Related Insurance and Legal Issues December 2002

University of Wisconsin-Madison, College of Engineering
Mold Related Problems in Buildings, November 2002, April 2003

University of Wisconsin-Madison, Center for Land Economics Research, Environmental Risk Management and Corporate Strategies. May 2002

VII. Teaching Positions and Lectures

Insurance Agent Professional Errors and Omissions Risk Management, Independent Insurance Agents and Brokers of America/ Swiss Re approved instructor

Faculty of the National Alliance for Insurance Education & Research

University of Wisconsin School of Business, Guest lecturer 1981-2019

Insurance Agent Continuing Education approved provider in multiple states 2000-current

CPCU, Instructor, Accounting and Finance, 1985, 1986, (National award winning)

Denver College, Introduction to Accounting, 1982

Lectures (not a comprehensive list, I have presented over 400 lectures at conferences and for insurance agents, architects and lawyers continuing education credits)

Unbelievable Fantastic Fun With Pollution Exclusions; National Alliance Advanced Rubles Mega Seminar 2019

Environmental Risk Management and Insurance, University of Wisconsin-Madison school of Business Sustainability Risk Management course, 2008-2019

Sustainability Risk Management; Risk and Insurance Management Society annual meeting 2008

Environmental Risk Management, UW-Madison Fluno Executive Education Center- two-day conference 2007.

Wisconsin Associated General Contractors seminars, Mold Related Insurance issues, February, September 2003

Environmental Bankers Association, 1997, 1999, 2001, 2003, 2004 summer meetings, Environmental Insurance topics related to lenders.

University of Wisconsin- Extension, Madison, College of Engineering, four guest lectures on environmental insurance and risk management issues related to water intrusion in buildings.

EPA-National Brownfields Convention, 2002, the Use of Environmental Insurance in Environmental Legacy Solutions

CPCU, National Teleconference- E-Commerce and the Insurance Industry

University of Wisconsin-Madison, Business School, Risk Management and Insurance Department, I have been a guest lecturer for twenty-eight consecutive years on environmental risk management topics.

Vanderbilt University, MBA Course, Environmental Insurance and Risk Management, four presentations

Risk and Insurance Management Society (RIMS) National Conventions, nine presentations. Rims local chapters, five presentations. In 2007 the first presentation to national RIMS on the topic of Sustainability Risk Management.

The Society of CPCU, National Convention two presentations, 1994 Environmental Insurance, 2003 Managing Mold Risks in a Post Exclusion Era

VI. Insurance Industry Committees

Lead environmental insurance resource for the 234,000-member Independent Insurance Agents and Brokers Association

Member of the Board of Directors of the 55,000+ member Institute of Inspection Cleaning and Restoration Certification

Chairman of the National Association of Insurance Brokers, Environmental Sub Committee on Superfund reform.

Participant in the U. S.EPA insurance industry committee on Pollution Liability

Lead Member of the U. S. EPA Superfund Contractor Indemnification Task Force
This work lead to the development of the Contractor Pollution Liability line of insurance)

CPCU, National Public Relations Committee Task Force 2007 and
Milwaukee Chapter, Public Relations Director, (National Award Winning 1982)

Appendix E
Recommended Insurance Requirements
And
Certificate of Insurance

Recommended Liability Insurance Requirements

The master insurance program for all of the Enbridge Inc operations may be used to fulfill this insurance requirement for \$900,000,000 U.S. of the specified liability insurance coverages as detailed below .

Any combination of Comprehensive General Liability Insurance with coverage for sudden and accidental pollution liability and Environmental Impairment Liability (EIL) Insurance can be utilized to attain the \$900,000,000 of coverage for Line 5 at the Straits. However, within the \$900,000,000 of liability insurances there must be a minimum of \$25,000,000 of EIL coverage on Line 5 at the Straits.

If loss payments and reserved amounts from claims reported during the policy term lead to remaining recoverable limits of less than \$300,000,000 on Line 5, notice of insufficient liability insurance limits remaining must be supplied to the Certificate of Insurance holder.

The recoverable limits of liability insurance for a loss on Line 5 at the Straits at any point in a policy term shall at a minimum be \$300,000,000. Within the \$300,000,000 a minimum of \$25,000,000 shall be EIL insurance.

If Enbridge, Inc. at any point in time fails to carry Comprehensive General Liability insurance with coverage for sudden and accidental pollution liability as an exception to the pollution exclusion f., Enbridge, Inc. must carry Environmental Impairment Liability insurance on Line 5 at the Straights in the amount of at least \$300,000,000 in limits of Liability.

Comprehensive General Liability Insurance With Coverage For Sudden and Accidental Pollution Liability

Coverage must be provided on the COMPREHESIVE GENERAL LIABILITY policy form as shown in Appendix F or its equivalent.

Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc. and Enbridge Energy Partners, L.P shall be additional named insureds on the policies.

Coverage shall apply to the premises, operations, products and completed operations of Line 5.

Coverage shall be provided for Bodily Injury Liability, Property Damage Liability and Defense costs.

Any restrictive base endorsements to the policy specifically pertaining to Line 5 shall be disclosed on the Certificate of Insurance and a copy of the endorsement that restricts coverage shall be attached to the Certificate of Insurance.

Exclusion f. pollution in the standard ISO Comprehensive General Liability insurance policy form in Appendix F. cannot be altered by endorsement to the policy.

Insurance must be provided by an insurer with an A.M. Best's rating of at least A, XIII or as approved by The State of Michigan. Beginning at a self-insured retention of no more than \$50,000,000 per loss, the insurance companies providing this insurance cannot be controlled, owned or operated by Enbridge entities.

The policy shall provide contractual liability coverage.

Coverage shall be extended by endorsement to The State of Michigan as an Additional Insured.

This insurance shall be Primary and Non-contributory to any insurance The State of Michigan may have available.

Any rights of subrogation against the State of Michigan shall be waived.

The policy cannot contain an "Insured vs. Insured" exclusion applying to the State of Michigan as an Additional Insured.

The policy shall obligate the insurer through a "notice of cancellation or non-renewal" endorsement to provide 60 days' notice of cancellation or nonrenewal to the Certificate of Insurance holder in the State of Michigan.

Environmental Impairment Liability Insurance

Environmental Impairment Liability Insurance, Site Pollution Liability Insurance or the equivalent.

Insured Location: The Line 5 dual pipelines and connected terminals at the Straits of Mackinac.

The Signatories to the Second Agreement, Enbridge Energy, Limited Partnership, Enbridge Energy Company, Inc. and Enbridge Energy Partners, L.P shall be Named Insureds or Additional Named Insureds.

Coverage shall not contain any exclusions or limitations of coverage for specific pollutants or contaminants found in petroleum products.

If the policy is written on a "Claims Made" basis the "retro date" on the policy must be set to the beginning of inception date of the first policy purchased. The "retro date" cannot be advanced on subsequent renewals of the coverage.

Insurance must be provided by an insurer with an A.M. Best's rating of at least A, XII or as approved by the State of Michigan. The insurance companies providing this insurance cannot be controlled, owned or operated by Enbridge.

Coverages to be included:

- On and Off-site Clean-up expenses
- Damages to Natural Resources
- Emergency response cost to at least \$5,000,000
- Bodily Injury Liability
- Property Damage Liability
- This coverage can be excess over other valid and collectable insurance and the deductible or self-insured retention amounts of any valid and collectable underlying insurances

Minimum Limit of Liability: \$25,000,000 per loss (U.S. Dollars)

If a policy covering more locations than Line 5 at the Straits of Mackinac is utilized to fulfil this insurance requirement, the policy shall have a reinstatement of limits purchase option of \$25,000,000 or an annual aggregate of \$50,000,000. This coverage extension may be limited to apply only to Line 5 at the Straits of Mackinac.

The policy shall obligate the insurer through a “notice of cancellation or non-renewal” endorsement to provide 60 days’ notice of cancellation or nonrenewal to the Certificate of Insurance holder in the State of Michigan.

The policy shall have coverage for contractual liability and the State of Michigan shall be an additional insured.

This insurance shall be Primary and Non-contributory to any insurance The State of Michigan may have available.

Any rights of subrogation against The State of Michigan shall be waived.

The policy cannot contain an “Insured vs. Insured” exclusion applying to The State of Michigan as an Additional Insured.

The maximum self-insured retention on this policy shall be \$5,000,000 and the recoverable full limits of liability shall be excess of the self-insured retention.

The EIL coverage can be excess coverage over other valid and collectable insurance available to Enbridge.

Evidence of Insurance

Within 10 days of the renewal of its liability insurance , Enbridge shall furnish a certificate of insurance which exactly matches the sample Certificate of Insurance shown below.

This Certificate of insurance shall be signed by a licensed insurance producer who holds the Chartered Property and Casualty Underwriter (CPCU) professional designation.

Appendix F

COMPREHENSIVE GENERAL LIABILITY INSURANCE

I. COVERAGE A — BODILY INJURY LIABILITY

COVERAGE B — PROPERTY DAMAGE LIABILITY

The company will pay on behalf of the insured all sums which the insured shall become legally obligated to pay as damages because of

- A. bodily injury or
- B. property damage

to which this insurance applies, caused by an occurrence, and the company shall have the right and duty to defend any suit against the insured seeking damages on account of such bodily injury or property damage, even if any of the allegations of the suit are groundless, false or fraudulent, and may make such investigation and settlement of any claim or suit as it deems expedient, but the company shall not be obligated to pay any claim or judgment or to defend any suit after the applicable limit of the company's liability has been exhausted by payment of judgments or settlements.

Exclusions

This insurance does not apply:

- (a) to liability assumed by the insured under any contract or agreement except an incidental contract; but this exclusion does not apply to a warranty of fitness or quality of the named insured's products or a warranty that work performed by or on behalf of the named insured will be done in a workman-like manner;
- (b) to bodily injury or property damage arising out of the ownership, maintenance, operation, use, loading or unloading of
 - (1) any automobile or aircraft owned or operated by or rented or loaned to any insured, or
 - (2) any other automobile or aircraft operated by any person in the course of his employment by any insured;but this exclusion does not apply to the parking of an automobile on premises owned by, rented to, or controlled by the named insured or the ways immediately adjoining, if such automobile is not owned by or rented or loaned to any insured;
- (c) to bodily injury or property damage arising out of
 - (1) the ownership, maintenance, operation, use, loading or unloading of any mobile equipment while being used in any prearranged or organized racing, speed or demolition contest or in any stunt-ing activity or in practice or preparation for any such contest or activity or
 - (2) the operation or use of any snowmobile or trailer designed for use therewith;
- (d) to bodily injury or property damage arising out of and in the course of the transportation of mobile

equipment by an automobile owned or operated by or rented or loaned to any insured;

- (e) to bodily injury or property damage arising out of the ownership, maintenance, operation, use, loading or unloading of
 - (1) any watercraft owned or operated by or rented or loaned to any insured, or
 - (2) any other watercraft operated by any person in the course of his employment by any insured;but this exclusion does not apply to watercraft while ashore on premises owned by, rented to or controlled by the named insured;
- (f) to bodily injury or property damage arising out of the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants into or upon land, the atmosphere or any water course or body of water; but this exclusion does not apply if such discharge, dispersal, release or escape is sudden and accidental;
- (g) to bodily injury or property damage due to war, whether or not declared, civil war, insurrection, rebellion or revolution or to any act or condition incident to any of the foregoing, with respect to
 - (1) liability assumed by the insured under an incidental contract, or
 - (2) expenses for first aid under the Supplementary Payments provision;
- (h) to bodily injury or property damage for which the insured or his indemnitee may be held liable
 - (1) as a person or organization engaged in the business of manufacturing, distributing, selling or serving alcoholic beverages, or
 - (2) if not so engaged, as an owner or lessor of premises used for such purposes, if such liability is imposed
 - (i) by, or because of the violation of, any statute, ordinance or regulation pertaining to the sale, gift, distribution or use of any alcoholic beverage, or
 - (ii) by reason of the selling, serving or giving of any alcoholic beverage to a minor or to a person under the influence of alcohol or which causes or contributes to the intoxication of any person;but part (ii) of this exclusion does not apply with respect to liability of the insured or his indemnitee as an owner or lessor described in (2) above;

- (i) to any obligation for which the insured or any carrier as his insurer may be held liable under any workmen's compensation, unemployment compensation or disability benefits law, or under any similar law;
- (j) to bodily injury to any employee of the insured arising out of and in the course of his employment by the insured or to any obligation of the insured to indemnify another because of damages arising out of such injury; but this exclusion does not apply to liability assumed by the insured under an incidental contract;
- (k) to property damage to
 - (1) property owned or occupied by or rented to the insured,
 - (2) property used by the insured, or
 - (3) property in the care, custody, or control of the insured or as to which the insured is for any purpose exercising physical control;

but parts (2) and (3) of this exclusion do not apply with respect to liability under a written sidetrack agreement and part (3) of this exclusion does not apply with respect to property damage (other than to elevators) arising out of the use of an elevator at premises owned by, rented to, or controlled by the named insured;
- (l) to property damage to premises alienated by the named insured arising out of such premises or any part thereof;
- (m) to loss of use of tangible property which has not been physically injured or destroyed resulting from
 - (1) a delay in or lack of performance by or on behalf of the named insured of any contract or agreement, or
 - (2) the failure of the named insured's products or work performed by or on behalf of the named insured to meet the level of performance, quality, fitness or durability warranted or represented by the named insured;

but this exclusion does not apply to loss of other tangible property resulting from the sudden and accidental physical injury to or destruction of the named insured's products or work performed by or on behalf of the named insured after such products or work have been put to use by any person or organization other than an insured;
- (n) to property damage to the named insured's products arising out of such products or any part of such products;
- (o) to property damage to work performed by or on behalf of the named insured arising out of the work or any portion thereof, or out of materials, parts, or equipment furnished in connection therewith;
- (p) to damages claimed for the withdrawal, inspection, repair, replacement, or loss of use of the named insured's products or work completed by or for the named insured or of any property of which such products or work form a part, if such products, work or property are withdrawn from the market or

from use because of any known or suspected defect or deficiency therein;

- (q) to property damage included within:
 - (1) the explosion hazard in connection with operations identified in this policy by a classification code number which includes the symbol "x",
 - (2) the collapse hazard in connection with operations identified in this policy by a classification code number which includes the symbol "c",
 - (3) the underground property damage hazard in connection with operations identified in this policy by a classification code number which includes the symbol "u".

II. PERSONS INSURED

Each of the following is an insured under this insurance to the extent set forth below:

- (a) if the named insured is designated in the declarations as an individual, the person so designated but only with respect to the conduct of a business of which he is the sole proprietor, and the spouse of the named insured with respect to the conduct of such a business;
- (b) if the named insured is designated in the declarations as a partnership or joint venture, the partnership or joint venture so designated and any partner or member thereof but only with respect to his liability as such;
- (c) if the named insured is designated in the declarations as other than an individual, partnership, or joint venture, the organization so designated and any executive officer, director, or stockholder thereof while acting within the scope of his duties as such;
- (d) any person (other than an employee of the named insured) or organization while acting as real estate manager for the named insured; and
- (e) with respect to the operation, for the purpose of locomotion upon a public highway, of mobile equipment registered under any motor vehicle registration law,
 - (i) an employee of the named insured while operating any such equipment in the course of his employment, and
 - (ii) any other person while operating with the permission of the named insured any such equipment registered in the name of the named insured and any person or organization legally responsible for such operation, but only if there is no other valid and collectible insurance available, either on a primary or excess basis, to such person or organization;

provided that no person or organization shall be an insured under this paragraph (e) with respect to:

 - (1) bodily injury to any fellow employee of such person injured in the course of his employment, or
 - (2) property damage to property owned by, rented to, in charge of or occupied by the named insured or the employer of any person described in subparagraph (ii).

This insurance does not apply to bodily injury or property damage arising out of the conduct of any partnership or joint venture of which the insured is a partner or member and which is not designated in this policy as a named insured.

III. LIMITS OF LIABILITY

Regardless of the number of (1) insureds under this policy, (2) persons or organizations who sustain bodily injury or property damage, or (3) claims made or suits brought on account of bodily injury or property damage, the company's liability is limited as follows:

Coverage A—The total liability of the company for all damages, including damages for care and loss of services, because of bodily injury sustained by one or more persons as the result of any one occurrence shall not exceed the limit of bodily injury liability stated in the declarations as applicable to "each occurrence."

Subject to the above provisions respecting "each occurrence", the total liability of the company for all damages because of (1) all bodily injury included within the completed operations hazard and (2) all bodily injury included within the products hazard shall not exceed the limit of bodily injury liability stated in the declarations as "aggregate".

Coverage B—The total liability of the company for all damages because of all property damage sustained by one or more persons or organizations as the result of any one occurrence shall not exceed the limit of property damage liability stated in the declarations as applicable to "each occurrence".

Subject to the above provision respecting "each occurrence", the total liability of the company for all damages because of all property damage to which this coverage applies and described in any of the numbered subparagraphs below shall not exceed the limit of property damage liability stated in the declarations as "aggregate".

- (1) all property damage arising out of premises or operations rated on a remuneration basis or contractor's equipment rated on a receipts basis, including property damage for which liability is assumed under any incidental contract relating to such premises or operations, but excluding property damage included in subparagraph (2) below;
- (2) all property damage arising out of and occurring in the course of operations performed for the named insured by independent contractors and general supervision thereof by the named insured, including any such property damage for which liability is assumed under any incidental contract relating to such operations, but this subparagraph (2) does not include property damage arising out of maintenance or repairs at premises owned by or rented to the named insured or structural alterations at such premises which do not involve changing the size of or moving buildings or other structures;
- (3) all property damage included within the products hazard and all property damage included within the completed operations hazard.

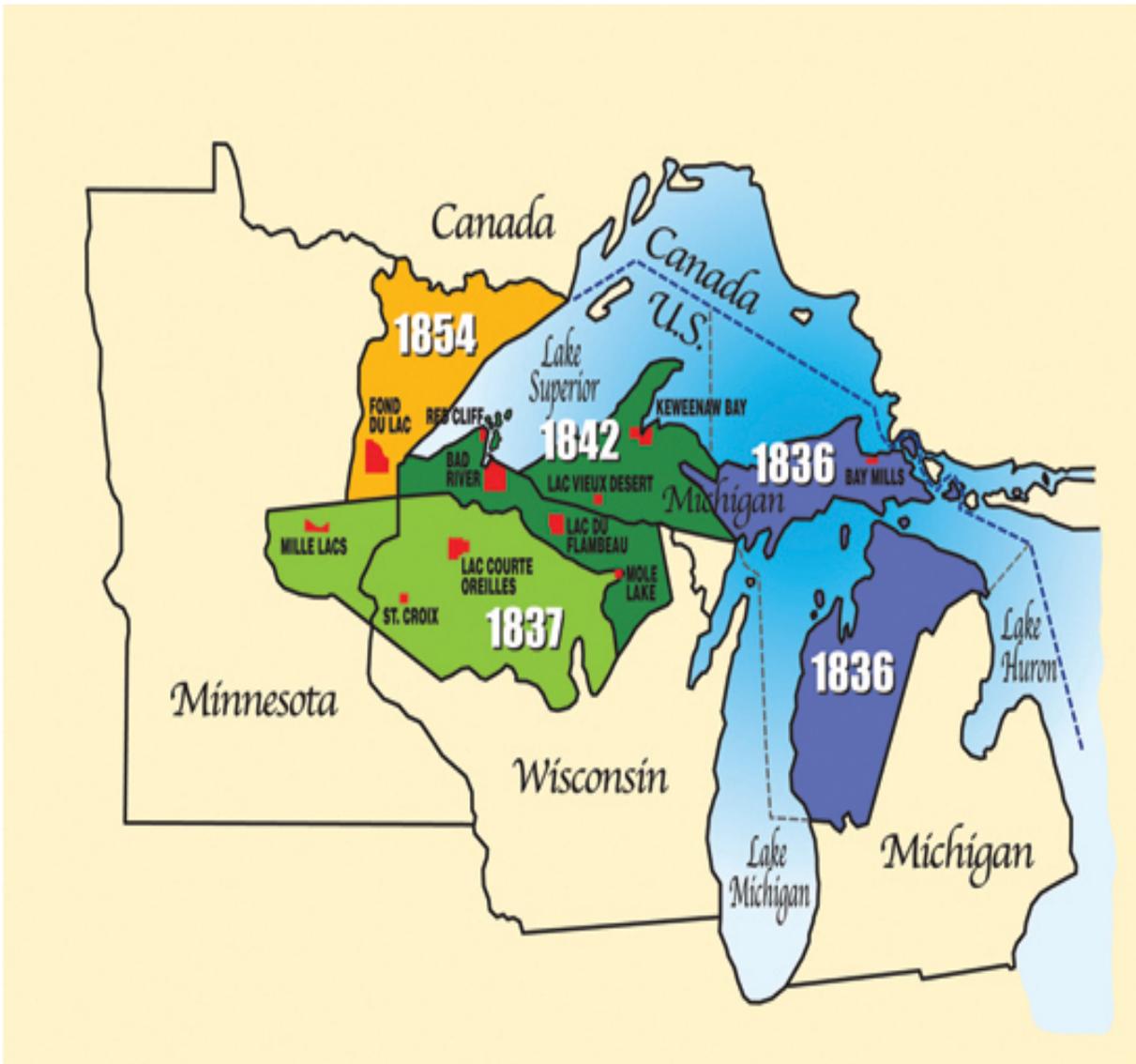
Such aggregate limit shall apply separately to the property damage described in subparagraphs (1), (2), and (3) above, and under subparagraphs (1) and (2), separately with respect to each project away from premises owned by or rented to the named insured.

Coverages A and B—For the purpose of determining the limit of the company's liability, all bodily injury and property damage arising out of continuous or repeated exposure to substantially the same general conditions shall be considered as arising out of one occurrence.

IV. POLICY PERIOD; TERRITORY

This insurance applies only to bodily injury or property damage which occurs within the policy territory.

Appendix G



Appendix H

This from Sierra Club in Wisconsin

GET ON THE BUS!



We have buses from across Wisconsin to the event in Duluth! On September 28, there will be a rally, march, and gathering to join in community and send a clear message to the Michigan Governor and state agencies: ***Midwesterners stand together to protect what we love and say STOP Line 3 and other pipelines that threaten our water, climate, and communities.***

Where: Park, Duluth

When: Saturday September 28, 2019

Reserve your spot on the bus!

Appendix I

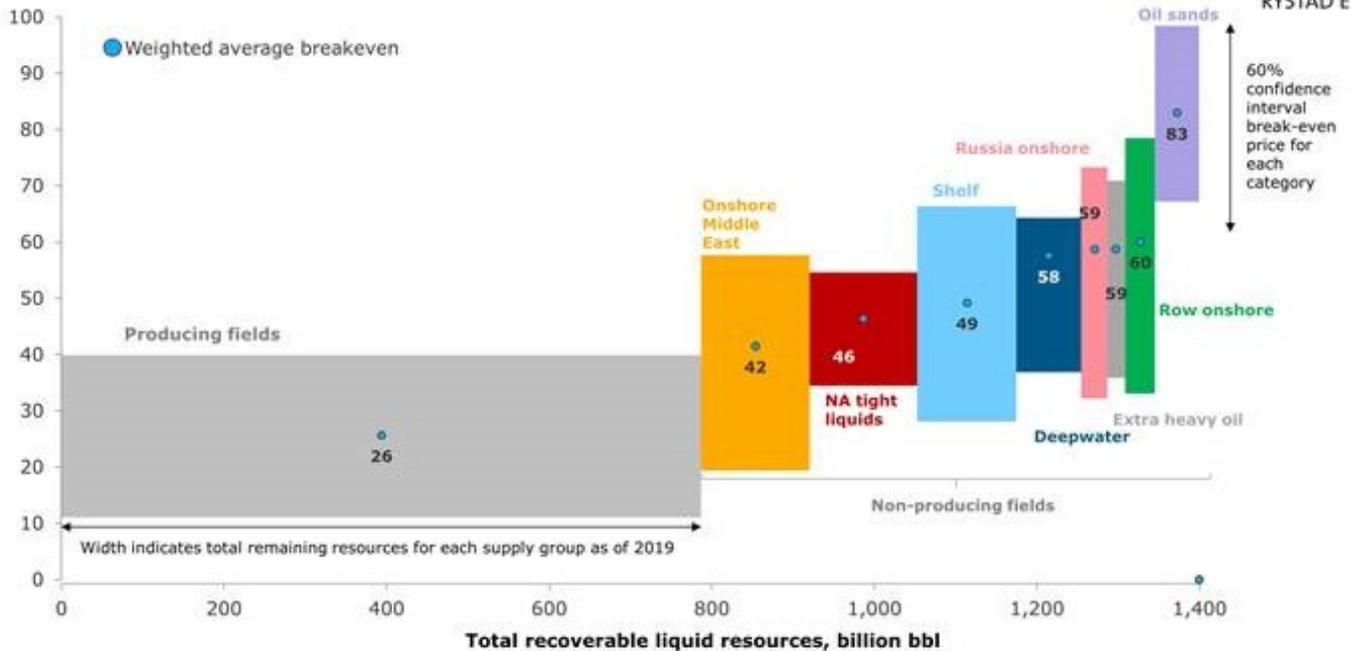
There several different sources of the cost premium for unconventional Canadian tar sands oil. Here is a summary of those estimates. Note that while these estimates do incorporate the fact that heavy crude like tar sands oil incurs more costly refinery costs, it is not clear that they fully incorporate tar sands oil more distant and complicated transportation costs to U.S. refineries, including the greater pipeline capacity constraints in shipping oil from Alberta to the Midwest and Texas, which frequently require rail haul that is three times more expensive (approximately \$30/barrel compared to \$10/barrel).

RYSTAD (21019)

Global liquid supply curve Real Brent Break-even price, USD/bbl

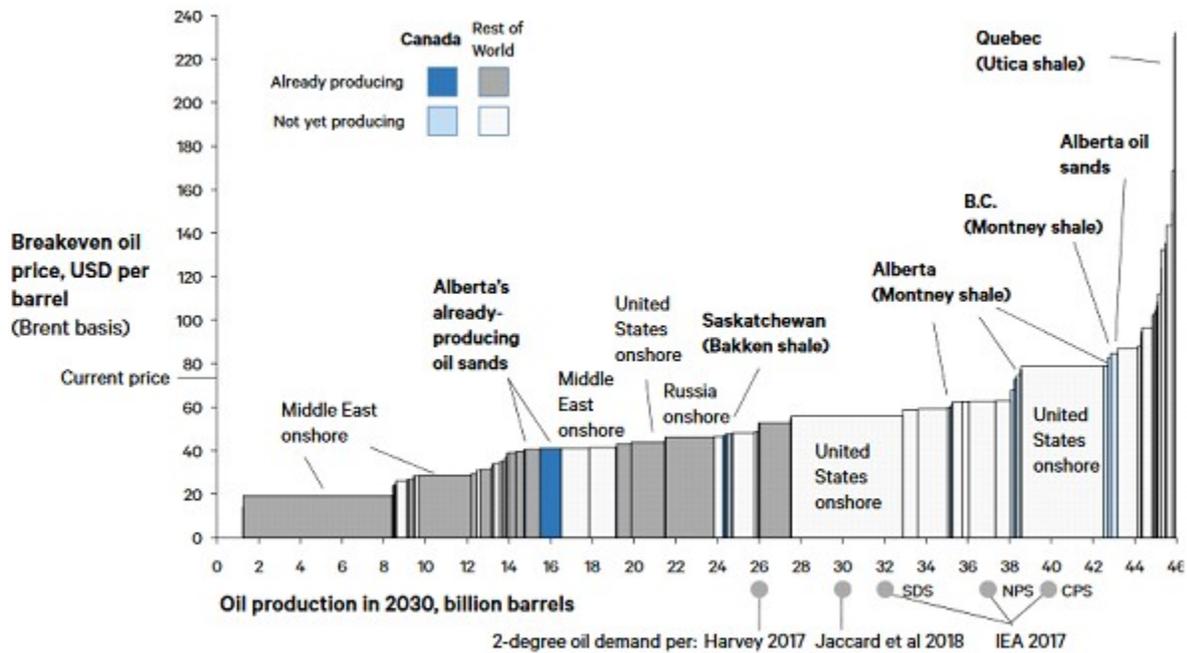


RYSTAD ENERGY



Source: Rystad Energy UCube

Figure 1. Cost curve of global oil production in 2030, with Canadian fields identified.

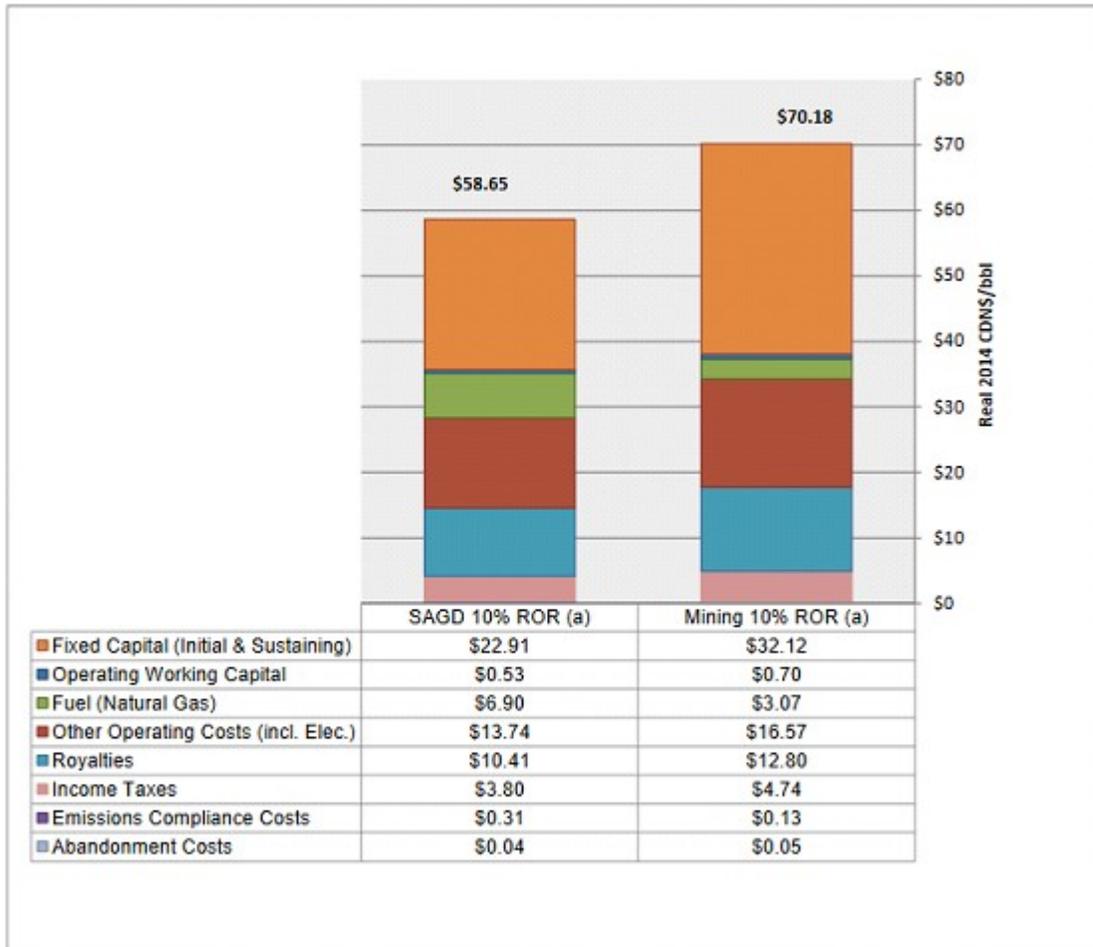


Prices are listed in Brent crude terms. The calculation of breakeven price for each field includes any discount for the actual price received by each producer; for example, oil sands projects are assumed to receive between \$5 to \$15 less per barrel compared to the Brent prices shown, to account for quality differences relative to other crudes. Dots along bottom axis show global 2-degree-consistent oil demand per Harvey (2017) and Jaccard et al (2018), plus oil demand in the IEA's Sustainable Development Scenario (SDS), New Policies Scenario (NPS), and Current Policies Scenario (CPS).
 Source: Rystad Energy (Rystad Energy 2017), plus oil demand scenarios from IEA (IEA 2017), Simon Fraser University (Jaccard et al. 2018), and University of Toronto (Harvey 2017)

SEI, Confronting Carbon Lock-in: Canada's Oil Sands (2018)

CANADIAN ENERGY RESEARCH INSTITUTE (2015)

Figure E.1: Total Field Gate Bitumen/SCO Supply Costs



Source: CERI

CERI, Canadian Oil Sands Supply Costs and Development Projects (2015)

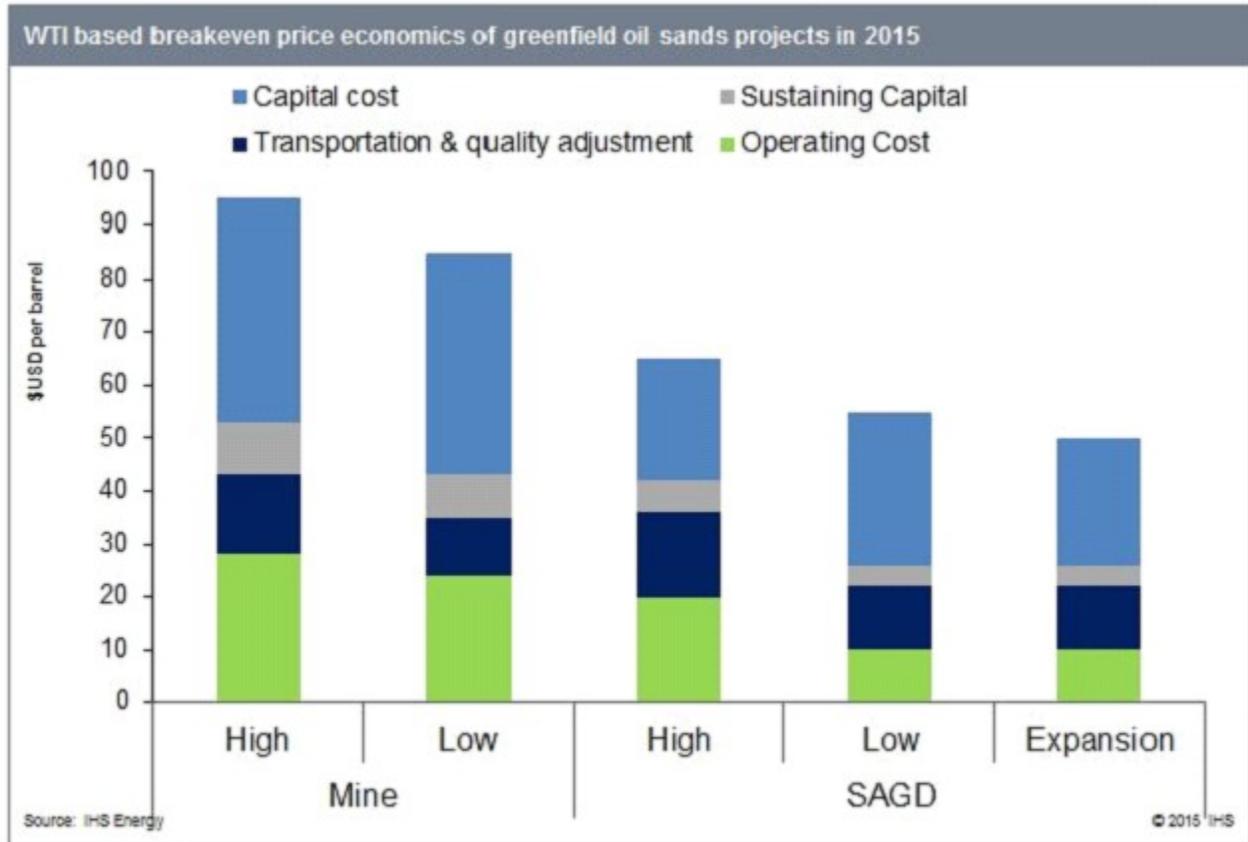
The left hand bar represents the least cost initial mining at the surface. As those deposits are exhausted, the more expensive deposits must be mined and steam assisted, as represented in the right hand bar.

SEEKING ALPHA (2014)

2014	Husky	Imperial	MEG	Suncor
Exploration costs	in lifting costs	0.34	in lifting costs	0.50
Lifting costs	19.98	48.61	21.35	36.34
Non-income related taxes	9.35	11.18	3.95	5.14
Total cost of sales	29.33	60.13	25.29	41.98
Depreciation	25.53	4.38	13.97	21.13
SG&A, R&D	1.18	0.26	5.76	1.32
Financial costs	0.57	0.10	6.88	2.69
Total costs	56.61	64.87	51.91	67.13
Realized total price/boe	63.88	77.01	56.71	76.26
Operating Cashflow [\$million]	5054	3987	695	8087.08
Capex [\$million]	4968	4899	1187	6467.13
Sale of Assets [\$million]	60	770	0	202.72

(source: Annual Report 2014 if already published, otherwise company websites)

IHS MARKIT (2016)



Estimates are based on average operating conditions over first three quarters of 2015. Additional costs for blending, taxes and royalties are included and would be in addition to sustaining capital in chart but are not shown for simplicity.

IHS, Production cost and the Canadian oil sands in a lower price environment (2016)

In addition the energy and financial press has discussed the subject of the Alberta tar sands oil fields economic disadvantages, of which some examples follow.

<https://www.reuters.com/article/us-canada-oilsands-economics-analysis/canadas-oil-sands-survive-but-cant-thrive-in-a-50-oil-world-idUSKBN1CN0FD>

REUTERS

Canada's oil sands survive, but can't thrive in a \$50 oil world
Nia Williams

Oct 18 2017

CALGARY, Alberta (Reuters) - Canada's oil sands producers are stuck in a rut.

The nation's oil firms are retrenching, with large producers planning little or no further expansion and some smaller projects struggling even to cover their operating costs.

As the era of large new projects comes to a close, many mid-sized producers - those with fewer assets and producing less than 100,000 barrels of oil a day in the oil sands - have shelved expansion plans, unable to earn back the high start-up costs with crude at around \$50 per barrel. Larger Canadian producers, meanwhile, focus on projects that in the past were associated with smaller names.

The last three years have seen dozens of new projects mothballed and expansions put on hold, meaning millions of barrels of crude from the world's third-largest reserves may never be extracted.

Where industry groups in 2014 expected Canada's oil sands output to more than double to nearly 5 million barrels per day (bpd) by 2030, that forecast has been knocked down to 3.7 million bpd.

This follows a spell of consolidation that has seen foreign majors sell off more than \$23 billion in Canadian assets in a year and turn to U.S. shale patches such as the Permian basin in Texas, which produce returns more quickly and where proximity to refiners means the barrels fetch a better price.

"We cannot compete with that huge sucking noise to the south that is called the Permian. Investment dollars are spiraling away down there," Derek Evans, chief executive of small oil sands producer Pengrowth Energy (PGF.TO) told Reuters in an interview.

Permian production rose 21 percent in 12 months through July compared to a 9 percent increase in Alberta's oil sands, according to Canadian and U.S. government data.

COSTLY STARTUP PHASE

Mid-sized producers are hurting the most, due to start-up costs that far exceed those in other major

producing areas. Oil sands producers have slashed operating costs by a third since 2014, but building a new thermal project - in which steam is pumped as deep as one kilometer (1094 yards) underground to liquefy tar-like bitumen and bring it to the surface - requires U.S. crude benchmark at around \$60 a barrel to break even, analysts estimate.

The North American benchmark West Texas Intermediate crude CLc1 has traded between \$42 and \$55 a barrel so far this year. The U.S. Energy Information Administration forecasts it will average \$49.69 a barrel in 2017 and \$50.57 a barrel next year.

There are around half a dozen thermal projects in the costly start-up phase, when engineers steadily increase steam pressure to bring a reservoir's production up to full capacity.

One of those is Athabasca Oil Corp's (ATH.TO) Hangingstone project. It was originally conceived as a 80,000 bpd project, but instead will bring output to only 12,000 bpd from the current 9,000 bpd. The project can break even with U.S. crude prices of at least \$53 a barrel, meaning right now Athabasca keeps losing money on Hangingstone production. Size is crucial in the oil sands; the more bitumen a company can squeeze out of a plant, the lower fixed costs per barrel will be.

"(Athabasca) was a company built when oil was \$100 a barrel. In those days we were going to find funding for joint ventures and build greenfield projects to a massive size. The reality is the world changed," chief executive Rob Broen told Reuters.

Quarterly filings show why smaller players are struggling. Transportation and marketing costs at Hangingstone, along with the cost of natural gas used to produce steam to extract oil, and other operating costs are much higher compared with Cenovus Energy's (CVE.TO) Christina Lake project, one of the highest-quality and biggest bitumen reservoirs in the oil sands.

Pengrowth's development plans are on hold as well, Evans said, because the company needs U.S. crude to stay at \$55 for a sustained period to justify investment in its 14,000 bpd Lindbergh thermal project, at one point intended to grow as large as 40,000 bpd.

THE BIG GO SMALL

Large producers have pulled back in response to lower global prices as well. For example, Suncor Energy's (SU.TO) 194,000 bpd Fort Hills mine, due to start producing oil by the end of this year, is the company's last megaproject.

Canadian Natural (CNQ.TO) restarted construction on its 40,000 bpd Kirby North project last November, one of a handful of smaller projects to start producing in 2019.

Slideshow (2 Images)

Other companies like MEG Energy (MEG.TO) are planning expansions at existing sites in 20,000 bpd "modules" rather than starting large new projects from scratch. But even such more modest investments are out of reach for smaller companies like Athabasca and Pengrowth.

“It’s very hard (for a small company) to drag itself out of the financing black hole it would have to get in to build a project to start with,” said Nick Lupick, an analyst at AltaCorp Capital. “A large company can take that on their balance sheet without having to leverage too highly.”

<https://www.desmogblog.com/2018/10/25/canadian-tar-sands-oil-financial-losses> DESMOG

Why Canadian Tar Sands Oil May Be Doomed Read time: 9 mins

By Justin Mikulka • Thursday, October 25, 2018 - 13:03 Fort McMurray, Alberta, Canada, tar sands oil operations

At current prices, Canadian tar sands oil producers are losing money on every barrel of oil they dig out. Despite signs earlier this year the industry would “turn profitable in 2018,” a much more likely scenario at this point is a fourth straight year of losses.

Producers are forced to keep cranking out product and selling it at a loss to cover the massive costs required to start one of these sprawling unconventional oil operations, a point made painfully clear when Alberta wildfires in 2016 forced some tar sands operators to shut down.

“I do think they’ll start up quickly once the danger from the fire is gone because there is a lot of motivation to do that,” Jackie Forrest, an energy economist for Arc Financial Corp, told The Globe and Mail. “They have a lot of fixed costs so they’re going to be motivated to get some revenue to pay for those costs that aren’t going away.”

In the face of such challenging economics, what are Canadian tar sands producers doing? Tapping more oil than ever.

In June 2018 Canada set a new record for exporting oil to the U.S., hitting well over three million barrels per day. This record coincided with another one for oil exported by rail from Canada to the U.S. The U.S. is currently the only major market for Canadian crude, with 99 percent of its exports going to either U.S. refineries or ports for export.

Source: U.S. Energy Information Administration America Is
Maxing out on Canadian Crude

American refineries certainly enjoy buying Canadian crude at such low prices. How low are the prices? As the Financial Post reported in mid-October, Western Canadian Select (WCS) was \$19 a barrel — approximately \$50 a barrel cheaper than a barrel of the American oil standard known as Western Texas Intermediate (WTI).

Without a competing market in sight, American buyers likely will continue receiving huge discounts on Canadian oil. As Sandy Fielden, director of oil and products research at Morningstar, told Reuters in 2016: “If Canada can’t get their oil to another market besides the U.S. [market],

you'll always be a price taker, not a price maker.”

Even under these economic conditions, one company, Teck Resources, is proposing to build a new tar sands mining operation. Projections estimate the cost to produce a barrel of oil at this operation will be around \$85 a barrel. That's quite the mismatch with what a barrel of Canadian crude oil is fetching these days, and doesn't bode well for a sustainable business model.

Another complicating factor is that even at such low prices, American refineries only want and need so much tar sands oil, which is a heavy, lower-quality oil. America is experiencing a boom in production of the light fracked crude oil from shale basins, which is not only more valuable to refineries but requires much lower transportation costs than importing crude from Alberta, the tar sands capital of North America.

As The Energy Mix reported recently: “Permian Basin oil is a far better fit for the only U.S. refineries capable of handling more bitumen [tar sands oil], and will likely be for at least the next decade.”

As an example of that preference, Exxon just announced plans to expand its Beaumont, Texas, refinery by 300,000 barrels per day, which would make it the largest refinery in America. This additional capacity is for light crude oil, not heavy Canadian oil.

Still, American refineries are importing, and refining, record amounts of Canadian oil right now, but at massively discounted prices compared to average global oil prices, which helps lead to huge profits for American refiners.

Yet another complication for tar sands producers is that, as The Energy Mix highlighted, “In reality, virtually every refinery in America that buys heavy crude is operating at full capacity. That is why there are no buyers willing to pay higher prices.”

Economics 101. If supply is higher than demand, prices go down. And sellers in that market have to take whatever price they can get, even if that means selling at a loss.

To help extract itself from this difficult situation, Canada is looking to build pipelines, such as the still-uncertain Trans Mountain pipeline expansion, to transport its landlocked oil to tidewaters, where companies theoretically can sell the oil to Asia's rapidly growing market.

Never Get Involved in an Oil War With Saudi Arabia

Shell tar sands mine in Alberta

Shell Jackpine tar sands mine in 2014. Credit: Julia Kilpatrick, Pembina Institute, CC BY-NC-ND 2.0

Canada's tar sands pipeline plans have several fatal flaws. The first is that tar sands oil is heavy and not the most desirable oil on the market. The second is that Canada is late to the game, with some rather formidable competition from the U.S., which is exporting oil to Asia at ever increasing

rates, and also from the Middle East.

While Canada's tar sands proven oil reserves are the third largest for any country in the world, Saudi Arabia holds the number two spot (Venezuela is number one). Unlike the stiff production costs Canadian tar sands operators face, Saudi Arabia has production costs in the range of \$10 per barrel. Plus, Saudi Arabia is producing more desirable grades of oil and has easy access to ports, giving the country a strong competitive edge.

However, Saudi Arabia still needs to secure markets for its oil and has been striking deals and partnerships around the world to ensure its oil is the oil that meets future global demand. It has begun shipping oil to one of these joint venture projects in Malaysia and is helping finance projects in China, South Africa, India, Pakistan, and South Korea. French oil company Total SA is also partnering with the state-owned Saudi Aramco on a huge refinery and petrochemical complex in eastern Saudi Arabia.

Saudi Aramco even owns the largest oil refinery in America, in Port Arthur, Texas, where it processes large amounts of oil imported from Saudi Arabia. Aramco's plans to expand the facility are centered on petrochemical production, an area many oil producers see as the future for growth in the business and not one that will require tar sands oil as feedstock.

In the near term, Canada faces competition with America's booming fracked oil trade, and in the long term, Saudi Arabia is locking up deals to supply the foreign markets Canada eventually hopes to reach if it can ever build pipelines to export its oil. Even then, The Energy Mix predicts that Canada would require prices of "upwards of U.S. \$100 per barrel for decades."

This is all assuming a significant reduction in global oil consumption doesn't occur in the coming decades in order to address the climate crisis. Years of successful pipeline protests and global oil economics may end up keeping a large portion of the Canadian tar sands oil "in the ground."

Canadian Prime Minister Justin Trudeau most likely wouldn't be pleased at that prospect. In 2017 he told an oil industry conference: "No country would find 173 billion barrels of oil in the ground and leave them there." But a country might if the oil were sold at a loss.

Looking for Bailouts

A good indicator of the failed tar sands model is how many major oil companies sold their positions in Canadian tar sands and took their losses. Their main explanation? No one could make money on those projects at current oil prices.

The remaining companies apparently have to rely on government bailouts. The first bailout signaling trouble for the industry was when the Canadian government bought the Trans Mountain pipeline expansion project from Texas-based Kinder Morgan for CAN \$4.5 billion. A federal court ruled that the pipeline didn't get the proper approvals, which means it is now in legal limbo and may not be built — but Kinder Morgan still gets its \$4.5 billion. A big win for Kinder Morgan, perhaps less so for the people of Canada.

Trudeau and the Canadian oil industry need this pipeline if they have any hopes of exporting tar sands oil to Asia. Energy East, the other large pipeline designed for exports, was canceled in 2017. As the delays continue and the economics remain unfavorable for Canadian tar sands, other suppliers such as Saudi Arabia are securing future oil export markets.

More recently — indicating how desperate the situation is for tar sands producers — Alberta Premier Rachel Notley pitched the idea that the Canadian government should invest in the oil-by-rail business to help tar sands producers, which sounds a lot like corporate welfare to support a failing business model.

This request comes despite oil producer Cenovus signing a deal in September to move more of its oil by rail, and this deal reportedly isn't the only one of its kind. Canada is set up to move far more oil-by-rail than ever before, despite the obvious risks to safety and environment.

Moving oil by rail is more expensive than by pipeline but does offer the advantage of reaching ports where the oil could be exported — and a desperate Canadian oil industry has very few options.
Technology Not the Savior

Canadian tar sands oil had very different prospects in 2010. The American shale oil and gas revolution had just begun, and producers were trying to figure out which shale plays would actually produce oil. It did not seem like a threat to the massive Canadian tar sands oil industry at the time.

Meanwhile in Canada, the industry knew where the bitumen was and how much was there (a lot). In a 2010 article in *The Globe and Mail*, Darin Barter, a spokesman for Alberta's Energy Resources Conservation Board, noted that unlike the traditional oil industry, exploration costs for the tar sands industry were "zero."

"We know the oil is there, the bitumen is there, the technology may not be there," Barter said in 2010, "But we all know how quickly technology moves forward when there is a financial reward at the end. "

In 2018, the technology is definitely there. The bitumen can be mined and diluted and pumped through pipelines and into rail tank cars. But the financial reward that Barter was expecting technology to deliver has not materialized.

Almost 10 years later, the financial payout for tar sands oil looks less likely than ever.

<https://insideclimatenews.org/news/23022016/tar-sands-becoming-worthless-production-rises-even-prices-plummet> INSIDE

CLIMATE

With Some Tar Sands Oil Selling at a Loss, Why Is Production Still Rising?

Canadian oil producers can't address the downturn by slowing production without huge losses, so they now sell at a loss economically and for the climate.

By Phil McKenna, InsideClimate News Feb 23, 2016

The Syncrude tar sands site, on April 27, 2015 outside of Fort McMurray, Canada. Tar sands oil production in Canada is expected to increase by 9 percent in 2016, even though the oil currently sells for less than the cost of production. That's because the wells can't be shuttered without significant financial losses.

Like a supertanker unable to make quick turns, production from tar sands in the Canadian oil patch continues to increase despite prices so low producers have to sell their output at a loss.

The industry's inability to cut production could have a profound impact on the climate as well as corporate bottom lines. Despite reductions in greenhouse gas emissions across Canada, continued tar sands oil production will most likely keep the nation from meeting targets it set as part of the international climate accord agreed to in Paris.

Energy-intensive tar sands production in Canada that requires steam to liquefy and extract the oil is expected to increase by 9 percent in 2016, according to the Canadian National Energy Board. Yet the oil currently sells for less than the cost of production when transportation costs are figured in, according to a detailed analysis by RBN Energy LLC, an industry consulting firm.

"It's not very pretty right now," said Phil Flynn, senior energy analyst at the PRICE Futures Group, who was not part of the analysis. "Some of these companies are losing money on every barrel."

Alberta's tar sands are the third-largest oil reserve in the world after Venezuela and Saudi Arabia. Proven reserves in Alberta total 166 billion barrels, 24 times the amount consumed by the U.S. in 2014, according to the U.S. Energy Information Administration. Tar sands yield a heavy, thick, low-quality oil that requires significantly more energy to extract and refine than conventional crude. Producing tar sands oil emits three to four times more greenhouse gases than ordinary oil, according to a 2008 U.S. Department of Energy report.

"Tar sands are some of the most carbon-intensive oil sources in the world barrel-for-barrel," said Anthony Swift, an attorney with the Natural Resources Defense Council who focuses on tar sand development.

When crude oil prices were hovering around \$100 a barrel five years ago, the tar sands industry

could project attractive returns on investment in extracting and transporting the oil to market by rail or pipeline. But with the fracking-driven energy glut of recent years, the price of tar sands crude has plunged to \$20 a barrel, obliterating the economic calculations that launched the industry.

The RBN Energy analysis focused on transportation costs. Pipeline capacity limitations and growing production volumes are increasingly forcing producers to transport tar sands oil to Gulf Coast refineries by rail, which costs about \$6 a barrel more than pipelines would charge.

As of Feb. 8, producers paid an estimated \$20.50 a barrel to ship the oil to Houston, first by truck and then by rail, but received just \$20 a barrel for the product. When the cost of chemicals required to dilute the crude to make it less viscous were factored in, producers lost \$2.74 a barrel, according to the analysis. Producers able to ship by pipeline came out slightly better, making \$2.97 per barrel after transportation fees.

However, the cost to keep energy-intensive production facilities running is \$5 a barrel, on top of the transportation costs, RBN Energy estimated.

"Whichever way you look at it, there are some operations that are now losing money on every barrel," the report concluded.

Suncor Energy, Canada's largest oil producer, reported a net loss of \$2 billion in the fourth quarter of 2015. Imperial Oil, another tar sands giant, reported earnings of \$1.1 billion in 2015, down from \$3.8 billion from a year earlier

"It's not going to continue for the long run because the money is going to run out," Flynn said. "You can't pump more barrels of oil and make up for it in volume. At some point something's going to give."

Yet tar sands production has continued to increase because the wells represent long-term investments that can't be shuttered without significant financial losses.

"This is like a toboggan going down a hill," said Maurice Dusseault, a petroleum engineering professor at the University of Waterloo in Ontario. "You can't stop a third of the way down very easily and then start up again. You've got to stick it through to the end of the project."

Unlike hydraulic fracturing wells, which can be brought online quickly and play out quickly, tar sands wells typically take several years to complete and then produce steadily for decades.

Most Canadian oil sands production uses a process called steam-assisted gravity drainage. It requires significant upfront costs, including natural-gas fired steam production facilities, and can take as much as seven months to reach peak production. And if the steam process is stopped, it creates a vacuum inside the reservoir that floods the production well with water and is irreversible.

"We don't really know how to shut down a steam chamber and start it up again without massive

losses," Dusseault said. "If you say, 'Well look, prices are low, I've got to shut down,' then you are basically adopting a much bigger financial penalty when you start up again."

Sticking with tar sands production, however, comes at tremendous environmental costs.

"The expanding tar sands sector and emissions from that are the chief reason that Canada has missed its climate targets to date and is not on track to hit its 2030 target," Swift said.

In November, the provincial government of Alberta announced a plan to cap tar sands emissions at 100 million metric tons of carbon a year. The cap hasn't been implemented and would still allow for substantial growth, Swift said.

"Over the long term it's difficult to see how Canada will meet its 2030 and 2050 goals without a fairly rapid peak in the emissions of tar sands and an effort to phase down those emissions," Swift said.

In its final supplemental environmental impact statement on the Keystone XL pipeline, which would have significantly expanded low-cost transportation capacity to Gulf Coast refineries, the U.S. State Department concluded that the pipeline would not impact the volume of oil sands production. The 2014 assessment, however, assumed oil wouldn't drop below \$75 a barrel. At that price it would be economically viable to ship tar sands by rail if cheaper pipeline transport were not available.

"Their analysis suggested that at oil prices above \$75 a barrel, tar sands expansion could happen with or without pipelines like Keystone XL," Swift said. "What we've found is with oil prices below \$75 a barrel, it's absolutely clear that the existence of cheap transport capacity is a make-or-break issue for companies deciding whether to green-light new tar sands projects or not."

The lack of cheap transportation and the current glut of oil could bring all new projects to a standstill.

A report published Monday by the International Energy Agency concluded that peak production might not be far off.

"We are likely to see continued capacity increases in the near term, with growth slowing considerably, if not coming to a complete standstill, after the projects under construction are completed," according to the report.

The conclusion was based on the high cost of tar sands production, lack of pipeline capacity, and heightened environmental concerns.

"Nobody is happy," Swift said of the current situation. "That is one of the reasons why there is so much focus on preventing more investment in the sector."

Appendix J

At the core of the Complaint is the fact that the easement expressly compels Enbridge to remove its pipeline in the event an easement term is not renewed. Taken from the Complaint:

57. The easements under which the pipeline was installed on the Bad River Reservation in the 1950s were renewed in the 1970s and again in 1993.

58. By their express terms, fifteen of the easements that were renewed in 1993 were “limited as to tenure for a period not to exceed 20 (Twenty) years, beginning on June 3, 1993, and ending on June 2, 2013[.]” The Band holds between a

forty-percent and a ninety-percent ownership interest in eleven of the fifteen parcels to which the now-expired easements attached.

59. Those easements further expressly required as follows:

At the termination of this Grant of Easement, [Enbridge] shall remove all materials, equipment and associated installations within six months of termination, and agrees to restore the land to its prior condition.

Such restoration may include, but not be limited to, filling, leveling, and seeding the right of way area.

60. Enbridge accordingly was under a legal duty to cease the flow of oil across the parcels by June 2, 2013, and to remove the pipeline from those parcels and to restore them to their prior condition within six months, or by December 2, 2013. Following that date, Enbridge had no legal right to use or possess any portion of those lands. (See Complaint, p. 20.)

The lawsuit provides as its substantive basis a detailed description of the risks of an accident posed by even new pipelines, nonetheless ones built 66 years ago after six decades of operating stresses. The risks included the economic, social and environmental consequences to the Bad River Band from an accident on Line 5 (see Complaint, pp. 4-24).

It makes three legal claims, under public nuisance law (federal and state), trespass law, and ejection (see Complaint, pp. 48-50). For relief, it seeks a declaratory judgment under the nuisance and trespass claims and an order of removal of the pipeline (see Complaint, p. 51).