The Relative Economic Costs and Benefits of the Line 9B Reversal and Line 9 Capacity Expansion

Written Expert Evidence Prepared

by

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on behalf of
Équiterre (Coalition)

Presented in the case of
Enbridge Pipelines Inc.
Line 9B Reversal and Line 9 Capacity Expansion Project Application
under section 58 of the National Energy Board Act
OH-002-2013

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1. Mandate

Following the filing by Enbridge Pipelines Inc. (Enbridge) of the Line 9B Reversal and Line 9 Capacity Expansion Project (Project) Application under section 58 (Application) of the National Energy Board Act OH-002-2013, the Équiterre Coalition (Coalition)[1] retained the services of The Goodman Group, Ltd. (TGG). Ian Goodman and Brigid Rowan of TGG were retained as experts in order to assist the Coalition with its intervention before the National Energy Board (NEB), and to produce written evidence (TGG Report) within the context of the case. In accordance with the NEB's List of Issues[2] in this case, TGG specified the hearing subjects on which it intended to present evidence (in TGG's "Proposal for Expert Assistance on Enbridge Line 9B Reversal and Line 9 Capacity Expansion Project (NEB OH-002-2013)," filed on April 11, 2013).

As stated in TGG's Proposal for Expert Assistance, TGG focusses on economic issues, but has also considered relevant interactions between the economic issues and other important issues in this hearing.

In particular, the TGG Report reviews various claims made in the Enbridge Application (Filing A3D7I1) regarding the economic costs and benefits of the project:

1. "The Project was initiated in response to requests from eastern Canadian refineries to have access to the growing and less expensive supplies of crude oil production from western Canada and the U.S. Bakken region."[3]
2. The Project "will provide western Canadian and U.S. Bakken producers access to the Quebec refining market while reducing the reliance of Quebec refiners on crude oil from areas of declining, or potentially unreliable, supply."[4]
3. The Project has substantial benefits in terms of allowing refineries in Québec to access lower cost crudes supplies, resulting in increased competitiveness and sizable cost savings for these refineries.[5]

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[1] The Équiterre Coalition is made up of: Équiterre, Ecojustice, Environmental Defence, ENJEU, Association québécoise de lutte contre la pollution atmosphérique (AQLPA), The Sierra Club, Climate Justice Montreal (CJM) and Nature Québec.
[2] Filing A3G6J4, Procedural Update No. 1 Appendix I, Adobe p. 11.
[3] Filing A3D7I1, Enbridge Application, p. 24, lines 2-4.
[4] Enbridge Application, p. 24, lines 15-19.
[5] Enbridge Application, p. 25, lines 3-6:

> The Project allows refineries in Quebec to access lower cost crude oil supplies from western Canada and the U.S. Bakken region, increasing the competitiveness of these refineries. Over the next 30 years, refinery cost savings of approximately $23 B are expected as a result of the Project.

4. The Project has substantial socio-economic benefits, such as increased GDP, increased labour income, and increased employment.[6]
5. The Enbridge Application further claims that incremental environmental and stakeholder effects will be minimized[7] and that the Project is unlikely to result in a significant negative residual environmental effect.[8]

In evaluating the economic benefits of the Project, TGG has also reviewed Enbridge's evidence regarding the specifics of supply and crude types (notably heavy versus light) expected to be transported on Line 9, as well as Enbridge's request to move all allowable crude types, including heavy crude, on Line 9.[9]

In light of our review of Enbridge's claims in its Application and its answers to Information Requests from various participants, the TGG Report provides its own evaluation of the costs and benefits of the Project.

Following the List of NEB Issues[10] discussed in TGG's Proposal for Expert Assistance, the TGG Report covers the following Issues:

1. The need for the proposed Project.
2. The potential commercial impacts of the proposed Project.
3. The appropriateness of the proposed Rules and Regulation Tariff and tolling methodology.

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[6] Enbridge Application, p. 25, lines 7-14:
> Over a 30 year period (2013 – 2043), the Project is expected to result in socio-economic benefits, such as:
> - an impact on Canadian Gross Domestic Product ("GDP") of approximately $25 B, taking into account the Project's total multiplied impact;
> - labour income increase of nearly $350 MM, mostly in the provinces of Ontario and Quebec; and
> - employment increases of approximately 5,500 person years, mostly in the provinces of Ontario and Quebec.

[7] Enbridge Application, p. 26, lines 1-2:
> By taking advantage of existing facilities and ROW, incremental environmental and stakeholder impacts will be minimized.

[8] Enbridge Application, p. 49, lines 22-25:
> Enbridge has developed general, and will develop Project-specific, programs to ensure that the recommended mitigation measures and commitments made in the ESEIA [Environmental and Socio-Economic Impact Assessment] are implemented throughout the construction and operations phases of the Project. Taking into account the implementation of these programs and mitigation measures, the ESEIA concludes that the Project is not anticipated to result in a significant negative residual environmental effect.

[9] Enbridge Application, p. 50, lines 2-15.

[10] See footnote 2.

4. The potential environmental and socio-economic effects of the proposed Project, including the potential effects of malfunctions or accidents that may occur, and any cumulative environmental effects that are likely to result from the proposed Project.
9. The terms and conditions, related to the above issues, to be included in any approval the Board may issue for the proposed Project.

The focus of the work to be undertaken is on economics, as opposed to engineering, environmental effects, and safety. Nonetheless, consideration of the issues identified above (i.e. Issues 1, 2, 3, 4, and 9) is taken into account, and have implications for, the following issues specified in the NEB List of Issues:

5. The engineering design and integrity of the proposed Project.
6. The safety, security, and contingency planning associated with the construction and operation of the proposed Project, including emergency response planning and third-party damage prevention.

The TGG Report's evaluation of the costs and benefits of the Project covers all of these Issues, either implicitly or explicitly.

2. Executive Summary

TGG has undertaken a relative cost-benefit analysis to compare to relative economic costs and benefits of the Project in order to assist the NEB in carrying out its mandate. We have limited our cost analysis to costs that directly affect economic activity and can be approximately quantified using market economics. In the economic benefits, we have considered both the commercial impact of the Project, as well as the economic-development benefits that can be approximated through macro-economic analysis.

To make a decision whether to approve or reject the Project, the NEB must consider the following questions:

1. Do the potential benefits justify the potential costs?
2. How are the costs and benefits distributed among the various stakeholders?

Because of the risk factors involved in this case (and especially the unusual proximity of Line 9 to people, water and economic activity), it is particularly important and challenging for the NEB to weigh the costs and benefits in this Project.

TGG provided an approximation of the benefits as less than $1 billion/per year and likely less than $0.5 billion/year, especially in the near-term. We also concluded that these benefits are insignificant in the relevant context of the overall Quebec, Ontario, and Canadian economies, and even more insignificant when weighed against the cost of a major accident/spill. Enbridge has downplayed any potential cost, but the Project has a range of rupture costs that vary from significant to catastrophic. However there is a high degree of uncertainly associated with a broad range of costs that make a precise determination of costs very challenging. Nonetheless, TGG has provided the NEB with a range of relative magnitudes for potential costs under a variety of accident/spill possibilities.

The conclusion of pipeline safety expert, Richard Kuprewicz, that there is a high risk of rupture in early years of the reversal under the operation conditions resulting from the Project,[11] greatly influenced our evaluation of the expected costs associated with rupture. Due to Line 9B's extraordinary proximity to people, water and economic activities, the rupture costs of the Project, under a range of pipeline malfunction/accident possibilities, vary from significant to catastrophic. With rupture

[11] Kuprewicz, Richard, "Report on Pipeline Safety for Enbridge's Line 9B Application to NEB," August 5, 2013, Conclusion 4, p. 26

costs that vary from significant to catastrophic and an assessment of a high risk of rupture, the expected Project costs therefore range from significant to catastrophic.

Under bad to worst-case scenarios, TGG concludes that the potential economic costs for a major rupture in an HCA[12] but not an urban setting (similar to Marshall) could start at $1 billion (bad scenario). If a major accident occurred in a densely populated area, damaging and disrupting key infrastructure, these costs could escalate to multi-billion dollar damages (potentially as high as $5-$10 billion) (worst-case scenario). Given the flammability of the proposed new crude slate to be carried on Line 9B, which includes both Bakken and dilbit, an accident involving this pipeline could also involve loss of human life.

Based on our evaluation of economic costs and benefits, TGG concludes that the potential economic costs could exceed (and, under a range of malfunction/accident conditions, greatly exceed) the potential economic benefits.

In light of the following:

1. the results of our relative economic cost benefit analysis, which demonstrates that the potential economic costs could exceed (and, under a range of malfunction/accident conditions, greatly exceed) the potential economic benefits;
2. the highly uneven allocation of costs and benefits among the stakeholders; and across regions;
3. the Kuprewicz Report's conclusion that there is a high risk that Line 9 will rupture in the early years following project implementation due to a combination of cracking and corrosion,

TGG strongly recommends that the NEB reject Enbridge's Project.

Section 1 contains a description of TGG's mandate in this proceeding. Section 2 is the Executive Summary. Section 3 sets out the Analytical Framework used to evaluate to relative economic costs and benefits. Section 4 analyzes the Benefits and provides an approximate range for these. Section 5 analyzes the Costs and explains how we determined a range of relative magnitudes for potential costs under a variety of accident/spill possibilities. Section 6 compares the Costs and Benefits, and Section 7 provides TGG's Recommendations.

[12] High Consequence Area. See Section 3.3 for more details.

3. Analytical Framework

3.1. Economic Cost-Benefit Analysis

The analytical framework for this report is an economic cost-benefit analysis (CBA), which has been applied to assist the National Energy Board in carrying out its mandate, as set out on its website.

> The NEB carries out its mandate in the *public interest*. The public interest is inclusive of all Canadians and refers to a balance of economic, environmental and social considerations that changes as society's values and preferences evolve over time.[13]
>
> […]
>
> The Board must ask itself: to what extent is Canada better off, or worse off, overall, by choosing a course of action? By considering all the evidence in context of the circumstances, the Board is able to make recommendations in the public interest.[14]

The NEB regulates pipelines, including the construction and operation of interprovincial oil pipelines, in the Canadian public interest. Thus, the NEB must consider the public interest, as defined above in its decision regarding Enbridge's Project for Line 9B Reversal and Line 9 Capacity Expansion.

In its decision, the NEB must weigh both the costs and benefits of the Project. TGG has focussed our review on the comparison of the economic costs and benefits of the Project because (i) these are the elements that can be most readily be estimated and compared; (ii) TGG has a well-developed expertise in the evaluation of economic development benefits from various energy options; (iii) the evaluation of the environmental and social costs and benefits is subject to major controversy and will be considered by other parties.

The NEB must balance environmental and social considerations with economic considerations. The NEB is an economic regulator (with a very strong focus/expertise in

[13] See NEB website, under The National Energy Board Mandate.
http://www.neb-one.gc.ca/clf-nsi/rsftyndthnvrnmnt/prtctngcndnnvrnmnt/vrvw-eng.html
[14] See NEB website, A, Our purpose – Public Interest
http://www.neb-one.gc.ca/clf-nsi/rsftyndthnvrnmnt/prtctngcndnnvrnmnt/ntnlnrgbrd-eng.html

regard to economics) and is therefore greatly concerned with the economic costs and benefits of its decisions. Based on our evaluation of economic costs and benefits, TGG concludes that the potential economic costs could exceed (and, under a range of malfunction/accident conditions, greatly exceed) the potential economic benefits.

As indicated in Section 0, Enbridge claims that the Project has substantial "socio-economic benefits," such as increased GDP, increased labour income, and increased employment.[15] Furthermore, Issue #4 in the NEB List of Issues[16] includes consideration of:

> The potential environmental and socio-economic effects of the proposed Project, including the potential effects of malfunctions or accidents that may occur, and any cumulative environmental effects that are likely to result from the proposed Project (Issue #4).

As part of our evaluation of the economic costs and benefits of the Project, TGG has taken into account:

1. The potential commercial impacts of the Project.
2. The potential economic-development-related socio-economic effects[17] of the Proposed Project insofar as these effects can be readily measured with macroeconomic analysis.[18]
3. The potential environmental[19] and other socio-economic effects[20] of the proposed Project, including the potential effects of malfunctions or accidents that may occur insofar as these impacts can be readily and broadly quantified using market economics.

[15] See footnote 6
[16] See footnote 2.
[17] These potential economic-development-related socio-economic effects fall within the "Employment and Economy" category of the Socio-Economic Elements of the NEB's Filing Manual. See NEB Filing Manual, Guide A.2 – Environmental and Socio-Economic Assessment, Section A.2.8, Table A-3: Filing Requirements for Socio-Economic Elements, Employment and Economy.
[18] Beyond the commercial impacts of the Project, TGG has taken into account the macroeconomic impacts of the project with respect to employment, labour income, GDP, and economic development spinoffs. These are the same impacts that Enbridge identifies as the Project's "socio-economic benefits" (see footnote 6).
[19] These potential environmental effects fall within the relevant Biophysical Elements listed in the NEB Filing Manual. See NEB Filing Manual, Guide A.2 – Environmental and Socio-Economic Assessment, Section A.2.8, Table A-2: Filing Requirements for Biophysical Elements.
[20] "Other" socio-economic effects fall within the relevant Socio-Economic Elements listed in the NEB Filing Manual, excluding those that fall into the "Employment and Economy" category. See NEB Filing Manual, Guide A.2 – Environmental and Socio-Economic Assessment, Section A.2.8, Table A-3: Filing Requirements for Socio-Economic Elements.

Items 1 and 2 comprise the benefits of the Project, which will be analyzed in Section 4, Item 3 comprises the costs of the Project, which will be analyzed in Section 5.

Regarding the potential environmental and other socio-economic effects of the Project (i.e., item 3), TGG did not undertake a complete evaluation of the potential environmental costs, nor did we attempt to quantify impacts on human health and safety and the cumulative environmental effects that are likely to result from the Project. A complete analysis of all of the potential environmental effects of the Project would be subject to major controversy, very difficult to measure, and exceeds the scope of TGG's mandate in this case.

Similarly, Socio-Economic Elements, as defined in the NEB filing manual include some effects that are more difficult and subjective to measure, such as social and cultural well-being. Although these elements are important, TGG has not included them in our evaluation of socio-economic impacts. The economic-development-related socio-economic impacts considered by TGG in item 2 are those included in traditional economic development studies (and are the same as those included in Enbridge's own economic evaluation).

In item 3, TGG considered a range of potential environmental and other socio-economic costs related to "the potential effects of malfunctions or accidents that may occur." We have limited our cost analysis to environmental and socio-economic impacts that directly affect economic activity and can be somewhat readily (albeit approximately) quantified using market economics.. These impacts are less subjective than impacts on human health and safety, and broader and cumulative environmental and other socio-economic effects of a spill.[21] Furthermore we have limited our consideration of the potential environmental and other socio-economic costs to those associated with pipeline malfunctions or accidents.

This is not to say that there should not be consideration of impacts on human health and safety and the broader and cumulative environmental and other socio-economic effects. Especially in light of the extensive participation in this case by numerous parties, TGG trusts that other participants in this case will attempt to address and measure these effects. For instance, a spill that harms plant and animal life will have important environmental (and potential human health and safety) impacts that should be quantified. The consideration of human health and safety and the broader and

[21] As will be discussed in Section 5.2, TGG has not attempted to assign a cost to potential effects on human health and safety, including loss of life. But to illustrate potential effects, especially for worst case scenarios for what could occur in a densely populated urban area, loss of life data are provided for the relevant examples of pipeline accidents and other disasters described in Section 5.5.

cumulative environmental and other socio-economic costs will further increase the overall costs of the Project. However, TGG has concluded that our relative comparison of more narrowly defined economic costs and benefits (including a more limited consideration of socio-economic and environmental impacts) will provide the NEB with sufficient evidence to assist it in making a decision.

TGG's evaluation of the economic-development-related socio-economic benefits will be discussed in detail in Section 4. Our evaluation of the environmental and other socio-economic costs will be further discussed in Section 5.

3.2. Definition of the Reference Case

In order to measure the costs and benefits of the Project, it is necessary to define a base case. Enbridge has confirmed that the base case for the Project as follows:

> The economic effects of the Line 9B Reversal and Line 9 Capacity Expansion Project (the "Project") are measured relative to a reference case without the Project (but including the Line 9 Phase I Reversal Project).[22]
>
> […]
>
> Throughput on Line 9 over the last three years (2009-2011) has averaged only 10,175 m3/day (64,000 d) and ultimately, Line 9B, unless it is reversed, would be idled when Line 9A is reversed.[23]

In other words, the reference case for the Project includes the following:

1. Line 9A is reversed (as per the NEB approval in the Line 9 Phase 1 Reversal Project);
2. Line 9B remains idle;
3. There is no capacity expansion for Line 9.[24]

We note that an economic impact study prepared for Enbridge of the Project also assumes that Line 9B will be idled absent NEB approval of the Project.[25]

[22] Enbridge Response 2.1 a) to NEB IR No. 2.
[23] Enbridge Application, p. 26, lines 7-9.
[24] See also Enbridge Response 2.3 to Équiterre IR No. 1.
[25] Attachment 1 to Stratégies Énergétiques IR 1.4.a, entitled "An Evaluation of the Economic Impacts on Canada of the Enbridge Line 9B Reversal Project," prepared for Enbridge by Demke Management Ltd. and dated August 30, 2012 ("the Demke Evaluation"), Adobe pp.12, 17.

Under this reference case, Line 9B would be idled, so TGG estimates that the economic benefits and costs of the reference case (i.e. Line 9B idled and no capacity expansion for Line 9) to Canada would therefore be negligible and round off to zero.

So the economic benefits and costs are measured relative to a reference case that has essentially zero economics benefits and costs.

3.3. Line 9B: A Unique Pipeline with Extraordinary Proximity to People, Water, and Economic Activity

In making its public interest determination for Enbridge's Project, the NEB is faced with a particularly important and challenging task. Line 9B is a unique pipeline in the Canadian and North American context.

Quite simply, no other crude oil pipeline in Canada has the same proximity to human activity, water and economic activity.

Enbridge's IR response to Équiterre's IR 1.3 a) and b)[26] indicates that this pipeline has extraordinary proximity to High Consequence Areas (HCAs) (including Highly Populated Areas, Other Populated Areas, Drinking Water Resources, Environmentally Sensitive Areas, and Commercially Navigable Waterways).

The Expert Report of Richard Kuprewicz ("the Kuprewicz Report") further confirms the uniqueness of the pipeline as well as its extraordinary proximity to HCAs:[27]

> **4) Line 9B is situated in significant high consequence areas**
>
> A detailed review of the maps provided in the NEB process of Line 9B and Responses to Equiterre IRs will readily demonstrate that a great deal of Line 9 is located near large populations and/or sensitive waterways/wetland areas where a rupture will have serious consequences. [Footnotes 44 and 45 in original omitted.] This is not a pipeline routed in sparsely populated non sensitive areas of Canada, but running in some of the more populated corridors of southeastern Canada. Such a route definitely merits special considerations in IM approaches that actually reflect true conservativeness.

[26] Attachment 1 to Équiterre IR 1.3.a) and b), "Segments of pipeline in Highly Populated Areas (HPA), Other Populated Areas (OPA), Environmentally Sensitive Areas (ESA), Drinking Water Sources (DW) and Commercially Navigable Waterways (CNW)."
[27] Kuprewicz, Richard, "Report on Pipeline Safety for Enbridge's Line 9B Application to NEB," August 5, 2013, Conclusion 4, p. 26.

In addition to the extraordinary proximity to HCAs, Line 9B is routed through Canada's economic heartland, coinciding with the region of Canada with the largest concentrations of population and highest density, including Canada's two major metropolitan areas (Montreal and Toronto).

Line 9B's route through Toronto runs parallel to or crosses much of the region's key infrastructure, including major highways (400, 401, 403, 404, 407, and 427).[28] In fact, the pipeline crosses under a key junction in the highway network (401 and 427), just east of Canada's busiest airport (Pearson International).[29] Moreover, Line 9B runs just north of Finch Avenue, crossing Yonge Street directly adjacent to the Finch subway terminal.[30] Thus, a pipeline rupture could potentially affect large numbers of people, and damage and disrupt key infrastructure.

Furthermore, a pipeline rupture could threaten the drinking water supplies in both Toronto and Montreal. The July 4, 2013 Letter of Comment from the City of Montreal filed in the current proceeding confirms that the City is highly concerned with the effect of a Line 9B spill on the security of Montreal's drinking water. The City points out that a major spill into the Ottawa River or one of its tributaries could jeopardize the drinking water supply of Greater Montreal, and thus have a major impact on Montreal's public health, environment and economic prosperity:[31]

> *La ligne 9B traverse la rivière des Outaouais entre les municipalités Pointe-Fortune en Montérégie et Saint-André-d'Argenteuil, dans les Laurentides. La rivière des Outaouais s'écoule dans le lac des Deux Montagnes pour ensuite alimenter la Rivière-des-Prairies, le Lac-Saint-Louis et le fleuve Saint-Laurent.*
>
> *Le réseau de production et de distribution d'eau potable montréalais s'alimente à partir des sources d'eau citées. Il assure une distribution d'eau surpassant les normes de qualité aux citoyens, commerces, industries et institutions de*

[28] Attachment 1 to NEB IR 2.7, entitled "Detailed Project Map,"Adobe pp. 11-28.
[29] Attachment 1 to NEB IR 2.7, entitled "Detailed Project Map,"Adobe p. 18.
[30] Attachment 1 to NEB IR 2.7, entitled "Detailed Project Map,"Adobe p. 24. See also street view, showing Enbridge pipeline marker for Line 9B (with warning) next to Finch Station subway entrance: https://maps.google.com/maps?q=bishop+yonge+toronto&hl=en&ll=43.781738,-79.415954&spn=0.000001,0.001265&sll=37.269174,-119.306607&sspn=11.253772,20.720215&t=h&hq=bishop+yonge&hnear=Toronto,+Toronto+Division,+Ontario,+Canada&z=20&layer=c&cbll=43.781844,-79.415978&panoid=HOKclyDIoEZgd6I_XQfMSg&cbp=12,69.55,,1,3.76
[31] Lettre de commentaires de la Ville de Montréal présentée à l'Office national de l'énergie dans le cadre de l'audience OH-002-2013, Projet d'inversion de la canalisation 9B et accroissement de la capacité de la canalisation 9 de la compagnie Pipeline Enbridge inc., le 4 juillet 2013, p. 10 (PDF p. 13). Accessed July 21, 2013. https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/130635/969935/A3I8Z0_-_Lettre_de_commentaires_Ville_de_Montréal.pdf?nodeid=970155&vernum=0

l'agglomération de Montréal. Un déversement majeur de produits pétroliers dans la rivière des Outaouais ou de l'un de ses affluents aurait pour conséquences de mettre en péril les sources d'approvisionnement des usines de production d'eau potable, dont dispose l'agglomération de Montréal et par conséquent de près de deux millions de personnes. Il s'agit d'un risque dont les conséquences sur la santé publique, l'environnement et la prospérité économique de Montréal seraient majeures et doivent être évaluées.

Bien que ce risque soit localisé à l'extérieur des limites géographiques de l'agglomération de Montréal, les conséquences d'un éventuel déversement au point de traverse de la rivière des Outaouais affecteraient directement la sécurité de la population montréalaise.

3.4. The Need for a Higher Level of Risk Aversion

Time and again, we have historical and ongoing evidence that:

1. malfunctions and accidents occur on pipelines transporting crude oil;
2. these malfunctions/accidents can release ("spill") substantial amounts of crude oil;
3. crude oil spills can be extremely costly and difficult to clean up (especially when the spill is in water and involves dilbit);[32] and
4. the transportation of crude oil can be both dangerous and costly in terms of waterways, the environment, public health and safety and even human lives.

As such, the NEB should be particularly risk averse in approving this Project because just one spill could be extremely costly, and potentially dangerous, in the populous areas along Line 9, which form the heartland of the Canadian economy.

The following are key risk factors associated with the Project that increase the need for risk aversion:[33]

1. uniqueness of pipeline: proximity to people, water, economic activity;[34]

[32] Diluted bitumen. For the purposes of pipeline transportation, raw bitumen (very heavy tar sands crude) must first be either a) mixed with a petroleum-based diluent (such as naphtha or condensate) to make it less viscous (diluted bitumen/dilbit); or b) upgraded (partially refined) into synthetic crude oil (SCO).
[33] Many of these risk factors are discussed in greater depth in the Kuprewicz Report and particularly in his Conclusions 1-12 on pp. 22-30. See also the other specific sources for each risk factor.
[34] See previous subsection. As cited above, the Kuprewicz Report concurs that "[s]uch a route [situated in significant high consequence areas and highly populated corridors] definitely merits special considerations in IM approaches that actually reflect true conservativeness." See footnote 27.

2. high risk of rupture in early years of the reversal under the operation conditions resulting from the Project;[35]
3. a leak detection system that is inadequate to detect ruptures;[36]
4. inadequate emergency response plans and response times for HCAs;[37]
5. Enbridge's poor safety record and the NTSB's[38] characterization of Enbridge's pipeline operating culture as a "culture of deviance" in its investigation into the Line 6B oil spill in Marshall Michigan;[39]
6. a management culture at Enbridge that refuses to learn and apply the lessons from Line 6B – and to heed some important IM recommendations of the NTSB following the Marshall rupture;[40]
7. Enbridge's culture of denial regarding the strengths of hydrotesting and its highly distorted over-reliance of ILI inspection;[41]
8. the Project's proposed changes in crude slate, especially dilbit, that substantially increase crack growth rates;[42]
9. higher risks of dilbit spills in water (versus a conventional crude spill);[43]
10. high flammability of a Bakken spill, particularly in a highly populated areas or in petrochemical complex of Montreal East;
11. concerns about Enbridge's financial capability and responsibility to mitigate and compensate all the potential damages, especially in a worst-case scenario such as a major accident/spill in an area with a large concentration of people and economic activity.

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[35] Kuprewicz Report, Conclusion 9, p. 28
[36] Kuprewicz Report, Conclusion 10, pp. 28-29
[37] Kuprewicz Report, Conclusion 12, p. 30.
[38] National Transportation Safety Board.
[39] "This investigation identified a complete breakdown of safety at Enbridge. Their employees performed like Keystone Kops and failed to recognize their pipeline had ruptured and continued to pump crude into the environment," said NTSB Chairman Deborah A.P. Hersman. "Despite multiple alarms and a loss of pressure in the pipeline, for more than 17 hours and through three shifts they failed to follow their own shutdown procedures" […] Further, the NTSB attributed systemic flaws in operational decision-making to a "culture of deviance," which concluded that personnel had a developed an operating culture in which not adhering to approved procedures and protocols was normalized." (emphasis added)
NTSB Press Release, "Pipeline Rupture and Oil Spill Accident Caused by Organizational Failures and Weak Regulations," July 10, 2012. Accessed August 3, 2012.
http://www.ntsb.gov/news/2012/120710.html
[40] Kuprewicz Report, Conclusion 6, p. 26.
[41] Kuprewicz Report, Recommendation 1, p. 30.
[42] Kuprewicz Report, Conclusion 3, pp. 25-26.
[43] In light of recent findings regarding Enbridge's Line 6B tar sands crude spill in Marshall, MI, the EPA has recently expressed concerns regarding the additional impacts of tar sands crude spills (versus conventional oil), with a particular concern about spills on waterways. Comments of EPA on the Department of State's Keystone XL Draft Supplement Environmental Impact Statement (DSEIS), http://epa.gov/compliance/nepa/keystone-xl-project-epa-comment-letter-20130056.pdf

3.5. Key Questions for the NEB to Consider in Reviewing the Project

To make a decision whether to approve or reject the Project (in a way that fulfills its mandate of considering the public interest) the NEB needs to answer the following questions:

3. Do the potential benefits justify the potential costs?
4. How are the costs and benefits distributed among the various stakeholders?

Because of the risk factors involved in this case (and particularly the unusual proximity of Line 9 to people, water and economic activity), it is particularly important and challenging for the NEB to weigh the costs and benefits in this Project.

3.6. A Relative Comparison of Costs and Benefits

Given the evidence in the case to date, TGG has determined that there are economic benefits associated with the Project. Enbridge has made some attempt to quantify these benefits; and TGG has reviewed Enbridge's evidence and analyzed the economic benefits of the Project in Section 4. According to the Demke Evaluation[44] (the evaluation of economic impacts of the Project prepared for Enbridge), these benefits are somewhat modest (in the order of less than $1 billion per year and 200 jobs per year over the period 2013-2043 when the Project is assumed to be constructed and operated). TGG has concluded that Project benefits are less than $1 billion/per year and likely less than $0.5 billion/year, especially in the near-term. We also concluded that these benefits are insignificant in the relevant context of the overall Quebec, Ontario, and Canadian economies.

Enbridge has downplayed any potential costs,[45] but the Project has numerous possibilities for potential costs of malfunctions/accidents that range from significant to catastrophic. While TGG can provide an approximation of the benefits of the Project, there is a high degree of uncertainty and a broad range of potential costs. Because of this high degree of uncertainty and broad range of costs, TGG is not in a position to make a precise determination of the costs (or the risks) associated with the Project.

[44] See footnote 25.
[45] See footnotes 7 and 8.

However, as noted above in the discussion of risk factors in Section 3.4, the Équiterre Coalition's pipeline safety expert (Richard Kuprewicz) has determined that there is a high risk of rupture in early years of the reversal under the operation conditions resulting from the Project. In addition, Kuprewicz has raised a number of grave safety concerns regarding the Project, Enbridge's management style, and the risks associated with the transportation of dilbit in this pipeline.[46] Kuprewicz's findings are important in assessing the costs of the Project because the higher the probability of a rupture (and the larger the amount of crude spilled), the higher the expected value of the potential costs.

There will likely be important evidence submitted by other parties on August 6 that will further quantify the costs/risks of project in order to assist the NEB in further estimating the Project's costs. However, even with all the evidence, it will be very challenging (if not impossible) to readily quantify all the costs. The costs of the Project are discussed in Section 5.

Despite the challenge in making a precise determination of the costs (and risks) of the Project, TGG can offer practical guidance to the NEB regarding the relative magnitude of the costs and benefits.

The Section 5 discusses the relative magnitude of the costs and risks of the Project in greater detail.

[46] See footnote 33 and discussion of risk factors in Section 3.4

4. Benefits

4.1. Introduction

As previously discussed in Section 3.1, the Enbridge Application (Filing A3D7I1) claims the following economic benefits for the project:

1. "The Project was initiated in response to requests from eastern Canadian refineries to have access to the growing and less expensive supplies of crude oil production from western Canada and the U.S. Bakken region."[47]
2. The Project "will provide western Canadian and U.S. Bakken producers access to the Quebec refining market while reducing the reliance of Quebec refiners on crude oil from areas of declining, or potentially unreliable, supply."[48]
3. The Project has substantial benefits in terms of allowing refineries in Québec to access lower cost crudes supplies, resulting in increased competitiveness and sizable cost savings for these refineries.[49]
4. The Project has substantial socio-economic benefits, such as increased GDP, increased labour income, and increased employment.[50]

Given the evidence in the case to date, TGG has determined that there are economic benefits associated with the Project. Enbridge has made some attempt to quantify these benefits; and TGG has reviewed Enbridge's evidence and analyzed the economic benefits of the Project. According to the Demke Evaluation[51] (the evaluation of

[47] Filing A3D7I1, Enbridge Application, p. 24, lines 2-4.
[48] Enbridge Application, p. 24, lines 15-19.
[49] Enbridge Application, p. 25, lines 3-6:
> The Project allows refineries in Quebec to access lower cost crude oil supplies from western Canada and the U.S. Bakken region, increasing the competitiveness of these refineries. Over the next 30 years, refinery cost savings of approximately $23 B are expected as a result of the Project.

[50] Enbridge Application, p. 25, lines 7-14:
> Over a 30 year period (2013 – 2043), the Project is expected to result in socio-economic benefits, such as:
> - an impact on Canadian Gross Domestic Product ("GDP") of approximately $25 B, taking into account the Project's total multiplied impact;
> - labour income increase of nearly $350 MM, mostly in the provinces of Ontario and Quebec; and
> - employment increases of approximately 5,500 person years, mostly in the provinces of Ontario and Quebec.

[51] See footnote 25.

economic impacts of the Project prepared for Enbridge), these benefits are somewhat modest (in the order of less than $1 billion per year and 200 jobs per year over the period 2013-2043 when the Project is assumed to be constructed and operated).

The potential economic benefits of the Project in terms of providing western Canadian and U.S. Bakken producers access to the Quebec refining market are discussed in Section 4.2. The potential economic benefits in terms of allowing refineries in Québec to access lower cost crudes supplies are discussed in Section 4.3. The potential socio-economic benefits (such as increased GDP, labour income, and employment) are discussed in Section 4.4. Finally, Section 4.5 considers Project benefits in the Provincial and National Economic Context

4.2. Benefits to Crude Producers

The Project would benefit western Canadian and U.S. Bakken producers by providing access to the Quebec refining market. The Enbridge Application (Filing A3D7I1) does not quantify these potential benefits to crude producers, but Enbridge has provided some additional information in response to IRs.[52]

Based on available information and a number of considerations, it is credible that the Project would benefit crude producers; however, these benefits are both difficult to predict and likely to be of relatively small magnitude. As further discussed in Section 4.3, crude markets are rapidly evolving, highly dynamic, and subject to substantial volatility and uncertainty, both short and long-term. Thus, it cannot be easily predicted how a given project will affect market dynamics and pricing.

And as Enbridge points out,[53] the capacity of the Project is quite small relative to the amount of crude production in both western Canada and U.S. Bakken, such that the project will have a negligible impact on refinery markets outside of Quebec. Moreover, to the extent that the Project could result in higher netbacks for crude producers, this could in turn reduce the benefits to refiners.[54]

[52] Enbridge Response 1.5 to NEB IR No.1; Enbridge Response 2.5 to NEB IR No.2; Enbridge Response 3.6 e) to NEB IR No.3.
[53] Enbridge Response 2.5 to NEB IR No. 2.
[54] The netback price of a barrel of crude oil is calculated by taking the revenue that producers receive for that oil and subtracting all the costs associated with getting that crude oil to a market. All else being equal, if producers receive higher netbacks, refiners will be paying more for their crude supply.

Put another way, the benefits to crude producers are unlikely to be a major factor in terms of the overall evaluation of the relative costs and benefits for the Project. And to the extent that these crude producers are located in the U.S. (notably in the Bakken), as opposed to Canada, the benefits may fall outside of the Canadian public interest of concern to the NEB.

4.3. Benefits to Quebec Refiners

The Project would benefit refineries in Québec by allowing access to lower cost crudes. The Enbridge Application claims that these benefits will be very sizable:

> The Project allows refineries in Quebec to access lower cost crude oil supplies from western Canada and the U.S. Bakken region, increasing the competitiveness of these refineries. Over the next 30 years, refinery cost savings of approximately $23 B are expected as a result of the Project.[55]

Moreover, as made clear in the Demke Evaluation[56] (the evaluation of economic impacts of the Project prepared for Enbridge), the claimed refinery cost savings account for virtually all of the economic benefits claimed for the Project:

> it is the assumptions regarding the refinery input cost savings component of the Project that are the most important and have a huge bearing on the outcome.[57]

> The direct economic impact of the refinery cost savings of $23.5 billion over 30 years (or $2.2 billion over 5 years and $5.5 billion over 10 years) can be compared to the pipeline development and construction phase direct, indirect and induced GDP effect of $113 million, or the pipeline operations phase direct, indirect and induced GDP effect of $1,485 million over 30 years. The predominant effect of the Project is on the refining industry and this effect is shown to overwhelm the pipeline construction and operations impacts. [58]

The Demke Evaluation of refinery cost savings assumes that inland crude oil supplies (from western Canada and the U.S. Bakken region) can be delivered to the Quebec

[55] Enbridge Application (Filing A3D7I1), p. 25, lines 3-6.
[56] See footnote 25.
[57] Demke Evaluation, Adobe p. 11.
[58] Demke Evaluation, Adobe p. 29. All monetary figures from the Demke Evaluation are 2012 C$)

refineries via the Project at a cost substantially below the delivered cost of the offshore crudes assumed to be displaced.

Demke also assumes that the cost differential between inland and offshore crudes will substantially increase over time, such that the Project will result in much larger refiner cost savings in the later years of the 30 year period (2014-2043) over which the Project is assumed to operate. Thus, the Project is estimated to result in annual refinery cost savings averaging about $440 million over the first 5 years of Project operation (2014-2018), $560 million over the next 5 years (2019-2023), and $900 million over the following 20 years (2024-2043).

The Demke Evaluation assumes that the project will deliver 250,000 bpd (barrels per day) to Quebec refineries, with deliveries split evenly between Suncor Montreal and Ultramar Quebec City (St.-Romuald/Levis) such that each receives 125,000 bpd. [59] But the estimated refinery cost savings are mainly at Suncor Montreal, owing to two locational factors. First, the delivered cost of inland crudes is assumed to be about $1/Bbl (barrel) lower for Suncor Montreal than for Ultramar Quebec City.[60] Second, the delivered cost of offshore crudes is assumed to be around $2/Bbl higher for Suncor Montreal than for Ultramar Quebec City.[61]

Thus, the Demke Evaluation assumes that inland crude oil supplies have a delivered cost advantage relative to offshore crudes that is about $3/Bbl greater for Suncor Montreal than for Ultramar Quebec City.[62] Demke assumes that inland crudes have a delivered cost advantage averaging about $6.20/Bbl at Suncor Montreal, vs. $3.40/Bbl at Ultramar Quebec City over the first 5 years of project operation (2014-2018), eventually rising to about $11.30/Bbl at Suncor Montreal, vs. $8.40/Bbl at Ultramar Quebec City over the last 20 years (2024-2043).

Based on available information and a number of considerations, it is credible that the project could benefit Quebec refiners; however, these benefits are both difficult to predict and likely to be of considerably smaller magnitude than assumed by Demke and claimed in the Enbridge Application.

[59] Demke Evaluation, Adobe p. 24.
[60] The Project would terminate in Montreal and can deliver inland crudes directly to Suncor Montreal. For the Project to supply Ultramar, crude must be transported from Montreal to Quebec City, with an assumed additional cost of about $1/Bbl. Demke Evaluation, Adobe pp. 45-46; Attachment 1 to Equiterre IR 3.5 f), g) and i).
[61] Offshore crudes are delivered directly to Ultramar Quebec City via tanker and to Suncor Montreal via tanker to Portland, Maine and then the Portland-Montreal pipeline to the refinery. Demke Evaluation, Adobe pp. 45-46; Attachment 1 to Equiterre IR 3.5 f), g) and i).
[62] Demke Evaluation, Adobe pp. 45-46; Attachment 1 to Equiterre IR 3.5 f), g) and i).

Crude markets are rapidly evolving, highly dynamic, and subject to substantial volatility and uncertainty, both short and long-term. Thus, it cannot be easily predicted how pricing differentials between crudes will evolve over time and specifically how much cost advantage there may be for inland crudes relative to offshore crudes. The Demke Evaluation is based on crude price forecasts and other assumptions that are now over a year old.[63] Meanwhile, crude markets and pricing differentials continue to evolve very rapidly.

In recent years, the North American oil system has been undergoing dramatic shifts that are large, rapid, ongoing, and possibly accelerating. Put very simply, Canadian and US crude production is rapidly increasing, but Canadian and US demand for refining products is stagnant or falling, such that crude imports (from overseas) are rapidly falling and product exports (to overseas) are rapidly rising.

While various forecasts have begun to take these dramatic shifts into account, there is typically a significant lag. So it is fair to say that forecasts are now often a lagging indicator of emerging shifts in petroleum markets. At some point in the future, conditions may begin to stabilize, and forecasts may catch up to more fully reflect emerging future realities. But for now and quite possibly for at least the next few years, each new forecast will reflect major changes then emerging, but later forecasts will reflect even more change.

In particular, petroleum market forecasts will likely continue to be playing catch up until the boom in shale/tight oil production levels off, or at least until it becomes better understood and its future evolution becomes more predictable.

TGG is very aware of the difficulties of energy forecasting and policymaking, in general and especially in a period of very rapid change. TGG shares the view of some other energy market analysts that the recent shifts in North American oil system (notably the rapid increase in production from shale/tight oil, hydraulic fracturing (fracking), and horizontal drilling) are likely to be ongoing and possibly accelerating, as they have been for natural gas. But there are very large uncertainties associated with these shifts, and many (including many environmental organizations) continue to be skeptical that these shifts are likely to be sustained and are sustainable (in a variety of senses).

The lagging nature of petroleum market forecasts (and petroleum market analysis more generally) matters for evaluating the proposed Line 9 Project. There is a wide range of

[63] Demke Evaluation, Adobe pp. 45-46; Enbridge Response 3.5 k) to Equiterre IR No. 2.

opinion regarding future crude prices (for both North American and global markets). Given the shifts underway in North America and globally, some are predicting that crude prices will soften or even decline substantially from current levels.[64] In particular, the decline in waterborne imports into North America is certainly affecting crude pricing in North American markets, and there are increasing indications that this large decrease in imports will also begin to put downward pressure on global crude prices.

The Demke Evaluation assumes that the cost differential between inland and offshore crudes will be sizable and will substantially increase over time. But large pricing differentials between inland North American and offshore global crudes may not be sustainable given evolving market conditions. Thus, while it is credible that the Project would benefit Quebec refiners,[65] these benefits could be of considerably smaller magnitude than assumed by Demke and claimed in the Enbridge Application.

The Demke Evaluation also assumes that refiners will not need to make any capital investments in relation to the Project and shifting from offshore to inland crudes.[66] The July 4, 2013 Letter of Comment from the City of Montreal filed in the current proceeding indicates that both Suncor Montreal and Ultramar Quebec City will be undertaking some capital investments in relation to the Project:[67]

> *la direction de la raffinerie Suncor estime à quelque 55 millions de dollars les investissements nécessaires. Ultramar estime que 110 millions de dollars devront être consentis, dans leurs installations portuaires de Montréal.*

To the extent that Quebec refineries need to undertake capital investments in relation to the Project, this is an economic cost and it will reduce the potential benefits of the Project in terms of refinery cost savings. But any such effect may be relatively small.

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[64] E.g., Verleger http://www.pkverlegerllc.com/assets/documents/TIE_W13_Verleger.pdf and Citi, Energy 2020: Independence Day https://www.citivelocity.com/citigps/ReportSeries.action https://ir.citi.com/dY2GZTnBVKoXNrT1sVyHcQCSQNAUUsI%2F8pXCARkTtvUOa8zDR2EckBRtxCGyJoDVW58uAgJ35%2BU%3D

[65] Both Suncor Montreal and Ultramar Quebec City have committed to be shippers on Line 9 under 10 year TSAs (Transportation Services Agreements) and thus provide commercial support for the proposed Project.

[66] Demke Evaluation, Adobe pp. 7, 21.

[67] Lettre de commentaires de la Ville de Montréal présentée à l'Office national de l'énergie dans le cadre de l'audience OH-002-2013, Projet d'inversion de la canalisation 9B et accroissement de la capacité de la canalisation 9 de la compagnie Pipeline Enbridge inc., le 4 juillet 2013, p. 14 (PDF p. 17). https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/130635/969935/A3I8Z0_-_Lettre_de_commentaires_Ville_de_Montréal.pdf?nodeid=970155&vernum=0

The capital investments identified by the City of Montreal in relation to the Project are relatively small when viewed in terms of the relevant context.

These capital investments identified by the City of Montreal are quite small in comparison with amount of refinery cost savings assumed by Demke. But as explained above, the Project benefits in terms of refinery cost savings could be of considerably smaller magnitude than assumed by Demke and claimed in the Enbridge Application. But even if refiners do undertake some capital investments in relation to the Project. refinery cost savings are likely to be the predominant economic benefits for the Project.[68]

4.4. Socio-Economic Benefits

The Project could result in socio-economic benefits, such as increased GDP, increased labour income, and increased employment. The Enbridge Application claims that these benefits will be significant: [69]

> Over a 30 year period (2013 – 2043), the Project is expected to result in socio-economic benefits, such as:
> - an impact on Canadian Gross Domestic Product ("GDP") of approximately $25 B, taking into account the Project's total multiplied impact;
> - labour income increase of nearly $350 MM, mostly in the provinces of Ontario and Quebec; and
> - employment increases of approximately 5,500 person years, mostly in the provinces of Ontario and Quebec.

Demke Evaluation makes clear that the claimed refinery cost savings account for virtually all of the socio-economic benefits claimed for the Project in terms of increased GDP:

> it is the assumptions regarding the refinery input cost savings component of the Project that are the most important and have a huge bearing on the outcome.[70]

[68] To the extent that Quebec refineries do undertake some capital investments in relation to the Project, this could provide some socio-economic benefits (such as increased employment), as will be discussed in Section 4.4.
[69] Enbridge Application, p. 25, lines 7-14.

> the annual saving in feedstock costs was added to Quebec's GDP and counted as a direct economic effect of the Project. [71]

> The direct economic impact of the refinery cost savings of $23.5 billion over 30 years (or $2.2 billion over 5 years and $5.5 billion over 10 years) can be compared to the pipeline development and construction phase direct, indirect and induced GDP effect of $113 million, or the pipeline operations phase direct, indirect and induced GDP effect of $1,485 million over 30 years. The predominant effect of the Project is on the refining industry and this effect is shown to overwhelm the pipeline construction and operations impacts. [72]

As discussed in Section 4.3, while it is credible that the Project would benefit Quebec refiners in terms of cost savings, these benefits could be of considerably smaller magnitude than assumed by Demke and claimed in the Enbridge Application. And to the extent that refinery cost savings are lower than assumed and claimed for the Project, socioeconomic benefits in terms of increased GDP will also be lower than assumed and claimed.

As also made clear in the Demke Evaluation, construction of the Project is estimated to have socio-economic benefits that are very small and short-term:

> Project construction will create about 270 person-years of direct employment in the construction sector for Canadian workers. [73]

> The pipeline development and construction phase effects are short-term (2012 to 2014) and relatively minor in the context of the overall total effects because the modifications to Line 9B can be achieved at relatively low cost. Line 9B is an existing pipeline flowing westward with sunk capital expenditures. [74]

The Demke Evaluation also shows that operation of the Project is estimated to have socio-economic benefits that are extremely small annually, but somewhat more significant if aggregated over the 30 year period assumed for Project operations :

(footnote continued from previous page)
[70] Demke Evaluation, Adobe p. 11.
[71] Demke Evaluation, Adobe p. 8.
[72] Demke Evaluation, Adobe p. 29. All monetary figures from the Demke Evaluation are 2012 C$)
[73] Demke Evaluation, Adobe p. 7.
[74] Demke Evaluation, Adobe p. 9.

> Operations employment equals an estimated 8 full-time-equivalent workers; 4 located in Ontario and 4 located in Quebec. Over 30 years this equals 240 person-years of employment. [75]
>
> The pipeline operations phase effects are also relatively minor on an annual basis, but over thirty years (2014 to 2043) add up to a significant amount. They represent sustainable long-term economic impacts. In the absence of reversal, Line 9B would be idle.

As was also summarized at the beginning of this section, the Enbridge Application claims the Project will result in socio-economic benefits of nearly $350 million in increased labour income and approximately 5,500 person-years of employment. [76] As explained in the Demke Evaluation, these benefits were estimated using an Input-Output Model and include both direct and indirect effects over the entire period (2012-2043) assumed for Project construction and operations. Project operations accounted for over 80% of the total claimed socio-economic benefits relating to increased labour income and employment; project construction accounted for less than 20% of the total.

It is possible that the Project will result in capital investments being undertaken in addition to those assumed in the Demke Evaluation and the Enbridge Application.[77] As explained in this section above, the socio-economic benefits estimated for Project construction are very small. Similarly, to the extent that the Project will result in additional capital investments being undertaken, the socio-economic benefits of these additional investments are also likely to be quite small.

Various claims have been made that the Project will help to make the Quebec refineries more competitive and thus help to maintain and increase economic activity associated with crude processing.[78] Processing of crudes at refineries is not a labour-intensive activity, and refineries are a very small portion (far less than 1%) of total economic activity in Quebec.[79]

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[75] Demke Evaluation, Adobe p. 7.
[76] Enbridge Application, p. 25, lines 7-14.
[77] As discussed in Section 4.3 and footnote 67, the July 4, 2013 Letter of Comment from the City of Montreal filed in the current proceeding indicates that both Suncor Montreal and Ultramar Quebec City will be undertaking some capital investments in relation to the Project.
[78] See for example Enbridge Application (Filing A3D7I1), p. 25, lines 3-6.
[79] Todd Crawford, Canada's Petroleum Refining Sector: An Important Contributor Facing Global Challenges, The Conference Board of Canada, October 2011, p. 22. Accessed July 18, 2013. http://canadianfuels.ca/userfiles/file/12-051_CanadaPetroleumRefiningSectorFINAL.pdf
"Today, refining activity accounts for 0.2 per cent of real GDP in Quebec"
study was relied upon as an input to the Demke Evaluation (Adobe pp. 33-34). The above figure for Quebec refinery share of total economic activity is broadly consistent with other data sources, including:
(footnote continued on next page)

Moreover, the viability of Quebec refineries (and thus the continuation of related employment, other economic activity, and spinoff effects) in not contingent upon the Project. Quebec refineries can remain open and competitive even without the Project for the following reasons:

- the two refineries have survived and expanded when others have closed, so these are the most profitable and viable survivors;[80]
- they are set up to process light crude and now well-positioned given the shale/tight oil boom and abundance of light crude;
- similar refineries in Northeast US now also have a much more viable future due to the flood of shale crude.

In light of the above, with or without the Project, these two refineries can remain open and will likely improve profitability as these refineries access lower cost crude supply via transport options including rail, water, and pipelines. Overall employment and economic activity associated with Quebec refineries will likely be very similar (and very small overall), regardless of whether the Project goes forward.

The Suncor Montreal refinery is also part of the Montreal East Petrochemical Complex.[81] Business and union organizations have claimed that the Line 9B Reversal and Expansion Project will facilitate Quebec economic development by strengthening the Montreal East Petrochemical Complex, and specifically the polyester supply chain.[82]

(footnote continued from previous page)
Statistics Canada, CANSIM Table 379-0030, GDP data for Quebec Petroleum refineries [32411], Petroleum and coal product manufacturing [324], and All industries [T001] for 2007-2012. Accessed July 18, 2013.
http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790030&tabMode=dataTable&srchLan=-1&p1=-1&p2=9

[80] Since the 1980s, the Quebec refining sector has undergone significant restructuring. A number of Montreal refineries have closed, but the remaining refineries (in Montreal and St-Romuald) have expanded. As confirmed by data and analysis provided by the Quebec government and the companies involved in refining, overall refining capacity and output have been relatively constant and have not declined over the long-term.
http://www.mrn.gouv.qc.ca/energie/statistiques/statistiques-production-petrole.jsp
http://canadianfuels.ca/userfiles/file/12-051_CanadaPetroleumRefiningSectorFINAL.pdf pp. 22-23

[81] See footnotes 83 and 110.

[82] Association Industrielle de l'Est de Montréal (AIEM) Press Release, We say YES to the line 9 reversal project, May 29, 2013. Accessed July 20, 2013.
http://www.newswire.ca/en/story/1174043/we-say-yes-to-the-line-9-reversal-project

> A large group of business and union organizations have come together today to officially launch the Coalition in support of the Line 9 reversal project, a project that will safely allow Quebec to become less dependent on oil from Africa, the Middle East and Europe while maintaining nearly 2,000 jobs in the petrochemical refining industry in Quebec.

(footnote continued on next page)

Much like the processing of crudes at refineries, petrochemical processing is not a labour-intensive activity. There are only about 350 jobs in the petrochemical plants most closely tied to the Suncor Montreal refinery.[83] Based on the above figures, these petrochemical plants are a minuscule part of overall provincial (and Montreal) employment.

But in addition to these petrochemical plants directly tied to Suncor Montreal, there may be further downstream linkages with Montreal petrochemical production. In this context, it is useful to consider the scale of the entire Montreal petrochemical industry. Even when viewed in its entirety, production of chemical and plastics products is estimated to employ less than 7500 workers in Montreal; combined with production of petroleum products (refining), the petrochemical industry is still estimated to employs less than 8700 workers in Montreal. [84]

(footnote continued from previous page)

> "Quebec must take advantage of this promising project as well as help save our two remaining refineries by creating and maintaining 2,000 high-paying, direct and indirect jobs. […]
>
> "The Line 9 reversal project is important for the economic development of Montreal East because it will ensure the viability of Quebec's petrochemical industry, its polyester supply chain, and a more competitive source of supply.

[83] Daniel Cloutier (National Representative, Communications, Energy and Paperworkers Union), in response to M. Jamie Nicholls (Vaudreuil-Soulanges, NDP): House of Commons Standing Committee on Natural Resources, Evidence May 9, 2013, p. 9 (Adobe p. 11). Accessed July 17, 2013 http://www.parl.gc.ca/content/hoc/Committee/411/RNNR/Evidence/EV6154633/RNNREV81-E.PDF

> [Translation] **Mr. Jamie Nicholls**: Do you know how many jobs are tied to the polyester chain?
>
> **Mr. Daniel Cloutier**: We know up to a point.
>
> First, the product leaves Petro-Canada and travels to Parachem's petrochemical plant. We're talking about a hundred or so jobs. It also goes to CEPSA. So that's 150 jobs. Neither of those includes the subcontractors. Next, various plants take it back. There's a small facility on the former Shell site, with a hundred jobs or so.
>
> Afterwards, the product travels in all the other directions, and I lose track of it.

[84] Lettre de commentaires de la Ville de Montréal présentée à l'Office national de l'énergie dans le cadre de l'audience OH-002-2013, Projet d'inversion de la canalisation 9B et accroissement de la capacité de la canalisation 9 de la compagnie Pipeline Enbridge inc.,Le 4 juillet 2013, p. 14 (Adobe p. 17). https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/130635/969935/A3I8Z0_-_Lettre_de_commentaires_Ville_de_Montréal.pdf?nodeid=970155&vernum=0

> "Selon les estimations intercensitaires produites par le Comité de recherches économiques de la région de Montréal, il y avait, en 2011, sur le territoire de l'agglomération de Montréal quelque 1 238 emplois dans le secteur de la fabrication de produits du pétrole, 2 712 emplois dans le secteur des produits chimiques (excluant les

(footnote continued on next page)

Thus, Montreal production of chemicals and plastics is less than 0.4% of all employment in Montreal and less than 0.2% of all employment in the entire province. Montreal production of all petrochemicals (petroleum, chemical, and plastic products) is just slightly more than 0.4% of all employment in Montreal and slightly more than 0.2% of all employment in the entire province. So even with the employment for the Quebec City refinery added in, employment in the Quebec petrochemical industry (refineries and potentially related chemical and plastics processing) is still less than 0.3% of the provincial total.

Moreover, the relevant context for evaluating the Project is not solely Quebec. Most of the Project is within Ontario and thus affects the Ontario economy, in terms of both benefits and costs. Any economic activity relating to crude processing in Quebec is an even smaller portion of total economic activity when viewed in the context of the combined Quebec and Ontario economies.

Finally, the Project will not result in lower prices for Canadian consumers (notably in Quebec and Ontario). Refiners want access to lower cost crudes in order to be more profitable, rather than to pass these savings on to consumers. Pricing of refined products for specific refineries typically reflects regional/global market factors (and particularly global crude prices), rather than the crude prices paid by the specific refineries making the products. Especially in coastal locations (such as Quebec), refiners have access to profitable export markets (e.g., US East Coast and Europe) and can sell their products at prices reflecting global crude prices as opposed to lower North American crude prices. Thus, to the extent that refiners have access to inland crudes that may be cheaper than alternative sources of supply, this situation will likely benefit refiners (via higher profits), rather than consumers (via lower product prices).[85]

(footnote continued from previous page)

produits pharmaceutiques) et 4 728 emplois dans le secteur de la fabrication de produits en plastique. [footnote 9 in original: Source : Statistique Canada, Recensement du Canada 2006, produit personnalisé sur le lieu de travail; estimations intercensitaires, Consortium de la Communauté métropolitaine de Montréal (CMM).] Les entreprises de ces secteurs sont majoritairement localisées sur le territoire de l'Arrondissement Rivière-des-Prairies- Pointe-aux-Trembles et de la Ville de Montréal-Est. À titre d'illustration, mentionnons que la production de polyester dans l'est de l'île représente environ 1% du total de la production mondiale."

[85] As explained by Suncor and Valero to investors, refining is a global business; global market conditions impact refiners in every market because products are generally very storable, transportable, and fungible commodities; prices for refined products are tied to global markets based on Brent (the benchmark for global crude pricing); Quebec is part of the Atlantic Basin where refined products (including gasoline and diesel) are widely traded throughout the intercontinental market; Valero and Suncor are using lower cost crude supply to increase profits and shareholder value, and to return cash to shareholders.

(footnote continued on next page)

4.5. Benefits in the Provincial and National Economic Context

As discussed in Sections 4.1, 4.2, 4.3, and 4.4 above, Project economic benefits assumed in the Demke Evaluation and claimed in the Enbridge Application are in the order of less than $1 billion per year and 200 jobs per year over the period 2013-2043 when the Project is assumed to be constructed and operated. These benefits are very small, especially when viewed in the relevant context of the Quebec, Ontario, and Canadian economies. As shown in the Demke Evaluation, total GDP is in the order of $300 billion for Quebec, almost $600 billion for Ontario, and $1,500 billion for Canada.[86] Likewise, total employment is in the order of 4 million for Quebec, almost 7 million for Ontario, and 17 million for Canada.

When viewed in the relevant context of the Quebec, Ontario, and Canadian economies, economic benefits for the Project are always much less than 1% of the total economic activity. Line 9 traverses Canada's economic heartland. The economic activity along Line 9 is far more significant than any economic activity that will result from the Project.

Moreover, as assumed in the Demke Evaluation, Project benefits are lower in the near term. As discussed in Sections 4.2, 4.3, and 4.4, refinery cost savings refinery cost savings account for virtually all of the economic benefits assumed for the Project. Annual refinery cost savings are assumed to average about $440 million over the first 5

(footnote continued from previous page)
Suncor 2012 Annual Report (especially pp. 7-8, 11, 20-21, 27-29, 39-42, 53, 65) and Q1 2013 Investor Presentation.
http://www.suncor.com/pdf/Suncor_Annual_Report_2012_en.pdf
http://www.suncor.com/pdf/Suncor_IR_Presentation_April_2013_v3.pdf
Valero Citi Global Energy Conference Presentation, May 14, 2013. Accessed May 16, 2013.
http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MTg1NzM5fENoaWxkSUQ9LTF8VHlwZT0z&t=1
The market analysis described above (and presented to investors by Suncor and Valero) is broadly consistent with other market analysis regarding refinery economics and pricing for gasoline and other refined products (including that presented by federal and provincial government agencies and energy suppliers:
http://www.nrcan.gc.ca/energy/sources/petroleum-products-market/1133
http://www.nrcan.gc.ca/energy/sources/petroleum-crude-prices/1579
http://www.regie-energie.qc.ca/documents/autres/RapportMinistre_ControlePrixProduitsPetroliers_juillet2011.pdf
http://canadianfuels.ca/userfiles/file/CPPI%20Presentation%20to%20Standing%20Committee%20June%202011%20ENG.pdf
http://www.kentmarketingservices.com/dnn/LinkClick.aspx?fileticket=RNZladVtT54%3d&tabid=121
http://www.kentmarketingservices.com/dnn/LinkClick.aspx?fileticket=1vZJ6i_fNXo%3d&tabid=107

[86] Demke Evaluation, Adobe p. 13.

years of Project operation (2014-2018), $560 million over the next 5 years (2019-2023), and $900 million over the following 20 years (2024-2043).

And as also discussed in Sections 4.2, 4.3, and 4.4 above, the Project benefits could be of considerably smaller magnitude than assumed by Demke and claimed in the Enbridge Application. TGG has thus concluded that overall Project benefits are less than $1 billion/per year and likely less than $0.5 billion/year, especially in the near-term. These benefits are insignificant in the relevant context of the overall Quebec, Ontario, and Canadian economies, and even more insignificant when weighed against the cost of a major accident/spill.

5. Costs

5.1. Introduction

As identified in Section 3.1 above, the costs of the Project make up item 3 in the list of items that TGG has considered in its evaluation of the costs and benefits of the project:

5. the potential environmental and other socio-economic effects of the Project, including the potential effects of malfunctions or accidents that may occur insofar as these impacts can be readily and broadly quantified using market economics.

Enbridge has provided no evaluation of these costs, other than to claim that incremental environmental and stakeholder effects will be minimized and that the Project is unlikely to result in significant negative environmental effect (taking into account Project-specific programs and mitigation measures).[87]

This Section will demonstrate the contrary. Due to Line 9B's extraordinary proximity to people, water and economic activities, the costs of the Project, under a range of pipeline malfunction/accident possibilities, vary from significant to catastrophic. Given the Kuprewicz Report's assessment of a high risk of rupture on Line 9, the potential costs of the Project therefore range from significant to catastrophic.

As indicated in Section 3.1, we have limited our cost analysis of the environmental and other socio-economic impacts to those that directly affect economic activity. These impacts are less subjective than impacts on human health and safety, and the broader and cumulative environmental and other socio-economic effects of a spill and can be approximately quantified using market economics. Furthermore we have limited our consideration of the potential environmental and other socio-economic costs to those associated with pipeline malfunctions or accidents. TGG has provided an approximation of the benefits of the Project in Section 4; however there is a high degree of uncertainty and a broad range of potential costs. As such, TGG is not in a position to make a precise determination of costs (or risks) associated with the project. In fact, as indicated in Section 3.6, even with all the evidence from all parties in the case, it is very challenging, if not impossible, to precisely determine the costs (and risks) of the project. Nonetheless, TGG can offer practical guidance to the NEB regarding the relative magnitude of the potential costs and risks.

[87] See footnotes 7 and 8.

5.2. Approach to Estimating the Magnitude of Costs

Apart from the challenges in quantifying the potential costs of Project, TGG did not (in the context of this NEB case) have sufficient time or resources to conduct an in-depth study of potential costs (which would involve modelling the costs/risks associated various pipeline malfunctions/accident scenarios, including pricing out the worst-case scenarios). However, TGG is able to provide the NEB with a range of relative magnitudes for the potential costs under a variety of spill possibilities. This range of cost magnitudes then allows TGG to undertake an order of magnitude comparison with the more readily estimated benefits. The purpose of this order of magnitude comparison is to use a market economic approach to demonstrate to the NEB:

1. Why we are deeply concerned about potentially disastrous costs and loss of life associated with the Project;
2. Why the potential economic costs of the Project could exceed (and, under a range of malfunction/accident conditions, greatly exceed) the potential economic benefits.

To illustrate the range of cost magnitudes and potential effects of an accident or malfunction on Line 9, TGG has selected a variety of relevant examples of pipeline accidents and other disasters. As indicated above, we have limited our cost analysis to environmental and socio-economic impacts that directly affect economic activity and can be somewhat readily (albeit approximately) quantified using market economics.

TGG has not attempted to assign a cost to potential effects on human health and safety, including loss of life. But to illustrate potential effects, especially for worst case scenarios for what could occur in a densely populated urban area, loss of life data are provided for these relevant examples of pipeline accidents and other disasters.

5.3. Consideration of Risk Factors and Their Effects on Costs

Before the discussion of damages from relevant pipeline accidents and other disasters, it is worthwhile to discuss the consideration of risk factors and their effect on costs: the higher the risk, the higher the expected value of potential costs.

Costs and risks are linked in a complex and dynamic relationship. TGG has limited consideration of the potential environmental and other socio-economic costs to those associated with pipeline malfunctions or accidents. As stated above, TGG has not

conducted an in-depth study of potential costs (which would involve modelling the costs, and therefore the risks, associated various pipeline malfunctions/accident scenarios, including pricing out the worst-case scenarios). However, we do have a number of conclusions on the pipeline risk factors, which are enumerated below, including the key assessment on risk of rupture from the Kuprewicz Report:

> […] I must conclude there is a high risk that Line 9 will rupture from the SCC/corrosion-fatigue/general corrosion interaction attack in the early years following Project implementation; and that Enbridge's IM approach, which relies on ILI and related engineering assessments, will not prevent rupture under the operating conditions resulting from the implementation of the Project.[88]

This assessment results in a higher expected value of all potential costs of the project associated with a rupture. With an assessment of a high risk of rupture from an international pipeline safety expert (Kuprewicz), the expected value of the Project costs are significantly higher than if the risk of rupture were low or medium.

The 11 risk factors that increase need for risk aversion, enumerated in Section 3.4 and repeated below, are the same ones that further increase the expected value of costs:[89]

1. uniqueness of pipeline: proximity to people, water, economic activity;
2. high risk of rupture in early years of the reversal under the operation conditions resulting from the Project;
3. a leak detection system that is inadequate to detect ruptures;
4. inadequate emergency response plans and response times for HCAs;
5. Enbridge's poor safety record and the NTSB's characterization of Enbridge's pipeline operating culture as a "culture of deviance" in its investigation into the Line 6B oil spill in Marshall Michigan;
6. a management culture at Enbridge that refuses to learn and apply the lessons from Line 6B – and to heed some important IM recommendations of the NTSB following the Marshall rupture;
7. Enbridge's culture of denial regarding the strengths of hydrotesting and its highly distorted over-reliance of ILI inspection;
8. the Project's proposed changes in crude slate, especially dilbit, that substantially increase crack growth rates;
9. higher risks of dilbit spills in water (versus a conventional crude spill);
10. high flammability of a Bakken spill, particularly in a highly populated areas or in petrochemical complex of Montreal East;

[88] See footnote 35.
[89] See Section 3.4 for the references associated with these risk factors.

11. concerns about Enbridge's financial capability and responsibility to mitigate and compensate all the potential damages, especially in a worst-case scenario such as a major accident/spill in an area with a large concentration of people and economic activity.

The 11th risk factor raises concerns about Enbridge's financial capability and responsibility to compensate for all potential damages. Because of the high risks associated with the Project, Enbridge, society and the NEB need to be risk averse. The purchase of sufficient additional insurance is a way to mitigate risks; but there is significant uncertainty around Enbridge's ability and willingness to internalize costs. In other words, can Enbridge compensate for potential damages? And will it be willing and able to pay?

Enbridge's insurance situation and concerns about the internalization of costs in the event of a worst-case scenario will be further discussed in Section 5.7.

5.4. Costs and the Uniqueness of Line 9B (Extraordinary Proximity to People, Water, Economic Activity)

The uniqueness of the pipeline and its extraordinary proximity to people, water and economic activity have been discussed in Section 3.3. The pipeline is extraordinarily proximate to HCAs. As discussed the same section, no other crude oil pipeline in Canada is routed through Canada's economic heartland, coinciding with the largest concentration of population and the highest density, including Canada's two largest metropolitan areas, Montreal and Toronto.

Due to Line 9B's extraordinary proximity to people, water and economic activities, the rupture costs of the Project, under a range of pipeline malfunction/accident possibilities, vary from significant to catastrophic.

With rupture costs that vary from significant to catastrophic and an assessment of a high risk of rupture, the expected Project costs therefore range from significant to catastrophic. Expected costs are much higher for Line 9 than for most pipelines.

5.5. Relevant Examples of Pipeline Accidents and other Disasters

As explained in Section 5.2, to illustrate the range of cost magnitudes and potential effects of an accident or malfunction on Line 9, TGG has selected a variety of relevant examples of pipeline accidents and other disasters in a variety of relevant locations

ranging from a populated, but not highly populated area to a small town to a residential area in an urban setting to city-wide disaster.

Some of these examples are more directly comparable than others, but we have provided the range of examples to highlight to the NEB that a major accident/spill on Line 9 will have very high costs with respect to damage and disruption of infrastructure, particularly in metropolitan regions of Toronto or Montreal.

As emphasized throughout the document, we have limited our cost analysis to environmental and socio-economic impacts that directly affect economic activity and can be somewhat readily (albeit approximately) quantified using market economics. These costs escalate very quickly in a more densely populated urban areas. Moreover, as we have witnessed firsthand in Quebec, this summer, Bakken crude is highly flammable and its unsafe transport can result in the loss of human life.

We are highly concerned with the potential for loss of life from this Project in light of Kuprewicz's assessment of a high risk of rupture in early years. Therefore although we have not attempted to assign a cost to potential effects on human health and safety, including loss of life, we have provided loss of life data with each example.

The four relevant examples are:

1. the spill of tar sands dilbit from Enbridge's Line 6B in Marshall, MI (2010)
2. the explosion, fire and spill of Bakken crude from a train derailment in Lac-Mégantic, QC (2013)
3. San Bruno natural gas pipeline rupture, explosion and fire in the San Francisco metropolitan area (2010)
4. widespread devastation to New York City and surrounding area from Hurricane Sandy (2012)

For each example, TGG will provide:

1. description of the disaster;
2. the cost and sources of the cost data;
3. the relevance of the example to the Project.

5.5.1. Enbridge's Line 6B Spill in Marshall, MI (2010)

Description of Disaster:

According to the NTSB, following its investigation of the Enbridge Line 6B Spill (emphasis added):[90]

> On Sunday, July 25, 2010, at about 5:58 p.m., a 30 inch-diameter pipeline (Line 6B) owned and operated by Enbridge Incorporated ruptured and spilled crude oil into an ecologically sensitive area near the Kalamazoo River in Marshall, Mich., for 17 hours until a local utility worker discovered the oil and contacted Enbridge to report the rupture.
>
> The NTSB found that the material failure of the pipeline was the result of multiple small corrosion-fatigue cracks that over time grew in size and linked together, creating a gaping breach in the pipe measuring over 80 inches long.
>
> "This investigation identified a complete breakdown of safety at Enbridge. Their employees performed like Keystone Kops and failed to recognize their pipeline had ruptured and continued to pump crude into the environment," said NTSB Chairman Deborah A.P. Hersman. "Despite multiple alarms and a loss of pressure in the pipeline, for more than 17 hours and through three shifts they failed to follow their own shutdown procedures."
>
> […]
>
> Over 840,000 gallons of crude oil - enough to fill 120 tanker trucks - spilled into hundreds of acres of Michigan wetlands, fouling a creek and a river. A Michigan Department of Community Health study concluded that over 300 individuals suffered adverse health effects related to benzene exposure, a toxic component of crude oil.
>
> Line 6B had been scheduled for a routine shutdown at the time of the rupture to accommodate changing delivery schedules. Following the shutdown, operators in the Enbridge control room in Edmonton, Alberta, received multiple alarms indicating a problem with low pressure in the pipeline, which were dismissed as being caused by factors other than a rupture. "Inadequate training of control center personnel" was cited as contributing to the accident.
>
> The investigation found that Enbridge failed to accurately assess the structural integrity of the pipeline, including correctly analyzing cracks that required repair. The NTSB characterized Enbridge's control room operations, leak detection, and

[90] NTSB Press Release, "Pipeline Rupture and Oil Spill Accident Caused by Organizational Failures and Weak Regulations," July 10, 2012. Accessed August 3, 2012. http://www.ntsb.gov/news/2012/120710.html

environmental response as deficient, and described the event as an "organizational accident."

Following the first alarm, Enbridge controllers restarted Line 6B twice, pumping an additional 683,000 gallons of crude oil, or 81 percent of the total amount spilled, through the ruptured pipeline. The NTSB determined that if Enbridge's own procedures had been followed during the initial phases of the accident, the magnitude of the spill would have been significantly reduced. Further, the NTSB attributed systemic flaws in operational decision-making to a "culture of deviance," which concluded that personnel had a developed an operating culture in which not adhering to approved procedures and protocols was normalized.

The NTSB also cited the Pipeline and Hazardous Materials Safety Administration's weak regulations regarding pipeline assessment and repair criteria as well as a cursory review of Enbridge's oil spill response plan as contributing to the magnitude of the accident.

The investigation revealed that the cracks in Line 6B that ultimately ruptured were detected by Enbridge in 2005 but were not repaired. A further examination of records revealed that Enbridge's crack assessment process was inadequate, increasing the risk of a rupture.

"This accident is a wake-up call to the industry, the regulator, and the public. Enbridge knew for years that this section of the pipeline was vulnerable yet they didn't act on that information," said Chairman Hersman. "Likewise, for the regulator to delegate too much authority to the regulated to assess their own system risks and correct them is tantamount to the fox guarding the hen house. Regulators need regulations and practices with teeth, and the resources to enable them to take corrective action before a spill. Not just after."

As a result of the investigation, the NTSB reiterated one recommendation to PHMSA and issued 19 new safety recommendations to the Department of the Transportation, PHMSA, Enbridge Incorporated, the American Petroleum Institute, the International Association of Fire Chiefs, and the National Emergency Number Association.

Costs and Sources of Cost Data

As of March 31, 2013, Enbridge indicated in its First Quarter Interim Report to Shareholders that the total clean-up for the spill is now estimated to cost approximately

$1 billion. Enbridge's civil penalty for the spill was only $3.7 million.[91] Enbridge also points out that there is a possibility that the clean-up bill will continue to increase as the clean-up is still ongoing.

No lives were lost, but as the NTSB citation above indicates: "over 300 individuals suffered adverse health effects related to benzene exposure, a toxic component of crude oil." Furthermore, "[o]ver 840,000 gallons of crude oil - enough to fill 120 tanker trucks - spilled into hundreds of acres of Michigan wetlands, fouling a creek and a river."

Relevance to the Project

The Enbridge Line 6B spill is highly relevant to the current Enbridge Project for the following reasons:

1. Enbridge is the owner and operator of both pipelines.
2. Line 6B connects at Sarnia to Line 9.
3. Both 6B and 9 are 30" pipelines.
4. 6B was carrying tar sands dilbit at the time of the spill and Enbridge is seeking approval to transport heavy crude, including dilbit on Line 9.
5. In light of recent findings regarding the Line 6B spill, the EPA has recently expressed concerns regarding the additional impacts of tar sands crude spills (versus conventional oil), with a particular concern about spills on waterways.[92]
6. The Marshall spill occurred in an environmentally sensitive area (with wetlands with proximity to waterways and human population), not dissimilar to the many HCAs along Line 9B in Southern Ontario and Quebec.
7. The NTSB investigation is scathing in its criticism of the response of Enbridge personnel to the rupture ("Keystone Kops"); and is very damning regarding Enbridge's management culture, referring to it as a "culture of deviance," in which "personnel had a developed an operating culture in which not adhering to approved procedures and protocols was normalized."
8. The NTSB investigation also clearly indicates that in the case of Enbridge, and with respect to the regulation of pipeline operators, "trust us" isn't good enough.
9. Finally and perhaps the most relevant aspect of all, the Kuprewicz Report's assessment of a high risk of rupture for Line 9B is based, among other reasons,

[91] Enbridge First Quarter Interim Report to Shareholders for the Three Months Ended March 31, 2013, Section 11 Contingencies, Adobe p. 67. Accessed August 3, 2013.
See http://www.enbridge.com/InvestorRelations/FinancialInformation/InvestorDocumentsandFilings.aspx and then click on FIRST QUARTER REPORT under 2013.
[92] See footnote 43.

on (i) the new information from the NTSB investigation of Marshall; (ii) Enbridge's failure to incorporate the NTSB IM recommendations in the Project.[93]

Although the Line 6B rupture caused widespread devastation to the Kalamazoo and surrounding wetlands and, at $1 billion in clean-up costs, holds the record for the single most expensive onshore spill in US history,[94] it is nowhere near the worst-case scenario for the Project, which runs through densely populated urban areas and could damage and disrupt major infrastructure, and possibly cause loss of life.

5.5.2. Lac-Mégantic Tragedy (2013)

Description of Disaster

According to the Transportation Safety Board of Canada (TSB), "[o]n July 6 2013, a unit train carrying petroleum crude oil operated by Montreal, Maine & Atlantic Railway (MMA) derailed numerous cars in Lac-Mégantic, Quebec, and a fire and explosions ensued."[95]

The train with five locomotives was pulling 72 DOT-111 tanker cars full of light crude oil from the Bakken shale play in North Dakota to the Irving Oil refinery in Saint John, N.B. The train was operated by Montreal Maine & Atlantic Railway. The train broke away and derailed, unleashing an explosive ball of burning Bakken crude, which incinerated the downtown core of this small Quebec town.[96]

On July 23, Quebec's Department of Sustainable Development, Environment and Parks says it believes 5.7 million litres of crude oil were released into the soil, water and air after the accident. Among its other findings:

A total of 7.2 million litres of crude oil were on the runaway MMA train

9 tankers, from a total of 72, avoided spilling during the accident

457,500 gallons of oil were recovered from Lac-Mégantic's city centre

51,200 gallons of oily water removed from the nearby Chaudière River

[93] See footnote 35.
[94] See footnote 90.
[95] See TSB website, Railway investigation R13D0054, http://www.tsb.gc.ca/eng/enquetes investigations/rail/2013/R13D0054/R13D0054.asp#Lac-M%C3%A9gantic
[96] "Lac-Mégantic: What we know, what we don't," Montreal Gazette, July 22, 2013. Accessed August 2, 2013. http://www.montrealgazette.com/news/M%C3%A9gantic+What+know+what+know/8626661/story.html

150,000 litres of oily water removed from Lac Mégantic.[97]

Costs and Sources of Cost Data

According to an August 1, 2013 press release, the TSB investigation is still ongoing.[98] It is far too early to know the final costs for this disaster but they are estimated to be in the hundreds of millions, and possibly exceed $1 billion. Preliminary clean-up bills for damage to the town doubled in the weeks following the accident from $4 million to almost $8 million. The MMA Railway has stated at the end of July that it was unable to pay clean-up costs because it was not getting funds from its insurers. At the time, MMA had outstanding bills for $7.7 million.

MMA has publicly raised the concern that it may go bankrupt.[99] In response, the Quebec government ordered World Fuel Services Corp. to assist with the clean-up. World Fuel "purchased the oil from producers in North Dakota's Bakken region, then leased and loaded rail cars and arranged for their transport to an Irving Oil refinery in New Brunswick."[100] World Fuel is disputing the cleanup order.

> "In the end, says one expert in civil responsibility, taxpayers could be stuck with a bill in the hundreds of millions of dollars.
>
> Quebec law professor Daniel Gardner says he highly doubts MM&A has enough coverage to absorb the massive, combined financial liabilities of damages like environmental cleanup, emergency-crew salaries and lawsuits.
>
> In fact, he believes the Lac-Megantic derailment could have more financial consequences than any other land disaster in North American history.
>
> "The whole cost of this will be far closer to $1 billion than to $500 million," said the Universite Laval academic, adding he would be surprised if the railway had a total of $500 million in coverage.
>
> "What will probably happen? ...The company will go bankrupt, insurance coverage won't be enough."

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[97] Ibid.
[98] http://www.tsb.gc.ca/eng/medias-media/communiques/rail/2013/R13D0054-20130801.asp
[99] Blatchford, Andy, "Railway says it can't pay for Lac-Mégantic disaster cleanup" http://www.theglobeandmail.com/news/national/mma-lays-off-nearly-one-third-of-quebec-workforce-union/article13496970/#dashboard/follows/
[100] McNish, Jacquie and Justin Giovanetti, "Oil Company Disputes Lac-Méganitc Cleanup Order," Globe and Mail. Accessed August 4. http://www.theglobeandmail.com/news/national/oil-company-disputes-lac-megantic-cleanup-order/article13518237/

Gardner expects governments will wind up covering the difference.[101]

"The catastrophe killed 47 residents and levelled more than 40 buildings." [102]

Relevance to the Project

The Lac-Mégantic tragedy is relevant to the current Enbridge Project for the following reasons:

1. It demonstrates the consequences of a crude oil accident in a small town by a lake, thus proximate to people, water and economic activity.
2. Bakken crude, which caused the explosion and which very light is highly flammable, has been identified by Enbridge as one of the crudes that could be shipped on Line 9B.
3. In addition to the devastation of the town, there has been significant release of crude into soil, air and water (5.7 million litres).[103]
4. There are serious concerns about who will bear the financial responsibility for the disaster.

Although Lac-Mégantic was devastating and may even exceed the costs of the Line 6B spill, it is nowhere near a worst-case scenario for the Project. A large pipeline under pressure such as Line 9 can spill far more than 70 tank cars. Moreover, Line 9B goes through Canada's two most populous cites and its economic heartland. A major spill in Toronto or Montreal could do far more damage (in terms of property, infrastructure and loss of life) than the derailment at Lac-Mégantic. In the aftermath of the tragedy, pipeline safety expert Richard Kuprewicz said:

> "Not to scare anyone, but a rupture on a 30-inch pipeline is going to put more tonnage into an area than railcars ever can, despite that terrible tragedy this past weekend that shows what can happen when respect for hydrocarbons is not grasped."[104]

[101] See footnote 99.
[102] See footnote 100.
[103] There have been concerns that the spill affected water quality and drinking water in Lac-Mégantic and nearby towns. Authorities continue to monitor water quality.
"Government Examining Lac-Mégantic Health Risks," The Record, July 31, 2013. Accessed August 2, 2013.
http://www.sherbrookerecord.com/content/gov%E2%80%99t-examining-lac-megantic-health-risks
[104] Kuprewicz, Richard, email, July 8, 2013.

5.5.3. San Bruno Natural Gas Explosion and Fire (2010)

Description of Disaster

The San Bruno pipeline accident occurred in the San Francisco metropolitan area, near the San Francisco International Airport, in a residential area with many homes highly proximate to the pipeline.[105] As reported by the NTSB:[106]

> Executive Summary
>
> On September 9, 2010, about 6:11 p.m. Pacific daylight time, a 30-inch-diameter segment of an intrastate natural gas transmission pipeline known as Line 132, owned and operated by the Pacific Gas and Electric Company (PG&E), ruptured in a residential area in San Bruno, California. The rupture occurred at mile point 39.28 of Line 132, at the intersection of Earl Avenue and Glenview Drive. The rupture produced a crater about 72 feet long by 26 feet wide. The section of pipe that ruptured, which was about 28 feet long and weighed about 3,000 pounds, was found 100 feet south of the crater. PG&E estimated that 47.6 million standard cubic feet of natural gas was released. The released natural gas ignited, resulting in a fire that destroyed 38 homes and damaged 70. Eight people were killed, many were injured, and many more were evacuated from the area.
>
> Probable Cause
>
> The National Transportation Safety Board determines that the probable cause of the accident was the Pacific Gas and Electric Company's (PG&E) (1) inadequate quality assurance and quality control in 1956 during its Line 132 relocation project, which allowed the installation of a substandard and poorly welded pipe section with a visible seam weld flaw that, over time grew to a critical size, causing the pipeline to rupture during a pressure increase stemming from poorly planned electrical work at the Milpitas Terminal; and (2) inadequate pipeline integrity management program, which failed to detect and repair or remove the defective pipe section.
>
> Contributing to the accident were the California Public Utilities Commission's (CPUC) and the U.S. Department of Transportation's

[105] http://www.ntsb.gov/doclib/reports/2011/PAR1101.pdf, Adobe pp. 17, 30, 32.
[106] NTSB website on the Pipeline Accident Report: http://www.ntsb.gov/investigations/summary/PAR1101.html

> exemptions of existing pipelines from the regulatory requirement for pressure testing, which likely would have detected the installation defects. Also contributing to the accident was the CPUC's failure to detect the inadequacies of PG&E's pipeline integrity management program.
>
> Contributing to the severity of the accident were the lack of either automatic shutoff valves or remote control valves on the line and PG&E's flawed emergency response procedures and delay in isolating the rupture to stop the flow of gas. (emphasis added)

Costs of and Sources of Cost Data

TGG was unable to determine final costs for the San Bruno disaster and this could be due to ongoing litigation, as well as the breadth of the problems at PG&E (which go far beyond just the San Bruno disaster. Proceedings are currently underway at the CPUC to respond to the San Bruno accident, as well as extensive other failures by PG&E to properly and safely construct and operate its natural gas system. Very substantial penalties to be levied upon PG&E are under consideration. The CPUC Consumer Protection and Safety Division has proposed that a penalty of US$2.25 billion be levied; the amount of the proposed penalty would have been even higher based on the severity of PG&E's mismanagement, but was limited so as to not impair the company's creditworthiness and ability to serve customers and implement needed improvements.[107] Other parties have proposed penalties ranging from US$1.25-$2.539 billion.[108]

According to the NTSB cited above, the San Bruno accident destroyed 38 homes and damaged 70. Eight people were killed, many were injured, and many more were evacuated from the area.

In the case of the San Bruno tragedy, we relied on information of penalties and death toll from the California Public Utilities Commission (CPUC) and NTSB cited above.

Relevance to the Project

1. This example shows what can happen when a major pipeline accident occurs in a residential neighbourhood of an urban area: extensive property damage and loss of life. Particularly in Montreal, Line 9B passes through residential

[107] http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M065/K394/65394561.PDF, especially Adobe pp. 7-42.
[108] http://www.cpuc.ca.gov/NR/rdonlyres/50FD5635-30CD-4E9D-9326-95126F75DF59/0/I1201007etalCPSDReplyBriefonFinesandRemedies.pdf, especially Adobe p. 6

neighbourhoods on narrow right of ways just beside where people live and sleep.[109] Gas is extremely dangerous and we are not trying to equate gas and crude pipelines, but an examination of the San Bruno disaster is relevant because it is an example of an urban pipeline disaster. Typically, there are many more natural gas pipelines in urban areas and in proximity to people water and economic activity than crude pipelines. This is because natural gas is distributed to residences and commerces via pipelines.

2. The NTSB expressed grave concerns with inadequacies in the pipeline integrity management program and emergency response procedures in its investigations of both the Enbridge's Line 6B rupture and PG&E's San Bruno rupture. The Kuprewicz Report expresses similar concerns regarding the Line 9B Project and Enbridge's failure to heed some of the important IM recommendations from the Line 6B rupture.

Because the San Bruno disaster occurred in a highly populated urban area, it is getting closer to a worst-case scenario for the Project. However, a Line 9B spill and explosion near Pearson or the Finch subway could create even more extensive damage and disruption to infrastructure and cause greater loss of life. Moreover, a Line 9B spill and explosion in Montreal-East petrochemical complex has the potential to create a major explosion, by setting off a domino effect in an area with highly explosive facilities.[110]

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[109] See https://maps.google.com/maps?q=Montreal,+QC,+Canada&hl=en&ll=45.659038,-73.57199&spn=0.001215,0.002529&sll=37.269174,-119.306607&sspn=11.253772,20.720215&oq=montreal&hnear=Montreal,+Quebec,+Canada&t=h&layer=c&cbll=45.659079,-73.571876&panoid=l5ydkwFnmxZ9GyFmvv4guQ&cbp=12,245.75,,0,-2.96&z=19
[Line 9 crossing Boulevard Gouin Est in Montreal]
and
https://maps.google.com/maps?q=Montreal,+QC,+Canada&hl=en&ll=45.652561,-73.565113&spn=0.001215,0.002529&sll=37.269174,-119.306607&sspn=11.253772,20.720215&oq=montreal&hnear=Montreal,+Quebec,+Canada&t=h&layer=c&cbll=45.652506,-73.56522&panoid=tAlx9YgDJ3nuSOOgANnfvQ&cbp=12,136.1,,0,7.89&z=19
[Line 9 crossing 5e Rue in Montreal]

[110] The Domino Effect results when an incident at one facility leads to other incident(s) onsite or at other proximate facilities. The Domino Effect is of particular concern in Montreal-East. This area has a large concentration of facilities for transportation, processing, and storage of oil, natural gas, and chemicals, as well as other major infrastructure. Montreal East is on the Island of Montreal, combining very high proximity to population centers (locally and throughout the metropolitan region), and to major water bodies. The Quebec government (BAPE) review of Pipeline Saint-Laurent (a pipeline recently completed by Ultramar to transport petroleum products from the St-Romuald refinery to a terminal in Montreal-East) expressed concerns about the domino effect in Montreal-East.
Bureau d'audiences publiques sur l'environnement (BAPE), Projet de construction de l'oléoduc Pipeline Saint-Laurent entre Lévis et Montréal-Est: Rapport d'enquête et d'audience publique. Rapport 243, July
(footnote continued on next page)

5.5.4. Hurricane Sandy in New York City (and Surrounding Area)

Description of Disaster

Hurricane Sandy, the second most costly hurricane in US history, affected 24 states, but did the most damage in New Jersey and New York. New York City was particularly affected.

The following is a description of Hurricane Sandy as it affected New York City:

> Hurricane Sandy was the worst natural disaster ever to affect New York City. Forty-three New Yorkers lost their lives, many more lost homes or businesses, and entire communities were sent reeling by the storm's devastating impact.
>
> […]
>
> When Hurricane Sandy roared into New York on October 29, it drove the waters around our city right up to, and then over, our doorstep. Forty-three people died in the deluge and untold numbers were injured. Along the shoreline the storm surge smashed buildings and engulfed entire communities. It flooded roads, subway stations, and electrical facilities, paralyzing transportation networks and causing power outages that plunged hundreds of thousands into darkness. Fires raged. Wind felled trees. Heartache and hardship—and at least $19 billion in damage—are the storm's legacy.
>
> An unpredictable series of meteorological phenomena combined to create this disaster— Sandy arrived during a full moon, when the Atlantic tides were at their highest; the storm was enormous and when it collided with other weather fronts, it turned sharply and made landfall in New Jersey, subjecting the city to onshore winds that drove its devastating storm surge right into our coastal communities.[111]

Costs and Sources of Cost Data

(footnote continued from previous page)
2007, p. 85. Accessed May 16, 2013.
http://www.bape.gouv.qc.ca/sections/rapports/publications/bape243.pdf

[111] City of New York, "A Stronger, More Resilient New York", June 11, 2013, Forward and p. 5.
http://nytelecom.vo.llnwd.net/o15/agencies/sirr/SIRR_singles_Hi_res.pdf

For Hurricane Sandy, we have relied on estimates of economic damages and loss of life from the insurance industry and municipal government.[112]

Total economic damages in the US due to Hurricane Sandy ("Sandy") are estimated to be approximately $70 billion, with the insurance industry covering $35 billion. There were an estimated $19 billion of economic damages just in New York City, including over $13 billion in physical damage to assets (such as building and tunnels), and almost $6 billion of lost economic activity (reductions in income and loss of use due to transportation outages and other disruptions to economic activity). Sandy also resulted in large loss of life, with 237 deaths overall and 43 deaths just in New York City.

The above estimates of economic damages for Sandy are based on analyses undertaken by the insurance industry and municipal government, and specifically by Swiss Re (a leading global reinsurer) and City of New York (with input from Swiss Re). These analyses quantify costs in a fairly narrow and limited manner, restricted to the costs that can be most readily estimated based on market economics:

> Total losses
>
> For the purposes of the present sigma study, total losses are all the financial losses directly attributable to a major event, i.e. damage to buildings, infrastructure, vehicles etc. The term also includes losses due to business interruption as a direct consequence of the property damage. Insured losses are gross of any reinsurance, be it provided by commercial or government schemes. A figure identified as "total damage" or "economic loss" includes all damage, insured and uninsured. Total loss figures do not include indirect financial losses – i.e. loss of earnings by suppliers due to disabled businesses, estimated shortfalls in gross domestic product, and non-economic losses, such as loss of reputation or impaired quality of life.[113]
>
> the Swiss Re models only seek to estimate losses that can be readily measured in dollars—namely, physical damage to assets, such as buildings and tunnels, and reductions in income and loss of use due to

[112] Sources: Swiss Re, "Natural catastrophes and man-made disasters in 2012: A year of extreme weather events in the US", Sigma No 2/2013, pp. 1, 7, 13, 17-19, 37 http://media.swissre.com/documents/sigma2_2013_EN.pdf;
City of New York, "A Stronger, More Resilient New York", June 11, 2013, pp. 5, 13-18, 33 http://nytelecom.vo.llnwd.net/o15/agencies/sirr/SIRR_singles_Hi_res.pdf

[113] Swiss Re, "Natural catastrophes and man-made disasters in 2012: A year of extreme weather events in the US", Sigma No 2/2013, p. 37 http://media.swissre.com/documents/sigma2_2013_EN.pdf

> physical damage (for example, if people in unimpacted areas could not travel to work due to transportation outages). Using this approach total losses caused by Sandy, an estimated $19 billion (according to the City's analysis provided to the Federal government), could be broken down into over $13 billion of physical damage and almost $6 billion of lost economic activity. But of course, not every potential impact can or should be quantified by such a simple metric. For example, the Swiss Re models do not predict loss of life or injury. Nor do they highlight potentially disproportionate impacts on disadvantaged populations such as the elderly or medically vulnerable.[114]

Even within this fairly narrow and limited quantification of costs, Sandy was estimated to result in very large economic damages. The large economic damages and loss of life owing to Sandy reflect the high proximity to people, water, and economic activity. Sandy impacted New York City and other areas which have dense concentrations of people and economic activity, high property values, and complex, high value urban infrastructure systems. These urban infrastructure systems (including transportation, energy, and communications) were damaged and disrupted, resulting in substantial further economic damage.

Relevance to Project

TGG is not implying that a Line 9B spill in Toronto or Montreal is likely to create the same extent of damage as Sandy did in the US, and particularly New York City. However Sandy demonstrates in a way that the other examples do not, how major disasters in urban areas can have very high costs and major adverse impacts on large numbers of people. Aside from direct damage to various other types of property, damage and disruptions affecting urban infrastructure can result in large economic costs. Urban infrastructure is expensive to build, repair, and replace. Moreover, urban infrastructure is typically heavily used and enables a large amount of economic activity. Thus, disruptions affecting urban infrastructure can result in substantial additional economic damages due to lost economic activity. Disasters in urban areas can also result in large loss of life and other adverse impacts on human health and safety.

[114] City of New York, "A Stronger, More Resilient New York", June 11, 2013, p. 33 http://nytelecom.vo.llnwd.net/o15/agencies/sirr/SIRR_singles_Hi_res.pdf

5.6. Range of Costs

Even a narrow insurance definition of a range of potential costs is very high. As indicated in Section 5.4, due to Line 9B's extraordinary proximity to people, water and economic activities, the rupture costs of the Project, under a range of pipeline malfunction/accident possibilities, vary from significant to catastrophic. The examples of pipeline accidents and other disasters in the previous section have demonstrated a range of costs related to relevant accidents.

From the Marshall MI example, a pipeline accident involving a significant spill in a populated non-metropolitan area would cost about $1 billion.

The Lac-Mégantic example describes the damage and death toll from an explosion in a small town involving a derailed train transporting Bakken crude. It is too early to estimate the costs of this tragedy but they will likely be over $1 billion. A Bakken spill from Line 9 could be much larger and result in even more damage.

While Marshall had devastating effects on wetlands and the Kalamazoo, and Lac-Mégantic was a terrible tragedy, neither is near worst-case in terms of damage and loss of lives, especially for what could occur in a densely populated urban area.

San Bruno and Sandy provide illustrations of how costs can rapidly escalate when a disaster occurs in an urban area, which damages and disrupts infrastructure and affects large numbers of people. The full economic damage of San Bruno was not determined but penalties to PG&E are likely to exceed $2 billion. Damages for Sandy are estimated in the tens of billions. As indicated in the previous section, a Line 9B spill in Toronto or Montreal is unlikely to create the same extent of damage as Sandy. However Sandy demonstrates in a way that the other examples do not, how a major disasters in urban areas can have very high costs and major adverse impacts on large numbers of people.

Under bad to worst-case scenarios, TGG concludes that the potential costs for a major rupture in an HCA but not an urban setting (similar to Marshall) could start at $1 billion (bad scenario). If a major accident occurred in a densely populated area, damaging and disrupting key infrastructure, these costs could escalate to multi-billion dollar damages (potentially as high as $5-$10 billion) (worst-case scenario). Given the flammability of the proposed new crude slate to be carried on Line 9B, which includes both Bakken and dilbit, an accident involving this pipeline could also involve loss of human life.

5.7. Concerns about Enbridge's Capability to Cover Damages in a Worst-Case Scenario

As discussed in Section 5.3, TGG has concerns about Enbridge's financial capability and responsibility to mitigate and compensate all the potential damages, especially in a worst-case scenario such as a major accident/spill in an area with a large concentration of people and economic activity. In light of the a Lac-Mégantic tragedy and concerns around the adequacy of MM&A's (other parties') ability and willingness to pay for damages, we are particularly concerned about the following questions surrounding Enbridge's insurance:

1. To what extent will Enbridge will forced to internalize the costs of a major pipeline accident/spill?
2. Given the uncertainty around (a), to what extent does Enbridge has the proper incentives to buy enough insurance (or to simply trust that the full costs will not be internalized)?
3. Even if Enbridge were willing to buy adequate insurance, to what extent would such insurance be available at an affordable price?

In the context of the current NEB case, TGG has not been able to conduct an in-depth review of Enbridge's insurance situation, and its legal obligations in compensating for damages. But our quick review does raise a number of concerns about Enbridge's capability/responsibility to internalize the costs in the event of a major accident/spill.

As reflected in Enbridge's last quarterly earnings conference call (August 1, 2013), in light of the many recent pipeline spills and the Lac-Mégantic tragedy, Enbridge appears to encountering some resistance from insurers and may not be able to obtain as much coverage as would be optimal (our emphasis):[115]

> Andrew Kuske - Credit Suisse - Analyst
>
> Thanks. Good morning. Just a question as it relates to an increasing issue in the industry, just insurance costs. From what we've seen from some of the recent spills that have happened and then the tragedy in Quebec, how do you think about insurance costs just from a coverage standpoint, the willingness for

[115] Thomson Reuters Streetevents, EDITED TRANSCRIPT ENB. TO – Q2 2013 Enbridge Earnings Conference Call, August 1, 2013, 14. Accessed August 3, 2013. http://www.enbridge.com/~/media/www/Site%20Documents/Investor%20Relations/2013/2013_ENB_Q2_Transcript.pdf, p. 14

insurers to actually cover the industry, costs, deductibles? Is there some kind of Government intervention that actually comes in at some point in the future?

Al Monaco - Enbridge Inc - President & CEO

Richard, do you want to take a shot at that?

Richard Bird - Enbridge Inc - EVP, CFO and Corporate Development

Yes. Well, as you might expect, insurance costs generally have been rising of late, and all aspects of insurance is tougher than it was historically. We were able to modestly increase our coverage this last go around from CAD660 million general liability insurance to CAD685 million. We would have taken more if had been available at a reasonable price, but that was pretty much capping out at least what the market availability was to Enbridge, so -- and recent developments are not going to help that.

Andrew Kuske - Credit Suisse - Analyst

Do you think we're heading down the path of, effectively, surety bonds for the industry for covering certain incidents? I mention that in part just because of some of the criteria that have been imposed on Gateway.

Richard Bird - Enbridge Inc - EVP, CFO and Corporate Development

Well, and not just Gateway. I think you've seen an announcement by the Federal Government to the -- what will be a Canadian-wide regulation requiring provision of financial resources to support addressing any major incident, and I think there is probably going to be a fair bit of thinking done and innovation done on different financial structures that could be put in place to provide the assurance to the Government and the public that there will be resources to address any spill. Of course, the primary line of attack is to minimize the likelihood of such a thing happening in the first place, but you are right, Andrew, there will be alternative financial structures to address that small residual risk.

Andrew Kuske - Credit Suisse - Analyst

So then finally, the final point on this, do you see this as being -- all of these developments effectively being better for the larger companies that are better capitalized, bigger balance sheets, more assets for handling, essentially, the environmental changes, the insurance costs and the obligations are being put on the industry to a much greater degree than the smaller ones that might not be able to operate in that kind of environment.

Richard Bird - Enbridge Inc - EVP, CFO and Corporate Development

That's a possibility. I think it's probably too soon to see that, and I wouldn't rule out the possibility that there is some form of -- and maybe this is something you

were getting at a little earlier -- some form of industry-wide financial solution, structural solution as opposed to a pipe-by-pipe or company-by-company solution, and that would avoid putting that very difficult circumstance on some of the smaller pipelines that you just referred to.

As per the information provided in this conference call, the key takeaways are the following:

- Enbridge's insurance coverage is apparently limited in availability and expensive,
- Enbridge has only $685 million in insurance.
- There are some initiatives underway to deal with providing assurance of resources to address "any spill."
- This appears to be a work in progress.

According to Enbridge's most recent report to shareholders, the comprehensive insurance program is maintained by Enbridge for all its subsidiaries and affiliates. The renewed coverage for the liability program has an aggregate limit of US$685 million.[116] Whether the total amount is US or CAD$685 million, this would not be enough insurance to a major disaster associated with the Project, especially not if that disaster were in an urban centre. Moreover, $685 million is not a lot of coverage for Enbridge and all of its subsidiaries and affiliates, at a time of frequent and costly pipeline spills with a management culture that lacks attention to pipeline safety.

The July 4, 2013 Letter of Comment from the City of Montreal filed in the current proceeding confirms that the Montreal shares similar concern with respect to Enbridge's financial capability to pay for the potential damages incurred by a malfunction or accident on Line 9B. Montreal asks that the NEB refuse to grant approval for the Project unless Enbridge can demonstrate the financial capability to respond to any incident.[117]

À ce titre, la Ville de Montréal considère qu'aucune autorisation de procéder au renversement de la conduite 9B ne devrait être accordée par l'ONE sans le respect des conditions suivantes :

- le partage des évaluations d'analyse de risque du pipeline au point de traverse de la rivière des Outaouais et de ses affluents aux autorités responsables de la sécurité civile locale et de l'agglomération de Montréal;
- le partage des plans d'intervention d'urgence à jour détaillés pour le territoire englobant le point de traverse de la rivière des Outaouais et de ses affluents

[116] Enbridge First Quarter Interim Report to Shareholders for the Three Months Ended March 31, 2013, Section 11 Contingencies, Adobe p. 68. Accessed August 3, 2013; see footnote 90 for link.
[117] See footnote 31.

aux autorités responsables de la sécurité civile locale et de l'agglomération de Montréal ainsi que lors de toute révision et mise à jour;[118]

- la démonstration de la capacité financière de l'entreprise pour répondre à tout incident.

[118] We also note that City of Montreal shares similar concerns regarding risk factors related to proximity to water, as well as the adequacy of city-specific emergency response plans.

6. Relative Weighting of Costs and Benefits

6.1. Results of Sections 4 (Benefits) and 5 (Costs)

Section 4 has demonstrated that the overall benefits of the project, taking into account benefits from the commercial impact of the Project (mainly to refineries) and economic-development-related socio-economic benefits are less than $1 billion/per year and likely less than $0.5 billion/year, especially in the near-term.

Section 5 concluded that due to Line 9B's extraordinary proximity to people, water and economic activities, the rupture costs of the Project, under a range of pipeline malfunction/accident possibilities, vary from significant to catastrophic. With rupture costs that vary from significant to catastrophic and an assessment of a high risk of rupture, the expected Project costs therefore range from significant to catastrophic. Expected costs are much higher for Line 9 than for most pipelines.

Under bad to worst-case scenarios, TGG concludes that the potential economic costs for a major rupture in an HCA but not an urban setting (similar to Marshall) could start at $1 billion (bad scenario). If a major accident occurred in a densely populated area, damaging and disrupting key infrastructure, these costs could escalate to multi-billion dollar damages (potentially as high as $5-$10 billion) (worst-case scenario). Given the flammability of the proposed new crude slate to be carried on Line 9B, which includes both Bakken and dilbit, an accident involving this pipeline could also involve loss of human life.

6.2. Costs Could Greatly Exceed Benefits Under a Range of Accident Conditions

Based on our evaluation of economic costs and benefits, TGG concludes that the potential economic costs could exceed (and, under a range of malfunction/accident conditions, greatly exceed) the potential economic benefits. The range of malfunction/accident conditions are the bad to worst-case scenarios describe in Section 5, which range from $1 billion to multi-billion dollar damages, and which could also involve loss of life. TGG was able to assign a much higher expected cost to these bad-to-worst-case scenarios given that the Kuprewicz Report has concluded that the Project has a high risk of rupture in the early years.

We note once again that we have limited our cost analysis to environmental and socio-economic impacts that directly affect economic activity, and that can be somewhat readily (albeit approximately) quantified using market economics. The consideration of human health and safety and the broader and cumulative environmental and other socio-economic costs will further increase the overall costs of the Project. However, TGG has concluded that our relative comparison of more narrowly defined economic costs and benefits (including a more limited consideration of socio-economic and environmental impacts) is sufficient demonstration that the relative costs can exceed, and in some cases greatly exceed, the benefits.

6.3. Allocation of Costs and Benefits

NEB has a mandate to balance to balance economic, environmental and social consideration. In our review of the costs and the benefits of the Project, we have noted that the costs and benefits are very unevenly allocated among various stakeholders and across regions.

The biggest costs and potential risks of the Project are borne by the inhabitants of urban areas (Montreal and Toronto), where the worst-case scenario related to a major pipeline disaster could occur. Because there is some concern about Enbridge's willingness and ability to pay all of the damages associated with a worst-case scenario, taxpayers in these cities and provinces are also subject to higher risks. Section 4 concludes that the economic-development benefits to Montreal (and Quebec as a whole), are insignificant, particularly when weighed against the risk of a major spill. Moreover, the province receives negligible short-term economic development benefits.

Conversely, Enbridge, the Quebec refineries and the crude producers (tar sands, other Alberta, and Bakken) will benefit from the Project. Suncor and Valero (the Alberta- and Texas-based owners of Quebec refineries) will benefit from increased profits due to lower-priced crudes (Bakken and tar sands). Moreover, crude producers will be able to increase profits by accessing higher priced markets. Furthermore, Enbridge is highly motivated to extend its pipeline network and increase profits. Enbridge is facing considerable uncertainty with respect to its Northern Gateway project and is seeking to increase its capacity to transport tar sands crude. As such, Enbridge, the Quebec refineries and crude producers are even more highly motivated to tout the supposed benefits of these projects to the inhabitants of Ontario and Quebec. In effect though, the vast majority of benefits will flow to Enbridge, the owners of the two refineries in Quebec and crude producers.

7. Recommendations

In light of the following:

4. the results of our relative economic cost benefit analysis, which demonstrates that the potential economic costs could exceed (and, under a range of malfunction/accident conditions, greatly exceed) the potential economic benefits;
5. the highly uneven allocation of costs and benefits among the the stakholders; and across regions;
6. the Kuprewicz Report's conclusion that there is a high risk that Line 9 will rupture in the early years following project implementation due to a combination of cracking and corrosion

TGG strongly recommends that the NEB reject Enbridge's Project.

Because of the uniqueness of this people with its extraordinary proximity to people, water and economic activity, TGG concludes that it would be would be reckless to allow Enbridge run 300,000 bpd of volatile Bakken or dilbit along this route in a pipeline with a high risk of rupture. This is even more true of the Line 9B's routing through Canada's two biggest urban centres. A rupture of flammable crude in either Greater Montreal or Metropolitan Toronto could result in major damage and destruction to urban infrastructure and property, as well as potential loss of life.

TGG believes that the public interest will be served in Line 9B is left idle (reference scenario) and that Canada as a whole will be better off.

If the NEB decides to approve the Project despite our strong recommendation of rejection and our descriptions of worst case scenarios involving major damage to urban centres, impacts on great numbers of people (and even loss of life), TGG recommends the following:

1. The implementation of all the recommendations of the Kuprewicz Report to ensure better pipeline safety; and regular and ongoing monitoring of Line 9B;
2. Better assurance that Enbridge will be responsible for all damages in the case of a major multi-billion dollar spill (similar to the Ville de Montréal recommendation);
3. The maintenance of the same crude slate (with a restriction on heavy crude) that was approved for Line 9A in Phase 1.