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

City of Toronto
Information Request No. 1 to Enbridge
File OF-Fac-Oil-E101-2012-10 02

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NOTE:

This Information Request was prepared with input from staff of other municipalities sharing similar concerns. Specifically, a liaison group was established and met regularly regarding the Application. The liaison group was attended by staff from the Town of Ajax, the City of Burlington, the City of Hamilton, the City of Kingston, the City of Mississauga, the City of Toronto, and other municipal groups.

Engineering Matters

1.1 Integrity Management Plan

Reference:

i) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe page 38 of 54).

ii) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe page 95 of 96).

Preamble:

The Reference i) sets out that the Project will be designed and operated to meet the requirements of the most recent versions of Enbridge's Engineering Standards and Guidelines. Enbridge states that all of their Standards and Guidelines have been filed with the NEB.

In Part 6. Conclusion of the Reference ii) it states the line reversal will not require a modification to the current Integrity Management Plan.

Request:

Please provide the following:

a) The most recent version of Enbridge's Engineering Standards and Guidelines.

b) Enbridge's current Integrity Management Plan.

c) Annotation of modifications to the Engineering Standards and Integrity Management Plan over the course of the last five years in response to regulations as well as issues related to the transportation of heavy crude.

1.2 System Operations

Reference:

Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe page 45 of 54).

Preamble:

In the Reference, which is regarding System Operations, Enbridge states the facilities will be operated in accordance with all applicable regulatory requirements, certificate conditions, licenses and Enbridge's own

operating requirements. In addition, Enbridge states that operating and maintenance procedures and preventative maintenance program will ensure the safe and reliable operation of the equipment and facilities.

Request: Please provide the following:

a) A listing of applicable certificate conditions and licenses applicable to Line 9, Line 9B Reversal and Line 9 Capacity Expansion Project.

b) Enbridge's operating requirements applicable to Line 9.

c) Enbridge's operating and maintenance procedures applicable to Line 9.

d) Enbridge's preventative maintenance program applicable to Line 9.

1.3 Pipeline Integrity and Spill Data

Reference:

i) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe pages 18, 48, and 50 of 54).

ii) Filing A3D7I14: Attachment 7, Pipeline Integrity Engineering Assessment, (Adobe pages 10 and 91 of 96).

iii) Tar Sands Pipelines Safety Risks, Joint Report by Natural Resources Defense Council (NRDC), National Wildlife Federation, Pipeline Safety Trust and Sierra Club, February 2011, page 8.

iv) Filing A3D7J1: Attachment 4f, Letter to Ontario and Quebec Municipalities, Energy Resources Conservation Board, News Release, ERCB Addresses Statements in Natural Resources Defense Council Pipeline Safety Report, February 16, 2011, pages 1 and 2.

Preamble: In References i) and ii) Enbridge indicates an intention to transport heavy crude oil blends on Line 9. Considering that heavy crude will be sourced from Western Canadian (Alberta) fields it is likely that unconventional heavy blends or Diluted Bitumen (DilBit) such as Christina DilBit Blend (CDB), Access Western Blend (AWB), Cold Lake (CL) and Peace River Heavy (PH) will be transported through Line 9 if they meet tariff

specifications.

Reference iii) reports that "*In the Alberta system, 1257 of 2705 spills resulting in releases greater than 26.3 gallons between 2002 and 2010 were attributed to internal corrosion. This constitutes 46.5 percent of all spills on the Alberta system between 2002 and 2010.*"

Reference iv) identifies "*only three spills resulting from internal corrosion for pipelines shipping bitumen and blends of bitumen between 1990 and 2005 (and only eight from 1975 to 2010). The resulting average failure frequency for the grouping of crude oil pipelines from 1990 to 2005 is thus 0.03 per 1000 km per year.*"

Request: Please provide the following:

a) Enbridge's total number of spills in Alberta greater than 26.3 gallons between 2002 and 2010 and the corresponding number of spills attributable to internal corrosion.

b) Enbridge's number of spills greater than 26.3 gallons resulting from internal corrosion for pipelines shipping bitumen and blends of bitumen by year from 1975 to 2010.

c) Enbridge's opinion as to the accuracy of the statement: "*In the Alberta system, 1257 of 2705 spills resulting in releases greater than 26.3 gallons between 2002 and 2010 were attributed to internal corrosion.*"

d) Enbridge's opinion as to the accuracy of the statement that there were "*only three spills resulting from internal corrosion for pipelines shipping bitumen and blends of bitumen between 1990 and 2005 (and only eight from 1975 to 2010).*"

e) If the statements in either c) or d) are inaccurate, explain the inaccuracies.

1.4 Pipeline Integrity and DilBit, SynBit, and DilSynBit Research

Reference:

i) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe pages 18, 48, and 50 of 54).

ii) Filing A3D7I14: Attachment 7, Pipeline Integrity Engineering

Assessment, (Adobe pages 10 and 91 of 96).

iii) Filing A2T1T0/A41505: Response to NEB IR No 5.0, Application for Line 9 Reversal Phase 1 Project (OH-005-2011), (Adobe pages 4 to 6 of 11).

iv) Filing A3D7J1: Attachment 4f, Letter to Ontario and Quebec Municipalities, Jenny Been (2011) "Comparison of the Corrosivity of DilBit and Conventional Crude" Alberta Innovates – Technology Futures

v) CanMetMATERIALS (2012) "Comparison of Corrosivity of Crude Oils Using Rotating Cage Method"

vi) The Pipeline Integrity and Corrosion Management (PICoM) program at Alberta Innovates – Technology Futures.

vii) Study of Pipeline Transportation of Diluted Bitumen, DilBit Committee, Transportation Research Board of the National Academies.

Preamble: In References i) and ii) Enbridge indicates an intention to transport heavy crude oil blends on Line 9. Considering that heavy crude will be sourced from Western Canadian fields it is likely that unconventional heavy blends or DilBit will be transported through Line 9 if they meet tariff specifications.

Reference iii) which is in response to Information Request 5.2 of the Line 9 Reversal Phase 1 Project, states Enbridge has been working with several consultants and research agencies (including the authors of the ASTM G205 Standard Guide) to investigate methods of enhancing hydrocarbon corrosiveness testing and how it could be incorporated into the Internal Pipe Corrosion (IPC) susceptibility analysis. Enbridge will consider the crude corrosiveness test results, once available, to determine how they may be incorporated in the IPC susceptibility analysis.

Reference iv) presents the status as of 2011 for the corrosivity of DilBit in pipelines as compared to conventional or 'non-oil sands derived' crude oil including temperature effects.

Reference v) presents an evaluation of the corrosivities of conventional and bitumen-derived crude oils.

Reference vi) is an industry working group with a research program to

proactively address issues in pipeline corrosion and integrity. Enbridge Inc. is a Transmission Member of PICoM.

Reference vii) is a study of the DilBit Committee which will analyze whether transportation of DilBit by transmission pipeline has an increased likelihood of release compared with pipeline transportation of other crude oils. The study was commissioned by PHMSA and the results of the study must be delivered to Congress by July 2013.

Request: Please provide the following:

a) A full list of research, studies and reports that Enbridge reviewed in assessing the characteristics and behaviour of DilBit, Synthetic DilBit (SynBit) or Diluted SynBit (DilSynBit) in pipeline transportation.

b) An annotated list of identified "knowledge gaps" on the corrosivity of DilBit, SynBit and DilSynBit where further research is required to produce greater certainty of their characteristics and behaviour in pipelines.

c) Enbridge's concerns on the validity of the CanMetMATERIALS rotating cage tests and the results presented in the Summary of the Comparison Report due to the tests being performed at ambient temperature and pressure conditions rather than pipeline operating temperatures and pressures.

d) Enbridge's understanding of the temperature impact on corrosion capacity of DilBit.

e) Enbridge's interpretation of CanMetMATERIALS report "Comparison of Corrosivity of Crude Oils Using Rotating Cage Method".

f) Crude corrosiveness test results, if any, since Enbridge's response to Information Request 5.2 of the Line 9 Reversal Phase 1 Project.

g) An outline of Enbridge's participation and correspondence with PICoM.

h) Enbridge's plan to review the DilBit Committee study.

i) Timing for Enbridge to provide an analysis of the DilBit Committee study and respond with issues, if any, relevant to Enbridge's

Integrity Management Plan applicable to Line 9.

1.5 Amendments to Line 9 Rules and Regulations

Reference:

i) Filing A3D7K2: Attachment 10, Draft Rules and Regulations Tariff, (Adobe page 4 of 15).

ii) Enbridge Line 9 Offshore Crude Petroleum Tariff, Rules and Regulations Governing the Transportation of Offshore Crude Petroleum - NEB No. 297 (Effective August 1, 2011), pages 2 and 3.

iii) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, Tables 7.2.1 to 7.2.3 Product Properties, (Adobe page 38 of 54).

iv) Filing A3D7J4: Attachment 7 – Pipeline Integrity Engineering Assessment, Table 4-6 Baseline Product Properties, (Adobe page 41 of 96).

v) Keystone XL Project - Supplemental Draft Environmental Impact Statement (SDEIS), United States Department of State, April 15, 2011, page 3 of 112.

Preamble:

In Reference i) Enbridge sets out the draft rules and regulations for Line 9 service from Sarnia, Ontario, via Westover, Ontario, to Montréal, Québec (Tariff). Section 4(a)(i) limits temperature upon receipt to 38°C.

In Reference ii) the current rules and regulations for Line 9 (NEB No. 297 Rules and Regulations) are set out and include, in Rule 1. Definitions, the descriptions and characteristics of Light Petroleum and Medium Petroleum currently carried on Line 9 and, in Rule 4, the Specifications as to Quality of Crude Petroleum to be delivered to the pipeline Carrier.

In Reference iii) Enbridge provides typical properties of the oil product to be transported in Line 9B including Table 7.2.1 Product Properties – Light Crude, Table 7.2.2. Product Properties – Medium Crude, and Table 7.2.3 Product Properties – Heavy Crude.

In Reference iv) the properties for light and heavy crudes that Enbridge has utilized to analyze internal corrosion susceptibility are tabularized.

The Density and Viscosity for each type of crude listed in Table 4.6 of Reference iv) are the minimum Density and Viscosity listed in Tables 7.2.1 through 7.2.3 in Reference ii). It appears the internal corrosion susceptibility analyses are based on minimum Density and Viscosity characteristics.

Reference v) states the maximum operating temperature of the proposed Keystone XL project would not exceed 150 degrees Fahrenheit.

Request: Please provide the following:

a) Supporting information that DilBit, SynBit or DilSynBit transported along Line 9 will be below 38°C upon receipt and will remain under 38°C during all stages of pipeline transportation.

b) Indication of how Enbridge measures temperature at Receiving Points and during pipeline transmission.

c) The pipeline locations where temperature is measured.

d) For the years 2007 through 2012, the average daily delivery temperature of crude oil shipments for:

    a.1) Light crude oil.

    b.1) Medium crude oil.

e) Identify within the Line 9 Crude Petroleum Tariff Draft Rules and Regulations the changes in wording from NEB No. 297.

f) The impact on pipeline function, operation, and integrity of each requested amendment.

g) Explanation for requesting amendments to Rule 4 (Specifications as to Quality). Specifically, the reasoning for changes from NEB No. 297 to the Draft Rules and Regulations in Rules 4(a)(iii) through 4(a)(v):

    a.1) NEB No. 297 Section 4(a)(iii) through 4(a)(v):

        iii. sediment and water in excess of 1.0 percent by volume;

        iv. a Density in excess of 904 kilograms per cubic metre

at 15 degrees Celsius;

v. a kinematic viscosity in excess of 100 square millimetres per second, determined at the lower of the temperature of such Offshore Crude Petroleum or the Carrier's reference line temperature;

b.1) Draft Rules and Regulations Section 4(a)(iii) through 4(a)(v):

iii. sediment and water in excess of 0.5 percent by volume;

iv. a Density in excess of 940 kilograms per cubic metre at 15 degrees Celsius;

v. a kinematic viscosity in excess of 350 square millimetres per second determined at the Carrier's reference line temperature;

h) The circumstances under which Enbridge may provide Shippers with a waiver of the Tariff Specifications as to Quality such that Enbridge accepts crude oil not meeting the Tariff quality specifications.

i) A listing of each waiver Enbridge has granted for crude oil on Line 9 including:

a.1) Shipper

b.1) Date

c.1) Volume

d.1) Receiving Point

e.1) Specification

f.1) The value of the crude oil property which was waived compared with the Tariff required specification

g.1) The rationale behind the granting of the waiver.

j) Explanation of the need for a Tariff maximum temperature of 38°C when all crude products listed in Table 7.2.1 to 7.2.3 have a

maximum temperature of 18.5°C.

k) Clarification that the heavy crude properties listed in Table 7.2.3 include the range of values and characteristics of DilBit, SynBit and DilSynBit crude grades.

l) Confirmation that the analysis of internal corrosion susceptibility in the Pipeline Integrity Engineering Assessment assumes the minimum Density and Viscosity for each type of crude (for example, Table 4.6 lists a Density of 904 kg/m3 and a Viscosity of 100 cSt for heavy crude) that is the minimum Density and Viscosity shown in Table 7.2.3.

m) If the Density and Viscosity in Table 4-6 is correct, please provide an explanation as to why the minimum Density and Viscosity was utilized for the analysis of internal corrosion susceptibility rather than the maximum Density and Viscosity.

n) If the incorrect baseline product properties were utilized to analyse internal corrosion susceptibility, please provide a corrected Internal Corrosion Susceptibility Analysis.

o) Explanation why the SDEIS for the proposed Keystone XL line states the maximum operating temperature would not exceed 150°F (66°C) with a normal operating temperature of 49°C while Line 9 has a maximum allowable temperature set at 38°C.

1.6 Pipeline Construction – Original and Current Construction Specifications

Reference: Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe page 15 of 96).

Preamble: The Reference states that Line 9 from ML to SA was constructed in 1975 and placed into service in 1976 as part of the Enbridge pipeline system design and built to transport Western Canadian crude oil from Sarnia to Montreal.

Request:

a) Regarding the differences in the pipeline construction specifications and regulatory requirements (jointly "Specifications") pertaining to pipeline construction between: 1) the construction of Line 9B in 1975, and, 2) the construction requirements of Line 9B as if being

built in 2013, please provide a:

a.1) Description of the Specifications that Enbridge has implemented since 1975 that were not required in 1975 but would now be required if the pipeline had been constructed in 2013.

b.1) Description of the Specifications that would have been required for the construction of Line 9B in 2013 that Enbridge has not implemented on Line 9B.

1.7 Elements of Integrity Management and Integration of Threats

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe page 10 of 96).

ii) National Transportation Safety Board (NTSB) Enbridge Line 6B Accident Report NTSB/PAR-12/01 PB2012-916501, Section 1.8.2, Elements of Integrity Management and Integration of Threats and Section 2.4.7 Effect of Integrity Management Deficiencies.

Preamble:

In Reference i) the Executive Summary of the Pipeline Engineering Integrity Assessment states corrosion threats can be adequately managed through the existing Corrosion Management Program. It also states that cracking threats can be adequately managed through the Crack Management Program of the subject pipeline.

In Reference ii) the 2012 report regarding the 2010 DilBit spill from Enbridge's Line 6B in Marshall, Michigan (near Kalamazoo), the NTSB states as follows (at p. 92):

... the NTSB concludes that Enbridge's integrity management program was inadequate because it did not consider the following: a sufficient margin of safety, appropriate wall thickness, tool tolerances, use of a continuous reassessment approach to incorporate lessons learned, the effects of corrosion on crack depth sizing, and accelerated crack growth rates due to corrosion fatigue on corroded pipe with a failed coating.

The NTSB recommends that Enbridge revise its integrity management program to ensure the integrity of its hazardous liquid pipelines as follows: (1) implement, as part of the excavation selection process, a

safety margin that conservatively takes into account the uncertainties associated with the sizing of crack defects from in-line inspections; (2) implement procedures that apply a continuous reassessment approach to immediately incorporate any new relevant information as it becomes available and reevaluate the integrity of all pipelines within the program; (3) develop and implement a methodology that includes local corrosion wall loss in addition to the crack depth when performing engineering assessments of crack defects coincident with areas of corrosion; and (4) develop and implement a corrosion fatigue model for pipelines under cyclic loading that estimates growth rates for cracks that coincide with areas of corrosion when determining re-inspection intervals.

The NTSB also recommends all threats are to be evaluated using an overlay or side-by-side analysis that would include cathodic protection, coating surveys, in-line inspection tool findings (for example, geometry, crack, and corrosion), and previous dig reports.

Request:

a) For the Integrity Management Plans or programs relied upon before the NEB, please provide details of the revisions Enbridge has adopted to take into account the four recommendations set out in the NTSB report.

b) Please provide an annotation of the latest Integrity Management Plan highlighting the policies and procedures where Enbridge is implementing a methodology to integrate "an overlay or side-by-side analyses" for evaluating threats.

c) In particular, please provide changes to the Integrity Management Plan that Enbridge has implemented to develop a methodology described in Recommendation No. 3 to overlay risks associated crack defects coincident with areas of corrosion.

d) Please provide the differences, if any, between an Enbridge Integrity Management Plan that meets Canadian Regulations (SOR/99-294) and an Enbridge Integrity Plan that meets United States Regulations. (49CFR Part 195)

1.8 Enbridge Integrity Management Program

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe pages 10 and 11 of 96).

ii) NTSB Enbridge Line 6B Accident Report NTSB/PAR-12/01 PB2012-916501, Section 1.9, Enbridge Integrity Management Program.

iii) Filing A3G4R8: Response to NEB Information Request No.1, Line 9B Reversal and Line 9 Capacity Expansion Project Application.

Preamble:

Reference i) provides Enbridge's planned integrity work prior to flow reversal of Line 9B.

The Reference ii) states the Enbridge pipeline integrity department has been responsible for monitoring and implementing repair or remediation activities that are pertinent to mainline pipelines. The department is divided into three groups responsible for evaluating the risks associated with corrosion, cracks, and geometry-related issues. All of the groups rely on in-line inspection technologies to assess the integrity of the pipeline and identify potential threats. The crack and corrosion groups perform engineering assessments on the data received from the final in-line inspection reports to prioritize and schedule pipeline excavations. Excavations are conducted to evaluate the in-line inspection results, to remediate or repair defects, and to examine the condition of the pipeline segment.

Reference iii) provides that in order to maintain the integrity of Line 9B, Enbridge has incurred integrity management costs of approximately $4.1 million as of December 31, 2012 and approximately $5.5 million between January 1 and February 28, 2013 (a total of approximately $9.6 million of costs incurred for integrity activities).

Request:

a) Please provide the proposed timetable for issuing status reports that describe the progress of the repairs or other remedial actions being undertaken following Line 9B start-up.

b) Please provide the latest assessment procedures that highlight lessons learned from Line 6B that have modified Enbridge's procedures for integrity work deemed necessary on Line 9B.

c) Please provide a breakdown of the $9.6 million cost for the Line 9B planned integrity management activities prior to flow reversal including: 1) conducting a comprehensive ILI program targeting metal loss, cracking and geotechnical features between ML and NW; 2) evaluation of the results of the ILI program and re-assessment of pipeline integrity based on 2012-2013 inspection

data; 3) determination of line rehabilitation activities required to maintain the integrity of the pipeline; and, 4) execution of the required excavations and rehabilitation of the pipeline to maintain pipeline integrity and meet the required operating parameters as per the Enbridge Integrity Management Plan.

1.9 Pipeline Performance: Leakage, Rupture and Replacement

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, Table 3-2 (Adobe pages 16 and 17 of 96), and Table 3-6 (Adobe page 20 of 96).

ii) Dynamic Risk Assessment Systems Inc.'s threat assessment review of Enbridge's 1984–2010 leak report database.

Preamble:

Reference i) Table 3-2 – In service Leaks and Ruptures: Line 9 (NW – ML) categorizes the date, cause, location, and type of 13 leaks and ruptures.

Reference i) Table 3-6 – Excavation and Repairs: Line 9 (HL-NW) categorizes excavations and repairs by type of repair (sleeve repairs, recoats and cutouts) for identified corrosion, dents and cracks.

Reference ii) provides a threat assessment of Enbridge's 1984–2010 leak report database.

Request:

a) Please provide the following for each of the 13 leaks and ruptures listed in Table 3-2:

a.1) The location of each incident (distance from the nearest locality or other geographically important location).

b.1) The location in latitude and longitude for each event.

c.1) The volume of material that was spilled for each leak or rupture.

d.1) Copies of all investigation reports for each leak or rupture including the cause for each (external corrosion, internal corrosion, or other specific cause).

e.1) The emergency response measures required for each event including timeline.

f.1) Copies of notifications provided to the Government, Ministry, or regulatory authorities for each leak or rupture.

b) For leaks shown in Table 3-2 occurring on 1/26/1991 and 7/14/1993, both of which were in the City of Toronto, please provide:

a.1) How the leaks were identified.

b.1) The corrective steps taken to repair the pipeline.

c.1) The external environment for both incidents including soil type, water inundation, or unique ROW attributes.

c) For excavations and repairs shown in Table 3-6 please provide:

a.1) Kilometre Post (KP).

b.1) Latitude and longitude.

c.1) Date of repair.

d) Please provide from Enbridge's leak report database:

a.1) Information on all internal corrosion incidents since 1984 that have resulted in a reportable spill across all Enbridge owned or operated light, medium, and heavy crude oil pipelines in North America.

b.1) The KP and location in latitude and longitude for each event.

c.1) The location of each incident (distance from the nearest locality or other geographically important location).

d.1) The volume of material that was spilled for each leak or rupture.

e.1) Copies of all investigation reports for each leak or rupture including the cause for each.

f.1) The emergency response measures required for each event

including timeline.

g.1) Copies of all notifications provided to the Government, Ministry, or regulatory authorities for each leak or rupture.

e) Please provide Dynamic Risk Assessment Systems Inc.'s threat assessment review of Enbridge's 1984–2010 leak report database:

a.1) Executive Summary

b.1) Recommendations and Conclusions

1.10 Pipeline Risk Assessment

Reference: Filing A3D7J6: Appendix B to Pipeline Integrity Engineering Assessment, (Adobe pages 7 and 8 of 18).

Preamble: The Reference sets out that the volume of a spill due to pipeline rupture is affected by the capacity expansion. The Reference further defines that the increase in initial volume out due to the Line 9 Capacity Expansion is approximately 47 m^3. The initial volume out is the amount of product released at design flow rate before remote controlled valves are closed and the pipeline isolated.

The Reference also states the assessment typically uses a risk assessment section of 305 m (1000 ft.).

Request: Please provide the following:

a) The initial volume out (in barrels) at 240,000 B/D flow rate.

b) The initial volume out (in barrels) at 300,000 B/D flow rate.

c) The increase in initial volume out (in barrels) due to the Line 9 Capacity Expansion (barrel equivalent to 47 m^3).

d) An explanation why the percentage increase in pipeline capacity (i.e. 25%) does not correspond or translate to a proportionate increase in volume out in a spill event which is calculated to only increase by 0.9% (47 m^3).

e) The risk assessment uses a risk assessment model of 305 metre (1000 ft.):

a.1) Please provide the risk ranking of each 305 metre section within the City of Toronto.

b.1) Identify whether those sections are identified by Enbridge as within the highest risk rankings for Line 9.

c.1) Identify the projects and expenditures Enbridge plans for mitigation of the highest risk rankings within the City of Toronto.

f) For Enbridge's Line 6B Hazardous Liquid Pipeline Rupture and Release at Marshall, Michigan:

a.1) The initial volume out (in barrels) calculated for the Line 6B pipeline capacity.

b.1) The initial volume out (in barrels) calculated for the Line 6B pipeline flow rate at the time of the rupture and release.

c.1) The total volume (in barrels) leaked from the rupture.

1.11 In Line Inspection Program

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe page 10 of 96).

ii) Filing A2C0V6: Enbridge Line 9 Reversal Phase 1 Project Application Engineering, Section 2.2 Engineering Assessment, (Adobe pages 27, 28, 46, 50, and 53 of 59).

Preamble:

In Reference i), Enbridge plans to complete an In Line Inspection (ILI) program for Line 9B in 2014.

In Reference ii), an ILI inspection program was similarly provided for in the Phase 1 Project application and it is understood that the program has been put in place.

As of writing, information has not been made available in relation to the results and interpretation of the Phase 1 Project 2013 ILI program.

Enbridge has agreed to provide a summary of the Report.

Request: Please provide the following:

a) Independent verification the Line 9 Reversal Phase 1 Project ILI inspection program is complete. If no independent verification has been completed or is planned, explain why this independent verification will not occur.

b) Indicate whether and how the results of the Phase 1 Project ILI work informed the proposal for the Line 9B ILI work.

c) Advise whether Enbridge is prepared to defer its application pending satisfactory completion of the Line 9B ILI work in 2014.

d) Advise whether Enbridge is prepared to consent to a condition from the NEB providing that approval of the application is subject to satisfactory completion of the ILI inspection program in 2014.

e) Advise whether the raw data for the current (2012-2013) ILI program for Line 9B has been verified, reviewed and audited by a third party other than Enbridge.

f) Provide Enbridge's or its ILI Consultant's summary and recommendations from the report respecting the ILI data from the 2012-2013 ILI runs.

1.12 Temperature Control

Reference:

i) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe pages 38 and 39 of 54).

ii) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe pages 14, 22 and 41 of 96).

Preamble: The Reference i) sets out in Tables 7.2.1, 7.2.2, and 7.2.3, that the hydraulic design of the pipeline is based on a maximum temperature of 18.5°C (65°F). Table 7.3.1, Proposed Mainline Pumps; and Table 7.3.2, Proposed Booster Pumps at Sarnia Terminal; list the Inlet and Outlet Temperature (Annual Average) of 13°C (55°F).

In Reference ii), Table 3-1 – Pipe Properties and Test Pressures, lists the pipe coating as Single Layer Polyethylene Tape ("PE Tape").

Also, in Reference ii) the title of Section 4.2.6.2 is "Product Characteristics and Operating Temperature"; however, there are no operating temperatures listed in the section.

Furthermore, in Reference ii) protective external coating is listed in Section 4.2 - Metal Loss as one of the external corrosion prevention methods.

Request: Please provide the following:

a) The operating temperature of the pipeline that is missing from Section 4.2.6.2.

b) Location of pump discharge temperature sensors available through Enbridge's SCADA system.

c) The maximum temperature rating of the PE Tape.

d) The potential for pump discharge temperatures to exceed the maximum temperature rating of the PE Tape due to:

   a.1) Pumping out of atmospheric storage.

   b.1) Introduction of DRA.

   c.1) Heavy crude.

   d.1) Pipeline operation at 300,000 bpd.

   e.1) Other cause(s).

   f.1) Most severe combination of the above.

e) If there is a combination where the maximum temperature rating of the PE Tape can be exceeded, explain if Enbridge is considering a coating monitoring program.

1.13 Surge Analysis

Reference: Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe page 46 of 54).

Preamble: Reference i) states the Pipeline Control System includes local pump station control systems whose function is to control, monitor and protect the station from overpressure, surges, abnormal operating conditions, and other anomalies. Additionally, the Leak Detection System incorporates Computational Pipeline Modeling ("CPM") which includes engineering hydraulic calculations.

Pressure monitoring of pipelines occur at discrete points where pressure transmitters are located. The pressure in the pipeline between the pressure transmitters is not measured but can be modeled.

Request:

a) Please confirm if the CPM software includes real time surge analysis.

b) If the CPM software does not include a real time surge analysis, please provide Enbridge's plan to utilize pressure sensors installed along the pipeline and the CPM software to conduct surge analysis in real time using hydraulic modeling to determine overpressure conditions of pipeline segments.

c) Also, provide a description of the controls in Enbridge's operating procedures and the protective equipment that will be utilized to control the pressure within regulated limits during surges.

d) Please provide Enbridge's mitigation plan when the surge analysis calculates that pipeline pressures have exceeded pipeline MOP.

1.14 Depth of Cover

Reference: Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe pages 14, 15, and 83 of 96).

Preamble: Reference i) states that Line 9 was constructed in 1975 and placed in service in 1976. Table 3-1, Pipe Properties and Test Pressures, includes information on the original construction but does not indicate the depth of cover the pipeline was installed to or the current depth of cover for the

pipeline.

Depth of cover surveys are components of the Enbridge's third party damage protection prevention program, however, no plans to conduct a depth of cover survey of the entirety of Line 9B are mentioned in the Reference.

Request: Please provide the following:

a) The depth of cover requirement for the original construction of the pipeline.

b) The date of the last depth of cover survey.

c) A graph showing the latest depth of cover (on Y axis) versus KP (on X axis).

d) Areas where Enbridge has had to replace cover or take other corrective actions when depth of cover was less than required on Line 9B within the City of Toronto:

    a.1) Location (KP and longitude/latitude).

    b.1) Planned additional mitigative and preventative measures to address concerns related to depth of cover and the scheduled dates of implementation.

    c.1) Plan for future monitoring.

e) Enbridge's policy for installing additional pipeline markers when depth of cover is less than the current cover requirement.

f) Enbridge's plan for the next depth of cover survey for Line 9B including:

    a.1) The start date and completion date for the study.

    b.1) Time period within which Enbridge will replace cover that is found to be less than specification.

    c.1) The frequency for future studies.

1.15 Control Room Management

Reference:

i) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe page 46 of 54).

ii) Canadian Standards Association (CSA) Standard Z662 Oil and Gas Pipeline Systems

iii) U.S. CFR Title 49, Part 195-Transportation of Hazardous Liquids by Pipeline, §195.446 Control room management.

Preamble:

The Reference i) sets out that Enbridge operates the Edmonton control centre where pipeline controllers monitor pipeline information 24/7. A SCADA system is used to monitor and control the pipeline and facilities.

Reference ii) is the Canadian Standard which covers the design, construction, operation, and maintenance of oil and gas industry pipeline systems that convey liquid hydrocarbons among other fluids.

Reference iii) provides regulations for each operator of a U.S. pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system.

Request:

Please provide the following:

a) Portions of §195.446 (or the equivalent provision in CSA-Z662) that Enbridge has incorporated into its Edmonton control centre and confirmation that centre staff has been trained on these changes.

b) Requirements in §195.446 (or the equivalent provision in CSA-Z662) that Enbridge has not incorporated but plans to incorporate and the date by which they will be incorporated.

c) Items of §195.446 (or the equivalent provision in CSA-Z662) that Enbridge does not plan to incorporate into its Edmonton control centre with justification as to why Enbridge has chosen not to incorporate them.

1.16 Pump Station Integrity Management

Reference:

i) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe pages 18, 41 and 43 of 54).

ii) Filing A3D7J7: Attachment 8 – Facilities Integrity Engineering Assessment, (Adobe page 18 of 23).

iii) Filing A3D7J5: Appendix A to Pipeline EA - Map

Preamble:

Reference i) states project work will occur at Sarnia Terminal, North Westover Station, Hilton Station, Cardinal Station (in Ontario), and Terrebonne Station and Montreal Terminal (in Quebec), and includes the modification or replacement of existing equipment and the installation of pumps and piping within the facility boundaries. The location of the pump stations and terminal are shown on Reference iii), a map of the Line 9 system. Reference i) also states that corrosion control methods for Station piping will include the painting of all above-ground equipment and facilities. Cathodic protection and coating will be provided for underground steel components.

The Enbridge Integrity Management Plan includes In-line Inspection (ILI) of the Pipeline to monitor for internal corrosion. However, not all portions of pipelines are capable of ILI, namely pump stations and other facilities. Reference ii) states that, since 2006, several internal inspections have been completed on piping at the Facilities. However, it is not stated which Stations have been inspected and whether the statement "several internal inspections" is a reference to the number of inspections overall or if several inspections have been made at each Station.

Request:

a) Please clarify whether "several internal inspections" refers to the number of inspections overall or if several inspections have been made at each Station.

b) Please provide details of the direct assessment plan for corrosion mitigation at pump stations and other facilities.

1.17 Sediment and Water Content

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe pages 22 and 41 of 96).

ii) Filing A3D7J7: Attachment 8 – Facilities Integrity Engineering Assessment, (Adobe page 15 of 23).

Preamble:

Reference i) states the Line 9 internal corrosion prevention, monitoring and mitigation measures include, among other measures, tariff limits on Sediment and Water (S&W) content. Also, in the overview of the Internal Corrosion program, it is stated that "Enbridge regularly conducts evaluations that include **periodic** (emphasis added) testing to ensure that the sediment and water content does not exceed tariff quality limits".

Reference ii) states Line 9 currently operates in a start/stop mode and that continuous operation "lowers the corrosion risk for the facilities because water and/or solids entrained in the oil do not continuously drop out and create corrosion cells on the bottom of the pipe."

In order to reduce corrosion threats, S&W is limited in pipelines. Crude oil transmission pipelines, including those that carry DilBit and SynBit, are operated at flow velocities above that at which water and sediment drop out tend to occur, but below the velocities where erosion corrosion can occur. S&W is removed from the pipeline during cleaning pig runs. Examination of the S&W removed from cleaning pig runs can provide additional information on the corrosion threat from S&W.

Request:

Please provide the following:

a) What is meant by "periodic"? What parameters are used to determine when periodic S&W testing is conducted?

b) For a batch of crude, when are S&W test results available (length of time in advance of injection or length of time after the batch is injected) in relation to when the crude oil was injected into the pipeline?

c) Enbridge's policy to correct future crude oil injections when S&W is

detected above the tariff limits.

d) When S&W is detected in the pipeline above tariff limits, please provide Enbridge's plan to mitigate potential corrosion issues.

e) The planned frequency of cleaning pig runs.

f) Enbridge's plan to sample and test S&W removed during cleaning pig runs on Line 9B.

g) For the anticipated operating pipeline flow rate regimes:

   a.1) Calculated velocity range of the pipeline.

   b.1) Calculated velocity below which S&W tend to drop out.

   c.1) Calculated velocity above which erosion can occur.

h) Enbridge procedures to ensure the pipeline operates within the velocity range required to avoid drop out of S&W and avoid erosion.

i) The time periods during which Line 9 operated in a stop and start mode.

j) Data Enbridge has as to the corrosion cells that have or may have been found in Line 9 during the period in which it operated in stop and start mode.

k) How the Pipeline Integrity Management program addresses such corrosion cells.

l) Whether Line 9B could operate again in the start and stop mode, and, if so, what measures will be taken to address the formation of corrosion cells?

1.18 Stress Corrosion Cracking – Hydro Testing

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe page 15 of 96).

ii) NTSB/PAR-12/01 PB2012-916501 (Line 6B Accident Report) (Section 1.9.4, Stress Corrosion Cracking).

Preamble:

In Reference i), it is stated Line 9 was constructed in 1975 and hydrostatically tested in 1976. A second hydro test was conducted on Line 9 in 1997 as part of the Line 9 reversal project that same year.

In Reference ii), it is stated that, as a policy, Enbridge examined all excavated pipeline segments for Stress Corrosion Cracking ("SCC"). Canadian Energy Pipeline Association's ("CEPA's") recommended SCC mitigation approach included hydrostatic retesting, in-line inspection if appropriate tools were available, extensive pipe replacement, and recoating. CEPA considered hydrostatic retesting and in-line inspection to be temporary mitigation techniques. In contrast, repairs such as recoating the pipe, installing sleeves, grinding away the defects, and replacing the pipe were permanent mitigation techniques. According to CEPA, hydrostatic retesting has been shown to be an effective means for identifying near-critical axial defects, such as SCC.

Request:

a) Please provide the latest plan for hydrostatic retesting of Line 9B.

b) Given the long period of operation of Line 9B under significantly different conditions since the last hydro test in 1997, please advise whether Enbridge is prepared to conduct a further hydro test of Line 9B to confirm the pipeline integrity prior to the reversal.

c) If Enbridge concluded that it was important to hydro test Line 9B prior to the reversal in 1997 but does not plan to hydro test Line 9B prior to this reversal, please provide an explanation as to why a hydro test would not be in the best interest to confirm the current integrity of the pipeline.

d) In the alternative, please advise whether Enbridge is prepared to agree to the conducting of such a hydro test within a specific time period as a condition to be imposed on any approval of this application by the NEB.

e) Please advise whether the requirements of the NEB or Enbridge's Integrity Management Plan which would mandate a future hydro test of Line 9B.

1.19 Crack Management Program

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe pages 12 and 21 of 96).

ii) Filing A2Q7D7: Line 9 Reversal Phase 1, Attachment 1 to 3.1 – Updated Engineering Assessment, (Adobe pages 4 and 5 of 59).

iii) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe page 18 of 54).

Preamble:

In Reference i) it states the Engineering Assessment prepared for the Line 9 Reversal Phase 1 Project is applicable to the Project.

Also in Reference i) Enbridge confirms the planned flow reversal of Line 9B will result in increases of risk to the operation of the pipeline at the discharge side of the pump stations (NW, HL, CD and Terrebonne ("TB")).

Additionally in Reference i) Enbridge states the flow reversal will result in segments of the pipeline being operated at higher pressures than the previous operating levels.

In Reference ii) it states that in planned activities prior to the flow reversal of Line 9A that Enbridge would conduct crack excavations in 2012 with particular focus west of Sarnia Terminal (SA) where the cracking risk profile is expected to change due to the line reversal. The crack risk profile is higher because the section downstream of SA will see higher operating pressures than it has typically seen in the past.

Reference iii) states Line 9 has a current approved capacity of approximately 240,000 bpd. Enbridge is seeking NEB approval to increase the annual capacity of the entire Line 9 to approximately 300,000 bpd through the injection of Drag Reducing Agent (DRA).

Request:

Please provide the following:

a) In Section 3.4.3 System Flow Rates and Pressures, an addition to Tables 3.9 through 3.14 to include the MOP of the respective station's discharge pressure for a direct comparison between the Post Project Max./Min. and the MOP.

b) An explanation as to why the higher operating pressures due to line

reversal required a particular focus downstream of the pumps for Line 9A but there is no mention of a similar focus planned for crack excavations in the crack management program for Line 9B.

c) An explanation as to why higher operating pressures due to the increase in capacity were not considered in the crack management plan for a particular focus downstream of the pumps.

1.20 Cathodic Protection Monitoring System

Reference:

i) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe page 23 of 96).

ii) Filing A2Q7D7: Line 9 Reversal Phase 1, Attachment 1 to 3.1 – Updated Engineering Assessment, (Adobe page 5 of 59).

Preamble:

In Reference i) a remote monitoring program is in place for Line 9, enabling continual interrogation of rectifier status through cellular or satellite communication. This section of Line 9 within the remote monitoring program region has a total of 22 influencing rectifiers, which are all equipped with remote monitoring units.

In Reference ii), included in the planned activities prior to flow reversal of Line 9 Project Phase 1, was an enhancement of the CP monitoring system by installing remote monitoring equipment on all Eastern Region rectifiers by the end of 2011.

Request:

a) Please confirm that remote monitoring of the CP monitoring system has been added on <u>all</u> rectifiers on Line 9.

b) If the installation is not complete, provide a firm schedule for completion.

1.21 Material Balance System

Reference:

i) Filing A3D7I1: Line 9B Reversal and Line 9 Capacity Expansion Project Application, (Adobe page 18 of 54).

ii) Filing P09H0084: Pipeline Investigative Report, Crude Oil Pipeline Leak, 29 September 2009.

Preamble:

Reference i) sets out that Line 9 is an existing Enbridge 762 mm (NPS

30) diameter pipeline with a current approved capacity of approximately 38,157 m3/day (240,000 barrels per day ("bpd")). Enbridge is seeking NEB approval to increase the annual capacity of the entire Line 9 to approximately 47,696 m3/day (300,000 bpd).

Reference i) states the increased capacity will be achieved through the addition of pumps and skids that will inject Drag Reducing Agent ("DRA") into Line 9 at existing Enbridge facilities.

Reference ii) sets out that a crude oil leak occurred on the Enbridge Pipelines Inc. 610-mm outside diameter Line 2 at Mile Post 474.7335, immediately downstream of the Odessa pump station near Odessa, Saskatchewan. The leak was attributed to a crack within a shallow dent at the 6 o'clock position on the pipe. There were indications of gouging associated with the dent.

Reference ii) further explains a material balance system (MBS) is one of the tools utilized by the pipeline's leak detection system. Alarms are generated when a leak is detected. An alarm was received at the time of the leak indicating the volume balance had gone outside of acceptable limits. During this time, DRA was being injected into the pipeline at a rate of 20 parts per million (ppm). The MBS analyst at the control centre determined that the modeled effectiveness of the DRA differed significantly from the actual effectiveness which resulted in the leak alarm. The MBS analyst then adjusted the MBS settings which reduced the imbalance and the alarm eventually cleared. During 2009, the MBS alarm was triggered 18 times across the Enbridge system due to DRA inconsistencies.

The leak was reported by a landowner.

Request:

Please provide the following:

a) The smallest leak rate on Line 9 that will trigger an MBS alarm.

b) Enbridge's plan to accurately modify the MBS during DRA injection so a leak will not go undetected.

c) MBS alarms across the Enbridge system due to DRA inconsistencies during 2010, 2011, and 2012.

d) Leaks not detected by the MBS across the Enbridge system during the last five years due to improper adjustments of MBS settings.

1.22 External Tape Disbondment

Reference National Transportation Safety Board (NTSB) Enbridge Line 6B Accident Report NTSB/PAR-12/01 PB2012-916501, Section 1.8.2, Elements of Integrity Management and Integration of Threats.

Preamble: The NTSB concluded that the corrosion that caused the Marshall spill was a result of tape disbondment (p. 118, Finding 3)

Request: Please advise whether the external tape on Line 9 is the same as or similar to the tape material which failed in Line 6 in Marshall, Michigan. If so, what steps have been taken to prevent a similar problem from arising on Line 9?

1.23 Enbridge Safety Initiatives

Reference: i) Letter to Enbridge from NEB re NTSB Report on Marshall, Michigan spill, NEB File OF-SURV-GEN01, dated July 26, 2012

https://www.neb-one.gc.ca/clf-nsi/rsftyndthnvrnmnt/sfty/brdrdr/nbrdg_cntrlcntr_2012-07_26-eng.html

ii) Filing A3D715: Attachment 4 – Stakeholder Consultation Report (Adobe p. 19 of 43) referring to Enbridge News Release entitled "Enbridge Improvements and Initiatives in Integrity, Safety and Operations"

http://www.enbridge.com/MediaCentre/News/enbridgeimprovements.aspx

iii) National Transportation Safety Board (NTSB) Enbridge Line 6B Accident Report NTSB/PAR-12/01 PB2012-916501

Preamble: The NEB sent a letter (Ref i) to Enbridge respecting the results of the NTSB report (Ref iii). Consequently, Enbridge issued a news release (Ref. ii) outlining the steps it had or would be taking with respect to improvements on integrity, safety and operations. With respect to the Enbridge newsletter, please advise as follows (and particularly with respect to Line 9B).

Request: a) Enbridge indicated that it would not provide detailed statements on the specific contents of the NTSB report on Marshall, Michigan until it was issued and Enbridge's analysis was complete. Please provide Enbridge's detailed responses in relation to the NTSB investigation, released in July 2012.

b) Enbridge indicated that "appropriate operational and procedural changes" were implemented in 2010, 2011. Please advise what these changes are, whether any further changes were deemed necessary as a result of the release of the NTSB report, and whether and how such further changes have been implemented.

c) Enbridge advised it has utilized enhanced procedures for leak detection analysis. Please provide particulars on these measures.

d) Enbridge indicated it had reviewed and strengthened its public awareness programs. Please advise what measures have been taken and how they have been implemented in Toronto and generally along the course of Line 9.

e) Enbridge noted a Canadian Public Awareness Committee and a Canadian Public Awareness Database. Please advise what materials or activities have been prepared in relation to either one and what steps have been taken to implement improved public awareness through the Committee and Database. Please provide a copy of any materials prepared.

f) Enbridge advised that $50 Million will be spent (projected) between 2012 and 2013 to improve emergency response capabilities. Please advise what amounts have been spent and how those amounts have been spent to date.

g) Enbridge advised that it is developing better tools and techniques for worst-case waterborne spills. Please advise what steps have been taken in relation to worst-case waterborne spills in and around Toronto and the north shore of Lake Ontario.

h) Enbridge indicated it was conducting an emergency response preparedness assessment. Please provide a copy of that assessment. Please also advise what steps have been taken as a result of that assessment in relation to Line 9.

i) Enbridge advised that it had a renewed focus on risk assessment and research and development. Please advise what specific steps have been taken as a result of this renewed focus, particularly with respect to the conclusions reached by the NTSB in relation to: inadequate integrity management, inadequate public awareness, and the need for further research on the properties of dilbit materials. Please also advise how Enbridge intends to incorporate the work currently underway by the National Academies with respect to the properties of dilbit in relation to this renewed focus on research.

Financial Assurance

1.24

Reference: The Application materials make no specific reference to compensation for loss, expense or damage arising from a pipeline spill. Enbridge has indicated in correspondence with the City of Toronto that it will comply with s.75 of the *National Energy Board Act* and will maintain insurance coverage that is "consistent with coverage considered customary".

Preamble: Media coverage (Enbridge Cleanup may cost $1Billion, company warns, by Kelly Cryderman, Globe and Mail, March 20, 2013) has indicated that the dilbit spill from Enbridge Line 6B in Marshall, Michigan has cost in excess of $800 Million (U.S.) and that Enbridge may not have insurance to cover that amount.

In evidence submitted to the Enbridge Northern Gateway Project Joint Review Panel by Enbridge in response to the JRP questions (Northern Gateway Response to JRP IR No. 9) the following evidence was presented

Northern Gateway provides an overview of planned insurance coverage for its construction and operational phases. Two of the insurance programs identified for the operational phase are the Property and Business Interruption Insurance Program with a coverage limit of CAD 700 million for any one event and the General Liability Insurance Program with an annual coverage limit of USD 575 million. Coverage for pollution legal liability is included within this latter program (at page 9)

and

Regardless of whether or not insurance covers losses and liabilities of Northern Gateway and/or third parties, Northern Gateway would make good the damages which it has caused.

In related evidence filed by the Alberta Federation of Labour, Ms. Allan suggested that:

Enbridge's current pollution liability umbrella policy is to a limit of $575 million and if Northern Gateway suffered a pollution spill in the same insurance year as another Enbridge line—say Line 9, it is possible the company would allocate the insurance policy to the Line 9 spill and leave Northern Gateway to cover the costs of its spill out of cash flow.

Request:

a. What assurances can Enbridge provide that it has either insurance in place and/or the funds available to compensate the City for any/all losses and expenses, direct or indirect, arising from or related to an oil spill?

b. Specifically:

i. Will Enbridge identify and describe what insurance arrangements are currently in place for operational risk associated with Line 9?

ii. Will Enbridge advise whether insurance coverage limits are based on individual incidents or apply to the sum of all incidents within its system in the coverage period?

iii. Will Enbridge indicate whether it will be varying its insurance arrangements or policy coverage for operational changes associated with the Line 9 capacity, flow reversal and tariff changes? If yes, please provide particulars in coverage changes?

iv. Regardless of the sufficiency of insurance coverage would Enbridge make a representation upon which the City could rely that Enbridge would make good, direct or indirect, for any spill costs or damages from Line 9 in the event of a spill?

c. Is there a risk that costs associated with a large spill will exceed the insurance coverage Enbridge has? If so, what other financial means can Enbridge identify to cover costs arising from a possible large spill?

d. What is Enbridge's position on compensation in the event of a pipeline spill not caused by the fault of Enbridge?

e. What measures are in place or proposed to compensate residents and businesses or other third parties along Line 9 in the event they need to be evacuated? In relation to other costs?

Emergency Power Supply and Shutdown

1.25

Reference: i) Enbridge Pipelines Inc. (Enbridge) Corrective Action Plan for National Energy Board (the Board) Order SO-E1O1-OO1-2013

ii) Filing A3G4R8: B8-2, Enbridge Response to NEB Information Request No. 1, p. 44 of 46, paragraph 1.26

Preamble: In Reference i) on 15 March 2013, the Board issued Order SO-E101-001-2013 (the Order) directing Enbridge to file a Corrective Action Plan (CAP) by 15 April 2013, to address non-compliances with CSA Standard Z662-1 Oil and Gas Pipeline Systems (CSA Z662-1 1) Clause 4.14.3.3(c) and with the Onshore Pipeline Regulations, 1999 subsection 12(a) at its pump stations. Enbridge filed the CAP on 15 April 2013 as per the Order. The non-compliance relates to the installation of emergency shutdown mechanisms at pumping stations and alternate sources of power pumping stations. In correspondence dated May 2, 2013 to Enbridge, the National Energy Board noted that "Enbridge is proposing to complete all of the work by 31 December 2016".

In Reference ii) Enbridge indicated to the National Energy Board that alternate source of power installation will be completed by the in-service date of the Project. In relation to the emergency shutdown pushbuttons Enbridge "anticipates" that these will be installed prior to the in-service date for the Line 9B project.

Request: Please provide the following:

a. Enbridge's Corrective Action Plan identified in correspondence between the National Energy Board and Enbridge dated 2 May 2013.

b. Scheduling list for installation of the emergency shut-down push-button and alternate sources of power for pump stations.

c. Confirmation that all CAP work relevant to Line 9 will be completed before Line 9B pipeline reversal and capacity increase are implemented.

d. All correspondence between the National Energy Board and Enbridge related to Enbridge's non-compliances with CSA Standard Z662-1 Oil and

Gas Pipeline Systems (CSA Z662-1 1) Clause 4.14.3.3(c) and with the Onshore Pipeline Regulations, 1999 subsection 12(a).

Clean Up Response for Non-Conventional Heavy Crudes (Dilbit, SynDilBit and SynBit)

1.26

Reference: i) Filing A3D7J1; Attachment 4f – Letter to Ontario and Quebec Municipalities, pages 3-4 of 62.

ii) Nebraska's Keystone XL Pipeline Evaluation, Final Evaluation Report, by the Nebraska Department of Environmental Quality

http://deq.ne.gov/PipeMeet.nsf/MenuFinal?OpenPage

iii) Enbridge's *"Important Safety Information for Emergency Responders Enbridge Pipelines Inc"* page 11

iv) SL Ross Environmental Research Limited "Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend" October 2012

v) National Transportation Safety Board (NTSB) Enbridge Line 6B Accident Report NTSB/PAR-12/01 PB2012-916501, p 62-63

Preamble: In Reference i) Enbridge states "Decades of transporting heavy crude proves there is no evidence that pipelines transporting this product are more susceptible to internal corrosion than pipelines transporting other crude oil types."

Reference ii) Nebraska's Keystone XL Pipeline Evaluation, Final Evaluation Report, by the Nebraska Department of Environmental Quality, at pp. 6-23 to 6-24, suggests that heavy crudes such as *dilbit, synbit, and dilsynbit* behave differently to light and medium grade crudes in an open environment. The report states:

...weathering of spilled oil or dilbit in the open environment results in the evaporation of the lighter components of the oil. For very heavy crude oils such as dilbit, synbit, and dilsynbit, the remaining mixture may become heavier than water and sink. In surface water, submerged oil needs different cleanup methods than those used for oil floating on the water's surface.

Sediment is agitated to reintroduce submerged oil to the surface for cleanup, which can adversely affect plant and animal species and sediments on the bottom of a river or lake.

In Reference iii) on page 11 of Enbridge's *"Important Safety Information for Emergency Responders Enbridge Pipelines Inc"* a list of different hydrocarbon products are listed. The table lists special behaviours of crude oil, synthetic crude oil/condensate and LNG when released into the open environment.

In Reference iv) the study by SL Ross Environmental Research Ltd (on page 15) it is reported that, under controlled condition tests on Cold Lake Bitumen evaluating buoyancy and other attributes: *"The majority (approximately 85%) of the oil in both tests was found either at the surface or stuck to the side walls within 10 cm of the surface. At no point was oil found to submerge, sink, and stick to the bottom of the flume."*

In Reference v) the NTSB acknowledged that in relation to the Marshall oil spill "[on]ce the crude oil mixture entered the water, weathering, volatility, and physical agitation caused the denser oil fraction to sink and incorporate into river sediments and collect on the river bottom".

Request: Please provide the following information:

a. An outline of the key differences in leak stabilization, cleaning up and environmental remediation of conventional crude pipeline spills as compared to spills involving Dilbit, Synbit or Dilsynbit?

b. Information on specific actions and procedures used to contain dilbit leakage in the Marshall incident and remediate the spill area that would not have been undertaken if the product spilled was a "light" or "medium" crude?

c. Considering difference in viscosity and temperature and presence of Naphtha, the rationale as to why specialised instructions are not provided for DilBit, SynBit or Dilsynbit on page 11 of Enbridge's *"Important Safety Information for Emergency Responders Enbridge Pipelines Inc."*

d. What accounts for the difference in the behaviour of Dilbit in the SL Ross Environmental Research under controlled laboratory conditions and the behaviour of Dilbit in the open environment as noted by the NTSB in its

review of the Marshall spill on page 62-63 which describes denser oil fractions sinking and incorporating into river sediment?

e. Does Enbridge agree that tests conducted in a laboratory setting provide only limited information that cannot be relied upon in isolation to predict how oil will behave in the natural environment? How do laboratory studies take into account varying conditions such as water temperature, suspended sediment concentrations, wind speeds and other factors?

f. Does Enbridge agree that there are information gaps in understanding how dilbit, synbit, etc. behave in water and that additional research is required to understand how diblit behaves in watercourses? If yes, identify those gaps. If no, explain why no gaps exist.

g. Will Enbridge identify what techniques it would employ to effectively remove dissolved oil or oil that becomes entrained in the water column? Is it possible for crude oil to dissolve in the water column? Can oil become "neutrally buoyant" and linger in the water column so that it is difficult to track and becomes a threat to organisms?

h. Does Enbridge agree that oil may not remain on the water surface in a number of conditions such as oils having specific gravities equal to or greater than the receiving fresh water, oil being near the same density as the receiving water which has high flow rates or increased turbulence, or oils being weathered and reaching a specific gravity that is the same or greater than the receiving water?

Emergency Response Book

1.27

Reference: i) Application for Line 9 Reversal Phase I Project (OH-005-2011): B-25B - Attachment 1 to OPLA IR No 1.7(a) - A2S4G1

ii) Application for Line 9 Reversal Phase I Project (OH-005-2011) B-25C - Attachment 2, 3 and 4 to OPLA IR No 1.7(a) - A2S4G2

iii) National Transportation Safety Board (NTSB) Enbridge Line 6B Accident Report NTSB/PAR-12/01 PB2012-916501 at pp. 105-112, 119-120, 123-124

Preamble: In Reference i) and ii) the NEB made a ruling on Ontario Pipeline Landowners Association ("OPLA") Notice of Motion requesting Enbridge's Emergency Response Plan. In providing these documents, Enbridge noted that "[t]he attached documents have been redacted to remove: irrelevant information, such as information related to U.S. operations or information not related to Line 9 (Sarnia to Westover)".

Enbridge provided these documents in redacted form in response to a City of Toronto informal request for information.

Request: Please provide the following:

a. A copy of *Operations and Maintenance Procedures Book 7: Emergency Response* without Line 9B relevant sections redacted.

b. List of emergency equipment inspections from 2008 to present outlining date and location of inspection.

c. Between 2008 -2012 how much did Enbridge spend per annum on replacing emergency equipment after completion of inspections.

The following items of this request arise in relation to the Enbridge *Operations and Maintenance Procedures Book 7: Emergency Response:*

d. Book 7 refers to emergency exercise documentation (p. 5 of 173) and reports (p. 20 of 173). Please advise:

i) Was a report prepared for the Don River exercise carried out in 2011? Please provide a copy.

ii) What assumptions were made in that exercise as to the flow rate (in bpd) in Line 9, and the material being transported?

iii) What assumptions were made about the flow rate of the Don River?

iv) Who was provided a copy of the exercise results and were municipalities or conservation authorities provided with results? Please provide a copy of any materials so provided.

v) What other emergency exercises have been conducted on Line 9 in the last five years?

vi) What exercises are proposed for Line 9B if the NEB grants the approval being sought?

e. Book 7 refers to an "incident command system" and an "incident commander" at pages 5 and 8 of 173. The Public Safety and Emergency Management Unit of the Toronto Police Service (TPS) also uses an incident management system. Please advise how "command" roles have been coordinated between Enbridge forces and the TPS, Toronto Fire Service, the Office of Emergency Management, and other City Divisions, as well as Ministry of Environment (Ontario), and Environment Canada, on site. Have City Divisions been made aware of any expectation that they will have a role? What role would they have?

f. Book 7 refers to cooperative agreements to provide Enbridge with additional emergency response equipment and services (p. 11 of 173). Please advise whether such arrangements or agreements are in place on Line 9 currently, or are proposed to be put in place?

g. Book 7 (p. 12 of 173) refers to maps identifying sensitive areas along the pipeline. Please provide detailed map references showing sensitive features, low lying areas, areas close to residential development and businesses along Line 9B through Toronto and generally along the north shore of Lake Ontario (i.e. from Hamilton to Kingston).

h. Book 7 refers to tabletop exercises being conducted involving "worst case discharge" scenarios. Please advise what the tabletop "worst case" discharge volume was used in Line 9 at 240,000 barrels per day capacity and in Line 6 prior to the Marshall discharge in 2010? What, if any, tabletop exercise has been conducted on Line 9 using the proposed 300,000 barrels per day flow and using dilbit as the transported material? What was the "worst case" discharge volume? What such exercises are proposed to be conducted in the future, and when?

i. Please provide Emergency Response Exercise Reports from the Oil Spill Exercise Report Database (Reference i), p. 20 of 173)

j. Book 7 contemplates that evacuation may be required "if necessary" (p. 25 of 173). Please advise what constitutes a condition of "necessity" for the

purpose of evacuation? Who makes that decision? What plans are in place to liaise and cooperate with local emergency responders such as Police, Fire, the Office of Emergency Management or the Mayor's Office and/or the Ontario Ministry of the Environment or Environment Canada, in relation to any needed evacuation?

k. Book 7 refers to a "unified command group" (p. 32 of 173) which may have multi-governmental aspects. Please advise what procedures are in place in relation to this command group and how it would involve municipal staff in and around Line 9. Please provide any documentation on these procedures.

l. Book 7 refers to "liaison officers" to provide contact with Police, Fire and other government officials (p. 37 of 173). Please advise who this person is on Line 9. What if any, protocols or procedures are in place in relation to this officer? Please provide a copy. What is Enbridge's view on who the relevant "government officials" are?

m. Book 7 warns that prompt first aid treatment is crucial for people exposed to breathing hazards, noting that "treatment varies according to materials" and stresses the need to be "aware of the proper first aid treatment" (p. 88 of 173). Please advise what information has or will be provided to municipal emergency responders on breathing hazards associated with dilbit, synbit and dilsynbit and particularly the volatile diluent components of these products.

n. Book 7 provides a redacted section dealing with "responding to fires" (p. 97 of 173). Please advise whether and how redacted information has been shared with municipal fire departments. If not, why not?

o. Book 7 refers to stormwater sewer runoff collection systems in relation to spills on land (p. 106 of 173) and redacts portions of text immediately thereafter as "security information". Please advise of the basis for the security concern. Please also advise of information available to Enbridge of the location of such storm sewer collection points through the City of Toronto in proximity to Line 9, and what steps have been taken by Enbridge to ensure that spilled material does not enter the City stormwater system. Does Enbridge have similar information for all of Line 9?

p. Book 7 refers to procedures to be used in wetlands (p. 113 of 173) and rivers (p. 122 of 173). The NTSB report investigating the Marshall spill of 2010 was critical of Enbridge for having failed to ensure that proper

underflow damming equipment was in place to deal with spills in fast flowing waters (pp. 105-108).

i) Please advise what measures are in place to ensure that equipment and training are in place to permit the installation of such equipment at major water crossings.

ii) Please also advise whether locations for spill collection points, underflow dams, containment dams and booms for major watercourses flowing along the north shore of Lake Ontario have been identified. If yes, please provide details for each containment measure. If no, why not?

q. Book 7 contemplates an alternative water supply in the event that a spill contaminates drinking water (p. 147 of 173). Please advise what if any, alternative measures could or would be taken in the event of contamination of drinking water drawn from Lake Ontario. Please advise what, if any, discussions have taken place with Toronto Water or other water authorities drawing drinking water from Lake Ontario's north shore.

r. Book 7 refers to procedures for in situ burning of oil products under some circumstances (p. 151 of 173). Please advise under what circumstances "significant health, safety, environmental or operational justification exists" for in situ burning (as opposed to cleanup) and who makes that decision. What if any, role would the local Medical Officer of Health have?

The following questions relate to the Book 7 component dealing with the Eastern region ("Eastern Region Book") and Book 1: General Compliance Reference:

s. A copy of Eastern Region Book provided to the City of Toronto refers to contacts, measures and provisions relevant to the Sarnia Hampton area. Please advise whether a similar document exists for Line 9 in relation to the area between Hamilton and Kingston and provide a copy of same.

t. The Eastern Region Book provides for site evacuation of the Enbridge facilities in Hamilton and Sarnia (pp. 12 to 13 of 71). Please advise if there is any comparable plan or consideration for evacuation of third parties and residents adjacent to the Line 9 right-of-way in built-up areas.

u. The Eastern Region Book refers to a Chemical Valley Emergency Coordination Organization (pp. 37 to 45 of 71), as well as a Municipal Emergency Operations Centre (p. 47 of 71) which is intended to facilitate

evacuation, develop policy, declare emergencies. Please advise whether comparable information, organizations or systems are in place in or around Toronto or the north shore of Lake Ontario. If not, why not?

v. Book 1: General Compliance, which was provided to the City of Toronto along with Book 7, discusses a Management Of Change (MOC) assurance system intended to ensure improved response to changed materials or procedures (pp. 65, 67 of 71). Please advise whether the Line 9B application has been subject to the Management Of Change process, especially as it relates to the increased volume being carried and the different material (i.e. dilbit) proposed to be carried. If yes, what recommendations, if any, were made as a result of this process? If no MOC process was employed, why not?

Emergency Response and Control Measures

1.28

Reference: i) Line 9B Reversal and Line 9 Capacity Expansion Project Application, page 54 of 54

Preamble: Enbridge devotes 9 lines of its Application to Emergency Management, referring to an April 24, 2002 NEB letter re procedures, community engagement and markings on the pipeline ROW.

In its response to NEB question 2.7, Enbridge indicated that it is "determining new valve placement and looking at installing additional valves on Line 9 in 2013."

https://www.neb-one.gc.ca/ll-eng/livelink.exe/fetch/2000/90464/90552/92263/790736/890819/918445/947647/B11-2_-_Response_to_NEB_Information_Request_No_2_-_A3H3A8.pdf?nodeid=947745&vernum=0

Request: Please provide information on:

a. Existence and location of all control valves/stations on Line 9B North Westover to Montreal, how they function/operate. How often are these control valves tested?

b. Please advise the status of the review of valve placement and the installation of new valves, particularly those near major waterways.

c. Please advise whether Enbridge has advised all municipal emergency service or fire personnel about the location of emergency shut off valves. Please also advise under what circumstances or conditions it would be appropriate for municipal staff to operate this equipment rather than waiting for Enbridge personnel to arrive. Please advise what, if any, discussions have been held with Toronto Fire or other municipal staff regarding these valves.

d. Please advise whether Enbridge has shared results of ILI work with municipal staff? Please provide particulars on instances of consultation and engagement.

e. Please advise whether Enbridge has provided municipalities with specific – as opposed to general - emergency plans to deal with pipeline rupture or spills.

f. Please identify any Line 9B pipeline sections that could be considered "inaccessible" or characterised as difficult (low to high level difficulty) for vehicles and equipment to access. Please provide any plans or proposals to ensure that access can be obtained in these circumstances? Please advise whether such plans or proposals include land profiles.

g. Along Line 9B pipeline sections please identify areas with high environmental sensitivity but "low to no' human population/residential receptors within 1km of the pipeline. For the areas identified could Enbridge also provide pipeline monitoring features and integrity history?

h. Please provide estimated response time for the City of Toronto for:

i) Trained Enbridge emergency first responders;

ii) Enbridge emergency response contractors;

i. Is the 1.5 hours response time of the Enbridge Emergency Response Team - achieved during the 2011 Don River exercise - used in all pipeline spill/rupture modelling or scenarios?

j. Please provide details on the location, type and quality of spill control equipment/resources that are readily available along Line 9B and the time within which these resources could be mobilized to reach the major waterways in Toronto. Please advise how or whether these response times are affected by flow rates in these major waterways. Please also advise whether Enbridge has given any consideration to siting resources based on population density around major waterways.

k. The NTSB report on Marshall noted that spill response was hampered by lack of access for heavy equipment in wetland areas. Please advise what steps have been taken along Line 9B to ensure that heavy equipment can function in wet areas (whether naturally wet, or wet as a result of precipitation).

l. Please advise how many and which municipal staff members have completed Enbridge Emergency training, and which programs were so completed.

Integrity Digs in Toronto

1.29

Reference: City of Toronto informal information request to Enbridge of May 1, 2013.

Preamble: In response to a City of Toronto question, Enbridge advised that it has "identified only two locations where an "integrity dig" will be conducted to determine the accuracy of the ILI tool and conduct repairs if that is deemed the correct course of action at the time of visual inspection".

Request: Please advise:

a) Upon what basis were the two Toronto sites identified for integrity digs?

b) What are the two proposed integrity dig locations?

c) Upon what basis would repairs be deemed the correct course of action?

d) What repairs would be undertaken if deemed the correct course of action?

e) Is Enbridge prepared to agree to a condition deferring NEB approval of the application until such time as the correct course of action has been implemented at these two sites?

Source Water Protection

1.30

Reference: i) B8-2 Response to National Energy Board Information Request No.1 - Line 9B Reversal and Line 9 Capacity Expansion Project – Enbridge Response to NEB IR No. 1

ii) Filing A3D7J4: Attachment 7 - Pipeline Integrity Engineering Assessment, (Adobe pp. 93-94 of 96)

iii) Filing A3D7J1: Attachment 4f – Letter to Ontario and Quebec Municipalities, pp. 3-4 of 62

iv) Credit Valley, Toronto and Region and Central Lake Ontario (CTC) Proposed Source Protection Plan, Chapter 10, LO-PIPE-1, pp. 137-138

Whole Plan -
http://www.ctcswp.ca/files/CTCProposedSourceProtectionPlan_LowRezFINAL.pdf

Chapter 10 Policies -
http://www.ctcswp.ca/files/plan/Proposed%20Chap10.pdf

City Council Decision on CTC -
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PW19.6

Preamble: In Reference i) the National Energy Board requested information on how Enbridge will update its Environmental Protection Program to continue to comply with Section 48 of the OPR-99. The National Energy Board specifically requested information on depth of cover at or under water bodies and riparian areas.

In Reference ii) Enbridge provides details on River Crossing Management and Impact of Line Reversal on Geohazard Management.

In Reference iii) Enbridge states: "We maintain comprehensive emergency response plans, developed in consultation with regulatory agencies and appropriate stakeholders, that address regional priorities and high risk locations such as key water crossings and residential communities."

In Reference iv) the City of Toronto formally endorsed the Lake Ontario policies contained in the Credit Valley, Toronto and Region, Central Ontario (CTC) Source Protection Plan which is intended to protect the City of Toronto's drinking water source from threats, including a petroleum spill from a pipeline failure.

Request: Please provide the following:

a. A copy of documentation showing Enbridge's Environmental Protection Program as it relates to water bodies and crossings and riparian areas.

b. An annotated list of all modifications made to Enbridge Environmental Protection Program since 2008.

c. Details on information provided to municipalities on minimum depth of cover requirements for stream/creek crossing including actual inspected depth of cover at each stream crossing.

d. A table listing depth of cover surveys at stream crossings where follow up remediation action is taken and including information on the type of remediation action taken, the rationale for the specific action and the expected outcome.

e. Identify the sources and resources that Enbridge uses to assess erosion and flood risk on stream crossings.

f. An indication whether Enbridge has "site specific emergency response and spill containment plans" for stream crossings and whether these plans are tailored to each crossing and conditions at the time, or are generic?

g. Information on how Enbridge would dispose of and/or manage product collected from the open environment after a spill or rupture event.

h. The degree to which Enbridge's Environmental Protection Plan and Emergency Response Plan are consistent with the policies and procedures set out in the CTC Proposed Source Protection Plan in LO-PIPE 1 Policy. Please provide specific references to Enbridge emergency and environmental procedures that demonstrate compliance with LO PIPE 1.

i) Where there is difference between the LO PIPE 1 Policy (for example frequency of pipeline crossing inspections and depth of cover surveys), provide a rationale for the difference and explain why policies and procedures are acceptable.

i. Modelling undertaken or commissioned by Enbridge which predicts product spill extent and magnitude across surface water under different river flow rates. What is the estimated time it would take for oil spilt as a result of a rupture in Line 9 near a stream to reach Lake Ontario, including assumptions underlying the estimate?

j. Provide spill maps for Toronto waterways.

k. Does Enbridge agree that although Enbridge uses current systems and technologies to mitigate against spills, that it is possible that a spill on Line 9B may occur near a stream crossing?

l. Are corrosion inhibitors put through the line periodically, and if yes, please provide details on the type of substances used for corrosion prevention?

m. Aside from crude products complying with relevant tariff conditions, what other substances are transmitted through the pipeline (i.e. added chemicals)?