

**Enbridge Pipelines Inc. (“Enbridge”) Line 9B Reversal and Line 9 Capacity Expansion Project (“Project”)**  
**Application under section 58 and Part IV (“Application”) of the National Energy Board Act OH-002-2013**

**National Energy Board (“NEB” or “Board”)**  
**Information Request No. 4 to Enbridge**  
**File OF-Fac-Oil-E101-2012-10 02**  
**Information Request No. 4**

## **Economic and Financial Matters**

### **4.1 Emergency Response Financing**

- Reference:**
- i) Filing A3IGL7 Enbridge response to NEB IR No. 3.7 a-b (Adobe 21 of 43);
  - ii) Filing A2R7R3, Enbridge Pipelines Inc. 2012 Financial Statements 29 March 2012;
  - iii) Filing A3IGL7 Enbridge response to NEB IR No. 3.7 a-c (Adobe 21-22 of 43);
  - iv) Filing A3J3W2 Enbridge response to Ontario Ministry of Energy IR 2.1 (Adobe 1 of 16).

**Preamble:** In reference i), Enbridge explains that it is covered under a consolidated (umbrella) insurance program maintained by Enbridge Inc. on its various operations and assets that renews annually (on May 1st). Enbridge states that the current year's limit of coverage is US\$685 million and provides further details on the coverage.

Also in reference i) Enbridge explains that Enbridge Inc. has an established allocation methodology (which is based on insurance-based risk and exposure criteria as well as each operation's proportional share amongst the consolidated group), which determines cost and coverage allocation.

Reference ii) is Enbridge Pipeline Inc.'s 2012 Consolidated Financial Statement for three operating segments: Liquids Pipelines, Sponsored Investments, and Corporate.

In reference iii), Enbridge states that the substantial resources of Enbridge and those upon which it could draw would be accessible to satisfy obligations and liabilities that may arise in the unlikely event of a large volume hydrocarbon spill scenario or other high impact (or consequence event) emergency.

In reference iv), Enbridge states that it interprets section 75 of the National Energy Board Act as requiring Enbridge, in the unlikely event of a release, to be responsible for damages that are directly attributable to its operations, which may include compensation for costs incurred by municipal and provincial first responders.

**Request:**

- a) Please discuss whether the various operations and assets that would be covered under the consolidated Enbridge Inc. insurance program discussed in reference i) are the same operations and assets included in reference ii).  
If the operations and assets in reference i) are different than those included in reference ii), please list the operations and assets covered by Enbridge Inc.'s consolidated insurance program.
- b) Please explain how Enbridge Inc.'s established allocation methodology, discussed in reference i), would allocate coverage to Line 9 assets using assumptions for the following hypothetical situation:
  - i. there is a total of consolidated claims in one insurance year of \$US750 million, of which \$US650 million is from the Enbridge Mainline in Canada;
  - iii. none of the standard exclusions apply; and
  - ii. there is a claim for Line 9 of \$US100 million included in the \$US750 million total claim.

In the response, please estimate the insurance payout that would be allocated to Line 9 claim of \$US100 million before the deductible is applied.

- c) Please explain if all Enbridge operations and assets, as discussed in the answer to a) above, also have a similar level of access as described in reference iii) to the substantial resources of Enbridge Inc. in the event that all these operations and assets should need access to additional resources?
- d) Please describe Enbridge's understanding of what would be included in the damages directly attributable to Enbridge operations as stated in reference iv) should a worst case scenario materialize, and include examples of what damages would typically be included and excluded in this scenario.
- e) Should the cost of damages due to a worst case scenario resulting from the Project exceed the proceeds from Enbridge's insurance policy, please explain how Enbridge will still be able provide

financial resources for matters it is responsible for.

- Response:**
- a) The operations and assets included in reference ii), being the operations and assets of Enbridge Pipelines Inc. (“Enbridge” or “EPI”), are those that are covered under the referenced \$685 million consolidated insurance program cited in reference i).
  - b) Assuming that the coverage for the relevant insurance year were to be US\$685 million and consolidated claims totaled US\$750 million, each individual claim would receive an insurance recovery of approximately 91.3%. Thus, assuming a claim for Line 9 of \$US100 million, it would receive an insurance recovery of US\$91.3 million.
  - c) All of the assets and operations discussed in response to NEB IR 4.1.a have a similar level of access to the substantial resources of EPI should the need arise.
  - d) The determination of damages for which Enbridge would be responsible in any scenario would depend on the specific relevant facts of the scenario. Damages previously paid include damages to landowners for restoration of the area impacted by an incident, damages for nuisance and/or inconvenience, business interruption damages, and damages to farmers for crop loss as a result of an incident. Damages that may not be attributable directly to Enbridge's operations may include those claimed by potential users of land, who have no interest in, or connection to, land impacted by an incident.
  - e) In the unlikely event that the costs of damages were to exceed the insurance proceeds, Enbridge would have access to various substantial financial resources. These would include (ready access to) committed bank lines presently totaling \$300 million. Further, Enbridge carries a strong A credit rating and has exceptional access to public debt markets. Finally, Enbridge is well capitalized with a sizeable equity base and annual positive cash flow.

#### 4.2 *Uncommitted toll charges*

- Reference:**
- i) Filing A3IGL7 Enbridge response to NEB IR No. 3.2 d (Adobe 6 of 43);
  - ii) Filing A3IGL7 Enbridge response to NEB IR No. 3.5 b (Adobe 9 of 43);
  - iii) Filing A1Y9R7 Enbridge Competitive Toll Settlement, Part VIII, Line 9 Matters, (Adobe page 42 of 122).

**Preamble:** In reference i), Enbridge explains that the initial term of the Transportation Service Agreement ("TSA") is 10 years and that committed shippers may extend the TSA for an additional five years. Furthermore, Enbridge explains that the 22% maximum premium over committed tolls will apply for the duration of the TSA.

In reference ii), Enbridge states that "Yes, under Section 31.12 of the CTS, Enbridge is responsible for all Line 9 Capital Expenditures during the CTS Term." Furthermore, Enbridge explains that the CTS provides that it can negotiate with shippers for projects with expected capital expenditures greater than \$25 million, among other projects.

Also in reference ii) Enbridge states that the initial committed tolls include the aggregate capital costs for the Project.

Articles 31.11, 31.12 and 31.13 of reference iii) detail the definition and treatment of Line 9 Capital Expenditures.

- Request:**
- a) Given that the uncommitted toll premium applies for the duration of the TSA, as discussed in reference i), please clarify how the uncommitted toll premium will be calculated if one or two of the three committed shippers choose to extend the TSA for another five years.
  - b) Please clarify whether article 31.12 of the CTS applies in a circumstance where Enbridge negotiates with shippers for capital expenditures over \$25 million as described in section 31.13 of reference iii).
  - c) Please explain how Enbridge will inform shippers of capital expenditure under \$25 million and discuss whether capital expenditures under \$25 million may be negotiated with shippers.

- Response:**
- a) If a shipper were to extend its TSA for an additional five years, the uncommitted toll premium would be calculated in the same manner as during the initial term. Section 5.03 of the TSA stipulates that the "Committed Tolls and Uncommitted Tolls shall continue to be adjusted in accordance with Article 6 [of the TSA] during such

extension period.”

- b) Enbridge is responsible for all Line 9 capital expenditures during the Competitive Toll Settlement (“CTS”) term as described in section 31.12 of the CTS. However, section 31.13 of the CTS provides that Enbridge may negotiate with shippers on Line 9 to recover the costs of any project with capital expenditures over \$25 million. In that case, section 31.12 would not apply.
- c) CTS section 31.23 states that, “...Enbridge will provide shippers on Line 9 with a summary of capital additions for the prior year and forecast capital additions for the current year to the Line 9 rate base in total and will detail individual items that exceed \$5 million, and the aggregate amount of capital under a Shipper Supported Expansion Project in accordance with the Line 9 Capital Reporting Template...”. Enbridge is responsible for all capital expenditures under \$25 million but can, at any time, negotiate with shippers for any proposed change to the tolls.

#### 4.3 *Socio-economic impact study assumptions*

**Reference:** i) Filing A3IGL7 Enbridge response to NEB IR No. 3.6 e (Adobe 18-19 of 43);

ii) Filing A3I6L8 Enbridge Attachment 1 to NEB IR 3.6.c (Adobe 1-3 of 3).

**Preamble:** In reference i), Enbridge states that an analysis of the period 2015 to 2017 indicates that the reversal of Line 9B would increase the average netback price for western Canadian light sweet conventional and light sweet synthetic crude oil by \$0.83 and \$1.24/bbl, respectively. The estimated increase for western Canadian heavy crude oil is approximately \$0.36/bbl.

Also in reference i), Enbridge explains that the analysis assumes that the Imperial Dartmouth, Nova Scotia, refinery has been closed, and is no longer a potential market for Line 9B shippers, but that no attempt has been made to estimate the degree to which the remaining Quebec and Atlantic Canada refineries might act to increase their crude oil runs in response to the closure of a local competitor, and thus increase demand for Line 9B shipments.

In reference ii), Enbridge provides details respecting the calculation of the estimated refiner input cost savings attributable to the Project.

**Request:** a) Please confirm that the calculations of the estimated refiner input cost savings in reference ii) include the netback increase expected in 2015-2017 as described in reference i). If not confirmed, please describe how the netback increase expected will impact refiner input cost savings in 2015-2017 and discuss the expended impact on refiner input cost savings post-2017.

b) Although Enbridge states in reference i) that the degree of potential increased demand by Quebec and Atlantic Canada refineries due to the closure of a competitor has not been estimated, please confirm that Enbridge's allocation of uncommitted capacity will enable it to meet its common carrier obligations should there be an increased demand for uncommitted capacity as suggested in reference i).

**Response:** a) The calculations of the estimated refiner input costs savings in reference ii) do not include the netback increase expected in 2015-2017 as described in reference i). The analysis in reference ii) implicitly assumed that the price effects on domestic crude oil of the Line 9B Reversal Project were relatively small and could be disregarded. Assuming that average netback prices were to increase by the amounts stated in the preamble (and all other assumptions are as per the base case in “An Evaluation of the Economic Impacts on Canada of the Enbridge Line 9B Reversal Project” (Attachment 1 to Stratégies Énergétiques IR 1.4a) (“Demke Report”)), the refinery

input cost savings reported in the Demke Report would be reduced by approximately \$90 million per annum during the period 2015 through 2017. The price effects are expected to moderate in subsequent years. Therefore, the refinery input costs post-2017 estimated in the Demke Report would be reduced by a lesser amount.

- b) Confirmed.

#### **4.4 Public reporting of financial information**

- Reference:**
- i) Filing A3D7K2: Line 9B Reversal and Line 9 Capacity Expansion Project Application (Adobe page 5 of 15)
  - ii) NEB Filing Manual, Guide BB – Financial Surveillance Reports (Adobe page 211-213 of 264)
  - iii) Filing A2D0K1 NEB Letter to Enbridge Pipelines Inc., TO-004-2011, Adobe 2 of 5.
  - iv) Filing A1Z9I1, Line 9 Settlement Appendices, Paragraph 30, Adobe 18-19.

**Preamble:** In reference i), Enbridge states that it may publicly disclose the volume of Crude Petroleum tendered to the Carrier by the categories of: i. Light Crude Petroleum; ii. Medium Crude Petroleum; and iii. Heavy Crude Petroleum, on a consolidated basis, so long as each category is comprised of volumes from at least three Shippers.

In reference ii), the Board states that Group 1 companies must report some base level financial surveillance information, including throughput information by service type.

Reference iii) is the Board Letter and Order approving the Line 9 Settlement Agreements and granting Line 9 an exemption from, among other requirements, the requirement to keep the system of accounts as prescribed by the Oil Pipeline Uniform Accounting Regulations and the requirement to comply with the reporting and filing requirements set forth in the Board's Filing Manual, Guide BB entitled Financial Surveillance Reports. In the letter the Board noted that it considered the relatively short time frame of the Line 9 settlement.

Reference iv) explains the provisions that will terminate the Line 9 Settlement, one of which is that Line 9, or any portion thereof, is in service to provide eastbound transportation.

- Request:**
- a) Please provide detail regarding what information would be publicly disclosed in the event there are not three shippers in each category of crude as described in reference i). Please provide a rationale if no public disclosure be planned.
  - b) Please explain how Enbridge will meet the Board's filing requirements outlined in reference ii) when Line 9 or any portion thereof is reversed, and, if relevant, explain the relief Enbridge expects to seek from the Board.

- Response:**
- a) Enbridge considers shipper throughput information to be confidential. Article 6(b) of the Draft Pro Forma Line 9 Rules and

Regulations Tariff states that Enbridge “may publicly disclose the volume of Crude Petroleum tendered to the Carrier... so long as each category is comprised of volumes from at least three Shippers.” In the event there are not three shippers in each crude category, Enbridge would either disclose the aggregate volume across all three crude categories or file the information with the Board in confidence.

- b) Enbridge will be seeking exemption from the filing requirements specified in Guide BB of the *Filing Manual*. Enbridge proposes to file with the Board, on an annual basis, audited annual consolidated financial statements instead of the information specified in Guide BB. Enbridge submits that the requested exemption is consistent with past practice as the filing of audited annual consolidated financial statements combined with the existing NEB audit provisions will provide the Board with the information required to evaluate and monitor financial information.

Additionally, Enbridge will be seeking exemption from the requirement to keep the system of accounts prescribed by the *Oil Pipeline Uniform Accounting Regulations* (“OPUAR”). Enbridge proposes to continue to maintain its existing chart of accounts for Line 9 and otherwise which is consistent with past practice. Enbridge complies with paragraphs 5(1)(a) and 5(1)(b) of the OPUAR vis-à-vis Line 9 and otherwise. Enbridge does not keep its general ledger according to the prescribed system of accounts, as would be required by paragraph 5(1)(c) absent an exemption. Enbridge instead maintains its general ledger according to its own chart of accounts. However, Enbridge also maps the accounts from its general ledger to the prescribed system of accounts. Enbridge would therefore be able to recast its general ledger according to the prescribed system of accounts if, and whenever, the Board were to require it to do so.

#### 4.5 *Economic impacts of the Project*

- Reference:**
- i) Filing A3I6T6, Enbridge Response to Stratégies Énergétiques IR 1.4a Attachment 1, 25 June 2013;
  - ii) Filing A3J8A7, IHS Global Canada Report, 6 August 2013, (Adobe page 40 of 52).

**Preamble:** In reference i), Enbridge provides an evaluation of the economic impacts on Canada of the Project. Adobe page 9 of reference i) states that “the refinery feedstock savings effects are predominant and overwhelm the pipeline effects (construction and operations) even though only the direct effects have been included.” In 2025, the savings of replacing mixed sweet with bonny light to Montreal would be \$14.07 per barrel.

Adobe page 20 of reference i) explains that the Project provides Quebec refineries with access to crude oil supplies from western Canada and the Bakken region of North Dakota. Adobe page 29 states that the base case domestic replacement oil is 50% Medium Sweet and 50% Sweet Synthetic. Adobe page 37 describes the sensitivity analysis of domestic oil used in the two refineries as split 40% Mixed Sweet (MSW), 40% Sweet Synthetic, and 20% Bakken. This analysis causes the base case GDP direct and indirect impact to fall from \$24.9 billion to \$22.3 billion.

Adobe pages 36-37 of reference i) describe the sensitivity analysis increasing and decreasing the Enbridge projections of price differentials by 50%. With a 50% higher price differential, the overall project GDP direct and indirect impact is \$36.7 billion.

With a 50% lower price differential the overall project GDP direct and indirect impact is \$13.2 billion.

Adobe page 36 of reference i) states that “[p]rice differentials have exhibited high variability.” The report was finalized on 30 August 2012.

Reference ii) is the IHS Report on the impact of the Project on Quebec Refineries prepared on behalf of two committed shippers on Line 9B. The Report includes an analysis of the refining economics by replacing Bonny Light with MSW. In 2025, the savings of replacing 100% Bonny Light with 100% MSW in Montreal would be \$6.44 per barrel. The IHS Report was finalized in July 2013.

- Request:**
- a) Please discuss why the base case scenario in reference i) does not include any Bakken oil as the replacement oil for imported oil, given the Project is stated to provide Quebec refineries with access to crude oil supplies from western Canada and the Bakken region of North Dakota.
  - b) Please discuss the likelihood of the realization of each of the high

and low oil price sensitivity analyses and the factors that are expected to influence such outcomes, such as the successful completion of other major oil pipeline projects.

- c) Has Enbridge updated its evaluation of the economic benefits using more recent pricing forecasts? Please explain why or why not, and discuss if adopting the price forecast in reference ii) may impact the assessment of the economic benefits from the Project described in reference i).

- Response:**
- a) Under any modeling exercise, assumptions must be made. In the base case it was assumed that all of the replacement supply into Montreal was from domestic sources and a sensitivity case assuming 20% Bakken oil in the replacement crude mix was also presented. In the sensitivity case the estimated feedstock cost saving over 30 years was reduced by only 11% from the base case estimate (please refer to Attachment 1 to Équiterre IR 3.6.a).
  - b) For the base case oil price differentials and for the high and low price sensitivity analysis in which differentials were increased and reduced by 50% respectively, it is recognized that the further out the forecast extends the less confidence there can be in the projections. However, price differential changes are a function of transportation rates which are more stable than, and do not change as rapidly as, oil and gas prices. The base case price differentials were interpreted as a most likely scenario, and the sensitivities of +50%/-50% were arbitrarily selected. The likelihood of price differentials trending to a lower level appears to be higher than the likelihood of price differentials trending to a higher level.

In the current environment of a large resource base, growing hydrocarbon production and significant infrastructure constraints, the price differentials between certain benchmark crudes and similar grades of crude oil in western Canada have been substantial. The commissioning of additional pipeline capacity such as Keystone XL, Flanagan South, Northern Gateway Pipeline and Line 9B Reversal (as well as rail capacity) could be expected to result in a narrowing of the wide price differentials. Price relationships are also influenced by committed volumes on high capacity pipelines. A committed shipper's incremental cash costs to ship on the pipeline to which it is committed is close to zero, and that fact influences the shipper's behaviour. Other influences at play that could contribute to widening of the differentials include varying escalation in future transportation costs depending on the mode of transportation (e.g., tanker, rail, pipeline), delays in the start-up of needed pipeline capacity, and increased volumes of western Canadian crude oil

accessing markets beyond the traditional historical markets.

- c) Enbridge has not updated its evaluation of the economic benefits using more recent pricing forecasts. The actual benefits realized from the Project will be determined by the market – with shippers selecting from a range of crude oil supply options available to them and responding to price signals from the marketplace. The purpose of the Project is to respond 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. The committed shippers are, apparently, sufficiently confident of expected savings that they have entered into 10 year ship-or-pay contracts for eastward service on Line 9B.

Adopting the price forecast in reference ii) would impact the assessment of the economic benefits described in the Demke Report. An estimation of that impact is provided in Attachment 1 to NEB IR 4.5.c. The cumulative feedstock cost savings for the period 2014 to 2043 implied by the price differential forecasts from reference ii) were calculated (rebased to 2012 C\$). The feedstock cost savings were also calculated using the price differential forecasts from reference i) and assuming that domestic Mixed Sweet (“MSW”) substitutes for imported Bonny Light (comparable to the assumption in reference ii). Two cases were considered: deliveries 50% Montreal/50% Quebec City, and deliveries 35% Montreal/65% Quebec City.

#### **4.6 Capacity constraints**

**Reference:** i) Filing A3J8C0 Evidence of Suncor Energy Marketing Inc., 6 August 2013 Adobe 8 of 8;

ii) Filing A3I6T9 Enbridge Response to Marathon IR No. 1, 25 June 2013 Adobe 2 of 3.

**Preamble:** In reference i), Suncor explains that it is constructing limited rail offloading capability at Montréal which is anticipated to be in service later this year. The rail facilities will be used to mitigate any crude supply shortfalls due to any constraints on the Enbridge Mainline that may limit the delivery of Suncor's Line 9 committed volumes into Sarnia particularly during the initial years of a Line 9 re-reversal.

In reference ii), Enbridge states that Line 5 and Line 6B have the ability to supply crude oil to be transported by the Project.

**Request:** a) Please discuss the likelihood for crude supply shortfalls due to any constraints on the Enbridge Mainline that may limit the delivery of Line 9 committed and uncommitted volumes into Sarnia particularly during the initial years of a Line 9 re-reversal.

b) Should it be necessary, please discuss how volumes will be prioritized on the Enbridge Mainline to facilitate the delivery of Line 9 committed volumes.

**Response:** a) Given the existing capacity expansion plans for the Enbridge pipeline system and the forecasted volumes for the system, no constraints that would impact deliveries to Line 9 are presently foreseen.

b) Capacity constraints on the Enbridge Mainline upstream of Line 9 could potentially impact delivery of Line 9 committed volumes. In such circumstances, volumes on the Enbridge Mainline would not be prioritized to facilitate the delivery of Line 9 committed volumes. Rather, the available capacity would be allocated among shippers in accordance with the relevant provisions of the Enbridge Mainline tariff in effect at the time.

## Engineering Matters

### 4.7 Pressure Surge Analysis and Mitigation

**Reference:** i) Filing A3I6Q1: Enbridge Response - Attachment 1 to NEB IR 3.9

(Adobe page 6 of 6);

ii) Filing A3I6R4: Enbridge Response to Équiterre Information Request

No. 1.1 k. (Adobe page 4 of 17);

iii) CSA-Z662-11 Oil and Gas Pipeline Systems, Clause 4.18.1.2.

**Preamble:** In Table 3.1 of reference i) Enbridge has presented the summary of critical results relative to Line 9 Pressure Surge Analysis under certain operating conditions. These results include five scenarios that could cause a mainline pressure to exceed 110% of the maximum operating pressure (MOP) of the pipeline. Enbridge has further specified some mitigation measures to protect Line 9 against these overpressure events.

In reference ii) Enbridge has submitted that remote controlled mainline valve closures are not considered to cause the greatest transient pressure on this pipeline due to the longer closing time and control logic associated with these valves compared to that of a pressure control valve (PCV). The transient pressure associated with the PCV has been analyzed and therefore a transient analysis of the remote controlled mainline valves is not considered necessary.

Reference iii) states that “where failure of the pressure-control system, or other causes, can result in the maximum operating pressure of the piping being exceeded, overpressure protection shall be installed to ensure that the maximum operating pressure is not exceeded by more than 10% or by 35 kPa, whichever is greater”.

The Board notes that although the greatest transient pressure may not be caused by remote controlled mainline valve closures (or manually controlled valves), Enbridge did not provide any value for the maximum transient pressure that could be reached in the events of such valve closures. Further, Enbridge did not evaluate potential overpressure scenarios such as multiple failure modes involving a station PCV closure with malfunction in station communication (COMM-OUT) and the closure of a downstream mainline valve (by operator error, failure of the pipeline control logic system, incident downstream the station, etc.). In these multiple failure scenarios station bypass check valves may not be efficient for North Westover, Hilton, and Cardinal stations. A station bypass check valve would not be able to provide equivalent level of protection as a surge relief tank (i.e., the case in Montreal).

**Request:** Please provide:

- a) In a similar format to that of reference i), a Mainline Transient Analysis Summary Report for all of Line 9 that takes into account the proposed increase in capacity and the closure of mainline valves (remotely and manually controlled). As in reference i), the report shall identify worst-case pressure transient scenarios including multiple failure modes discussed above as they relate to the proposed MOP of a reversed Line 9.
- b) For each identified overpressure scenario, a discussion on mitigative measures in order to comply with Clause 4.18.1.2 of CSA Z662-11.

**Response:**

- a - b) During development of the engineering design standards for the transient hydraulic analysis of Enbridge facilities, a comprehensive review of both Enbridge's operational history and project related design studies was undertaken. The purpose was to establish a set of credible abnormal operating conditions having a reasonable probability of causing an over-pressure event in a mainline or terminal piping system. Internal and third party experts were involved in the review. Based on the review, closure of mainline block valves has not been included in the standard suite of scenarios that are evaluated by Enbridge in its transient hydraulic analyses. Closure of mainline block valves is not considered by Enbridge to be an abnormal operating condition that poses a credible risk of over-pressure on the Enbridge system in light, in particular, of the following considerations:
  - i. the fact that the system control logic would automatically shut down the pipeline if a mainline block valve were to begin to vary from a fully open status;
  - ii. each mainline block valve and actuator is designed to ensure that the valve is closed slowly (typically over three minutes), thereby minimizing the potential for a pressure surge to occur; and
  - iii. Enbridge has no operational experience that indicates that the closure of mainline block valves is a cause for concern with respect to pipeline over-pressures.

For the foregoing reasons, the Line 9 Transient Analysis Summary report did not include any scenarios involving closure of mainline block valves. Enbridge cannot respond more fully to this information request without completing additional modeling and analysis. That additional work has commenced but cannot be completed in time to file the IR responses. Further to Enbridge's letter to the NEB dated September 3, 2013, and the NEB's ruling of September 4, 2013, Enbridge plans to file the following information

with the Board by September 30, 2013:

- a. A transient hydraulic study for each pump station-to-pump station segment of Line 9 that considers a multiple failure scenario in which: the discharge pressure control valve at the downstream pump station closes while that pump station has experienced a communication malfunction (COMM-OUT), in conjunction with the simultaneous closure of the nearest mainline block valve downstream of the pump station discharge; and
- b. An update to the Line 9B Reversal and Line 9 Capacity Expansion Project Mainline Transient Analysis Summary Report that includes the scenarios listed in (a) above, including an identification of worst-case scenarios and a discussion of any additional mitigating measures that may need to be incorporated into the design or operational philosophy for the system.

#### 4.8 ***Leak Detection System***

- Reference:**
- i) Filing A3I6L7: Enbridge Response to NEB IR No. 3.10 (Adobe page 27 of 43);
  - ii) Filing A3G4R8: Enbridge Response to NEB IR No. 1.25 a (Adobe pages 42 -43 of 46);
  - iii) CSA-Z662-11 Oil and Gas Pipeline Systems (CSA);
  - iv) Filing A3I6Q2: Enbridge Response - Attachment 1 to NEB IR No. 3.10 c (Adobe page 1 of 1).

**Preamble:** In reference i) Enbridge stated that it “exceeds the expectations for class locations set out in CSA Z662-11 Annex E - Table E.1, intervals for data retrieval, maximum calculation intervals, and recommended calculation windows, by applying 5 minute, 20 minute and 2 hour alarm windows, as well as line balance calculations on a 2 and 24 hour period”. Enbridge further stated that this enhances leak detection by enabling alarm annunciation to occur much sooner than the longer 1 hour and daily windows noted in Table E.1. This would suggest that Enbridge has developed Line 9 leak detection program based on spills occurring in a class 1 location only.

In reference ii), Enbridge submitted that the objective of designating the class location is to identify the safety factor needed when determining the pressure design for steel pipe. Enbridge further stated that for the Project, there are no additional protective measures required due to location pursuant to CSA.

The Board notes that the flow in the subject line is more than 2,000 m<sup>3</sup> /h and that Annex E Table E.1 of reference iii) defines flows greater than 150 m<sup>3</sup> /h as high flow. Table E.1 provides requirements relative to material balance maximum calculation intervals and recommended calculation windows for pipelines including high-flow Low-vapour-pressure (LVP) transmission pipelines in every class location. For example, regarding the maximum calculation interval for high-flow LVP pipelines in a Class 2, 3 or 4 location, two calculations must be done every 5 minutes, one calculation every 24 h, one calculation every week, and one calculation every month. These expectations (recommended practices) are intended to manage oil spill consequences by taking into account pipelines actual class locations (i.e., high populated locations versus remote areas) regardless of the design location factor (or safety factor) mentioned by Enbridge in reference ii). The Board notes that Line 9 facilities and pipelines were built in 1970s. Since that time cities and other sensitive areas have grown along the pipeline right-of-way.

In reference iv), Enbridge has submitted its estimated sensitivity for Line

9B Computational Pipeline Monitoring System alarm windows.

- Request:** Please provide:
- a) Details of how Enbridge leak detection system, for the entire Line 9, will meet or exceed the expectations regarding class location as set out in CSA Z661-11 Annex E table E.1.
  - b) Taking into account measurement and operational considerations set out in CSA Annex E clause E.3.2, please provide the uncertainty in the receipt and delivery values used in Line 9 material balance calculation for 5 minutes, one week, and one month. Please explain the relationship between this uncertainty and the estimated sensitivity in reference iv).
  - c) An update of current class location designations for all facilities and pipeline portions involved in this Project from Sarnia to Montréal.
- Response:**
- a) The Enbridge implementation of the Material Balance System (“MBS”) leak detection system uses the same approach in all class locations for the “high” flow case for all the service fluids identified in Table E.1. The “maximum calculation interval” for all MBS cases is one minute or less. This exceeds the Table E.1 Class 1 and Class 2/3/4 shortest intervals of 1 hour and 5 minutes respectively.  
The three MBS calculation windows are 5 minutes, 20 minutes and 2 hours. These replace the 5-minute, one-hour and 24-hour “recommended calculation windows” identified in Table E.1. The MBS windows exceed the equivalent Table E.1 recommended windows in Class 1 (one-hour and 24-hour). The MBS windows meet the Table E.1 5-minute window recommendation for Class 2/3/4 locations.
- Prior to the reversal of Line 9B, Enbridge commits to incorporating longer term calculation windows in an automated line balance monitoring system on Line 9 based on service fluid measurements for one day, one week and one month calculation windows. The functionality of these Computational Pipeline Monitoring (“CPM”) systems will meet the “recommended calculation windows” in Table E.1. including the 24-hour, one week and one month windows identified for Class 1 and Class 2/3/4 locations. The “maximum calculation interval” for this automated monitoring will meet or exceed the intervals identified in Table E.1 for all class locations.
- The Enbridge CPM implementations for leak detection exceed CSA Z662/Annex E recommendations by using a short calculation interval (maximum one minute) and by using significantly shorter imbalance calculation windows than those indicated in Table E.1. This speeds up leak detection by enabling alarm annunciation

to occur sooner than the longer 1-hour and 24-hour windows recommended in Table E.1.

- b) The measurement uncertainty for delivery and receipts in all three MBS windows is defined by the accuracy of flow measurements. The accuracy target for flow measurements is better than 2% of actual flow rate. This measurement uncertainty would be the limiting factor affecting sensitivity for all imbalance periods that use flow meter measurements.
- c) Given the information provided in response to NEB IR 4.8.a that the Line 9 leak detection system does or will meet or exceed the requirements of CSA Z662 Annex E Table E.1 for all class locations (i.e., Class 1, 2, 3 and 4), Enbridge submits that an update of current class location designations for the Project should not be required.

## Environment Matters

### 4.9 Emergency Spill Response Planning

- Reference:**
- i) Filing (A3J7G2): City of Hamilton – Letter of Comment (Adobe pages 2 and 5 of 6);
  - ii) Filing (A3J5X5): Town of Ajax – Letter of Comment (Adobe page 4 of 4);
  - iii) Filing A3J5Z0: City of Kingston – Letter of Comment (Adobe page 2 of 3);
  - iv) Filing A3J7Z2: City of Toronto – Written Evidence (Adobe pages 4-6 of 20);
  - v) Filing A3J6L7: City of Burlington – Letter of Comment (Adobe page 2 of 3);
  - vi) Filing A3J3F1: The Regional Municipality of Durham – Letter of Comment (Section 4.2; Adobe page 6-7 of 20);
  - vii) Filing A3J7Q8: City of Mississauga – Written Evidence of the City of Mississauga (Adobe page 4 of 6);
  - viii) Filing A3J9A6: La Municipalité de Ste-Justine-de-Newton – Letter of Comment (Adobe pages 8 and 9 of 14);
  - ix) Filing A3J713 : Preuve écrite – Municipalité de Très-Saint-Rédempteur (Adobe page 8 of 13);
  - x) Filing A3J6K9 : Preuve écrite – Municipalité Régionale de Comté de Vaudreuil-Soulanges (Adobe page 10 of 22).
  - xi) *Onshore Pipeline Regulations.*

**Preamble:** In reference i) the City of Hamilton is of the view that Enbridge is not prepared to provide municipal emergency responders with the level of information that would enable these first responders to properly plan and prepare for the most effective coordinated response in the event of a pipeline related emergency.

In reference ii) the Town of Ajax indicates that Enbridge has not established a relationship with the Town in order to provide information such as stormwater management locations for emergency response purposes. They further indicate that spill response plans are not provided

by Enbridge to municipalities in advance. The Town of Ajax is of the view that municipal-specific plans that outline roles and responsibilities for local and regional municipal staff, emergency response personnel, conservation authorizes and the ministry of the Environment is vital for municipalities to have an understanding, in advance of a spill occurrence, of the actions that need to be taken to protect the public and the environment.

In reference iii) the City of Kingston expressed an interest in seeing a rigorous system of emergency preparedness and emergency response put in place that coordinates training, mock exercises and response between all local pipeline operators and local emergency responders.

In reference iv) the City of Toronto notes that the revised Enbridge Emergency Manual provided during the line 9B proceeding is a “generic” document that does not address emergency response in Toronto specifically. The City of Toronto suggests a meeting with other emergency service providers in order to review and consider the Enbridge spill response protocol.

In reference v) the City of Burlington is of the view that a coordinated response plan should be put in place and that plan must leverage the capabilities of local emergency response teams.

In reference vi) the Regional Municipality of Durham suggest hands on emergency response training sessions and simulated spill events with affected municipalities, frontline responder and stakeholders to specifically address local concerns and area specific measures that may be required in the Emergency Response Plan.

In reference vii) the City of Mississauga states that Enbridge has not conducted an Emergency Response Exercise with City staff first responders.

In reference viii) and reference ix) the Municipalities of St-Justine-de-Newton and Très-Saint-Rédempteur request participation of their responders and appropriate emergency services with respect to training and collaboration on the Emergency Responses Plan for Line 9.

In reference x) the Municipalité Régionale de Comté de Vaudreuil-Soulanges requests that Enbridge provide information to its emergency services as well as to be consulted and involved in the Emergency Response Plan.

The Board notes that sections 33 to 35 of the *National Energy Board Onshore Pipeline Regulations* (OPR) are as follows:

**33. A company shall establish and maintain liaison with the agencies that may be involved in an emergency response on the pipeline and shall consult with them in developing and updating the emergency procedures**

*manual.*

**34.** *A company shall take all reasonable steps to inform all persons who may be associated with an emergency response activity on the pipeline of the practices and procedures to be followed and make available to them the relevant information that is consistent with that which is specified in the emergency procedures manual.*

**35.** *A company shall develop a continuing education program for the police, fire departments, medical facilities, other appropriate organizations and agencies and the public residing adjacent to the pipeline to inform them of the location of the pipeline, potential emergency situations involving the pipeline and the safety procedures to be followed in the case of an emergency.*

**Request:**

1. Please describe how Enbridge has met the requirements of each of sections 33 to 35 of the OPR for the Project, or, where any requirement(s) has not been met, provide a detailed action plan and schedule for meeting the requirement(s).
2. In responding to the above question, please describe the following:
  - a) the stakeholders, agencies and other organizations that were engaged;
  - b) the details of information provided to each of the stakeholders, agencies and other organizations;
  - c) the dates information was provided or meetings were conducted with each of the stakeholders, agencies and other organizations;
  - d) the comments or concerns that were expressed by the stakeholders, agencies and other organizations that were engaged, if any; and
  - e) the actions proposed by Enbridge to address each comment or concern expressed, or if Enbridge considers no action is required to address the comment or concern, the rationale for not addressing the comment or concern.

**Response:**

**Stakeholders, Agencies and Organizations Engaged**

***Public Awareness Program***

Enbridge meets annually with stakeholders and emergency response agencies along Line 9 in accordance with the Enbridge Operations and Maintenance Manual (“OMM”) Book 1 section 03-02-02 - Public Awareness Program standard. Book 1 is on file with the NEB, and a redacted copy of Book 1, including the complete section 03-02-02, was filed as Exhibit B-25D in the Line 9 Reversal Phase I proceeding (OH-

005-2011).

The purpose of the Public Awareness Program (“PAP”) is to continually educate the public adjacent to the pipeline right of way (“ROW”), as well as police and fire departments and other organizations/agencies, about the location of the pipeline and the pipeline safety procedures to be implemented in the unlikely event of a release.

Through the PAP, Enbridge contacts landowners and tenants on the Line 9 ROW and neighbours within 60 m of the ROW annually by mail.

Enbridge also personally visits landowners, tenants and neighbours every three years. Please refer to response to Ontario IR 1.51.b and response to Toronto IR 2.23.d for a description of information provided annually to landowners as part of the PAP.

Further, Enbridge contacts local agencies (including emergency responders) within 20 kilometres of the pipeline ROW annually by personal visit. As part of the PAP, Enbridge addresses emergency response information including the roles to be played by Enbridge and the response organizations in the event of an emergency on the Enbridge system. Information gathered from these meetings is reviewed by Enbridge each year to determine if changes to the Emergency Response Plan (“ERP”) are necessary.

Please refer to Attachment 1 to NEB IR 4.9 for a listing of stakeholders, agencies, and other organizations that were engaged in emergency response discussions as part of the Enbridge PAP in 2012. 2013 information is not yet available as the 2013 PAP is ongoing.

### ***Project-Specific Engagement***

As stated in response to NEB IR 3.11, the location of Line 9 will not change, nor will the ERP for Line 9 change, as a result of the Project. Therefore, Enbridge submits that the information it has historically provided and continues to provide to stakeholders as part of its PAP meets the requirements of each of sections 33 through 35 of the *National Energy Board Onshore Pipeline Regulations* (“OPR”) for the Project. However, in addition to the PAP meetings and to further satisfy the requirements of sections 33 to 35 of the OPR for the Project, Enbridge has conducted Project-specific meetings with various municipal governments between May 2012 and July 2013. In each of these meetings, Enbridge provided details regarding how Enbridge responds to an emergency and Enbridge’s expectations of emergency response organizations.

### ***Municipalities***

Enbridge consulted with the following municipalities between May 2012 and July 2013 in Project-specific meetings:

Ontario

- City of Belleville
- City of Brockville
- City of Burlington
- City of Cambridge
- City of Cornwall
- City of Hamilton
- City of Kingston
- City of Kitchener
- City of London
- City of Oakville
- City of Oshawa
- City of Pickering
- City of Quinte West
- City of Sarnia
- City of Scarborough
- City of Toronto
- City of Mississauga
- City of Waterloo
- County of Alnwick-Haldimand
- County of Brant
- County of North Dumfries
- County of Leeds & Grenville
- County of Lambton
- Municipality of Brighton
- Municipality of Clarington
- Municipality of Port Hope
- Municipality of Tweed
- Region of Halton
- Region of Durham
- Township of Augusta
- Township of Cramahe
- Township of Dawn Euphemia
- Township of Edwardsburg/Cardinal
- Township of Elizabethtown-Kitley
- Township of Front of Yonge
- Township of Leeds & 1,000 Islands
- Township of Lennox & Addington
- Loyalist Township
- Township of Quinte West
- Township of North Glengarry
- Township of South Glengarry
- Township of Tyendinaga
- Town of Pickering
- Town of Whitby

- Town of Ajax
- Town of Bowmanville
- Town of Colbourne
- Town of Brighton
- Town of Cobourg
- Town of Gananoque

Quebec

- Ville de Montréal Est
- Ville de Montréal
- Ville de Laval
- Terrebonne
- Point-Fortune
- Sainte Anne-des-Plaines
- Mirabel
- Saint-Placide
- Saint-André-d'Argenteuil
- Ville de Rigaud
- Très-Saint-Rédempteur
- Sainte-Justine-de-Newton

***Emergency Response***

Each year, in addition to the PAP requirements, Enbridge personally delivers important information about pipeline safety to emergency response agencies within a 20 km corridor along the Line 9 ROW. In 2012 Enbridge provided the emergency response agencies and municipalities with USB memory sticks loaded with various information including:

- “Important Safety Information for Emergency Responders” brochure containing information about pipeline safety precautions and emergency telephone numbers specific to first responders;
- Material Sheet Data Sheets (“MSDS”) on products transported on the Enbridge pipeline system;
- “Pipeline to Safety” video, explaining pipeline construction and maintenance program; and
- A series of maps for each county to show where the pipeline crosses to enable emergency responders to better identify the pipeline routing and become familiar with the location of Enbridge facilities. These maps were provided in response to requests received from emergency responders in 2011.

During the Project-specific meetings with municipalities between May 2012 and July 2013, the following emergency response topics were discussed by Enbridge:

- Regional personnel on-call 24/7 who are trained to respond to

- pipeline emergencies
- Spare materials on hand (pipe, fittings, etc.)
  - Response equipment on hand (boom, skimmers, pads, etc.)
  - Steps of emergency response plan
  - Enbridge works to ensure safety of the public and its employees
  - Protection of the environment
  - Resume operation only after the above two objectives have been met
  - Work in partnership with municipal response agencies for coordinated response

### **Comments or Concerns Received**

As part of the PAP, Enbridge records all questions and concerns raised by stakeholders, agencies and other organizations. No concerns regarding emergency response or safety were raised by landowners as part of the 2012 PAP.

At the emergency response meetings, the comments and questions raised during the 2012 PAP were consistent and focused on the following issues:

1. How much oil would be released in the event of a pipeline incident?
2. How long would it take Enbridge to arrive onsite in the event of a pipeline incident?
3. Does Enbridge operate under an Incident Management System?
4. Can Enbridge provide a map of its pipeline location?

Enbridge was able to respond to the first three of these questions raised by emergency responders within the meetings with the response agencies.

In response to the requests for maps of the pipeline location, Enbridge began providing maps to local responders in 2012. By the end of the 2013 PAP, all first responders will have received maps of the pipeline.

The questions raised during the Project-specific municipal meetings were also consistent. The questions, as well as the responses provided or actions taken by Enbridge, are detailed below.

- How long would the response take to their specific community?  
**Enbridge Response:** Enbridge responded to this question whenever, and at the time that, it was asked. As a result, Enbridge is of the view that no further action is required to address this question.
- What has Enbridge done, or is it doing, to train municipal responders to respond to an oil spill?

Enbridge Response: The PAP informs municipal responders regarding actions to be taken in response to an incident. In addition, on average, Enbridge conducts 15 spill response exercises each year – including field and table-top style activities. Enbridge invites various response agencies to participate in these exercises which allows Enbridge the opportunity to build relationships and for Enbridge and the agencies to learn from each other. For example, Enbridge conducted a table top exercise related to the Don River crossing on August 21, 2013. Toronto Water and Police Services attended the exercise. Toronto Fire declined.

In early 2013, Enbridge announced a new on-line training program for emergency responders ([mypipelinetraining.com](http://mypipelinetraining.com)) and has been identifying the free, four-hour modular program to fire training officers and fire chiefs along the Line 9 ROW with positive feedback to date.

In response to specific questions received from the City of Toronto and the City of Hamilton, Enbridge is currently working on follow-up action items regarding localized response strategies for the Greater Toronto Area (“GTA”) and the City of Hamilton.

- What special response measures are in place to protect sensitive ecosystems such as wetlands, watersheds, creeks and rivers?

Enbridge Response: The Enbridge ERP has been provided (in redacted form) to all intervenors (please refer to response to Ontario IR 1.44.b.v). Enbridge intends to meet with regional Conservation Authorities along the Line 9 ROW prior to completion of Project construction in order to review the full ERP and to discuss detailed emergency response plans. On August 27, 2013, Enbridge met with staff from the Toronto and Region Conservation Authority (“TRCA”) to review response plans and strategies for key water crossings in the GTA.

Enbridge has compiled a spill response directory that identifies sensitive areas that Line 9 crosses. Enbridge has completed control point mapping for all of the waterways in Ontario and Quebec that the pipeline crosses and has identified strategic locations for deployment of spill containment and recovery equipment to effectively remediate a spill to these waterways.

- Does transport of diluted bitumen create new emergency response issues?

Enbridge Response: Enbridge responded to this question whenever, and at the time that, it was asked. As a result, Enbridge is of the view that no further action is required to

address this question.

Certain communities have voiced specific concerns in submissions in this proceeding. Enbridge responds as follows, in addition to the information presented elsewhere in this IR response and in Attachment 1 to NEB IR 4.9:

City of Hamilton:

Enbridge representatives met with City of Hamilton Fire Chief Rob Simonds and senior staff on May 22, 2013 to discuss the Department's information requirements and steps to provide additional information. Enbridge is compiling the requested information and is scheduled to meet again with Hamilton Fire in late September, 2013.

Town of Ajax:

An Enbridge representative met with Ajax Fire Chief Mark Diotte on January 9, 2013 and discussed Enbridge emergency response procedures. The Chief was provided with a USB memory stick containing pipeline information and maps, emergency response procedures, information videos and emergency contact information. Enbridge will contact the municipality to determine with whom to discuss the town's stormwater management concerns.

City of Kingston:

An Enbridge representative met with Kingston Fire Chief Rheaume Chaput on March 14, 2013 and discussed Enbridge emergency response procedures. The Chief was provided with a USB memory stick containing pipeline information and maps, emergency response procedures, information videos and emergency contact information.

Enbridge has been working with Kingston executive officer Greg Robinson on a project to provide a pipeline valve assembly to the Kingston Fire Training Centre for use by first responders as a training aid. Enbridge anticipates that the valve assembly will be delivered to Kingston before the end of 2013.

On August 7, 8 and 9, 2012 an Enbridge training consultant provided emergency response program training in Kingston to the Kingston Fire Department. The training covered Enbridge response tactics and resources and outlined roles for municipal responders supporting the incident response.

City of Toronto:

Since June 2013, Enbridge has been working with Captain William Brown, Senior Training Officer Toronto Fire Services, to implement the new Enbridge online training program "mypipelinetraining.com" for

the City of Toronto Fire Department. Captain Brown has indicated an intention to have all 3,500 Toronto Fire Department members complete the training.

On August 27, 2013 subject matter experts from Enbridge met with staff at the TRCA to review and discuss Enbridge's emergency response plan for the GTA. Key areas for further discussion and planning were identified. As mentioned above, key water crossing tactical response plans were discussed and opportunities for information sharing highlighted.

Enbridge will be establishing a pipeline maintenance work crew in Mississauga commencing in the third quarter of 2014. This crew would respond in the unlikely event of any pipeline incident in the GTA. The crew's location would improve Enbridge's response time to a pipeline incident within the GTA. This addresses concerns regarding emergency response time expressed by the City of Toronto, the TRCA and others within the GTA.

City of Burlington:

An Enbridge representative is scheduled to meet with Burlington Fire Chief Tony Bavota on September 13, 2013. This meeting will serve as an opportunity to review the Enbridge emergency responder PAP information package and the new online training program available for first responders. Enbridge will also use the occasion to obtain further clarification from the Fire Chief as to how Enbridge can best work with the Burlington Fire Department to ensure a clear understanding of Enbridge's regional response plan and how Burlington Fire Department would support such a response if needed.

Regional Municipality of Durham:

First responder training sessions were conducted in Durham Region in 2012 by an Enbridge training consultant on the following dates:

Clarington:	November 5, 12, 19, 22, 26, 27
Whitby:	November 13, 20, 27
Ajax:	November 29, 30, December 6, 7

The Fire Departments in Ajax, Pickering, Whitby and Clarington have been advised of the new online training program for first responders, and an Enbridge representative delivered a presentation to the Ontario Association of Fire Training Officers at the 2013 Ontario Fire Marshall's Conference in Toronto on May 7, 2013. Training officers from Durham Region were in attendance.

City of Mississauga:

Enbridge will approach the Mississauga Fire Department to arrange plans

to conduct a response simulation exercise in 2014.

Municipalities of St-Justine-de-Newton and Très-Saint-Rédempteur:

In November 2012, Enbridge representatives met with Fire Department officials in Très-Saint Rédempteur and Rigaud, Quebec to review emergency responder PAP information. St-Justine-de-Newton is served by the Rigaud Fire Department.

Emergency response exercises in Quebec will be scheduled to occur in 2014.

Municipalité Régionale de Comté ("MRC") de Vaudreuil-Soulanges

The Line 9B pipeline ROW passes through three municipalities within the MRC de Vaudreuil-Soulanges. To date, Enbridge's efforts have focused on sharing information with those directly impacted municipalities. In response to a request from the MRC, Enbridge will be arranging a meeting with MRC staff to convey information on Enbridge's emergency response plans for the Quebec region.

#### **4.10 Emergency Preparedness and Response Program - Hazard Assessment**

- Reference:**
- i) Filing A3J6W5: The Toronto and Region Conservation Authority (TRCA) – Written Evidence August 2, 2013 (Adobe pages 5, 14-22 and 28 of 30);
  - ii) Filing A3J6Z0: TRCA – Exhibit P – Technical Guidelines for the Development of Environmental Management Plans for Underground Infrastructure Revised – July 2013 (Adobe pages 1-5 of 5);
  - iii) Filing A3J7Q1: Environment Canada – Written Evidence (Adobe page 3 of 20);
  - iv) Filing A3J7G9: Bart Hawkins – Letter of Comment (Adobe page 16 of 20);
  - v) Filing A3I3R2: Great Lakes and St. Lawrence Cities Initiative (GLSLCI) – Comments and Questions (Adobe page 13 of 18);
  - vi) *National Energy Board Onshore Pipeline Regulations*, SOR/99-294 (OPR).

**Preamble:** In reference i) TRCA submits that Enbridge must take a proactive approach in addressing pipeline exposure and failure, spill response training, and rehabilitation and restoration planning for each of TRCA's nine watersheds.

TRCA, reference ii, has provided guidelines that were developed for a proactive approach to managing potential failures or fractures of pipelines in valley and stream corridors and wetland areas, and as a means of ensuring the protection, mitigation and restoration of terrestrial, aquatic and public park systems of the TRCA.

In reference iii) Environment Canada recommends that the proponent's emergency spill response plan includes the latest data on migratory birds, species at risk, protected areas and waterfowl gathering areas that could be encountered along the existing pipeline and downstream watercourses.

In reference iv) Mr. Hawkins indicates that a wide range of initial conditions must be considered in order to adequately assess the risk of spills in the environment.

In reference v) the GLSLCI enquired about consultation with local and regional water protection staff and relevant departments and/or agencies responsible for the supply of drinkable water to identify possible threats and how to optimize response plans accordingly.

The Board's top priority is the safety and security of people, and the

protection of the environment and property. The Board notes section 6.5(1)(c) to 6.5(1)(f) of the OPR:

***6.5 (1) A company shall, as part of its management system and the programs referred to in section 55***

...

*(c) establish and implement a process for identifying and analyzing all hazards and potential hazards;*

*(d) establish and maintain an inventory of the identified hazards and potential hazards;*

*(e) establish and implement a process for evaluating and managing the risks associated with the identified hazards, including the risks related to normal and abnormal operating conditions;*

*(f) establish and implement a process for developing and implementing controls to prevent, manage and mitigate the identified hazards and the risks and for communicating those controls to anyone who is exposed to the risks;*

The Board further notes that Section 32 of the OPR states that a company “*shall develop, implement and maintain an emergency management program that anticipates, prevents, manages and mitigates conditions during an emergency that could adversely affect property, the environment or the safety of workers or the public.*”

The Board notes that in order to develop an appropriate and effective emergency management program, companies must clearly understand the hazards posed by their operations and products and identify who or what may be exposed to these hazards. The Board is of the view that taking a proactive approach in the hazard assessment is essential in developing an effective emergency management program.

**Request:** Please provide a discussion on the process or methods used by Enbridge in undertaking a formal hazard assessment of the operation in the development of the emergency management program. Please include the details surrounding spill modeling (for example: density, temperature, spill rate) and the environmental factors used as baseline inputs.

**Response:** Pipeline Risk Assessment Model and Threat Assessment

The Pipeline Risk Assessment model discussed in the revised Line 9B Reversal and Line 9 Capacity Expansion Project Pipeline Risk Assessment (Exhibit B21-2) (“Revised Pipeline Risk Assessment”) comprehensively evaluates the range of applicable threats (corrosion, cracking, rock denting, third party damage, natural forces, ground movement, appurtenances and system operations) and consequences

(impact on population, environment, and business/customers).

The development of the Pipeline Risk Assessment model was initiated by Enbridge in 2000-2001. Since that time the model has undergone annual refinement to ensure that it meets changing business and regulatory requirements. Annual refinement includes addition of new threats and/or enhancements to the evaluation of previously identified threats. The Enbridge threat validation and identification process is based on ASME B31.8S Appendix A and ensures that all actual and potential threats to the liquid pipeline system are identified and included in the Pipeline Risk Assessment model.

### **Consequence Assessment**

#### ***High Consequence Areas***

As discussed in the Revised Pipeline Risk Assessment, the term High Consequence Area (“HCA”) is derived from the U.S. Department of Transport Code of Federal Regulations 195.450. HCAs are sensitive areas in close proximity to a pipeline that in the event of a pipeline rupture have a high probability of being impacted. Enbridge identifies five types of HCA:

1. Highly Populated Area
2. Other Populated Area
3. Drinking Water Resource
4. Environmentally Sensitive Areas
5. Commercially Navigable Waterways

HCA data for the Revised Pipeline Risk Assessment was collected and compiled from various municipal, provincial and federal agencies. In Ontario, the HCA data was collected from the Ministry of the Environment and the Ministry of Natural Resources. In Quebec, HCA data was collected from the Ministry of Sustainable Development, Environment, Wildlife and Parks; the Department of Integrated Water; Department of Natural Resources and Wildlife; and the Data Centre Natural Heritage of Quebec, Department of Ecosystems and Biodiversity. Data is also collected from Environment Canada, Natural Resources Canada, Bird Studies Canada, Internationally Recognized Areas of Environmental Importance (“UNEP-WCMC”), and the Western Hemisphere Shorebird Reserve Network (“WHSRN”).

Population HCAs are defined as residential areas which meet certain criteria with respect to overall population and/or housing density. A “highly populated area” is defined as an area with a population density exceeding 1,000 individuals per 2.6 square kilometres in an urban area of at least 50,000 people. An “other populated area” must have a density of more than 20 dwellings per ½ square kilometre. Both a highly populated

area and other populated area must have a municipal designation of village or greater. The determination of areas meeting the above population criteria was performed based on data from spatial databases, the most recent aerial imagery, and in cases of recent development, Enbridge knowledge of the area.

Drinking water data collected from the above-noted sources was compared against the following criteria to confirm their inclusion as drinking water HCAs:

- The water intake for a community water system (“CWS”) or a non-transient non-community water system (“NTNCWS”) that obtains its water supply primarily from a surface water source and does not have an adequate alternate drinking water source.
- The source water protection area (“SWPA”) for a CWS or a NTNCWS that obtains its water supply from a Class I or Class II aquifer and does not have an adequate alternate drinking water source. Where the SWPA is undefined, the Wellhead Protection Area (“WHPA”) is used until the SWPA is defined.
- The sole-source aquifer recharge area where the sole source aquifer is a karst aquifer in nature.

Environmental data collected from the above-noted sources was compared against the following criteria to confirm their inclusion as environmental HCAs:

- Species is ranked sub-nationally as critically imperiled (S1) or ranked as endangered under the *Species at Risk Act* (“SARA”), by the Committee on the Status of Endangered Wildlife in Canada (“COSEWIC”) or under provincial wildlife or endangered species legislation.
- An area containing an imperiled species, threatened or endangered species, depleted marine mammal species, or imperiled ecological community where the species or community occurrence is considered to be one of the most viable, highest quality, or in best condition, as identified by an Element Occurrence Ranking (“EO RANK”) of A (excellent quality) or B (good quality).
- An area containing an imperiled species, threatened or endangered species, depleted marine mammal species, or imperiled ecological community where the species or community is aquatic, aquatic dependent, or terrestrial with limited range.
- An Important Bird Area (“IBA”), Ramsar Wetland Site, WHSRN Site, UNESCO biosphere reserve program area, Areas of Natural and Scientific Interest (“ANSI”), migratory bird sanctuary, or migratory bird concentration site.

- An ecological community or multi-species assemblage area.

Commercially navigable waterways include waterways on which commercial navigation or transportation is likely. Large watercraft such as barges, commercial fishing boats, freighters and ferries are considered to be commercial navigation.

The TRCA and Environment Canada indicate that they possess data available for consideration by Enbridge in its identification of HCAs. Enbridge would be pleased to receive the data for consideration against the above-noted criteria, and where applicable, include the information in its ongoing assessment of Line 9 risk.

### ***Direct and Transport HCA Impacts and Spill Modeling***

As discussed in the Revised Pipeline Risk Assessment, a pipeline that traverses an HCA is considered to have a “direct” impact on the HCA because any volume of product released would impact the HCA. If an HCA is some distance from the pipeline but could still be impacted through a transport mechanism (e.g., spray, overland flow, water transport), the pipeline section in question is considered to have a “transport” impact on the HCA.

The spill modeling used by Enbridge for identification of HCAs uses the calculated volume out (please refer to response to National Farmers Union IR 2.1.e) to determine the amount of product with potential to impact an HCA. The spill modeling assumes that the calculated volume out is the release volume and does not consider the time that the product will take to reach a given HCA. As a result, the model assumes that the volume out will instantaneously impact the HCA (please refer, for example, to response to Toronto IR 1.30.j.) The commodities considered in the spill analysis include crude oil, diluent, refined products, and diluted bitumen. The topography in which the pipeline exists is also taken into account. If the slope is shallow, the distance that the released product will travel is less than if the slope is steep. The overland spill modeling does not consider the terrain that the pipeline traverses (grassy, treed, rocky, populated, etc.) in determining how far the product may travel overland. It assumes that the surface is featureless and has no barriers to product flow.

In the event of a water impact, where available, site-specific flow information is collected from Environment Canada’s Water Survey of Canada. For water crossings where flow rate data are not available, the transport of liquids on water is calculated as a function of advection and dispersion. To calculate the distance that a release would travel in flowing water before containment, a conservative response and containment time of five hours is used. If the overland spill analysis identifies an intersection with a flowing water body, the method described

above for flowing water bodies is used. The water transport spill modeling does not consider possible interactions of the product with the water body. As a result, it conservatively assumes that all of the calculated volume out will impact HCAs within five hours downstream of the release location.

Pipeline segments with the potential to impact an HCA directly or through a transport mechanism, as well as the HCAs themselves, are published in HCA maps that are kept in the Enbridge Eastern Region offices. The Enbridge Eastern Region offices are responsible for emergency response for Line 9.

#### ***Other Important Areas***

As described in Appendix 1 “Pipeline Risk Assessment Model” of the Revised Pipeline Risk Assessment, population sensitive areas, adjacent land use, and areas of environmental significance are collected and used in the assessment of consequence in the Pipeline Risk Assessment model. These are areas that do not meet the criteria to be classified as HCAs but are nonetheless important and are therefore included in the consequence assessment.

#### ***Consequence Scoring and Release Hazards***

The Enbridge Pipeline Risk Assessment model puts more importance on impact on population over impact on environment which, in turn, is given more importance than impact on business. Population and environment impacts are implied; that is, the model assumes that in the unlikely event of a release, identified population and environment HCAs in the vicinity of the release will be impacted. The model does not consider conditions that may negate the impact to an identified HCA (e.g., weather-related and/or terrain barriers such as grassland, trees, localized topographical features such as knolls, etc.). In considering population and environmental impacts, the model does not consider the specific hazards as a result of the pipeline release (i.e., fire, explosion, toxicity, etc. are not directly considered). Rather, as stated above, these hazards are implied in the assessment of population and environment consequence.

#### **Mainline Risk Assessment Algorithm**

The Enbridge Pipeline Risk Assessment model integrates the results of the corrosion, cracking, and mechanical damage analyses contained in the Pipeline Integrity Management Plan with a) other potential threats (including third party damage, ground movement, natural forces, incorrect operations, and appurtenances) and b) the potential consequences of these pipeline threats (including impact on population, environment, and business/customers).

The integration of this data yields a relative comparison of the risk for the

pipeline (using 305 m segmentation). These results are reviewed annually to determine the need for mitigation activities in addition to those that are already in place for individual threats driving the identified risks.

### **Generated Risk Assessment Results**

Risk is defined as the product of likelihood and consequence (Risk = Likelihood x Consequence) and is calculated for each 305 m risk assessment segment for the pipeline. As a result and for example, if an area has high consequence and the pipeline section passing through it has a low likelihood of release, then the calculated risk value or score will be moderate. If the consequence score is elevated and the likelihood is also evaluated, then the risk value will be higher. Likewise, if both the likelihood and consequence scores are low, then the risk score will also be low.

The risk assessment results generated by the Pipeline Risk Assessment model aid in decision-making, such as that required for the development of the Emergency Response Program, in the following areas:

- Identification of risk management projects. The risk assessment results enable an understanding of the risk drivers so that an optimal combination of risk management activities can be identified, pursued, and implemented.
- Prioritization of projects / optimization of expenditures. The risk assessment results support the prioritization or optimization of expenditures for those areas with the highest risk ranking.

### **Risk Control for Areas of Higher Risk**

Pipeline sections with higher risk are identified and evaluated for application of risk control or mitigation in addition to the risk control already in place. Additional risk control measures may include, for example, emergency response enhancements including the development of tactical response plans and control point mapping enhancements.

### **Emergency Management Program**

The Emergency Management Program utilizes a) the calculated volume out from the Pipeline Risk Assessment model, b) HCAs as identified on the HCA maps and c) environmental sensitivity maps as inputs to the development of control point maps. HCAs are identified and the local conditions are analyzed to ensure Enbridge's response efforts account for all recognized special conditions that may be present.

As part of the Emergency Management Program, Enbridge has developed control point map sets for waterways in Ontario and Quebec that the pipeline crosses. The control point maps identify product containment

and recovery sites as well as strategic locations for deployment of spill containment and recovery equipment to effectively remediate spills to waterways.

The water crossing areas identified by the Pipeline Risk Assessment model as higher risk areas are also considered for additional risk control or mitigation through the development of tactical response plans. Tactical response plans are scenario-specific emergency response plans for select areas that complement the control point mapping. The purpose of a tactical response plan is to provide responders a pre-developed plan of action in the event of an incident, thereby enhancing preparedness.

Response sites are pre-identified and differentiated by response strategy (containment, protection, recovery, staging, etc.) and the resources required to implement the strategy. Typical components of a tactical response plan include: satellite imagery; site photos; site information; access information; water course information; shoreline characteristics; and response strategy information to aid in the development of the Incident Command System (“ICS”) 204 Assignment List form. Please refer to response to Toronto IR 2.23.g for information on tactical response plan development for Line 9.

In the unlikely event of a release from Line 9, HCA and environmental sensitivity maps, along with other sources, would be used to help identify resources at risk in the area. This reference information, together with control point mapping and tactical response plans, represent part of the Enbridge Eastern Region’s Emergency Response Planning documentation and integral elements of the Emergency Management Program.

Enbridge regularly reviews its emergency response plans to ensure that it has comprehensive environmental and population data on its pipeline ROW. Enbridge is always looking to improve its data inputs and would welcome the opportunity to meet with the TRCA and Environment Canada to determine whether additional information could be incorporated into its environmental sensitivity maps and tactical response plans.