Council Direction:

At its meeting of July 12, 2012, Council approved Information Item (h)(ii) of the General Issues Committee Report 12-019, which reads as follows:
(ii) Enbridge Inc. Pipeline Flow Reversal (Item 10.2)

On a motion, staff was directed to investigate the Enbridge Inc. pipeline flow reversal project and the potential impact and report back to the General Issues Committee.

Information:

Background

On August 8, 2011, Enbridge Pipelines Inc. filed a Project Application with the National Energy Board (NEB) under Section 58 of the National Energy Board Act for approval to reverse the flow of crude oil within a section of pipeline referred to as Line 9 between Sarnia and Westover (see Appendix “A” to Report PED12160). The pipeline currently transports offshore crude oil in a westerly direction. If approved, this section of pipeline will carry crude oil from Western Canada to markets in Eastern Canada including Ontario and Quebec. Line 9 was originally constructed as an eastbound pipeline in the mid-70s to supply Eastern Canada with crude oil from the west. However, in the 1990s, when off-shore oil from areas such as the North Sea, West Africa and the Middle East was more affordable, Line 9 was reversed to westbound to carry crude oil from the Montreal Terminal to Sarnia.

Proposal

The proposal will require some additions and modifications at facilities between the Sarnia Terminal and the North Westover Station to allow the pipeline to reverse the flow of oil within the existing 762mm (30 inch) pipeline as originally approved in 1975. All proposed works will take place within Enbridge’s existing facilities, right-of-ways and easements. Except for the installation of a short section of pipe, there is no planned ground disturbance along the right-of-way.

Impacts on Areas within the City of Hamilton

Land-use Characteristics:

The Densitometer at MP1860 is on the east side of Kirkwall Road, north of Concession Road 6 West. The lands are designated as Rural in the Rural Hamilton Official Plan and zoned “A” Agriculture. The site is located outside the urban boundary within a rural setting. Existing land uses are primarily agricultural interspersed with large woodlots. There are four residences and one residential/farm property within 500 m of the site. Thirty-one wells are located within 1 km of this project site.
The North Westover Pump Station is located at 1437 6th Concession Road West, just north of Westover Station, which is set back approximately 520 m north of Concession Road 6 West. The lands are designated as Rural in the Rural Hamilton Official Plan and zoned “A” Agriculture. The site is located outside the urban boundary within a rural setting. Existing land use is primarily agricultural interspersed with large woodlots. There is one residence, with farm buildings, within approximately 500 m of the site. According to Enbridge’s application materials, construction activities at the North Westover will require a work force of a maximum of 30 people for a period of approximately four months. Forty-four wells are located within 1 km of this project site.

The Westover Terminal is located at 1430 6th Concession Road West in the City of Hamilton (see Appendix “B” to Report PED12160) on the south side of Concession Road 6 West. The lands are designated as Utility in the Rural Hamilton Official Plan and zoned “M3” Rural Industrial and “CM” Conservation Management. The site is located outside the urban boundary within a rural setting. Existing land uses are primarily agricultural interspersed with large woodlots. There are currently approximately four residences within approximately 500 m of the site, and a baseball diamond/recreational park area within 200 m of the fence line. Construction activities at the Westover Terminal site will require a work force of a maximum of 30 people for a period of approximately four months. Thirty-four wells are located within 1 km of this project site.

Environmental Characteristics:

Four Environmentally Significant Areas ("ESAs"), Hyde-Rockton-Beverly Complex, Westover Drumlin Field, Westover Lowland Forest and Westover Southwest Complex as well as one Provincially Significant Wetland ("PSW"), Sheffield-Rockton Complex have been identified within or adjacent to the Westover Project Sites.

Hyde-Rockton-Beverly Complex (ESA #22) consists of previously disturbed, regenerating habitat. This ESA provides a significant ecological function (habitat for significant species, interior forest habitat, high diversity of native plant species and rare biotic communities) as well as a significant hydrological function (contains a sensitive bedrock recharge zone). Several natural areas lie in close proximity to this ESA (Nature Counts, 2003). Densitometer MP 1860 and the right-of-way are located within this ESA.

Wetlands that form part of the Sheffield-Rockton PSW are also found within this ESA and adjacent to Densitometer MP 1860. Sheffield-Rockton Complex provides significant ecological functions (contains significant species, interior forest habitat, high diversity, linkage between Sheffield Complex and Beverly Swamp) and significant hydrological functions (aids in maintaining water quality in Fairchild Creek) (Nature Counts, 2003). This PSW provides linkages between this complex and several small wetlands, woodlots and successional natural areas. At this location, the Grand River Conservation Authority ("GRCA") regulates the wetland under the authority of Ontario Regulation 150/06 ("Development, Interference with Wetlands and Alteration to Shorelines and Watercourses").
The North Westover Terminal is located within the Westover Drumlin Field (ESA #27) and Westover Lowland Forest (ESA #25). The Westover Drumlin Field is composed of rounded hills mostly cleared of natural vegetation as well as Spencer Creek, which flows southerly through this feature (Nature Counts, 2003). This feature has been identified as an ESA based on its significant Earth Science feature (distinctive drumlin landforms) and significant ecological functions (provides habitat for significant species). This feature provides linkages to other features (Westover Lowland Forest and Hayesland Swamp) as well as supporting a hydrological linkage to Spencer Creek.

The Westover Lowland Forest is located within the Westover Drumlin Field and consists of Silver Maple swamps, upland forests, shrub thickets and riparian meadows. This ESA also includes segments of Barlow Creek (tributary of Fairchild Creek), Spencer Creek and two unnamed tributaries of Spencer Creek. Westover Lowland Forest has been identified as an ESA because of its significant ecological function (riparian link to natural areas, provides habitat for significant species, winter deer yard and interior forest habitat) and significant hydrological function (wetlands in the area to maintain surface water quality and regulated stream function). Wetlands that form the Sheffield-Rockton Complex, which have been described above, are also found within the Westover Drumlin Field and Westover Lowland Forest and are regulated by Hamilton Conservation Authority under Ontario Regulation 161/06 (“Development, Interference with Wetlands and Alteration to Shorelines and Watercourses”).

The Westover Southwest Complex (ESA #24) encompasses a mix of previously disturbed terrestrial communities and wetland areas. This feature has been identified as an ESA because of its significant ecological function (riparian area serves as a link between natural areas in Flamborough, provides habitat for significant species and contains interior forest habitat). The Westover Terminal is located within this ESA. The oil pipeline appears to have altered the surface drainage in the eastern wetland (Nature Counts, 2003). Wetlands that form the Sheffield-Rockton Complex, which have been described above, are also found within the Westover Southwest Complex and are regulated by Hamilton Conservation Authority under Ontario Regulation 161/06 (“Development, Interference with Wetlands and Alteration to Shorelines and Watercourses”).

The Draft Environmental Screening Report for the Line 9 Reversal Project indicates that the Project Sites have been disturbed to the point that no natural features are present and that all construction activities would occur within the confines of the existing and gravelled sites. The impacts of construction and operations will be localized and include silt and sediment runoff, construction dewatering, dust and vehicle emissions created during construction. These impacts may cause adverse health effects on nearby plants and fish, alter wetland hydrology and temporarily disturb wildlife; however their impacts would probably be temporary and could be minimized through appropriate mitigation measures (i.e. scheduling construction to avoid sensitive periods and confining construction activities to existing industrial sites).
Significant concerns have also been raised about accidents, malfunctions and unplanned events, including the ability of the company to detect and respond to such contingencies, and the potential for irreversible damage to people, property and the environment. The National Energy Board (NEB) heard evidence during the hearings and addressed these issues in their preliminary findings.

The National Energy Board (NEB) Hearings

The NEB oral hearings concluded the week of May 23, 2012. The NEB released a draft Environmental Screening Report (ESR) on June 5, 2012 (see Appendix “C” to Report PED12160) following which comments from parties to the hearing were received. Enbridge had the final right of reply and submitted its response on June 22, 2012. Effectively, the record is closed and there are no further opportunities to submit comments for the Board’s consideration.

The draft ESR gave a preliminary indication that the NEB would grant Enbridge its approval, with conditions. The Board’s assessment of accidents and malfunctions does not focus on the effects on individual receptor or specific areas because such an assessment would be hypothetical since the location(s) of any release point(s) cannot be predicted with confidence. Rather, the Board focuses on Enbridge’s overall approaches to minimizing the likelihood of a release and, in the event of a release, its response plan.

Based on the draft ESR, the Board appears satisfied that Enbridge has an appropriate set of systems, procedures and protocols in place to manage the risks associated with the integrity of Line 9 and to minimize the likelihood of a release occurring. The Board is satisfied, according to its draft ESR, that the potential adverse environmental effects of accidents and malfunctions are not likely to be significant, and the likelihood of a release occurring is low.

The NEB has completed its deliberation and on July 27, 2012, issued its decision (see Appendix “D” to Report PED12160) approving Enbridge’s application subject to fifteen (15) conditions (see Appendix “E” to Report PED12160). A complete copy of the NEB’s decision is located on their website at http://www.neb-one.qc.ca/clfnisi/rthnb/pplctnsbfrthnb/nbrdgln9phs1/nbrdgln9phs1-eng.html

Approval Authority

The NEB is the responsible authority under the Canadian Environmental Assessment Act (CEAA). This project is proceeding under Federal legislation, namely the NEB Act, CEAA and the Onshore Pipeline Regulations, 1999.

There are no municipal approvals or permits required by Enbridge, other than permits that may be related to construction activities post-project approval by the NEB. However, now that approval has been given, Enbridge will require:
• Permits from the Hamilton Conservation Authority (“HCA”) for works at the North Westover Pump Station and Westover Terminal under O. Reg. 161/06 “Development, Interference with Wetlands and Alteration to Watercourses” under the Ontario Conservation Authorities Act. Construction occurring at the North Westover Pump Station and the Westover Terminal will require permits under the regulation due to their proximity (within 120 m) to the Sheffield-Rockton PSW Complex.

• A Permit to Take Water (“PTTW”) from the Ministry of the Environment (MOE) for dewatering activities during construction. This PTTW is required when water from source will be taken at a rate in excess of 50,000 l/day. This may be required during construction activities at the North Westover Pump Station and the Westover Terminal.

Comments

From the City of Hamilton’s perspective, the following factors must be considered:

• The proposal is proceeding under Federal legislation, namely the National Energy Act, the Canadian Environmental Assessment Act and the Onshore Pipeline Regulations, 1999;

• All technical matters including pipeline safety issues and emergency response protocols will be addressed and evaluated as part of the National Energy Board's review of the application;

• The City of Hamilton has no approval authority with respect to matters related to underground oil or liquid pipelines;

• While the City of Hamilton staff are concerned with the potential of a spill, the Public Works Department, Public Health Services Department and the Emergency Management Office recognizes the fact that the City has no legal jurisdiction over this matter and have emergency protocols in place in the event of a spill;

• The Ontario Ministry of Environment did not identify a responsibility or interest in the Environmental Assessment of this project;

• The Hamilton Conservation Authority staff have expressed similar environmental concerns but also recognizes the fact that it has no legal jurisdiction over this matter, other than through the permitting process;

• The project will take place within an existing pipeline that was originally constructed to carry crude oil in an easterly direction; entirely within existing
Enbridge properties, right-of-ways and easements; and no ground disturbances are anticipated;

- There is no land use change or planned impacts on any of the Environmentally Significant Areas within Enbridge’s properties, right-of-way or easements;

- The City may submit comments to the Hamilton Conservation Authority, Grand River Conservation Authority or the Ministry of Environment if permits are required from these public agencies to implement Enbridge’s approval; and,

- The National Energy Board’s oral hearings have concluded, a draft Environmental Screening Report was released and finally, a Letter Decision and Order issued on July 27, 2012 approving Enbridge’s application.

Conclusion

Based on the above, staff is satisfied that the National Energy Board has addressed the issues surrounding pipeline safety and emergency response protocol through their approvals process. Since there are no planned impacts to Hamilton’s Environmentally Significant Areas and/or to existing land uses, residents and water supplies as a result of Enbridge’s proposal to reverse the direction of flow within the existing section of pipeline between Sarnia and Westover, it is concluded that there are no foreseeable impacts to the City of Hamilton.

APPENDICES / SCHEDULES

- Appendix “A” – Enbridge Pipeline Line 9 Route Map
- Appendix “B” – Enbridge Pipeline Line 9 Location Plan

RL/LM/ra
Attachs. (5)
File OF-Fac-Oil-E101-2011-01 01
5 June 2012

To: All Parties to the OH-005-2011 Proceeding

Enbridge Pipelines Inc. (Enbridge) Line 9 Reversal Phase I Project (Project)
Application under section 58 of the National Energy Board Act (NEB Act)
Hearing Order OH-005-2011
Draft Environmental Screening Report (ESR)

On 5 December 2011, the National Energy Board (Board) issued Hearing Order OH-005-2011, convening a public hearing to assess Enbridge’s proposed Project. As part of its responsibilities under the Canadian Environmental Assessment Act (CEA Act), the Board initiated an environmental assessment of the Project. Pursuant to paragraph 15 of Procedural Update No. 2, issued 27 February 2012, the Board has prepared the attached draft ESR for public review and comment.

Comments on the draft ESR must be filed with the Board and served on Enbridge no later than noon, Calgary time, on 19 June 2012. Comments may be filed with the Board either electronically or by facsimile at 403-292-5503 (toll-free 1-877-288-8803). Comments can be served on Enbridge either electronically via the Board’s website or by facsimiles sent to Enbridge at 403-767-3863.

Enbridge may file comments with the Board and serve a copy on any Parties who have filed comments no later than noon, Calgary time, on 22 June 2012.

The Board will consider submissions on the draft ESR in completing its final ESR and in reaching its determination under the CEA Act.

The draft ESR is also available on the Board’s website at www.neb-one.gc.ca. Click on View under Regulatory Documents and then on Quick Links. Click on Enbridge Pipelines Inc. – Application for Line 9 Phase I Project (OH-005-2011) and then on the folder called Environmental Screening Report.

If you have any questions about the above information, please contact Jessica Lim, Legal Counsel, at 403-299-3170, or through the Board’s toll-free number at 1-800-899-1265.

Yours truly,

For
Sheri Young
Secretary of the Board

Attachment: Draft ESR
DRAFT ENVIRONMENTAL SCREENING REPORT
Pursuant to the **Canadian Environmental Assessment Act** (CEA Act)

**Line 9 Reversal Phase I Project**

<table>
<thead>
<tr>
<th>Applicant Name:</th>
<th>Enbridge Pipelines Inc. (Enbridge)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Date:</td>
<td>8 August 2011</td>
</tr>
<tr>
<td><strong>CEA Act Registration Date:</strong></td>
<td>19 August 2011</td>
</tr>
<tr>
<td>National Energy Board File Number:</td>
<td>OF-Fac-Oil-E101-2011-01 01</td>
</tr>
<tr>
<td><strong>Canadian Environmental Assessment Registry Number:</strong></td>
<td>11-01-63658</td>
</tr>
<tr>
<td>CEA Act Law List Trigger(s):</td>
<td>Subsection 58(1), National Energy Board Act</td>
</tr>
<tr>
<td><strong>CEA Act Determination Date:</strong></td>
<td>To be determined</td>
</tr>
</tbody>
</table>

![Map of the Line 9 Reversal Phase I Project](image)

- **North Westover Pump Station**
- **Densitometer at Mile Post 1860**
- **Westover Terminal**
- **Sarnia Terminal**
SUMMARY

This report is a draft Environmental Screening Report (ESR) under the Canadian Environmental Assessment Act (CEA Act) for the Line 9 Reversal Phase I Project (the Project), as applied for by Enbridge Pipelines Inc. (Enbridge) on 8 August 2011. Once complete, the Project would enable crude oil to flow eastward within Enbridge’s existing Line 9 between its Sarnia Terminal (SA) and North Westover Pump Station (NW), for delivery to Westover Terminal (WT). Currently, this segment of Line 9 flows westward.

The Project includes the infrastructure additions and modifications (related to pumps, piping, valves, densitometers, a pig trap) at four existing fenced and graveled sites along Line 9 (SA, NW, WT and at a densitometer site 4.12 kilometres west of NW). A new electrical building would also be installed at WT. All construction work would be completed on existing Enbridge facilities and surface leases with no planned ground disturbances along the Line 9 right-of-way itself.

The National Energy Board (Board or NEB) is the Federal Environmental Assessment Coordinator for this Project. In this role, the NEB coordinated the involvement of federal departments with an interest in the Project. No other Responsible Authorities were identified. Environment Canada declared itself a Federal Authority in possession of specialist or expert information or knowledge.

This draft ESR was prepared as part of the NEB’s responsibilities under the CEA Act and incorporates information provided by Enbridge, government authorities, Aboriginal groups and the general public. The analysis in this draft ESR is based on the evidence on the record for the public hearing process held for the proposed Project, the full documentation of which can be found at the following hyperlink:

https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=706437&objAction=browse&sort=-name

As detailed in this draft ESR, various potential adverse environmental effects of the Project were assessed, the most notable being those related to accidents and malfunctions. The NEB is of the view that, if the Project is approved and, taking in account the implementation of Enbridge’s proposed environmental protection procedures and mitigation measures, and through its compliance with the Board’s regulatory requirements and the recommendations included in this draft ESR, the Project is not likely to cause significant adverse environmental effects.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1</td>
<td>Background</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Project Overview</td>
<td>1</td>
</tr>
<tr>
<td>1.3</td>
<td>Rationale for the Project</td>
<td>1</td>
</tr>
<tr>
<td>1.4</td>
<td>Baseline Information and Sources</td>
<td>1</td>
</tr>
<tr>
<td>2.0</td>
<td>ENVIRONMENTAL ASSESSMENT (EA) PROCESS</td>
<td>2</td>
</tr>
<tr>
<td>2.1</td>
<td>EA Coordination Process</td>
<td>2</td>
</tr>
<tr>
<td>2.2</td>
<td>Opportunities for Public Input into the EA</td>
<td>2</td>
</tr>
<tr>
<td>2.2.1</td>
<td>Public Hearing Process</td>
<td>2</td>
</tr>
<tr>
<td>2.2.2</td>
<td>Draft Scope of the EA</td>
<td>3</td>
</tr>
<tr>
<td>2.2.3</td>
<td>Draft ESR</td>
<td>3</td>
</tr>
<tr>
<td>3.0</td>
<td>SCOPE OF THE EA</td>
<td>3</td>
</tr>
<tr>
<td>4.0</td>
<td>DESCRIPTION OF THE PROJECT</td>
<td>4</td>
</tr>
<tr>
<td>4.1</td>
<td>Construction Phase</td>
<td>4</td>
</tr>
<tr>
<td>4.2</td>
<td>Operations Phase</td>
<td>4</td>
</tr>
<tr>
<td>4.3</td>
<td>Abandonment Phase</td>
<td>5</td>
</tr>
<tr>
<td>5.0</td>
<td>DESCRIPTION OF THE ENVIRONMENT</td>
<td>5</td>
</tr>
<tr>
<td>6.0</td>
<td>PROJECT-RELATED ISSUES/COMMENTS RAISED TO THE NEB</td>
<td>8</td>
</tr>
<tr>
<td>7.0</td>
<td>THE NEB’S EA METHODOLOGY</td>
<td>8</td>
</tr>
<tr>
<td>8.0</td>
<td>ENVIRONMENTAL EFFECTS ANALYSIS</td>
<td>9</td>
</tr>
<tr>
<td>8.1</td>
<td>Project – Environment Interactions</td>
<td>9</td>
</tr>
<tr>
<td>8.2</td>
<td>Analysis of Potential Adverse Environmental Effects</td>
<td>11</td>
</tr>
<tr>
<td>8.2.1</td>
<td>Analysis of Potential Adverse Environmental Effects to be Mitigated Using Standard Measures</td>
<td>11</td>
</tr>
<tr>
<td>8.2.2</td>
<td>Detailed Analysis of Potential Adverse Environmental Effects – Accidents and Malfunctions during Operations</td>
<td>12</td>
</tr>
<tr>
<td>8.2.2.1</td>
<td>Issue Background</td>
<td>12</td>
</tr>
<tr>
<td>8.2.2.2</td>
<td>Release Prevention</td>
<td>13</td>
</tr>
<tr>
<td>8.2.2.3</td>
<td>Release Detection, Minimization and Containment</td>
<td>17</td>
</tr>
<tr>
<td>8.2.2.4</td>
<td>Emergency Preparedness and Response (EPR)</td>
<td>18</td>
</tr>
<tr>
<td>8.2.2.5</td>
<td>Views of the Board on Significance</td>
<td>20</td>
</tr>
<tr>
<td>8.3</td>
<td>Cumulative Effects Assessment</td>
<td>21</td>
</tr>
<tr>
<td>8.4</td>
<td>CEA Act Follow-Up Program</td>
<td>23</td>
</tr>
<tr>
<td>8.5</td>
<td>Recommendations</td>
<td>23</td>
</tr>
<tr>
<td>9.0</td>
<td>THE NEB’S CONCLUSION</td>
<td>25</td>
</tr>
<tr>
<td>10.0</td>
<td>NEB CONTACT</td>
<td>26</td>
</tr>
<tr>
<td><strong>APPENDIX 1:</strong></td>
<td>SCOPE OF THE EA</td>
<td>27</td>
</tr>
</tbody>
</table>
LIST OF ACRONYMS AND ABBREVIATIONS

Board or NEB  National Energy Board
CEA Act  Canadian Environmental Assessment Act
CP  cathodic protection
CPM  Computational Pipeline Monitoring
EA  environmental assessment
Enbridge  Enbridge Pipelines Inc.
EPR Program  Emergency Preparedness and Response Program
ESA  Environmentally Significant Area
ESEIA  Environmental and Socio-Economic Impact Assessment
ESR  Environmental Screening Report
Federal Coordination Regulations  Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements
GHG  greenhouse gas
ILI  in-line inspection
IMP  Integrity Management Program
km  kilometre(s)
kPa  kilopascal(s)
LDS  Leak Detection System
Line 9  Enbridge Pipelines Inc.’s existing 762 millimetre (30-inch) outside diameter crude oil pipeline between Sarnia, Ontario and Montreal, Québec
LTO  Leave to Open
MOP  maximum operating pressure
MP 1860  densitometer site 4.12 kilometres west of North Westover Pump Station, at mile post 1860
NEB Act  National Energy Board Act
NW  North Westover Pump Station
ON  Ontario
OPR-99  Onshore Pipeline Regulations, 1999
PE  polyethylene
Project  Enbridge Pipelines Inc.’s proposed Line 9 Reversal Phase I Project
Project Sites  collectively, the four existing fenced and graveled sites where construction work is proposed: Sarnia Terminal, North Westover Pump Station, Westover Terminal and a site 4.12 kilometres west of North Westover Pump Station
psi  pounds per square inch
QC  Québec
RoW  right-of-way
SA  Sarnia Terminal
SCC  stress corrosion cracking
WT  Westover Terminal
1.0 INTRODUCTION

1.1 Background

Enbridge Pipelines Inc. (Enbridge) currently owns and operates Line 9, an approximately 830 kilometre (km) long, 762 millimetre (30-inch) outside diameter crude oil pipeline located between Sarnia, Ontario (ON) and Montreal, Québec (QC). The Board authorized its construction and operation with the issuance of Certificate of Public Convenience and Necessity OC-30. Line 9 was placed in service in 1976 with eastward flow. In 1997, the National Energy Board (NEB or Board) authorized a reversal to its current westward flow following proceeding OH-2-97.

1.2 Project Overview

On 8 August 2011, Enbridge applied to the NEB for authorization to construct and operate its Line 9 Reversal Phase I Project (the Project) between Sarnia and Westover in southwestern ON.

The Project includes the infrastructure additions and modifications required to allow the reversal of crude oil flow within the approximately 194 km long segment of Line 9 between Sarnia Terminal (SA) and North Westover Pump Station (NW). All construction activities would occur within the confines of four existing fenced and graveled sites: SA, NW, Westover Terminal (WT) and at a densitometer site 4.12 km west of NW, at mile post 1860 (MP 1860). These sites are collectively referred to as “the Project Sites”. Work is related to pumps, piping, valves, a pig trap and densitometers. A new electrical building would be built at WT.

Line 9 currently transports crude oil in a westward direction, with deliveries from Montreal Terminal flowing through NW and onward to either SA or WT. In the proposed reversed direction (eastward), Line 9 would deliver crude oil to WT from SA. East of NW, Line 9 would maintain its current westward flow.

Upon reversal, the anticipated average daily crude oil volume that would be shipped is 50,000 barrels per day. The maximum average daily volume that could be shipped is 152,000 barrels per day.

Section 4.0 provides a detailed description of the work associated with the Project.

1.3 Rationale for the Project

Enbridge has proposed the Project in order to meet shipper business demands. On this Line 9 segment, oil currently imported from offshore would be replaced by oil sourced from western Canada or the United States. Enbridge submits that the Project would eliminate the current reliance of ON refiners on crude oil from areas of declining or potentially unreliable supply.

1.4 Baseline Information and Sources

The analysis for this draft Environmental Screening Report (ESR) is based on information from the following sources:
Enbridge’s Project application package, including its Environmental and Socio-Economic Impact Assessment (ESEIA) and Engineering Assessment;

- Enbridge’s supplementary filings to its Project application;
- Enbridge’s responses to information requests;
- submissions from interested parties (e.g., general public, Aboriginal groups, government authorities, non-government organizations, industry);
- views expressed by those during the final argument portion of the public hearing; and
- various manuals referenced in the Project application (e.g., Enbridge’s *Environmental Guidelines for Construction*).

All filed information is available online within the NEB’s Regulatory Document Index at the following hyperlink:

https://www.neb-one.gc.ca/ll-eng/livelink.exe?func=ll&objId=706437&objAction=browse&sort=-name

For more details on how to obtain documents, please contact the Secretary of the NEB at the address specified in Section 10.0 of this report.

2.0 ENVIRONMENTAL ASSESSMENT (EA) PROCESS

Enbridge’s 8 August 2011 Project application under section 58 of the *National Energy Board Act* (NEB Act) triggered the *Canadian Environmental Assessment Act* (CEA Act) EA process. The Board was required to undertake a screening level of assessment for the Project.

2.1 EA Coordination Process

The NEB is the Federal Environment Assessment Coordinator for the Project. On 24 August 2011, pursuant to section 5 of the CEA Act *Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements*, the NEB issued a Federal Coordination Notification letter to identify the potential involvement of federal departments in the EA process.

No other Responsible Authorities were identified; however, Environment Canada identified itself as a Federal Authority in possession of specialist or expert information or knowledge.

The NEB’s letter was also sent to the Ontario Ministry of Environment, which, in turn, did not identify a responsibility or interest in the EA of the Project.

2.2 Opportunities for Public Input into the EA

2.2.1 Public Hearing Process

With the issuance of Hearing Order OH-005-2011 on 5 December 2011, the Board announced that it would convene a public hearing to assess the Project. It also issued Procedural Updates on 1 and 27 February and on 11 May 2012. These documents described the process and
requirements for the public hearing, and the various ways in which any member of the general public, Aboriginal groups, government authorities, non-government organizations and industry could participate and contribute.

The Board received several submissions related to environmental matters. Those dealing with topics relevant to the CEA Act EA are summarized in Section 6.0.

The oral final argument portion of the public hearing was held on 23-24 May 2012 in London, ON.

2.2.2 Draft Scope of the EA

At the time of release of the Hearing Order, the NEB sought comments from the public on the draft Scope of the EA. The draft scope and a request for public input on it were posted on the Canadian Environmental Assessment Registry Internet Site on 6 December 2011. The public (including government departments) was given the opportunity to suggest amendments or additions to the draft by filing comments with the Board by 12 January 2012.

During the public comment period, the NEB received two letters of comment: one from the Ontario Ministry of Energy and a joint letter from Équiterre and Environmental Defence.

The Ontario Ministry of Energy considered the draft Scope of the EA to be appropriate for the evaluation of the Project. Équiterre and Environmental Defence indicated that, provided the draft Scope of the EA is broadly interpreted, they had no specific amendments to suggest. No additions or changes to the document were made as a result of these letters.

2.2.3 Draft ESR

This section will be completed following the public comment period on this draft ESR. The Board will consider the comments received when preparing the final ESR.

3.0 SCOPE OF THE EA

Following the public comment period described in Subsection 2.2.2, the Board issued its Scope of the EA on 1 February 2012, which is comprised of three parts:

1. Scope of the Project (elaborated upon in Section 4.0 of this draft ESR);
2. Factors to be Considered; and
3. Scope of the Factors to be Considered.

The Scope of the EA is also included as Appendix 1 to this draft ESR. The Board notes that it has made various minor wording changes to improve clarity, consistency and readability.

During the oral portion of the hearing, Aamjiwnaang First Nation submitted that the Board was not considering the reversed operation of Line 9 (between SA and NW) in its EA of the Project. The Board confirms that, from the outset, it had always contemplated assessing the applied-for operation of this Line 9 segment in reversed flow and it has considered that operation in its EA of the Project. The previously-circulated Scope of the EA, for example, explicitly included mention of flow reversal, operation and consideration of the environmental effects of accidents.
or malfunctions. The List of Issues for the OH-005-2011 proceeding, likewise, includes issues related to line operation, such as pipeline integrity under reversed flow and contingency planning for accidents and malfunctions during operations.

4.0 DESCRIPTION OF THE PROJECT

4.1 Construction Phase

The following table outlines the work to be completed at each of the four Project Sites.

<table>
<thead>
<tr>
<th></th>
<th>SA</th>
<th>MP 1860</th>
<th>NW</th>
<th>WT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump and piping modifications</td>
<td>●</td>
<td>•</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>New valves and piping</td>
<td>●</td>
<td>•</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Replace existing densitometer</td>
<td></td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>New electrical building</td>
<td></td>
<td>•</td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>Replace pig trap</td>
<td></td>
<td>•</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Physical activities during Project construction include, but are not limited to: surveying, conducting geotechnical investigations, excavating, trench dewatering, backfilling, foundation construction, clean-up and reclamation. No clearing, in-water works or new access are required.

All construction would occur on existing Enbridge facilities and surface leases with no planned ground disturbances along the right-of-way (RoW) itself. No new lands are required. Work on at MP 1860 would be contained within an existing building and no excavation is planned.

4.2 Operations Phase

During operations, the segment of Line 9 between SA and NW would continue to transport crude oil, but in the reversed eastward direction. From NW, oil would head south to WT, as it does currently.

Proposed crude oil types to be shipped post-reversal are all light blends and are similar to those currently being transported in this Line 9 segment. Commodities of similar physical properties have been transported in the past in this segment. However, Enbridge would be able to transport any crude oil type that meets its imposed quality specifications.

Enbridge would continue to implement its existing integrity management practices along this segment of Line 9 and at its facilities. This includes maintenance and repair work along the pipeline, as well as line patrols, including by air. More details on integrity-related operational activities are included in Subsection 8.2.2.2.

No sources of continuous operational air emissions are proposed. Pumping at SA would be electrically-driven. Trace amounts of fugitive greenhouse gas (GHG) emissions can be expected to escape from valves and fittings along the pipeline; however, these would likely see a decrease compared to past pipeline operations due to the replacement of old valves with newer ones. The occasional use of equipment and vehicles (including aerial) would also result in periodic emissions releases during operations.
4.3 Abandonment Phase

Pursuant to the NEB Act, any plans for abandonment would require an application to the Board, at which time the NEB would assess the potential environmental effects.

5.0 DESCRIPTION OF THE ENVIRONMENT

This section focuses on describing the environmental and socio-economic setting at and in the vicinity of the four existing fenced and graveled Project Sites (SA, NW, MP 1860 and WT). All Project Sites currently have above-ground infrastructure in place.

As Line 9 already exists as a buried pipeline, its potential impacts on bio-physical and socio-economic elements are limited to those resulting from operational activities (e.g., investigative digs) or accidents and malfunctions, the locations of which, if any, cannot be meaningfully predicted. Therefore, a complete description of the setting along the remainder of Line 9 between SA and WT is not provided. However, some high-level information has been included to provide context. For more details on accidents and malfunctions, see Subsection 8.2.2.

Geographical Information, Human Occupancy and Resource Use

- The Project Sites are within the County of Lambton and the Regional Municipality of Hamilton-Wentworth, in southwestern ON.
- With the exception of SA, the Project Sites are within the City of Hamilton (WT and NW are within 1 km of each other). SA is within the City of Sarnia.
- With the exception of SA, the land use adjacent to the Project Sites is primarily agricultural. SA is located in a primarily industrial area (petrochemical- and petroleum-related). Generally-speaking, a high degree of agricultural activity occurs along the RoW between SA and NW.
- WT: a baseball diamond/recreational park area is within 200 metres of the fence line; four residential structures are within 500 m; numerous man-made linear features and corridors are in the vicinity.
- NW: one farm structure is within 500 m; numerous man-made linear features and corridors are in the vicinity.
- MP 1860: four residential structures and one residential/farm structure are within 500 m.

Traditional Land and Resource Use

- The Project Sites do not traverse Indian Reserve lands.
- The Aamjiwnaang First Nation reserve is within 1.3 km of SA.
- The Line 9 segment to be reversed is within the traditional territory claimed by the Aamjiwnaang First Nation, Oneida Nation of the Thames, Bkejwanong (Walpole Island) First Nation, Métis Nation of Ontario, the Southern First Nations Secretariat and Chippewa of the Thames First Nation.
The current land use at the Project Sites is incompatible with any traditional use. The lands are not currently being used for the purposes of exercising traditional rights and the sites have not been used in that respect for many generations.

**Terrain and Soils**

- The Project Sites are graveled.
- Soil permeability at WT and NW is high, low at SA and variable at MP 1860.
- There are no known areas of geotechnical instability along the Line 9 RoW from SA to NW.

**Vegetation**

- The Project Sites have been disturbed to the point that no natural sensitive environmental features are present.
- The dominant land cover in the general Project area is cropped land with limited areas of mixed and deciduous forests. Woodlots or wooded areas are found near all Project Sites.
- Two Environmentally Significant Areas (ESAs) – the Westover Lowland Forest and the Westover Southwest Complex – occur near the Project Sites (excluding SA).
- Bordering NW, the Westover Lowland Forest ESA is a natural area that crosses several watercourses including Barlow Creek, Spencer Creek and two unnamed tributaries of Spencer Creek. It consists of a variety of vegetation types and is hydrologically and physically connected to a larger network of natural areas and provides ecologically important linkages along riparian corridors and watersheds.
- The Westover Southwest Complex ESA occupies most of the wooded lands surrounding WT. It consists of a mix of previously-disturbed terrestrial communities and wetland areas. This ESA extends across the divide between the Grand River and Spencer Creek watersheds, providing a continuous corridor linking other natural areas.

**Water**

- The Cole Drain is adjacent to SA. This drain flows northwest, connects to other drains and eventually discharges into Talfourd Creek.
- Drainage at MP 1860 runs toward Fairchild Creek, located 460 m to the southwest. This creek runs through many small wetlands before discharging into the Grand River near Brantford, ON.
- Spencer Creek is located in the vicinity of WT and NW. Drainage from these sites is generally toward this creek. WT is almost completely surrounded by the floodplain of Spencer Creek and its tributaries.
- Groundwater supply near the Project Sites is of good quality with a high chloride and bicarbonate chemistry due to the underlying bedrock.
- The following numbers of wells are located within 1 km of the Project Sites: SA (24), NW (44), WT (34), MP 1860 (31).
- Groundwater at several of the Project Sites is at such a depth that it may be encountered during excavations.
Between SA and NW, Line 9 crosses numerous watercourses, including Black Creek and the Thames, Nith and Grand Rivers.

**Fish and Fish Habitat**

- Various cold, cool and warm water fish species may occur in the watercourses potentially-affected by Project construction and operations. These include, but aren’t limited to: central mudminnow, creek chub, fathead minnow, northern redbelly dace, common shiner, white sucker, brook stickleback, Johnny darter, brook trout, brown trout, rainbow trout, chinook salmon, largemouth bass, smallmouth bass, black crappie, finescale dace and golden shiner.

**Wetlands**

- SA is not within 200 m of any wetlands. Generally-speaking, the remaining Project Sites are located in areas interspersed with wetlands and swamps.
- NW, MP 1860 and WT are bordered to the south and east by the Sheffield-Rockton Wetland Complex, designated as a Provincially-Significant Wetland and protected by the Province. This complex occupies much of the low-lying wooded lands surrounding NW and WT.

**Wildlife and Wildlife Habitat**

- Characteristic wildlife species in the general Project area include white-tailed deer, grey squirrel, red squirrel and eastern chipmunk. Bird species include northern cardinal, wood thrush, eastern Screech-owl, mourning dove, green heron, pileated woodpecker, red-bellied woodpecker and wild turkey.
- The fenced and graveled Project Sites do not represent optimal wildlife habitat.

**Species at Risk or of Special Status**

- The applicable migratory bird restricted activity period is from 1 May to 31 July.
- The following species listed on Schedule 1 of the *Species at Risk Act* are known to occur within 2 km of the Project Sites. Many of these species are also protected provincially under the Ontario *Endangered Species Act, 2007*:
  - **Plants:** American columbo, small white lady’s slipper, American chestnut (all Endangered); colicroot, dense blazing star, willowleaf aster (all Threatened); Riddell’s goldenrod, swamp rose-mallow (both Special Concern).
  - **Reptile:** common five-lined skink (Endangered); Massasauga rattlesnake, Blanding’s turtle (both Threatened); eastern ribbonsnake and milksnake (both Special Concern).
  - **Birds:** Acadian flycatcher, Henslow’s sparrow (both Endangered).

- Several other plant, reptile, bird or fish species of various conservation statuses (as listed in the Natural Heritage Information Centre database) are known to occur in the vicinity of the Project Sites.
- The fenced and graveled Project Sites do not provide preferred habitat for listed species, although lands adjacent to the sites could support the preferred habitat of four species (common five-line skink, Blanding’s turtle, eastern ribbonsnake, Massasauga rattlesnake).
6.0 PROJECT-RELATED ISSUES/COMMENTS RAISED TO THE NEB

The Board received submissions related to environmental and socio-economic matters from several interested parties (e.g., public, landowner associations, government authorities, non-government organizations, Aboriginal groups).

Several submissions described issues and concerns that were not relevant to the Board’s overall assessment of the applied-for Project or to this CEA Act EA, as scoped.

However, many comments and concerns were relevant to the CEA Act EA. Common concerns generally related to accidents and malfunctions during the operation of this Line 9 segment in reversed flow. Specifically, concerns dealt with the potential for an increased risk of a leak occurring due to the effects of changing operating conditions (e.g., pressures, flow direction, crude types) on pipeline integrity. Comments also focused on the potential effects of a release on various elements, including water resources, wildlife habitat and land use (including for traditional purposes), as well as Enbridge’s emergency response measures. The Board’s analysis of accidents and malfunctions is found in Subsection 8.2.2 of this report.

Other specific comments and concerns relevant to the CEA Act EA were related to:

- Impacts of the Project on air and water quality in ON (see Subsections 8.1, 8.2 and 8.2.1); and
- Migratory bird and species at risk mitigation (see Subsections 8.2 and 8.2.1).

7.0 THE NEB’S EA METHODOLOGY

In assessing the environmental effects of the Project, the NEB used an issue-based approach. In Subsection 8.1, the NEB identified interactions expected to occur between the proposed Project activities and the surrounding bio-physical and socio-economic elements. The NEB also considered the potential accidents and malfunctions that may occur due to the Project and any change to the Project that may be caused by the environment. If there were no expected element/Project interactions, then no further examination was deemed necessary.

Subsection 8.2 provides analyses for the identified potential adverse environmental effects of the Project and is divided into two streams:

1. Subsection 8.2.1 serves to discuss those potential adverse environmental effects that can be addressed through standard or routine design and practices.

2. Subsection 8.2.2 serves to provide a more detailed analysis of individual potential adverse environmental effects that are of public concern, involve the use of non-standard mitigation measures or design, or have a relative importance in the context of the Project application.

Subsection 8.3 addresses cumulative effects, Subsection 8.4 addresses follow-up programs under the CEA Act and Subsection 8.5 lists all recommendations for any potential regulatory approval of the Project.
## ENVIRONMENTAL EFFECTS ANALYSIS

### 8.1 Project – Environment Interactions

<table>
<thead>
<tr>
<th>Environmental Element</th>
<th>Description of Interaction (How, When, Where) or Reason for No Interaction</th>
<th>Type of Potential Effect Pos/Nil/Adv</th>
<th>Potential Environmental Effect</th>
<th>Discussed in Subsection</th>
</tr>
</thead>
</table>
| Soil and Soil Productivity | - Excavation and backfilling activities.  
   - Discovery of historical contamination during excavations. | Adv | - Reduced soil productivity due to admixing of soil layers, rutting and compaction.  
   - Spread of historical contamination to unaffected areas. | 8.2.1 |
| Vegetation | - Runoff of sediment-laden water (e.g., from dewatering, spoil pile erosion). | Adv | - Health effects on nearby plants. | 8.2.1 |
| Water Quality and Quantity | - Runoff of sediment-laden water (e.g., from dewatering, spoil pile erosion).  
   - Excavation in areas with high water table.  
   - Discovery of historical contamination during excavations. | Adv | - Reduced water quality of nearby water sources and groundwater.  
   - Increased water quantity in nearby water bodies or watercourses.  
   - Spread of historical contamination to unaffected water sources and groundwater. | 8.2.1 |
| Fish and Fish Habitat | - Runoff of sediment-laden water (e.g., from dewatering, erosion of spoil piles) into nearby water sources. | Adv | - Health effects on fish (stress, injury, mortality). | 8.2.1 |
| Wetlands | - Runoff of sediment-laden water (e.g., from dewatering, erosion of spoil piles).  
   - Excavation in areas with high water table.  
   - Dewatering activities. | Adv | - Alteration of wetland hydrology. | 8.2.1 |
| Wildlife and Wildlife Habitat | - Noise from vehicle and equipment use during construction and operations.  
   - Wildlife injury or mortality. | 8.2.1 |
| Species at Risk or of Special Status | - See the “Wildlife and Wildlife Habitat” and “Vegetation” elements above. | Adv | - Effects noted in the “Wildlife and Wildlife Habitat” and “Vegetation” elements, as they relate to species at risk or of special status. | 8.2.1 |
| Air Emissions | - Dust from vehicle and equipment use during construction and operations.  
   - Emissions (including GHGs) from vehicle and equipment use during construction and operations.  
   - Fugitive emissions from valves and fittings during operation of the pipeline. | Adv | - Temporary and localized decrease in air quality.  
   - Temporary or occasional increases in GHG emissions to the atmosphere.  
   - Trace GHG emissions to the atmosphere during pipeline operations. | 8.2.1 |
<table>
<thead>
<tr>
<th>Environmental Element</th>
<th>Description of Interaction (How, When, Where) or Reason for No Interaction</th>
<th>Type of Potential Effect Pos/Nil/Adv</th>
<th>Potential Environmental Effect</th>
<th>Discussed in Subsection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic Environment</td>
<td>• Noise from vehicle and equipment use during construction and operations.</td>
<td>Adv</td>
<td>• Temporary or occasional increase in noise levels.</td>
<td>8.2.1</td>
</tr>
<tr>
<td>Human Occupancy and Resource Use</td>
<td>• No interaction: Construction activities would occur on previously-disturbed, existing industrial sites.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heritage Resources</td>
<td>• Excavation activities.</td>
<td>Adv</td>
<td>• Disturbance and/or destruction of previously-undisturbed heritage resources.</td>
<td>8.2.1</td>
</tr>
<tr>
<td>Traditional Land and Resource Use</td>
<td>• No interaction: Construction activities would occur on previously-disturbed, existing industrial sites.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social and Cultural Well-Being</td>
<td>• No interaction: Construction activities would occur on previously-disturbed, existing industrial sites.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Health and Aesthetics</td>
<td>• No interaction: Construction activities would occur on previously-disturbed, existing industrial sites.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Accidents and Malfunctions | • Pipeline rupture or facility failure during operations.  
• Hazardous material spills during construction. | Adv | • Contamination of soil, surface water and/or groundwater and associated effects on:  
  o soil and soil productivity;  
  o vegetation;  
  o fish and fish habitat;  
  o wetlands;  
  o wildlife and wildlife habitat;  
  o species at risk or of special status;  
  o human health; and  
  o resource use (including traditional). | 8.2.2 |
| Other                  |  |  |  |  |
| Effects of the Environment on the Project | • Severe weather and climatic events (e.g., precipitation, extreme temperatures). | Adv | • Damage to infrastructure.  
• Delays to Project schedule. | 8.2.1 |

Legend: Pos = Positive; Nil = Neutral; Adv = Adverse
8.2 Analysis of Potential Adverse Environmental Effects

Enbridge has proposed several mitigation strategies to avoid or minimize the potential effects of the Project including: scheduling of construction activities to avoid sensitive periods, developing mitigation measures to address site-specific and general issues, and confining construction to existing industrial sites. Enbridge’s proposed strategies and measures, together with its responses to information requests and submissions from Intervenors, have provided the Board with a sufficient basis to assess the potential adverse environmental effects and evaluate whether those effects can be effectively mitigated.

As noted in Section 7.0 of this draft ESR, the analysis of potential adverse effects has been categorized into two streams: Subsection 8.2.1 (dealing with potential adverse environmental effects that can be mitigated using standard measures) and Subsection 8.2.2 (dealing with a more detailed analysis of individual potential adverse environmental effects). The Table in Subsection 8.1 identifies which stream each identified potential effect is considered within.

8.2.1 Analysis of Potential Adverse Environmental Effects to be Mitigated Using Standard Measures

A standard mitigative measure is a specification or practice that has been developed by industry, or prescribed by a government agency, that has been previously employed successfully, and meets the expectations of the NEB.

Enbridge has proposed a variety of standard mitigation measures to address the majority of the potential adverse environmental and socio-economic effects of the Project. This includes all of the potential effects attributable to the construction phase. These measures are presented in Enbridge’s Project application package (including its ESEIA), its Environmental Guidelines for Construction and its subsequent submissions (e.g., responses to information requests).

The majority of identified potential effects are minor in nature due to construction activities occurring exclusively within previously-disturbed, fenced and graveled sites of relatively small dimensions. No previously-undisturbed lands would be impacted. Further, the majority of the identified potential effects are temporary (confined to the construction period) and much of the proposed work would be above-ground.

Beyond the change in flow direction and operating pressures, Project operation would effectively remain unchanged from what Line 9 is currently authorized for. No new continuous operational air emissions sources are proposed. Any required pumping at SA would be electrically-driven. Although trace amounts of fugitive GHG emissions can be expected to escape from valves and fittings during pipeline operation, their amounts could potentially decrease compared to past pipeline operations as a result of replacing older valves with newer ones.

The Board notes the potential for Enbridge to encounter historical contamination while excavating during construction at the Project Sites or during operational activities along the RoW. Enbridge committed to suspend work if contamination is suspected and summarized how it would store suspect material, obtain laboratory analyses and treat or dispose of affected material. Enbridge also committed to following the Board’s established Remediation Process Guide (2011).
Enbridge committed to develop, in collaboration with its construction contractor, an Emergency Plan to address accidental hazardous material spills during construction. This plan would provide guidance to field staff regarding actions to implement to minimize and mitigate the duration and severity of any potential adverse effects of such an event. Enbridge advised that it would submit this to the Board prior to construction. In order to ensure that this occurs, the Board recommends that, in any Order that it may grant, a condition be included requiring Enbridge to make this submission. See Recommendation 1 in Subsection 8.5 for more detailed wording of this condition.

The NEB is of the view that, if the Project is approved and, taking into account Enbridge’s implementation of its proposed environmental protection procedures and mitigation measures, and through its compliance with the Board’s regulatory requirements and the recommendation described above, the potential adverse environmental effects considered in this subsection are not likely to be significant.

8.2.2 Detailed Analysis of Potential Adverse Environmental Effects – Accidents and Malfunctions during Operations

As noted in Section 7.0, this subsection is intended to provide a more detailed analysis of effects that are of public concern, involve the use of non-standard design or mitigation measures or which the Board has identified as having a relative importance in the context of the Project application. In this case, the Board has identified the potential adverse effects of operational accidents and malfunctions (e.g., leaks, ruptures) as a key issue for detailed discussion.

8.2.2.1 Issue Background

There has been a great deal of public concern that crude oil flow reversal in this segment of Line 9 may lead to a greater risk of a leak or rupture occurring. Reasons cited include the pipeline’s current integrity status and impacts that changes in commodity composition/corrosivity, operating pressures and flow direction may have on pipeline integrity. The public has also expressed concern that, depending on the commodity being carried, the environmental consequences of a leak or rupture could be more detrimental. The Board also heard concerns about the vulnerability of local aquifers and the potential for leaked oil to be transported between them.

In the following subsections, the Board provides information and its views on three broad aspects of mitigating the potential effects of a crude oil release: release prevention (including pipeline integrity), release detection and emergency response. These topics will be addressed in more detail within the Board’s overall Reasons for Decision on the Project.

It is important to note that the Board’s assessment of accidents and malfunctions does not focus on the effects on individual receptors or specific areas. Such an assessment would be hypothetical since the location(s) of any release point(s) cannot be predicted with confidence. Other important factors that would influence the magnitude and extent of potential effects are also unknown at this time (e.g., weather; time of year; event duration; type and volume of the release; nature and characteristics of site-specific soils, geology, surface water and groundwater).
Rather, this assessment focuses on Enbridge’s overall approaches to minimizing the likelihood of a release and, in the event of a release, its response plans. The Board considers any release to be undesirable and that an incident in a particularly sensitive area (e.g., a river crossing, farmland) would have greater negative consequences than in a less sensitive area (e.g., within a facility site). Enbridge’s preparedness and operational practices are overarching and applicable to the entire Line 9 segment subject to this application. It is on this basis that the Board has performed its assessment of accidents and malfunctions.

8.2.2.2 Release Prevention

**Integrity Management**

Release prevention centers around the goal of ensuring that a pipeline’s integrity and operating conditions are such that it can be used safely while minimizing the risk of a release occurring. This typically involves conducting monitoring, inspections, maintenance and ongoing pipeline protection measures.

Enbridge indicated that it builds and maintains its pipeline system as a long life asset and that it implements a comprehensive Integrity Management Program (IMP). Enbridge submits that a large part of its daily operations is devoted to the prevention of any accidents, malfunctions and unplanned events. It has stated that its Pipeline Integrity Department supports the company’s goal of maintaining a safe and reliable pipeline system with a focus on preventing leaks or ruptures caused by service-related deterioration such as corrosion, cracks, mechanical damage and strain. The following outlines various integrity management activities that Enbridge conducts during the operation of its pipelines:

- **Supervisory Control and Data Acquisition** – Monitoring 24 hours/day, 365 days/year from Enbridge’s Control Centre in Edmonton, Alberta.

- **Routine in-line inspection (ILI) tool runs** – To monitor pipeline integrity for issues such as cracks, dents and corrosion.

- **Integrity excavations** – Regular pipeline exposure to validate ILI data, assess pipeline integrity and conduct repairs, where necessary. Various forms of monitoring aid in determining the schedule and priority of digs. During these digs, Enbridge collects data regarding soil conditions, land use, topography and drainage patterns in order to guide a more proactive approach for preventing potential problems.

- **External corrosion control** – A polyethylene (PE) tape coating is intended to provide a physical barrier between the pipe and soil, preventing corrosion. Continuous cathodic protection (CP) is used to provide protection against external corrosion where the coating has been compromised. Annual pipe to soil surveys are undertaken to evaluate CP protection levels. Routine CP rectifier inspections and/or monitoring are also conducted to assess CP performance and adequacy.

- **Internal corrosion inhibition** – Intended to protect pipelines from internal corrosion (e.g., limiting the water/sediment content of transported oil, line cleaning, oil batch testing, chemical treatment).

- **Crack Management Program** – An established program aimed at managing the threat associated with crack-related defects on Enbridge’s entire pipeline system.
Third-party damage prevention – A monitoring and stakeholder awareness program aimed at preventing third parties from accessing and damaging pipelines. This includes public awareness, maintaining signage, RoW patrols and follow-up on unauthorized activities.

Depth of cover surveys and remediation at problem areas. Underwater surveys of water body crossings are also conducted, typically at five- and ten-year intervals for major and minor crossings, respectively.

Mechanical Damage Management Plan – A plan intended to address the threat of damage in the form of dents and gouges due to a variety of causes, including strikes from excavating equipment and pipe settlement onto rock. This primarily involves running ILI tools and performing excavations.

**Integrity Status**

Enbridge’s Line 9 has been in an operational state since 1976, with the exception of a two-year period (July 1991 to July 1993) when the pipeline sat in an approved deactivated state. Initially, from 1976 to 1999, Line 9 flowed eastward. In 1999, the current westward flow along the entire length of Line 9 began. The Project essentially represents a re-reversal of the Line 9 segment from SA to NW to its original eastward flow direction.

Enbridge noted one historical leak along the segment of Line 9 to be reversed, which occurred in 1976 due to a dent caused by an in-trench rock. Enbridge submitted that affected soils and groundwater were remediated to applicable ON standards. There have been seven leaks at two terminals along this segment, all of which were under one barrel in volume.

Pipeline integrity can be influenced by a wide variety of factors. Enbridge has provided a significant amount of information related to this topic in its Engineering Assessment for the Project, as well as through its responses to information requests. Overall, Enbridge is of the view that the Engineering Assessment demonstrates that this segment of Line 9 can be reversed and be safely and reliably operated.

The following summarizes various conclusions that Enbridge has drawn with respect to certain hazards to the integrity of Line 9 between SA and NW:

<table>
<thead>
<tr>
<th>Metal Loss – Internal and External Corrosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Recent data found corrosion near long seam welds on approximately 70 joints. Two were excavated in 2009/2010. The remaining had features well below Enbridge’s excavation criteria.</td>
</tr>
<tr>
<td>▪ There are no metal loss features that require repair before reversal or prior to the next magnetic flux leakage inspection in 2013.</td>
</tr>
<tr>
<td>▪ Flow reversal would have no effect on external corrosion and only a minor potential effect on internal corrosion. Overall, the metal loss threat is being adequately addressed and should not prohibit flow reversal.</td>
</tr>
<tr>
<td>▪ There is a low external and internal corrosion feature density per km, demonstrating that the PE tape coating has performed well and the internal metal loss threat is being managed to acceptable levels.</td>
</tr>
<tr>
<td>▪ The pipe is coated with single-layer PE tape. Historically, PE tape-coated pipelines have exhibited moderate to high susceptibility to stress corrosion cracking (SCC). Enbridge considers this segment to have that potential.</td>
</tr>
<tr>
<td>▪ Since 2003, ten SCC colonies were detected at four locations, none of which met the definition of “significant SCC”. The observed shallow SCC does not present an immediate threat to integrity on this segment.</td>
</tr>
<tr>
<td>▪ Since 1999, approximately 40 joints were noted with coating reported as “fair” or “poor”. SCC was reported on only three. 2009-2010 CP survey results suggested that adequate CP was being demonstrated at these locations.</td>
</tr>
</tbody>
</table>
The SCC growth assessment showed that this segment can operate safely beyond the planned 2013 ILI tool run.

- No internal corrosion has been noted at watercourse crossings and observed external corrosion is very shallow.
- There is no increase to the internal pipe corrosion threat based on product shipped. Products to be shipped are all classified as light crude oils. Similar blends are currently being shipped in this pipe segment and commodities of similar physical properties have been transported in the past.
- The increase in flow rate would slightly raise the internal pipe corrosion threat, but would be insignificant and addressed through a regular cleaning program (e.g., using brushing tools to mobilize water and other accumulating potentially corrosive material).
- Enbridge’s historical experience and the low level of existing internal corrosion damage provides it with a high level of confidence that any newly formed corrosion that may result from reversed operation would be effectively managed through subsequent ILI and integrity programs.

**Cracking**

- No features reported by the 2008 crack detection inspection are predicted to fail in the next three years under pre- or post- flow conditions. 98% (349) of the 357 crack-like features were below 1 mm in depth. Enbridge plans to re-inspect this segment of Line 9 in two years time.
- The lowest predicted burst pressure of the reported features on Line 9 between SA and NW was 5,612 kilopascals (kPa) [814 pounds per square inch (psi)], which equates to 165% of the proposed normal operating discharge pressure post-reversal (3,393 kPa or 492 psi).
- Pre- and post- reversal cracking risk profiles are essentially identical. The post-reversal profile is higher along the first 8 km downstream of SA, where pumping would be initiated. Despite this change, this 8 km long segment is not immediately threatened by cracking-related mechanisms. The lowest predicted burst pressure of any observed crack-like feature is 209% of the current maximum allowable operating pressure. The shortest remaining life of any one feature is 53 years.
- Based on the results of a fatigue analysis, the crack threat would not be aggravated by flow reversal.

**Dents and Mechanical Damage**

- No dents, buckles or gouges require excavation prior to reversal, based on regulatory requirements or standard industry practices. The risk associated with existing features is not expected to increase due to flow reversal.
- Four deformation features are located on the bottom of the pipe at watercourse crossings, none of which exhibit stress concentrators or meet Enbridge’s excavation criteria.
- Currently, the top of pipe is at or below the depth of cover required by CSA Z662-2011 Oil and Gas Pipeline Systems.
- Features identified as having metal loss coincident with a dent or other geometry anomaly have been addressed as per Enbridge standards and in compliance with CSA Z662-11.
- The vast majority of existing mechanical damage features are likely related to pipe settlement, have been present for most of the pipeline’s life, including during eastward flow conditions prior to 1999.

Enbridge stated that it performs an annual system-wide analysis of the internal pipe corrosion threat, which is based on product(s) shipped, corrosion status of the line (as per ILI readings) and flow conditions.

**Views of the Board**

The Board notes that both the segment of Line 9 to be reversed and the segment between NW and WT have various features which require, or may require, further investigation, repairs and/or mitigation. The Board notes Enbridge’s completed and proposed work to document, categorize and assess these features of concern. The Board is of the view that the presence of such features is not uncommon and can reasonably be expected for any given pipeline. Of importance is how operating companies deal with these issues. Enbridge’s existing IMP and the pipeline’s integrity status are described in this draft ESR and more fully in Enbridge’s filings.
Various parties raised concerns about the effects of changing product types on internal corrosion. The Board notes Enbridge’s indication that, post-reversal, it intends on shipping light crude oils similar to those currently being transported on this segment of Line 9. With respect to the concerns raised, Enbridge indicated that it imposes quality specifications aimed at preventing product-related impacts on pipeline integrity and that it “simply will not transport oil that cannot be transported safely”. The Board notes Enbridge’s submission that its annual internal pipeline corrosion threat analysis would take into account any changes in product shipped. The Board is of the view that Enbridge’s existing IMP is adaptive and capable of recognizing and addressing possible internal corrosion issues related to transporting different grades of crude oil, should Enbridge identify this need in the future.

As part of its Project application, Enbridge sought an exemption from having to apply for Leave to Open (LTO) the pipeline in the reversed direction, under section 47 of the NEB Act. The Board recommends that, if the Project is approved, a LTO application should be required.

The Board also recommends that, in any Order that it may grant, various conditions be included related to investigating, understanding and managing integrity features, both in the short- and long-term. These recommended conditions are summarized below, with more detailed wording found in Subsection 8.5. These conditions would also require the filing of updated information regarding the pipe’s fitness-for-service. The Board notes that a number of these conditions would require information filings prior to operating in reversed flow or within a specific time period after flow is reversed.

**Recommendation 2:** Impose a condition requiring Enbridge to file, prior to applying for LTO, an updated Engineering Assessment demonstrating that the pipeline segments subject to the Project application are fit-for-service at a maximum operating pressure of 5,281 kPa (766 psi). The intent of this condition is to have Enbridge demonstrate safe operation at this pressure, since 3,393 kPa (492 psi) was the highest value used in performing its cracking fatigue analysis.

**Recommendation 3:** Impose a condition requiring Enbridge to, prior to applying for LTO, repair all integrity features meeting CSA Z662-11 repair criteria and the defects that triggered current pressure restrictions. The intent of this condition is to have Enbridge repair all features that could have a reasonable impact on the safe operation of this segment under eastward flow.

**Recommendation 4:** Impose a condition requiring Enbridge to submit, prior to applying for LTO, a plan to manage cracking features between NW and WT, including the timeline associated with the assessment methodology. The intent of this condition is to document Enbridge’s commitments with respect to managing cracking in this segment.

**Recommendation 5:** Impose a condition requiring Enbridge to run various ILI tools between SA and NW within one year of LTO approval. These tools must be capable of detecting, characterizing and sizing cracking, metal loss and geometry features. Enbridge would be required to repair or mitigate all features meeting CSA Z662-11 repair criteria. Enbridge would also be required to perform field validations for tool performance assessments, and to review the integrity status of cased crossings. The intent of this condition is to have Enbridge identify, and repair or mitigate, any integrity features that have grown since the last ILI tool runs, as well as to establish baseline data for the reversed flow direction.

**Recommendation 6:** Impose a condition requiring Enbridge to file a long-term integrity improvement plan to mitigate and monitor ILI-reported internal and external corrosion, geometry and cracking features between SA and WT. The intent of this condition is to identify and understand Enbridge’s long-term integrity management plans.
As part of the LTO application process, the Board would assess Enbridge’s compliance with all relevant conditions in determining whether or not to allow Enbridge to begin operating the pipeline in eastward flow.

The Board is of the view that, with the implementation of Enbridge’s existing integrity management practices and through compliance with the conditions summarized above, Enbridge is capable of addressing current and potential integrity issues facing these segments of Line 9.

### 8.2.2.3 Release Detection, Minimization and Containment

Integral to minimizing potential impacts from crude oil leaks or ruptures is the ability of a company to identify that such an event has occurred. Generally, the earlier a release can be detected and response measures implemented, the less the potential impact. To further minimize such impacts, companies often have in place pipeline and facility design measures that are aimed at limiting the amount of product released or confining it to a particular area.

Enbridge uses a variety of approaches for leak detection on its oil pipelines. Generally-speaking, Enbridge’s Edmonton Control Centre manages or monitors many aspects of the company’s leak detection activities. Enbridge’s four primary methods of monitoring for possible leaks are:

1. **Computational Pipeline Monitoring (CPM)** – This is a standard industry computer-based tool that uses continuous measurements of pipeline conditions for dedicated leak detection. CPM is Enbridge’s primary real-time system for detecting leaks on all of its oil pipelines. Enbridge submits that this system also exceeds regulatory requirements. Enbridge noted that the CPM’s targeted minimum detectable leak size for Line 9 (at the current nominal flow rate) is 60 cubic metres over two hours. The other means described below are intended to detect leaks below this threshold.

2. **Visual surveillance and reports** – Involves RoW patrols (aerial and ground) and responding to third-party reports of oil or odours. Aerial patrols occur approximately every two weeks and as needed in response to pipeline integrity concerns. The helicopter used is equipped with an infra-red camera to aid in identifying leaks. Station piping is inspected weekly. Third-party reports are handled through an emergency telephone line.

3. **Scheduled line balance calculations** – Calculations of oil inventory completed at a fixed time. These are intended to identify unexpected losses of inventory that may indicate a leak.

4. **Controller monitoring** – Continuous monitoring of pipeline conditions by the Pipeline Controller. This monitoring is focused on identifying unexpected operational changes (e.g., pressure drops) that may indicate a leak.

Enbridge explained that these approaches provide overlapping capabilities such that an alarm caused by one method can be further analyzed using a separate method. It also submitted that the various methods used also allow for detection of leaks of varying magnitudes.

Enbridge advised that it is actively investigating and testing a number of new leak detection technologies to complement its current system, including those aimed at detecting smaller leaks. This includes methods for external-based detection and alternative CPM approaches like statistical and extended real-time transient models.
Currently, mainline sectionalizing valves are located along Line 9. Should a release occur, valve closures would isolate the affected pipe segment(s) in an attempt to minimize the volume of oil that could be released to the environment. Remotely-operated valves are intended to further decrease this potential by allowing activation without personnel needing to travel to the site. Enbridge performed an Intelligent Valve Placement analysis for the segment of Line 9 between SA and NW to examine the potential for new remote-controlled valve placements in areas of higher consequence. This analysis identified that one new valve cut-in and two conversions of existing valves could provide increased protection. The two valve cut-ins are aimed at providing this protection at Black Creek and the Nith River. The exact locations of this valve work are still to be determined. As it would proceed regardless of whether or not the Project is approved (flow reversal was just one factor considered in the analysis), Enbridge advised that it would perform the activities under the Board’s Operations and Maintenance Activities on Pipelines Regulated Under the National Board Act: Requirements and Guidance Notes.

At its facility sites, Enbridge indicated that it implements several design aspects aimed at containing potential releases within site boundaries. This includes appropriate attention to equipment and piping selection, infrastructure maintenance, building and site containment areas, site grading and water management. As noted earlier, seven leaks at two terminals have occurred along this Line 9 segment. In none of these instances did the estimated leak volume exceed one barrel or affect lands outside of station properties.

**Views of the Board**

The Board notes Enbridge’s multi-faceted approach to leak detection. The Board is of the view that Enbridge currently employs the latest industry-standard leak detection practices along Line 9. The Board notes that Enbridge indicated that it is exploring new detection technologies aimed at detecting smaller leaks. The Board encourages Enbridge to continue this research and work towards potential implementation.

Annex E of CSA Z662-11 consists of recommended leak detection practices for oil pipelines. Although companies are not required to adhere to the recommendations, the Board considers that doing so is responsible industry practice. In light of the public concerns raised related to accidents and malfunctions and the Board’s desire to ensure that companies are appropriately prepared to identify leaks along their pipeline systems, the Board recommends that, in any Order that it may grant, a condition be included requiring Enbridge to file, prior to operating in reversed flow, and in the spirit of Annex E of CSA Z662-11, a comprehensive Leak Detection System manual. See Recommendation 7 in Subsection 8.5 for more detailed wording of this condition.

**8.2.2.4 Emergency Preparedness and Response (EPR)**

The NEB has set, through its Onshore Pipeline Regulations, 1999 (OPR-99), several requirements for companies to develop programs, procedures and protocols related to various aspects of emergency preparedness and response. In April 2002, the Board issued a letter to all
regulated companies which clarified the requirement for companies to develop and maintain EPR Programs in order to minimize the effects of incidents and emergencies that have the potential to impact the health and safety of the public, company employees, property and the environment. The Board described its expectations regarding the following eight elements:

- EPR Program Development (Hazard Assessment);
- Emergency Procedures Manual;
- Liaison Program (First Responders);
- Continuing Education Program (Public);
- Emergency Response Training;
- Emergency Response Exercises;
- Incident and Response Evaluation; and
- Emergency Response Equipment.

In its application filings, Enbridge stated that it has an established EPR Program on file with the Board. It elaborated on its compliance with the OPR-99 requirements and the Board’s EPR Program expectations. It noted that the various elements of its EPR Program are contained and fully laid out within its Operations & Maintenance Procedures (Books 1, 2 and 7). Although Enbridge had previously filed its EPR Program documentation confidentially with the Board, it was directed by the Board to provide this information, redacted as necessary, for the benefit of those participating in the hearing process who had concerns in this area. Enbridge did not anticipate any required changes to the EPR Program documentation as a result of the Project.

Enbridge generally described its tiered response to emergencies along its pipelines. It explained that such an approach promotes rapid and streamlined expansion of response operations by first involving onsite or nearby personnel and equipment, then local and regional resources as necessary, up to and including available resources at the national and international levels. For this segment of Line 9, Enbridge indicated that it has response equipment and trained personnel in Sarnia and Westover (the segment’s endpoints). These personnel would provide a Tier I response. Based on Enbridge’s history and experience with exercises, it anticipates that this would begin within three hours of initial leak notification. Personnel from Belleville, ON, and Montreal, QC, would provide a Tier II response. Tier III would include pre-identified resources from outside ON, including from the United States.

Enbridge provided details about its Public Awareness Program that it implements to continually educate the public residing adjacent to the pipeline RoW, as well as first responders (police and fire departments) and other agencies and organizations, about the pipeline location and procedures to follow in the case of emergency. Enbridge submits that this Program is also aimed at informing stakeholders about products being shipped. The Program includes face-to-face meetings for information sharing, regular contact with landowners, annual mail-outs, engagement with Aboriginal communities, as well as response drills and exercises involving

---

1 See the Board’s letter for a full description of these expectations:
local responders. Enbridge also stated that it performs scheduled reviews of its Public Awareness Program and distributes contact information for those who may have comments or questions.

Views of the Board

The Board regularly reviews regulated companies’ EPR Program documentation since these programs are critical in guiding companies through adequate, effective and responsible emergency response, should a release occur. As Enbridge noted, the Board issued a letter to Enbridge on 29 March 2012, advising that the NEB had completed an Emergency Procedures Manual Critical Information Check. The Board highlighted the need for two revisions related to NEB contact information and the roles and responsibilities of the NEB and Transportation Safety Board during incidents. Enbridge committed to making these revisions.

The Board notes that Enbridge’s EPR Program is currently in place and applicable to Line 9 in its current flow scheme. The Board is of the view that Enbridge’s EPR Program documentation is appropriate and entirely applicable to any release, of any product, from the segment of Line 9, should it be reversed.

Under section 35 of the OPR-99, Enbridge is required to develop continuing education programs for police, fire departments, medical facilities, other appropriate organizations/agencies and the public residing adjacent to their pipelines about pipeline locations, potential emergency situations and the safety procedures to be followed. The Board notes Enbridge’s description of its established Public Awareness Program, which serves to inform and educate the groups noted above, as per the OPR-99 requirements. The Board also notes that Enbridge provides contact information for anyone who may have questions or comments regarding emergency response procedures. The Board perceives this to be a potential avenue for continuous improvement and adaptation of Enbridge’s EPR Program.

Public concern was raised regarding liability for property damage caused by a leak or rupture. Although the issue of liability is not typically discussed in the context of the Board’s CEA Act EAs, the Board does note that Enbridge maintains insurance coverage for property damage occurring during operations, including for cleaning up and remediating damages caused by accidental pollutant releases.

8.2.2.5 Views of the Board on Significance

The Board notes Enbridge’s significant and demonstrated experience in safely operating its extensive Canadian pipeline system, as well as the fact that it has designed the Project in accordance with CSA Z662-11.

Although one cannot guarantee that a leak or rupture would never occur on any pipeline, the Board is of the view that Enbridge has an appropriate set of systems, procedures and protocols in place to manage the risks associated with the integrity of Line 9 between SA and WT and to minimize the likelihood of a release occurring. It also has acceptable systems in place, and in development, for leak detection and spill minimization. Should a release occur, Enbridge’s established EPR Program would be implemented.

The geographical extent of any potential release is impossible to determine at this time, but could range from being localized to more regional. Any release would likely have a short duration;
however, the potential effects of any release could endure until a full clean-up is completed. Depending on the affected bio-physical or socio-economic element, the potential effect could range from being completely reversible to irreversible. Even with regard to such uncertainties, the Board is of the view that, although a release could result in potential adverse environmental effects of high magnitude, the likelihood of a release occurring is low.

The NEB is of the view that, if the Project is approved and, taking into account Enbridge’s implementation of its proposed environmental protection procedures and mitigation measures, and through its compliance with the Board’s regulatory requirements and the recommendations included in Subsection 8.5, the potential adverse environmental effects of accidents and malfunctions are not likely to be significant.

8.3 Cumulative Effects Assessment

Cumulative effects assessment differs from conventional project-specific effect assessment by considering larger geographic study areas, longer time frames and interactions with other past, present and future projects or activities. The key difference between determining the significance of project-specific effects and cumulative effects is the added influence of those other projects and activities.

The Board considers cumulative effects by:

- First considering the environmental effects of a proposed project and whether, after the applicant implements mitigation, residual effects will remain.
- If no residual effects are predicted, further analysis of cumulative effects is not required.
- If residual effects are predicted, the Board considers the potential for those effects to interact with the residual effects of other projects and activities.
- If there are interactions, the combined effects are considered along with proposed mitigation, and a determination on the significance of the cumulative effect is made.

Construction Phase

For this Project, all construction activities would be confined to four existing fenced and graveled industrial sites. The Project involves modifications to, and additions and replacements of, various pieces of infrastructure within confined areas that are already heavily disturbed. No new disturbance outside of these sites is required and; therefore, the Project would not result in an increased industrial footprint.

The most likely residual effects related to Project construction are associated with unavoidable temporary and localized increases in air emissions (including GHGs) and noise levels due to the use of vehicles and equipment.

The associated effects of construction-related air emission and noise level increases are temporary (in the order of a few months) and relatively very minor in nature. Levels in both cases would return to the current baseline following construction completion. Any interactions of these effects with air emissions and noise levels from other projects and activities in the vicinity would also be temporary. Such unavoidable, temporary and relatively minor construction-related emissions (noise and air) would not meaningfully contribute to cumulative effects. The Board
does note that, with the exception of SA, all of the Project Sites are located in areas under rural/agricultural use where concentrated air emissions and noise levels from other activities are not expected. SA is surrounded by lands under industrial use where air emission and noise levels may be elevated on an ongoing basis such that the Project’s temporary contribution would be very minor.

**Operations Phase**

Beyond the change in flow direction and operating pressures, Project operation would effectively remain unchanged from what Line 9 is currently authorized for Operational noise levels are expected to remain unchanged, with the exception of those occurring during maintenance activities or line patrols. Limited operational air emissions would also be associated with these occasional activities. In the Board’s view, although residual effects from these occasional emissions increases are likely, they would be relatively very minor and of short duration, and would not meaningfully contribute to cumulative effects.

Trace GHG emissions would likely escape from valves and fittings during pipeline operation; however, an improvement in these emissions could be realized following the replacement of older valves with newer ones. The Board does not consider that these trace GHG emissions would meaningfully contribute to cumulative effects.

**Abandonment Phase**

As noted in Subsection 4.3 of this draft ESR, the environmental effects of any abandonment plans would be assessed by the Board at such time when an application is filed. A cumulative effects assessment would be undertaken at that time, as appropriate.

**Upstream / Downstream Activities**

In response to comments from Équiterre and Environmental Defence, the Board explained in its Procedural Update No. 1 (dated 1 February 2012) that it would only consider upstream Alberta oil sands production in its cumulative effects assessment to the extent that these activities may interact with the potential residual effects of the Project. The Board finds that the Project and oil sands production are sufficiently geographically separated such that there would be no interactions between the residual environmental effects of the two.

Aamjiwnaang First Nation raised concerns about cumulative effects associated with air emissions in the Sarnia area, and specifically with regards to crude oil storage at SA as a result of the Project. The Board does not consider oil storage to be within the Scope of the EA. Storage currently occurs at SA and would continue to occur, should flow be reversed. Considering this, the Board’s assessment of cumulative effects in this regard would be limited to the identified residual effects of the Project acting in combination with those from oil storage practices at Sarnia. The Board notes that pumping at SA would be electrically-driven. The most likely residual effects of the Project that would act in combination with oil storage are limited to those air emissions associated with construction activities and maintenance. The Board re-iterates its previously-expressed view that these temporary or occasional emissions would not meaningfully contribute to cumulative effects, given that they would be relatively very minor and of short duration.
The Board also re-iterates its decision within Procedural Update No. 1 that it is not considering the downstream consumption of oil transported by this segment of Line 9 within the cumulative effects assessment for the Project. Refining destinations are not likely to change as a result of the Project and the downstream use of refined oil would be not be any more identifiable than it is today. The potential for effects of downstream use to act cumulatively with any potential effects of the Project is too speculative to merit consideration.

Views of the Board on Significance

The Board finds that any adverse environmental effects that are likely to result from this Project in combination with other projects or activities that have been or will be carried out would be temporary, localized and/or minor in nature. Therefore, it is unlikely that there would be any significant cumulative environmental effects resulting from this Project.

8.4 CEA Act Follow-Up Program

The Project and its associated activities, including mitigation, are routine in nature and the identified potential adverse environmental effects are expected to be similar to those of past projects of a similar nature in a similar environment. For these reasons, the NEB is of the view that a follow-up program under the CEA Act would not be appropriate for this Project.

8.5 Recommendations

The Board proposes that, in any Order that it may grant, a condition be included requiring Enbridge to carry out all of the environmental protection and mitigation measures outlined in its application and subsequent submissions.

In addition, the Board also recommends that the following conditions form part of any NEB Order that may be granted for the construction and operation of the Project.

In these recommended conditions, the following terms are used:

“the Project” refers to Enbridge’s Line 9 Reversal Phase I Project, as described in Subsection 2.1 of the Scope of the EA (attached to this draft ESR as Appendix 1).

“commencing construction” includes groundbreaking and other forms of site preparation for the Project that may have an impact on the environment.

“applying for Leave to Open” means: making an application under section 47 of the NEB Act.

The Board must then grant Leave to Open before Enbridge is allowed to flow product eastward.

“MOP” means: the maximum operating pressures as set out in Enbridge’s revised response to NEB IR 3.7b) i).
1. Enbridge must file with the Board, at least 15 days prior to commencing construction, the Project-specific Emergency Plan that would be implemented during the construction phase, and which includes complete spill contingency measures that Enbridge would employ in response to accidental spills attributable to construction activities.

2. Enbridge must file with the Board, at least 30 days prior to applying for Leave to Open the pipeline in the reversed direction, an updated Engineering Assessment, which includes a remaining life analysis for cracks, demonstrating that the pipeline between North Westover Pump Station and Sarnia Terminal is fit-for-service in the reversed flow direction at 5,281 kPa (766 psi). If Enbridge chooses to apply a different operating pressure for this analysis, please provide justification.

3. Based on the maximum operating pressure (MOP) and integrity status information used in the updated Engineering Assessment (A2Q7D7), prior to applying for Leave to Open the pipeline in the reversed direction, Enbridge must:
   a) repair all the features that meet CSA Z662-11 repair criteria (depth and safety factor based on the MOP including the criterion for cracking depth equal to or greater than 40% nominal wall thickness) in the pipeline sections between Sarnia Terminal and Westover Terminal as identified by additional assessments and/or re-assessments committed to in the Project application;
   b) repair the defects which triggered the current pressure restrictions specified in Enbridge’s response to NEB Information Request 3.7 b), regardless of the existing operating pressure; and
   c) file a report that includes, but is not limited to, a list of features repaired, feature sizes, safety factors prior to repair, and repair date.

4. Enbridge must submit to the Board, prior to applying for Leave to Open the pipeline in the reversed direction, a plan to manage cracking features in the pipeline section between North Westover Pump Station and Westover Terminal. This plan must include the timeline associated with the assessment methodology, and the rationale for selecting the timeline.

5. Enbridge must, within 365 days following the receipt of Board approval for Leave to Open the pipeline in the reversed direction, for the segment of pipeline between Sarnia Terminal and North Westover Pump Station:
   a) run ILI tools capable of detecting, characterizing, and sizing cracking, metal loss, and geometry features using ultrasonic, high resolution Magnetic Flux Leakage and mechanical finger technologies, respectively;
   b) repair or mitigate, through measures such as excavations and pressure restrictions, all features, identified by these latest ILI runs, that meet CSA Z662-11 repair criteria (depth and safety factor based on the approved MOP including the criterion for cracking depth no greater than 40% nominal wall thickness);
   c) conduct a statistically representative field validation and investigative dig program.
to assess the detection, characterization and sizing performance of these latest ILIs;

d) using the new ILI data, review the integrity status of cased crossings, specifically the ones not monitored by the Cathodic Protection program; and

e) file with the Board, a report of Enbridge’s findings resulting from a), b), c) and d), which demonstrates the pipeline segment’s continued fitness-for-service. This should include, but is not limited to, the identified remaining features, their locations (mile post and km post), and their safety factors.

6. Enbridge must file with the Board, within 365 days following the receipt of Board approval for Leave to Open the pipeline in the reversed direction, a proposed long-term integrity improvement plan to mitigate and monitor remaining ILI-reported corrosion (internal and external), geometry and cracking features in the pipeline sections between Sarnia Terminal and Westover Terminal indicating, but not limited to, their timelines, the rationale for selecting those features, and the planned re-inspection interval.

7. Enbridge must file with the Board, at least 60 days prior to applying for Leave to Open the pipeline in the reversed direction, the LDS manual for the Project. The LDS manual must include, but not be limited to, the following:

a) senior management policy and commitment to leak detection;

b) the roles, responsibilities, and authorities of personnel in the event of a suspected leak;

c) the theory and rationale for each LDS design and application;

d) the methodology and instrument requirements;

e) performance indicators such as the accuracy, reliability, and sensitivity of the LDS;

f) leak alarms and diagnostic messaging as well as related procedures;

g) any information to be provided by the LDS to assist in operating the LDS and responding to any potential leak;

h) the estimated maximum amount of product released before a leak is detected;

i) the process to be followed with respect to the continuous improvement, non conformity, audits and corrective protocols;

j) the procedures for LDS record keeping, training, and performance evaluation; and

k) the plan for maintenance, testing methods (i.e., simulated signal, fluid withdrawal, etc.), and frequency of testing.

9.0 THE NEB’S CONCLUSION

Pursuant to the CEA Act, the NEB has determined that, if the Project is approved and, taking in account Enbridge’s implementation of its proposed environmental protection procedures and mitigation measures, and through its compliance with the Board’s regulatory requirements and the recommendations included in this draft ESR, the Project is not likely to cause significant adverse environmental effects.
10.0 NEB CONTACT

Secretary of the Board
National Energy Board
444 Seventh Avenue S.W.
Calgary, Alberta T2P 0X8
Phone: 1-800-899-1265
Facsimile: 1-877-288-8803
APPENDIX 1: Scope of the EA

Enbridge Pipelines Inc. (Enbridge)
Line 9 Reversal Phase I Project (Project)
Scope of the Environmental Assessment (EA)
Pursuant to the Canadian Environmental Assessment Act (CEA Act)

1.0 INTRODUCTION

Enbridge is proposing to construct and operate the Project, which would require an Order pursuant to section 58 of the National Energy Board Act (NEB Act). The Project would also be subject to a screening level of EA under the CEA Act.

On 8 August 2011, Enbridge filed its Project application with the National Energy Board (NEB).

On 24 August 2011, the NEB sent out notification pursuant to section 5 of the Regulations Respecting the Coordination by Federal Authorities of Environmental Assessment Procedures and Requirements (Federal Coordination Regulations). In response, Environment Canada identified itself as a Federal Authority in possession of specialist or expert information or knowledge in respect of the EA of the Project. No other Responsible Authorities were identified.

The Province of Ontario was also notified of the Project.

The scope of this EA was established by the NEB, after consulting with the Federal Authority, in accordance with the CEA Act and the Federal Coordination Regulations.

2.0 SCOPE OF THE ASSESSMENT

2.1 Scope of the Project

The scope of the Project for the purposes of the EA includes the various components of the Project as described by Enbridge in its 8 August 2011 Project application, as submitted to the NEB. The physical activities include construction, operation, maintenance and foreseeable changes, and reclamation, including physical works described in greater detail in the application. Section A.2.3 of the NEB’s Filing Manual provides additional information on how the NEB determines the scope of the Project.

The Project is defined as the additions and modifications required to allow the reversal of crude oil flow within the segment of the existing 762 millimetre (30-inch) outside diameter Line 9 between Sarnia Terminal and North Westover Station, in southwestern Ontario. These additions and modifications are related to pumps, piping, valves, a pig trap, and densitometers at Sarnia Terminal, North Westover Station, Westover Terminal and at a location 4.12 km west of North Westover Station. A new electrical building would also be built at Westover Terminal.

Line 9 currently transports crude oil in a westward direction, with deliveries from Montreal Terminal flowing through North Westover Station and onward to either Sarnia Terminal or Westover Terminal. In the reversed direction (eastward), crude oil would be delivered to
Westover Terminal from Sarnia Terminal. The bi-directional capability for Line 9 to flow westward in the future would be maintained by ensuring that necessary piping and instrumentation is in place.

All proposed work would take place on existing Enbridge facilities and surface leases, with no planned ground disturbance along the pipeline right-of-way itself.

See Figure 1 below for a map of the proposed Project, as provided by Enbridge in its Project application.

![Figure 1 – Project Map](image)

Any works and activities associated with decommissioning or abandonment would be subject to future examination under the NEB Act and the CEA Act.

2.2 Factors to be Considered

The EA will include a consideration of the following factors listed in paragraphs 16(1)(a) to (d) of the CEA Act:

(a) the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects\(^1\) that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

(b) the significance of the effects referred to in paragraph (a);

\(^1\)Section A.2.7 of the NEB’s Filing Manual provides additional information on how the NEB considers cumulative effects.
(c) comments from the public that are received during the EA process; and
(d) measures that are technically and economically feasible and that would mitigate any
significant adverse environmental effects of the project.

For further clarity, subsection 2(1) of the CEA Act defines ‘environmental effect’ as, in respect
of a project:

(a) any change that the project may cause in the environment, including any change that
the project may cause to a listed wildlife species, its critical habitat or the residences of
individuals of that species, as those terms are defined in subsection 2(1) of the Species
at Risk Act;
(b) any effect of any change referred to in paragraph (a) on
   i. health and socio economic conditions,
   ii. physical and cultural heritage,
   iii. the current use of lands and resources for traditional purposes by aboriginal
       persons, or
   iv. any structure, site or thing that is of historical, archaeological, paleontological, or
       architectural significance, or
(c) any change to the project that may be caused by the environment,

whether any such change or effect occurs within or outside Canada.

2.3 Scope of the Factors to be Considered

The EA will consider the potential effects of the proposed Project within spatial and temporal
boundaries within which the Project may potentially interact with, and have an effect on
components of the environment. These boundaries will vary with the issues and factors
considered, and will include but not be limited to:

- construction, operation and site reclamation, as well as any other undertakings proposed by
  Enbridge or that are likely to be carried out in relation to the physical works proposed by
  Enbridge, including mitigation and habitat replacement measures;
- seasonal or other natural variations of a population or ecological component;
- any sensitive life cycle phases of species (e.g., wildlife, vegetation) in relation to the timing
  of Project activities;
- the time required for an effect to become evident;
- the area within which a population or ecological component functions; and
- the area affected by the Project.

As indicated above, the EA will consider cumulative environmental effects that are likely to
result from the Project in combination with other projects or activities that have been or will be
carried out.
LETTER DECISION

File OF-Fac-Oil-E101-2011-01 01
27 July 2012

Ms. Chantal Robert          Mr. Francis (Frank) P. Durnford
Supervisor Regulatory Affairs Legal Counsel, Aboriginal and Regulatory
Enbridge Pipelines Inc.      Enbridge Pipelines Inc.
Suite 3000, 425 - 1st Street SW Suite 3000, 425 - 1 Street SW
Calgary, AB     T2P 3L8       Calgary, AB     T2P 3L8
Facsimile 403-767-3863       Facsimile 403-767-3863

Dear Ms. Robert and Mr. Durnford:

Enbridge Pipelines Inc. (Enbridge) Line 9 Reversal Phase I Project (Project)
Hearing Order OH-005-2011
National Energy Board (NEB or Board) Letter Decision

Background
Enbridge Line 9 is an approximately 830 kilometre (km) long, 30-inch outside diameter crude oil pipeline between Sarnia, Ontario, and Montreal, Québec. The Board authorized the construction and operation of Line 9 when it issued Certificate of Public Convenience and Necessity OC-30. Line 9 was placed into service in 1976 with eastward flow. The flow of the pipeline was reversed to a westward direction in 1999 following the Board’s OH-2-97 proceeding and pursuant to Order XO-J1-34-97.

Application
On 8 August 2011, Enbridge applied under section 58 of the National Energy Board Act (NEB Act) to reverse the approximately 194 km long segment of Line 9 between Sarnia Terminal (SA) and North Westover Pump Station (NW) to flow in an eastward direction (the Application). Enbridge also requested exemption from Leave to Open (LTO) under section 47 of the NEB Act.

To allow this reversal, Enbridge proposed infrastructure additions and modifications at four existing fenced and graveled sites: SA, NW, Westover Terminal (WT) and at a densitometer site 4.12 km west of NW. Work is related to pumps, piping, valves, a pig trap and densitometers. A new electrical building would be installed at WT.
A map of the Project can be found on the cover page of the Board’s Environmental Assessment (EA) Report (EA Report) for the Project, which is attached as Appendix I to this Letter Decision. The EA Report should be read as a companion document to this Letter Decision. Information about the environmental assessment process for the Project is found in Section 4.0 of this Decision.

This letter sets out the Board’s Decision and reasons with respect to the Application.

Process
Following the filing of Enbridge’s Application, the Board received a letter from Environmental Defence, Équiterre, Pembina Institute and Vermont Natural Resources Council (EED) on 26 August 2011 regarding the Application and the Board’s assessment process. On 6 September 2011, the Board sent a letter inviting comments on the issues raised and on the process that the Board should follow to consider this Application. During the comment process, the Board received Letters of Comment on the Project from landowners, the general public, non-governmental organizations, First Nations groups, government authorities and industry.

On 5 December 2011, the Board determined that the Project was a standalone project as it did not depend on any future facilities to proceed. The Board set the Application down for a public hearing with Hearing Order OH-005-2011.

The Board undertook an Enhanced Aboriginal Engagement (EAE) process by proactively contacting Aboriginal groups that could be affected by the Project and offering more information to help these groups understand the Board’s process. The Board carried out its EAE work between December 2011 and February 2012 by sending letters to identified groups and providing the contact information for the Board’s EAE contact. The Board also held information sessions about the NEB’s process and assigned a Process Advisor to support participants.

Participant funding was applied for and awarded to three Intervenors, including one Aboriginal group, to facilitate their involvement in the OH-005-2011 process. These were: Aamjiwnaang First Nation (AFN), the Ontario Pipeline Landowners Association (OPLA) and a coalition consisting of Équiterre, Environmental Defence and Environment Northeast.

The public hearing process was a combination of a written phase including the filing of written evidence and information requests (IRs), followed by an oral phase consisting of final oral argument. The oral portion of the hearing took place in London, Ontario, on 23 and 24 May 2012. Out of 18 registered Intervenors, the following appeared to make oral argument in addition to Enbridge: Imperial Oil (Imperial), OPLA, AFN (including Chief Chris Plain) and Ms. Louisette Lanteigne. Mr. Albert Koehl also gave oral argument on behalf of Équiterre, Environmental Defence, Citizen’s Environment Alliance, and Environment Northeast (Équiterre et al). The Ontario Ministry of Energy (OME) and the Canadian Association of Energy Pipeline Landowner Associations (CAEPLA) filed written argument. The Board wishes to recognize the efforts and cooperation of all Parties to the process.
Motions and Rulings
A table listing motions made to the Board leading up to the oral phase of the hearing and the Board’s rulings on these motions is attached as Appendix III.

Assessment of Issues

1.0 Need for the Project and Potential Commercial Impacts
Views of Enbridge
In its Application, Enbridge stated that it applied for the Project to meet business demands of shippers. The target annual capacity would be 24 157 cubic metres per day ($m^3$/d) [152,000 barrels per day (bpd)], with an initial design capacity of 26 858 $m^3$/d (169,000 bpd) on Line 9 (SA to WT), expandable to 40 000 $m^3$/d (250,000 bpd). Enbridge submitted that, between 2012 and 2020, the anticipated average daily volume of crude oil shipped would be 7 900 $m^3$/d (50,000 bpd). The estimated cost of the Project is $16,914,000.

The Canadian Association of Petroleum Producers’ June 2011 Forecast, filed by Enbridge, estimates substantial growth in western Canadian light crude oil supply of approximately 36 480 $m^3$/d (228,000 bpd) from 2011 to 2021. This growth in light crude oil supply from western Canada and the Bakken/Three Forks Formations in North Dakota is expected to cause the price of light crude oil to drop. Enbridge submitted that access to new markets would moderate this effect.

Enbridge stated that a reversed Line 9 could have other indirect benefits for shippers on its mainline system. In the event of a refinery upset, where traditional markets are unavailable, an eastbound Line 9 could create additional outlets for crude oil supplies and ease pricing and production impacts for all shippers. Enbridge stated that, without the Project, there would be insufficient capacity to supply the Ontario market with western Canadian crude oil.

Enbridge submitted that the Project would have positive commercial impacts for both Ontario crude oil refiners and western Canadian oil producers. It would provide greater access to the Ontario market for western Canadian oil producers and also eliminate the current reliance of Ontario refiners on crude from areas of declining or potentially unreliable supply. Enbridge stated that the Project represents an economic way to utilize the existing pipeline system. Although alternatives to the Project considered by Enbridge included expansion or looping of Line 7, Enbridge ultimately decided these were not viable options.

Enbridge noted that some Intervenors raised concerns that the Project was just a part of the larger Trailbreaker project. In its final argument, Enbridge stated that the objective of the Trailbreaker project was to transport heavy crude to the United States (U.S.) east coast for transportation to the U.S. Gulf Coast whereas the objective of the current Project is to transport light crude oil to WT for delivery to connected Canadian refineries, which is much different. Enbridge said the Project is standalone, independent of any other project, and a response to current market conditions.
Views of the Parties
Imperial
On 9 August 2011, Imperial filed a letter in support of Enbridge’s Application. In another letter filed on 20 September 2011, Imperial stated that Enbridge submitted the Application in response to its request for a change in service to its Nanticoke Refinery near Port Dover, Ontario. Prompted by market conditions and available light crude oil supplies, Imperial’s objective was to replace its current light crude oil supplies with light crude oil from Canadian and American sources. Imperial noted that there would be no other operational changes to the Nanticoke Refinery.

Imperial indicated that, although it can access some domestic crude for the Nanticoke Refinery between SA and NW via Enbridge’s Line 7, this line has insufficient capacity to enable Imperial to meet the full demand, which means that it must still purchase higher-priced offshore crude to meet its needs. Imperial submitted that this puts the Nanticoke Refinery at a competitive disadvantage to other refineries that can access domestic crude supply for their entire needs.

Imperial argued that there are numerous benefits from the Project. It would provide Imperial with the ability to access additional volumes or lower-priced domestic crude for its Nanticoke Refinery, while providing western Canadian producers greater access to the Ontario market. It would also allow Enbridge to make use of existing unused pipeline capacity. Imperial added all this can be achieved without any significant adverse impacts.

Équiterre and Environmental Defence
On 26 August 2011, a letter was submitted that was signed by Environmental Defence, Équiterre, Pembina Institute and Vermont Natural Resources Council (EED). In this letter, EED assumed that Phase I was in fact part of Enbridge’s Trailbreaker project, announced in July 2008, to move heavy oil through Montreal and onward for export to Portland, Maine, and points beyond. In the letter, EED asserted that by narrowly scoping the Trailbreaker project into pieces, the Board would not be able to discharge its regulatory duties and the public would have difficulty engaging in a transparent and meaningful process.

During final argument, Équiterre et al questioned whether Phase I is part of a multi-billion dollar expansion program to move western crude to eastern refineries and beyond, locking Ontario and other refineries into what it referred to as western tar sands crude.

In a 12 January 2012 filing, Équiterre et al stated that the proposed Project would also affect the diversity of crude oil supply for Ontario. They submitted that, as a result, Sarnia refineries would be more dependent upon crude supply from the west, from mid-continent and western Canadian sources.

Équiterre et al further submitted that Enbridge had not been specific enough about the economic benefits of the Project. It argued that evidence on the issue of demand was lacking and that assertions by Enbridge that there was demand for the Project were not supported. Équiterre et al took the view that the Board needed this information about demand to make its decision.
OME
OME’s view is that the Project has beneficial commercial impacts: the Project enables Ontario refiners to increase their access to lower priced crude oil, improving their viability and competitiveness; the Project increases the utilization of existing infrastructure; there is no commercial opposition to the Project; and the Project will not negatively impact Ontario’s energy security.

OME noted that, due to the higher price of offshore crude oil compared to domestic alternatives, the segment of Line 9 between NW and SA in its current westbound configuration is significantly underutilized and that underutilized infrastructure provides limited benefits.

OME disagreed with letters of comment expressing concern that the Project threatens Ontario’s energy security. OME noted that these energy security concerns neglect to consider that the replacement crudes from western Canadian and U.S. sources are highly secure and reliable. It stated that approval of the Project will improve the economic viability of the Nanticoke refinery and would enhance provincial energy security.

It was also stated that there is no evidence on the record from Suncor, Shell or Nova Chemicals – companies that are potential Sarnia-area Line 9 shippers – opposing the Project.

OPLA
In a letter dated 3 October 2011, OPLA stated that, since there appears to be “business demands of shippers”, Enbridge was now proposing a mini-Trailbreaker. OPLA shared the views expressed by some of the Parties that this Project was only a smaller version of a larger one.

CAEPLA
CAEPLA took the view that the Line 9 hearing was about a much bigger project. CAEPLA argued that Enbridge was applying to the Board in a piecemeal fashion and breaking up its applications to avoid full impartial transparent hearings.

Other Commercial Parties
There were interventions filed by the Canadian Association of Petroleum Producers, Plains Midstream Canada ULC, BP Canada Energy Trading Company, Canadian Oil Sands, Marathon Petroleum Trading Canada LLC, Suncor Energy Marketing Inc., and Talisman Energy Inc. These Parties did not provide evidence and there was no commercial opposition to the Project.

Views of the Board
The Board notes that Enbridge submitted the Application in response to Imperial’s request for a change of service to its Nanticoke refinery near Port Dover, Ontario. The Board also notes that there was no commercial opposition to the Project. The Board is of the view that the Project is commercially viable and there are a number of commercial benefits of eastbound service on Line 9 between SA and NW for Imperial, Enbridge, and western Canadian producers who would have greater access to the Ontario market. The Board is also of the view that making use of existing underutilized pipeline capacity, if this can be achieved without significant adverse impacts, is a sound idea.
The Board is not persuaded by the argument that the reversal would have a negative impact on Ontario’s energy security. The original configuration of Line 9 was in eastbound service for many years prior to the reversal in 1999, with no negative energy security impacts. The Board notes that the replacement crudes from western Canada and the U.S. are highly secure and reliable. The Board is persuaded by OME’s argument that the Project will improve the economic viability of the Nanticoke Refinery, enhancing Ontario energy security.

As the Board stated in its letter of 5 December 2011, the Board considered the Project to be a standalone project as it does not depend on future phases to proceed. In a letter dated 18 May 2012 responding to a motion made by Équiterre et al, the Board reiterated that the Project is a standalone project to transport crude oil from SA to NW, and not to Montreal, and that it does not depend on any future facilities to proceed. The Board indicated that it is within that context that the Board would assess the need for the Project and its potential commercial impacts. The Board maintains this view. While the Board does not deny that a full Line 9 reversal application is a future possibility, its focus in any proceeding is on the project applied for, including its specific need and purpose. Applicants may frame their applications as they determine to be appropriate. The Board has a legal obligation to hear an application and proceed to make a decision on it once the application is complete and the applicant and other Parties have presented their cases. The Board cannot assess an application that has not been filed. If an application to reverse the rest of Line 9 is filed in the future, the Board would then publicly review that application.

2.0 Enbridge’s Public Consultation

This section addresses Enbridge’s public consultation program. Enbridge’s Aboriginal consultation is discussed in Section 3.0, Aboriginal Matters.

Views of Enbridge

Enbridge submitted that it created a database of landowners located between SA and NW as well as those organizations, municipalities, First Nations and government departments who are in proximity to the Project or who Enbridge believed may have an interest in the Project. Enbridge submitted that additional stakeholders were added as they have made their respective interests known to Enbridge.

Enbridge stated that it developed a project notification letter and related map and distributed this notification package in March 2011 to all landowners or residents within 65 metres (m) of the pipeline and 250 m of the facilities, as well as to First Nations and governments. Communication with these parties and others who provided Letters of Comment continued throughout the process with further updates.

In developing its consultation plan, Enbridge considered that: no new land will need to be acquired for the Project; all work will take place within existing Enbridge right-of-way (RoW) and facility sites; and that minimal construction work will be required at Enbridge’s existing facilities. Enbridge submitted that, for the majority of stakeholders, the reversal will have no
noticeable impact since it involves reversing the flow on an existing pipeline and that any impacts arising from construction (noise, dust, traffic, and disruptions due to equipment movement) are expected to be temporary and minor in nature.

**Views of OPLA**
In a letter dated 7 September 2011, OPLA disagreed with Enbridge’s comment in the consultation section of its Application that there were no outstanding concerns. OPLA stated that landowners are always concerned with the product being shipped and how it relates to pipeline safety and integrity and accidents and malfunctions.

**Views of the Board**
The Board acknowledges Enbridge’s efforts to identify and consult with potentially-affected stakeholders. The Board is satisfied that the design and implementation of Enbridge’s public consultation program for the Project is adequate. Enbridge provided sufficient notification and information about the Application to anyone who may have had an interest in the OH-005-2011 process. The Board is of the view that Parties had an opportunity to make their views known to Enbridge and to the Board.

The Board considers consultation to be an ongoing process which involves relationship building and being responsive to the needs of stakeholders. The Board expects Enbridge to continue its consultation efforts and address concerns raised by affected stakeholders throughout construction, operation and abandonment of this Project. This includes an expectation that Enbridge will fulfill its obligation under section 35 of the *Onshore Pipeline Regulations, 1999* for a Continuing Education Program for emergency response.

### 3.0 Aboriginal Matters

**Views of Enbridge**
Enbridge stated that it began its engagement with respect to the Project in March 2011. Enbridge submitted that the two primary purposes of Enbridge’s Aboriginal engagement were to:

(i) determine whether the Project would have any potential impacts on the current exercise of traditional activities by Aboriginal communities; and

(ii) work with the relevant community in mitigating that impact if a potential impact were to be identified.

Enbridge explained that its determination as to which groups to initially engage was informed, among other considerations, by the Project’s limited scope of work and Enbridge’s history of operating Line 9, during which time Enbridge has not observed nor been made aware of the exercise by a First Nation, of any traditional rights on the Line 9 RoW or on Enbridge-owned property.

Enbridge initially identified two communities who could potentially be interested in the Project; AFN and Walpole Island First Nation. Enbridge noted that AFN was the only Aboriginal community that intervened in the OH-005-2011 proceeding.
Enbridge stated that its engagement with AFN included written notice of the Project, in-person meetings, Project update letters, distributing Project application materials and NEB information brochures and offers to hold community open houses. Enbridge submitted that its consultation with AFN occurred prior to and following the filing of its Application.

Enbridge noted that, aside from AFN, three other groups or Nations have participated in the application process for the Project, but not as Intervenors. These were: the Haudenosaunee Development Institute (HDI), on behalf of the Haudenosaunee Confederacy Chiefs Council; the Oneida Nation of the Thames (Oneida Nation), and the Chippewas of the Thames First Nation (CTFN).

Views of Parties

Aamjiwnaang First Nation
AFN expressed concerns that meaningful consultation with Enbridge did not occur and that its consultation protocol was not followed for the Project. AFN stated that consultation was required to understand any potential impacts of the Project on AFN’s Aboriginal and Treaty rights since parts of Line 9 between the SA and NW are located within AFN’s traditional territory. AFN stated that they assert their rights to hunt, trap, fish, and to collect medicines within their traditional territory and take issue with Enbridge’s assertion that AFN members do not currently practice traditional uses on lands within their traditional territory.

During the proceeding, AFN discussed the impacts it has experienced living within what it refers to as Canada’s “Chemical Valley”. AFN described the health effects it has endured which, it submits, are attributable to toxins being released by the numerous industrial facilities in the area. AFN is of the view that the Project would cause direct and cumulative impacts through the storage of different commodities at SA or by delivering different crude types to local refineries and industrial operators.

In final argument, AFN submitted that, prior to taking a course of action pursuant to section 20(1) of the Canadian Environmental Assessment Act (CEA Act) and, prior to making a decision on the Project, the Board must first require Enbridge to assess the environmental effects, including cumulative effects, of operating Line 9 following the reversal of flow, in the manner described by AFN. Secondly, AFN submitted that the Board must require Crown consultation to occur with AFN in respect of the potential adverse impacts that the Project may have on AFN’s Aboriginal and Treaty rights. AFN argued that it would be an error for the Board to make those decisions before a proper environmental assessment had been carried out and the Crown’s duty to consult and accommodate AFN had been discharged.

Haudenosaunee Development Institute,
on behalf of Haudenosaunee Confederacy Chiefs Council
The HDI filed a letter with the Board on 20 September 2011 and expressed concerns about the Project’s potential impacts on the lands, waters, rights and interests of the HDI. Concerns with accidents and malfunctions, pipeline safety and integrity and the scope of the Project were also
raised. HDI took the view that no process of engagement had occurred which would uphold Crown consultation obligations. HDI requested that the NEB work with them to determine a reasonable process for engagement for the Project, and also requested that the NEB reconsider Enbridge’s Application.

Oneida Nation of the Thames
The Oneida Nation filed a letter with the Board on 12 October 2011 stating that they did not believe that the request for an order under section 58 was appropriate for the Project. The Oneida Nation expressed concerns with the Project’s potential impacts on their lands, waters, rights and interests. They also expressed concern with risks related to the pipeline’s age, product corrosiveness, and higher pipeline temperatures and pressures.

Chippewas of the Thames First Nation
CTFN filed a letter with the Board on 26 January 2012 which stated a desire to meet with Enbridge to discuss the Project and any potential impacts that it may have on the exercise of the community's rights. CTFN submitted that the Project lies within their traditional territory.

Enbridge’s Response to Views of the Parties
Enbridge submitted that it confirmed its understanding of AFN’s expectations following a review of AFN’s Consultation Protocol and a meeting with the AFN Health and Environment Committee. Enbridge also notes that AFN did not share specific evidence of Aboriginal or Treaty rights.

Enbridge’s response to AFN’s IR indicated that, in its 35-year history of operating Line 9, Enbridge has not observed or been made aware of a First Nation exercising traditional rights on the Line 9 RoW or on Enbridge-owned property.

Enbridge submitted that, despite Enbridge’s engagement and, despite the Board’s process designed to gather relevant evidence on Aboriginal concerns, AFN has not provided specific details respecting the hunting, fishing, medicine gathering and ceremonial activities it purports to practice in the Project area. AFN only made broad assertions about the potential impacts of the Project, failing to identify ways in which any potential effects of the Project could be avoided or mitigated. However, Enbridge submitted that it is committed to responding to AFN’s concerns through an ongoing relationship with AFN and candid dialogue throughout the life of Enbridge’s projects.

Enbridge sent a letter in October 2011 to HDI and the Oneida Nation in response to their Letters of Comment. Both groups were added to the project distribution list and received Project updates throughout the process. Neither HDI nor Oneida Nation subsequently contacted Enbridge or the Board about the Project.

Enbridge responded to the CTFN letter and provided CTFN with a copy of the Project application as well as Project update letters. Enbridge met with CTFN on 3 May 2012 to discuss the Project and any Project-specific concerns. CTFN filed another Letter of Comment with the
Board on 10 May 2012 acknowledging their meeting with Enbridge and outlining the issues discussed. Enbridge submitted that a follow-up meeting between Enbridge and CTFN has been scheduled for 18 July 2012.

Views of the Board
As was previously explained in the Board’s letters of 21 March 2012 and 9 May 2012 to AFN, the Board is a quasi-judicial decision-maker and interprets its responsibilities under section 58 of the NEB Act in a manner consistent with the Constitution Act, 1982. Throughout this proceeding, the Board has established a process to ensure that interested Parties, including AFN, have an opportunity to provide their views on the Project. With respect to AFN’s assertion that the Board should require Crown consultation in respect of the Application, the Board notes that there is no other federal government agency involved in this decision; only the Board has the jurisdiction to make a decision on whether or not to approve this Application and what mitigation measures it would impose if the Project is approved. Therefore, it is appropriate that the Board, as the decision-maker, heard the views of AFN so that it could take them into consideration.

The Board’s process is designed to obtain as much relevant evidence as possible on Aboriginal concerns about a project, how the project may impact Aboriginal interests and possible mitigation measures that may address those concerns. Where a project has the potential to impact Aboriginal interests, the Board requires the proponent of the project to consult with all potentially-affected Aboriginal groups and to provide information to the Board about those consultations. The greater the potential for impacts on Aboriginals as a result of the project, the more the Board requires of the project proponent’s consultation program. By the same token, where there is a remote possibility of impact on Aboriginal interests, or the potential impacts are minor in nature, the proponent’s consultations will not be required to be as extensive.

The Board is satisfied that Enbridge meaningfully engaged Aboriginal communities, including AFN, in respect of the Project to an extent that was commensurate with the scope of the Project. The Board is of the view that all potentially-impacted Aboriginal communities were provided with sufficient details about the Project, and given the opportunity to make their views known in a timely manner to Enbridge and the Board so that their views could be factored in the decision-making process.

In addition to the one-on-one consultation proponents are required to carry out, the Board’s public hearing process itself is part of the overall consultative process. Aboriginal groups that are concerned about the potential impacts of a particular project can bring their concerns directly to the Board. The Board notes that, for this Application, AFN actively intervened, while the Oneida Nation, CTFN and HDI made their views known though Letters of Comment.

As an Intervenor in this hearing, AFN was given the opportunity to file evidence with the Board regarding the potential impacts the Project could have on its interests. AFN also made use of the opportunity to ask IRs to Enbridge on its evidence. AFN presented final oral argument and
summarized its point of view on the potential impacts that the Project would have on its Aboriginal and Treaty rights and had the opportunity to discuss the appropriateness of any mitigation that might be required to accommodate AFN’s concerns, and to make submissions about the weight and relevance of Enbridge’s evidence and on the direction the Board should take in carrying out its environmental screening pursuant to the CEA Act. AFN was also provided an opportunity to comment on possible draft conditions that could be attached to any authorization that the Board could issue. The Board is of the view that AFN had full opportunity to make its views known to the Board and that the Board has sufficient information about the concerns of AFN and other Aboriginal groups in the area regarding the Project.

The Board notes that AFN did not provide specific information respecting traditional activities that it practices in the Project area. AFN only made broad assertions about potential impacts of the Project and did not identify ways in which any potential effects of the Project on its interests could be avoided or mitigated.

The Board notes AFN’s concerns related to impacts of living in what AFN describes as “Chemical Valley”. The Board recognizes that the Sarnia area is heavily industrialized which has had an impact on local air quality. However, the Project would not be a significant contributor to these effects (see the attached EA Report for more details).

All known environmental effects and relevant socio-economic effects associated with the Project are assessed in the EA Report including effects on current traditional land uses by Aboriginal people, wildlife, fish, vegetation, air quality, human health and water resources.

The Board also confirms that the assessment of the operation of the Project post-reversal was contemplated from the beginning of the process. The EA Report includes an assessment of effects resulting from accidents and malfunctions during operation, as well as integrity issues during operation under reversed flow conditions, and contingency planning for accidents and malfunctions during operations.

Lastly, the Board notes that Enbridge is committed to ongoing communication throughout the life of the Project and will continue to engage AFN, HDI, Oneida Nation and CTFN as appropriate.

The Board is of the view that, taking into account the limited scope of the Project and minimal physical impacts, the implementation of Enbridge’s proposed environmental protection procedures and mitigation measures, and through its compliance with the Board’s regulatory requirements, conditions, and Enbridge’s commitments, any potential Project impacts on Aboriginal interests will be minimal and will be appropriately mitigated.
4.0  Environment and Socio-Economics

Environmental Assessment Process
The Project was applied for under section 58 of the NEB Act. At the time of Enbridge’s application, the Board was required to undertake an environmental screening level of EA under the CEA Act.

On 6 July 2012, the CEA Act was repealed and the *Canadian Environmental Assessment Act, 2012* (CEA Act 2012) was enacted. The Project is not captured by the CEA Act 2012 or the transitional provisions and an EA under the CEA Act 2012 is not required. However, under Part III of the NEB Act, the Board continues to have a mandate to consider whether or not the proposed Project is in the Canadian public interest, which includes consideration of the environmental impacts of the Project.

The Board has prepared the attached EA Report, based on the previously-issued draft Environmental Screening Report (ESR) under the former CEA Act, to reflect its assessment of the environmental and socio-economic effects of the Project. It also considered comments and information received from the public throughout the proceeding, including comments received on the draft ESR.

More information on the transition of the EA from the former CEA Act process to the process under the NEB Act is found in the EA Report.

Table 1 below shows where certain topics of public concern, or issues included on the Board’s List of Issues, are discussed in the EA Report:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Location in EA Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts of operational accidents and malfunctions, including:</td>
<td></td>
</tr>
<tr>
<td>- pipeline integrity (including impacts of flow reversal and crude slate)</td>
<td>8.2.2.2</td>
</tr>
<tr>
<td>- integrity management practices</td>
<td>8.2.2.2</td>
</tr>
<tr>
<td>- leak detection</td>
<td>8.2.2.3</td>
</tr>
<tr>
<td>- contingency planning for spills, accidents or malfunctions, during construction and operation of the pipeline</td>
<td>8.2.1, 8.2.2.4</td>
</tr>
<tr>
<td>- Safety and security during construction of the Project and operation of the pipeline, including emergency response planning and third-party damage prevention</td>
<td>8.2.2.2, 8.2.2.4</td>
</tr>
<tr>
<td>- liability for damages</td>
<td>8.2.2.4</td>
</tr>
<tr>
<td>Impacts on air and water quality in Ontario (including in the Sarnia area)</td>
<td>8.2.1, 8.2.2, 8.3</td>
</tr>
<tr>
<td>Impacts on traditional land use</td>
<td>5.0, 8.2.2</td>
</tr>
<tr>
<td>Cumulative effects (including upstream and downstream activities)</td>
<td>8.3</td>
</tr>
</tbody>
</table>
Views of the Board

Construction work associated with the Project is of a limited scope. As mentioned in the EA Report, work would take place within the confines of existing fenced and graveled Enbridge facilities and surface leases with no planned ground disturbances along the RoW itself.

The Board recognizes the concerns voiced by the public about operational accidents and malfunctions, including concerns about the structural integrity of the pipeline. Details are provided in the EA Report and in Section 6.0 of this Letter Decision. As discussed in its EA Report, the Board is of the view that Enbridge has an appropriate set of systems, procedures and protocols in place to manage the risks associated with pipeline integrity, to identify potential leaks or ruptures and to respond effectively to those events, if they occur.

As the Board determined in its EA Report, taking into account Enbridge’s implementation of its proposed environmental protection procedures and mitigation measures, and through its compliance with the Board’s regulatory requirements and the Board’s conditions of approval, the Project is not likely to cause significant adverse environmental effects.

5.0 Abandonment

During the OH-005-2011 proceeding, Enbridge submitted that it is currently participating in the Group 1 Abandonment Cost Estimates (ACE) – MH-001-2012 Hearing and has filed its pipeline abandonment cost estimates with the Board, including those for Line 9.

Enbridge further submitted that it is not currently exploring plans to abandon any portion of Line 9. Enbridge acknowledged that it requires Board approval for the abandonment of any part of Line 9. Enbridge asserted that specific steps to identify contamination along the RoW would be determined as part of the abandonment plan and regulatory process at the time. Enbridge also stated that it has a program in place to remediate contaminated sites as they are identified. Enbridge indicated that it would remediate to the standards of the day.

Views of the Parties

OPLA

OPLA expressed concerns that the recent filings with the NEB regarding Enbridge’s proposed method of abandoning its pipelines, including Line 9, suggest that Line 9 would be abandoned in place without any ongoing corrosion protection and, in the absence of removal operations, without an investigation of the presence of any historical undiscovered contamination along the line.

CAEPLA

CAEPLA submitted that the Project should not be approved or allowed to proceed until the outstanding issues between CAEPLA, OPLA, the NEB, and Enbridge have been resolved. CAEPLA pointed out that Enbridge stated in the 1975 Line 9 hearing that the life expectancy of pipelines was 30-35 years. CAEPLA has many concerns about abandonment and the effect it would have on landowners who would remain liable for the lands. It submitted that although the
ACE filings show that Enbridge plans to leave 99.9% of the pipes in the ground, CAEPLA is of the view that only 100% removal or care into perpetuity would protect landowners.

**Views of the Board**

In its RH-2-2008 Decision, the Board articulated the key principle that landowners will not be liable for costs of pipeline abandonment. All Parties agreed that pipeline companies have an obligation to ensure sufficient funds will be in place to pay for all costs of abandonment. Cost estimates for abandonment funding will be more fully addressed in the MH-001-2012 proceeding and Enbridge will be required to comply with any resulting decision or direction.

Companies are also required to include an abandonment plan developed in consultation with landowners when making an application for abandonment. In the future, if Enbridge decides to abandon all or any part of Line 9, Enbridge will have to file an application. The Board would assess any plan for abandonment at the time an application is made. The Board notes that an application for abandonment usually includes an abandonment plan developed in consultation with landowners and that applicants are required to consult with stakeholders that may be affected. For more information, Parties may refer to the Board’s publication *Regulating Pipeline Abandonment* found on the Board’s website or can be obtained in hard copy from the Board’s Library.

**6.0 Engineering and Integrity**

**Views of Enbridge**

**6.1 Project Details**

A description of the Project and associated work is found in Section 4.0 of the attached EA Report.

Enbridge plans to transport 50,000 to 90,000 bpd of crude oil between NW and SA upon reversal, with the potential in future to transport beyond 150,000 bpd at the previously-approved Maximum Operating Pressure (MOP). Enbridge stated that it anticipated the actual operations of the reversed line to be 50,000 bpd and that it will operate the pipeline within the approved operating and design parameters.

Enbridge stated that the products historically and currently shipped, and those it plans on shipping, are classified as light crude oils. The specific products to be shipped are defined by Enbridge as Light Sour Blend, Edmonton High Sour, Edmonton Low Sour and Mixed Blend Sour.

Enbridge indicated that, in its proposed configuration, Line 9 between SA and NW could transport heavy crude oil, but that it was only proposing to transport light crude oils.

---

1 Maximum Operating Pressure (MOP) is defined as those approved by the Board in the Orders reproduced in Schedule A attached to the Order found in this Letter Decision. These were originally referenced in Enbridge’s IR response 3.7(b)(i) (A2Q4K2) Adobe pg 13 of 37.
Enbridge submitted that the Project would be designed, constructed, tested and operated in accordance with the requirements of the Board’s OPR-99, Canadian Standards Association (CSA) 2662-11 Oil and Gas Pipeline Systems, and all other applicable standards, specifications, and codes referenced in the Application. It would also comply with other applicable federal, provincial and municipal codes and regulations.

6.2 Operating Pressure
Enbridge proposes that the MOP for the pipeline should not involve a change to the previously-approved MOP, which, for the segment between SA and NW varies between 4 037 kilopascals (kPa) [585 pounds per square inch (psi)] and 5 551 kPa (805 psi) and, for SA, is 5 281 kPa (766 psi). Enbridge submitted that the anticipated operating pressure would be 3 393 kPa (492 psi). Enbridge asserted that the approved MOP would continue to be appropriate post-flow reversal.

6.3 Pipeline Integrity and Enbridge’s Integrity Management Program
Enbridge asserted that over its long history of operating thousands of kilometres of pipelines, it has maintained a good record for safety and reliability. Enbridge submitted that it builds and maintains its pipeline system as a long life asset and that it uses a comprehensive Integrity Management Program (IMP), which includes the use of advanced internal inspection tools to ensure that the pipeline is inspected and maintained and can continue to safely operate as long as the pipeline is required. These programs encompass all the tools, technologies and strategies needed to ensure that the pipeline has the necessary strength and operating capability to operate safely.

Enbridge also noted that the cause of the Line 6B incident in Michigan is still under investigation by the U.S. National Transportation Safety Board (NTSB). Although Enbridge could not comment on specific details associated with the investigation until after the NTSB incident report is released, it would evaluate all information and learnings from the Line 6B incident and has and will continue to apply them to all of its pipeline operations.

Following the close of the hearing, the synopsis of the report of the NTSB concerning the Line 6B incident was released to the public. On 16 July 2012, OPLA filed a notice of motion (Motion) seeking to re-open the evidentiary record of the OH-005-2011 proceeding and to admit the synopsis onto the record. OPLA also requested that the Board direct Enbridge to file the complete NTSB report for the record once it became available, and to have the Board reserve a decision until the full report was reviewed and considered. The Board denied this Motion with reasons in its letter dated 20 July 2012.

6.4 Corrosion
6.4.1 Internal Corrosion
Enbridge submitted that it conducts regular analysis of the Internal Pipe Corrosion (IPC) threat. This includes an analysis of relevant data such as characteristics of the product(s) shipped, the
corrosion status of the line according to the most recent In-Line Inspection (ILI), and operating/flow conditions. Enbridge also stated that these analyses are updated as new data becomes available.

Enbridge submitted that, similar to its past operation, the line will continue to transport crude oils that typically contain trace amounts of water, suspended solids and bacteria. Enbridge stated that the Project poses no increased IPC threat due to the product to be shipped, as both the proposed products and the products currently and historically shipped are classified as light crude oils. Enbridge submitted that it regularly conducts evaluations that include periodic testing to ensure that the products being transported meet the specifications established in the applicable tariff.

Enbridge submitted that it has considered the potential causes for corrosion and that no new corrosion concerns will arise as a result of the products it will ship. Enbridge stated that it incorporates contaminant data into the IPC susceptibility analyses in combination with operating conditions to identify appropriate mitigative measures. Preventative measures are continually taken to inhibit or stop corrosion, and any areas of concern identified by regular line assessments are addressed through repair or mitigation as necessary. Any threat to internal corrosion would be addressed through the regular cleaning (pigging) program that Enbridge already has in place.

Enbridge affirmed that it would simply not transport oil that cannot be transported safely and stated that its IMP will ensure that Line 9 would only transport products that could be transported safely.

In response to Board IRs 3.2, 3.3, and 5.2, regarding the properties of the crude oil to be transported in the line and how it relates to internal corrosion, Enbridge stated that it does not currently measure corrosivity of the crude oil itself for use in the IPC susceptibility analysis. However, Enbridge does measure each custody transfer batch for sediment and water content using appropriate industry standards.

6.4.2 External Corrosion
Enbridge stated that the line is protected by the original single layer of polyethylene (PE) tape coating supported by a Cathodic Protection (CP) system. Enbridge submitted that the risk of external corrosion for the Line 9 facilities is already known and successfully managed through its IMP. Enbridge further submits that the proposed change in flow direction will not impact external corrosion. In response to questioning about its management of external corrosion due to concerns of PE tape disbondment, Enbridge stated, that through its IMP, it will continue to utilize CP, ILI and inspections to prevent failures due to corrosion.

Enbridge committed to monthly inspections of the rectifier component of the CP system, and annual pipe-to-soil surveys to evaluate the protection level achieved by the CP system. Enbridge also committed to completing the implementation of a remote monitoring system that would allow for weekly recordings of the rectifier readings. The rectifier readings enable Enbridge to monitor the potential for external corrosion, and to confirm that their CP system is continuing to manage this issue.
Enbridge submitted that its continued use of ILI enables it to identify and monitor external corrosion (as well as internal corrosion and mechanical damage) and that it would address any identified issues through its IMP.

6.4.3 Corrosion Management
Enbridge submitted that it has monitored, and would continue to monitor, metal loss due to internal and external corrosion through the use of appropriate tools, including Ultrasonic Testing (UT) and Magnetic Flux Leakage ILI pigs. Enbridge argued that requiring it to use a Phased Array ILI tool would be unduly restrictive given the limited availability of this tool world-wide and that “Phased Array” ought to be deleted from the proposed condition 13 and replaced with “ultrasonic”.
Enbridge’s IMP utilizes conservative repair criteria that require it to repair corrosion features well before they could grow to cause an integrity failure. Enbridge submitted that ILI tools provide a high level of certainty that metal loss exceeding their repair criteria will be detected. Enbridge also stated that no discernible trend exists in the internal corrosion ILI data, suggesting that their internal corrosion mitigation program is adequate.

Enbridge plans to perform the next metal loss ILI in 2013 as part of their corrosion management program. Enbridge also stated that their engineering assessment demonstrates that the metal loss threat on Line 9 is currently being adequately managed through its mitigation programs, and that flow reversal will not affect the effectiveness of those programs.

6.5 Cracking
Enbridge submitted that it has an established Crack Management Program to manage the threat associated with crack-related defects. The program applied on Line 9 consists of running UT crack detection ILI tools (Ultra Sonic Crack Detection [USCD]), conducting an engineering assessment on the data to determine the current Fitness for Service (FFS), validating and repairing identified critical anomalies through excavations, and then conducting a predictive engineering analysis that assesses the line’s continued FFS.

The current and post-reversal risk profiles for this segment of Line 9 were compared and Enbridge found that the risk profiles pre and post reversal are essentially the same except for approximately the first 8 km downstream of SA where the risk profile is higher and the last 8 km upstream of NW where the risk profile is lower. Enbridge explained that a higher risk profile immediately downstream of SA is to be expected since this section, post-flow reversal, will be seeing higher operating pressures than it has typically seen in the past. Enbridge stated that although the risk profile is theoretically higher post-flow reversal immediately downstream of SA, this section of the line is not at an immediate threat from cracking related mechanisms.

Enbridge stated that its analysis found that there are no adjusted tool-reported crack-like features that are expected to potentially fail at the anticipated operating pressure of 3 393 kPa (492 psi) during the next three years. Enbridge states that it plans on re-inspecting (for cracking using ILI) in two years time.
Enbridge submitted that the section of Line 9 between SA and NW has not experienced any in-service incidents and no ruptures were experienced during the 1997 hydrostatic test at 125% MOP. Enbridge also submitted in its response to NEB IR 3.7b) that there are currently three Enbridge voluntary pressure restrictions between SA and NW due to integrity features that have been identified for field assessment and repair. The lowest of those voluntary pressure restrictions is 3 393 kPa (492 psi). Enbridge submitted that it will perform investigative crack excavations with a particular focus east of SA where the cracking risk profile would increase due to the line reversal.

6.6 Mechanical Damage
Enbridge stated that it has a Mechanical Damage Management Plan (MDMP) to address the threat of damage (such as dents, gouges, and others identified in CSA Z662) from sources such as strikes from excavating equipment and pipe settlement onto rock. The MDMP primarily assesses the condition of the pipeline through ILI and field excavations. Enbridge submitted that the segment of Line 9 from SA to NW has never experienced a leak or rupture due to mechanical damage. Enbridge submitted that a key component of mitigating mechanical damage is preventing third-party damage through programs such as RoW monitoring, stakeholder awareness, signage and depth of cover surveys.

The Board requested more information on the depth of cover status for this section of Line 9 through NEB IR 3.11. The last depth of cover survey from SA to NW was completed in 2006 and 2007. It found two locations where the depth of cover was less than permitted by Clause 4.11 of CSA Z662-11, and Enbridge stated that these sites were addressed.

Enbridge uses RoW inspections to identify areas of slope instability. Enbridge stated that it has not identified any areas of slope instability that could affect the integrity of the segment of Line 9 between SA and NW; however, Enbridge stated that routine RoW inspections will continue to detect any area where slope instability may exist.

6.7 NW to WT Lateral
As Enbridge’s engineering assessment focused on the integrity of the Line 9 mainline between SA and NW, the Board questioned the integrity of the 900 m, 502 mm outside diameter (NPS 20) lateral between NW and WT and the pumping facilities through NEB IR 3.16 and 3.17. In its response to NEB IR 3.16, Enbridge provided an engineering assessment for this lateral which affirmed that the Project does not involve reversing flow on the lateral. It also stated that the integrity of the lateral is being adequately managed. The line would be operating within its existing parameters and the engineering assessment concluded that the revised conditions as a result of the Project do not pose any additional threats to the integrity of the lateral. Enbridge’s engineering assessment concluded that the Project would not change the approved MOP for the lateral.
6.8 Pumping Facilities at SA, NW and WT
In its engineering assessment of the facilities, Enbridge concluded that the pumping facilities at SA, NW, and WT can continue to operate safely and reliably under the proposed operating conditions. Enbridge submitted that the facility pipe operates at low stresses and that Enbridge performs inspections on facility assets such as pipe, valves and pumps at regular intervals between one and three years.

6.9 Overpressure Control, Pressure Surge Analysis and Leak Detection
6.9.1 Overpressure
Enbridge stated that its Mainline Risk Assessment Model (MRAM) integrates the results of the corrosion, cracking, and mechanical damage analyses in its IMP, along with other threats such as third-party damage, ground movement, natural forces, and incorrect operations. Consequence impacts on the general population, the environment, and on Enbridge’s business interests are then used to calculate relative risk scores. Enbridge lists Abnormal Operating Conditions and Pressure Safety Systems for Mainline Overpressure as incorrect operations in its Risk Assessment.

In its response to NEB IR 3.10, Enbridge submitted that, upon review of historical data since the 1999 westbound Line 9 reversal, no actual overpressures have occurred. Enbridge also submitted that the MRAM concluded that the reversal to eastbound service will not increase the risk of incorrect operations and that the threat of incorrect operations is adequately managed by Enbridge policies and procedures.

6.9.2 Pressure Surge Analysis
Enbridge provided a study that considered an involuntary closure of the WT suction valves as a worst case scenario that would produce the highest back pressure profile. In that response, Enbridge concluded that an involuntary closure of those valves would not create an overpressure of 110% MOP. Enbridge stated that the mainline sectionalizing valves cannot create the worst case outcome due to the closure time and control logic used. Enbridge justified that any pressure surge would not affect the integrity features in the line as the repair criteria does not allow features to grow to a predicted failure pressure of 125% MOP, and the worst case pressure surge scenario was found to not create overpressures of 110% MOP.

6.9.3 Leak Detection
Enbridge stated that it uses multiple approaches for leak detection that include computational pipeline monitoring, controller monitoring, line balance calculations and RoW inspections. Enbridge submitted that its ability to detect leaks and its response to leaks would comply with all necessary standards and regulations.

Views of the Parties
Équiterre et al
Équiterre et al submitted a report authored by Accufacts Inc. (Report) as part of its evidence. The Report noted that a periodic cleaning pig program, coupled with an analysis and monitoring
of the material removed by the cleaning pigs, should prove to be more than adequate in controlling internal corrosion. The Report further stated that corrosion rates can increase if the operating temperature is increased due to crude slate changes.

The Report noted that PE tape is susceptible to coating disbondment, and is a contributing risk factor for exterior corrosion and stress corrosion cracking (SCC). However, the Report also noted that Enbridge appears to be utilizing the appropriate ILI tools that can reliably detect general corrosion pipe wall loss, and some metal losses associated with third party damage.

The Report concurred with Enbridge’s repair criteria for internal and external corrosion features as being appropriately conservative.

In addition, the Report stated that Enbridge’s selection of an USCD ILI tool is appropriate for detecting cracks and SCC as opposed to other ILI tool technologies. It noted that investigative digs reported in Enbridge’s engineering assessment showed that the tool conservatively estimated the length of crack-like features.

The Report noted that cracking-related threats pose the greatest possible integrity threat to this pipeline segment, and that additional crack detection ILI and field validation of reporting confidence intervals is warranted.

The Report stated that Enbridge’s integrity management approach to evaluating mechanical damage (both simple dents and combined stress concentrators) appears reasonable.

The Report showed that overpressure from involuntary closure of mainline sectionalizing valves is of concern. It also supported the NEB’s IR to Enbridge asking for information related to potential overpressure from sectionalizing valves. The Report noted that the approach to reducing spill volume outlined by an Enbridge presentation at the valve installation and leak detection public workshop appears sound.

The Report stated that little credibility can be placed on pipeline Supervisory Control and Data Acquisition (SCADA) leak detection requirements as a function of capacity throughput. The Report indicated that higher confidence occurs on SCADA leak detection systems that focus on reliability rupture detection.

Équiterre et al, via a letter from Accufacts Inc. (Accufacts), also filed the following comments on the draft conditions:

- requiring Enbridge to run three types of ILI pigs within a year of Board approval appears to be a key factor in the proposed draft conditions. In Accufacts’ view, it is critical that the GE Phased Array cracking detection tool be given priority, and that this tool run be properly field confirmed on the pipeline with sufficient confirmation digs to develop adequate unity graphs;
- Accufacts supports the Board’s proposed condition to reduce the repair criteria threshold to 40% wall loss, instead of 50% wall loss targeted in Enbridge's proposal, to add more safety margin for certain threats related to corrosion;
Enbridge should update its leak detection manual to address slack. Reliable leak detection can be much more difficult than it seems; sufficient information should be made available to confirm a prudent surge analysis has been done to avoid overpressure from valve additions and modifications; temperatures might increase if there is a change in the crude slate, substantially increasing the potential for higher possible corrosion rates; and the Board might wish to incorporate the resulting recommendations from the NTSB report about the pipeline rupture in Michigan to avoid a possible rupture on Line 9.

During final argument, Équiterre et al expanded on its comments on the draft conditions, indicating that the Board should impose a condition on Enbridge to carry only light crude on the line and requiring Enbridge to come back to the Board for permission before changing the commodity since there had been significant public interest and concern about this issue.

Équiterre et al argued that there was an absence of any reports or analysis on the issue of the safety of transporting diluted bitumen (heavy crude). Équiterre et al questioned the lack of transparency and public engagement in the process that would enable Enbridge to change its tariff to allow the line to transport diluted bitumen.

**OPLA**

OPLA argued that Line 9 is nearly 40 years old and was built at the wrong time with the wrong materials. OPLA asserted that, for most of its length, Line 9 is thin-walled pipe; the thickness of the pipe met standards when it was constructed in the mid-1970s, but it does not match the standards employed by Enbridge today. OPLA pointed out that, in Enbridge’s own engineering assessment, it was noted that a high diameter-to-thickness ratio was present in the pipe. OPLA went on to say that this is a deficiency that cannot be corrected unless the pipe is replaced.

OPLA stated that it is particularly concerned about the risk of SCC on Line 9 due to potential disbondment of its PE tape coating. OPLA was concerned about metal loss anomalies and questioned how Enbridge could make a statement that there is a low feature density per kilometre when no context was provided for what “low” meant. OPLA expressed further concerns with the Line 9 pipe and how it compared to Enbridge’s Line 6B, which had a rupture in Michigan in July 2011.

OPLA argued that there are limitations to the accuracy and effectiveness of the integrity management tools used by Enbridge. OPLA stated that pinhole corrosion is a major concern for OPLA landowners and that there are no ILI tools that can accurately detect pinhole corrosion. OPLA submitted that, in regards to the pipeline rupture in Michigan, a report from the Pipeline and Hazardous Material Safety Administration in the U.S. noted the limits of defect detection with regards to Line 6B and its disbonded PE tape.

OPLA asserted that the potential risks of contamination to the land and water in the vicinity of the pipeline would be due to deficiencies in the integrity of the pipeline related to corrosion,
insufficient depth of cover and other factors. OPLA argued that the potential for small leaks that could go undetected for a long time makes it all the more important to avoid the risk of contamination in the first place. OPLA also argued that the Board should have looked at the entire operation of the line. OPLA noted that no modeling was done by Enbridge to assess the potential impacts of a hydrocarbon leak along the entirety of Line 9 and the costs associated with them.

OPLA’s consultant submitted that the Project should have minimal impact on the overall internal corrosion rate. The consultant had concerns in two areas: (i) Enbridge did not discuss the new corrosion patterns that may develop as a result of the flow reversal at localized sources of turbulence such as girth welds, tees and elbows; and (ii) Enbridge had not planned a baseline internal corrosion ILI prior to reversal. OPLA’s consultant recommended that a baseline study be required by Enbridge. OPLA’s consultant recommended that Enbridge perform an ILI to coincide with the flow reversal to gather baseline data, and that a follow-up ILI be performed in 2015.

OPLA requested that the following three conditions be imposed on Enbridge:

- require Enbridge to conduct a full ILI of Line 9 prior to reversal and in 2015 as recommended by OPLA’s consultant;
- require that the results of any ILI be analyzed in an updated engineering assessment to be made available for review by the Board and Intervenors prior to granting LTO; and
- restrict Enbridge to ship only light oil on its line until it has filed an updated engineering assessment that includes consideration of the potential impacts of medium and heavy crude oils. OPLA argued that medium and heavy crude oils could have greater impact on the corrosion risk to the pipeline.

OPLA put forward the above conditions without prejudice to the position advanced by AFN regarding the scoping of the EA required for the Project.

OME

In its written final argument, OME stated that it expected that the risks posed by the Project will be addressed through Enbridge’s risk management program, existing pipeline safety standards and oversight by the NEB. OME was of the view that approval of the Project will result in operations within the pipeline’s design parameters. In response to concerns about increased pipeline pressure, OME noted that post-reversal operating pressure will be well below the MOP established by previous hydrotests.

OME also argued that Enbridge had experience in handling high sulphur crude oil on the SA to NW segment of Line 9 and deliveries of sour crude oil on Line 9 in a reversed direction would be routine. OME noted that Enbridge anticipates the actual operations of the reversed line to be 50,000 bpd, which are well within historical operating rates and design parameters.
OME stated that Line 9 could possibly ship heavy crude since Enbridge noted that shippers would be permitted to ship any crude oil that meets the specifications of the tariff. Enbridge also stated that its engineering analysis would not change if medium or heavy crude oil was shipped on Line 9 and that changes in product would be addressed through its IMP. OME agreed that this approach can be reasonable and appropriate with appropriate regulatory oversight from the Board.

Regarding Enbridge’s approach to PE tape, OME agreed that Enbridge’s risk management programs are appropriate.

**CAEPLA**

CAEPLA expressed concern about the improprieties of pipelines coated with PE tape. CAEPLA submitted that PE tape comes unstuck from the pipe and sags, allowing moisture to get between the tape and the pipe, which then corrodes the pipeline. CAEPLA further submitted that the sagging tape compromises the CP since it insulates the area so that the electrical charge cannot act to protect the pipe from corrosion. CAEPLA argued that PE tape actually appears to speed up the corrosion of the pipe, initiating many integrity digs on landowners’ land further causing risk and cost to landowners. CAEPLA stated that Line 9 is one of the many pipelines across Canada built in the 1960s and 1970s coated with this tape, creating severe risk for environmental contamination of farmland.

**Louise Lanteigne**

Ms. Lanteigne submitted that the water supplies in the Grand River Watershed would be impacted by any failure and spill and that it would be difficult to isolate. She described the effects that a leak or rupture would have on local aquifers and rivers, including the Grand River, which serves as an important economic and recreational waterway through its support of commercial fishing, tourism, birding and boating. Ms. Lanteigne argued that there should be mandated criteria to better analyze potential aquifer contamination.

**Aamjiwnaang First Nation**

AFN stated that it is concerned that external and internal corrosion of the pipeline will increase following the reversal of flow as a result of the combined effect of the age and design of the pipeline, and shipping greater volumes of potentially more corrosive commodities. AFN also noted that the pipeline’s main protection against external corrosion is a single layer of PE tape, and it has been well-documented that other PE tape-coated pipelines have exhibited moderate to high susceptibility to SCC. AFN argued that increased rates of corrosion will likely increase the frequency and size of spills, leaks and discharges from the pipeline following the reversal of flow.

More details regarding AFN’s concerns with accidents and malfunction can be found in Section 3.0 above related to Aboriginal Matters. Explanation of the Project’s potential effects on the environment, including effects resulting from accidents and malfunctions during operation, are also addressed in Section 8.0 of the EA Report.
Views of the Board

When a company designs, constructs, operates or abandons a pipeline, it must do so in accordance with the Board’s OPR-99, the commitments made during the Board’s hearing process and the conditions attached to any approval. OPR-99 references various engineering codes and standards including CSA Z662. The applicant is responsible for ensuring that it follows the design, specifications, programs, manuals, procedures, measures and plans developed and implemented by the company in accordance with these requirements.

The integrity of the pipeline and facilities is largely defined by the impact on the pipeline of internal corrosion, external corrosion, cracking, mechanical damage, and pressure control. Leak detection is an aspect of integrity management as it is the final alert to an integrity matter that has failed to be suitably controlled. An effective IMP can be defined as one that addresses the potential integrity problems that can arise from these, and other areas, to prevent integrity failures.

The integrity of this proposed Project is influenced by the design, past operation, and previous operating environment of this pipeline. The proposed operating parameters (flow direction, product type, and operating pressure) combined with current pipeline integrity may exacerbate existing issues or create new ones. The safe operation of pipelines is paramount to the Board. The Board expects that integrity issues will be identified and managed effectively by the companies it regulates.

The Board monitors a company’s compliance with its conditions of approval and with legislation during all stages of the construction and operation of a project. The Board evaluates the need for specific compliance verification activities and determines whether an on-site inspection or review of the company’s management systems (audit) is required. The Board may also take actions in response to a complaint from an affected party.

The Board expects regulated companies to implement mitigative and preventative measures for all risks posed by hazards and threats to the integrity of pipeline systems, the public and workers, and to the environment. This includes company programs to address damage prevention. In the case of an incident, the Board coordinates the response to the emergency situation, monitors response activities, and may also assess and report on the incident following clean-up. More information on this can be found on the Board’s website www.neb-one.gc.ca under Safety or in the Board document Protecting Canadians and the Environment: How Does the National Energy Board Monitor and Enforce Safety, Security and Environmental Protection on Pipeline Systems?

Leave to Open

The Board denies Enbridge’s request for an exemption from section 47 of the NEB Act and Enbridge will be required to apply for LTO before it can commence operation of the facilities in reversed flow.

Letter Decision OH-005-2011
Page 24 of 28
The Board does not anticipate that additional hydrotests would be required on existing pipe in this case. The Board has imposed a number of conditions, as described below, which will need to be complied with prior to applying for LTO. The Board will then ensure that the required conditions are met and satisfy itself that the pipeline can be operated in a safe and secure manner.

**Operating Pressure**

The Board considers the existing and potential impact of corrosion, cracking, mechanical damage, and integrity management of the pipeline when determining a safe MOP.

The Board seeks to ensure that the approved MOPs, as detailed in Schedule A to the attached Order, will continue to be appropriate in reversed flow conditions. Consequently, the Board has imposed Condition 8 requiring Enbridge to, prior to applying for LTO, demonstrate that the line is fit for service at the approved MOP which is a higher pressure value than the 3393 kPa (492 psi) pressure value that was used in Section 4.3 of Enbridge’s engineering assessment related to the remaining life analysis for cracks.

The Board is of the view that, if a pipeline is not able to operate safely at its approved MOP or existing pressure, a pressure reduction may be a temporary solution. Ultimately, repair of any features affecting the integrity of the pipeline is the only permanent solution. Therefore, the Board has also imposed Condition 9 requiring Enbridge to repair known critical integrity features prior to applying for LTO.

**Corrosion**

The Board is of the view that Enbridge’s IMP, including its corrosion management methods, should adequately manage and protect the integrity of the facilities to enable the safe transport of crude oil products.

Enbridge has studied and assessed internal corrosion of Line 9 since its construction. In the Board’s view, Enbridge has maintained and improved upon its IMP for this line and has maintained the line in an appropriate manner. The Board notes that, since Line 9’s construction, Enbridge has continuously acquired information pertaining to its condition. This information, combined with the engineering analysis performed to assess the impact of the line’s condition and future operation on integrity, would make, in the Board’s view, the proposed requirement for Enbridge to establish a baseline unnecessary and redundant. The Board notes that Enbridge has stated that it performs routine ILI pigging of the line, building up a history of the condition and performance of the line that a single baseline tool run could not achieve.

The Board acknowledges that Enbridge is aware of issues with PE tape, and encourages Enbridge to continue monitoring and addressing them through its IMP before problem areas become failures.

---

2 Condition 8 uses the approved MOP for the SA terminal of 5 281 kPa (766 psi).
The Board finds that Enbridge’s approach to identifying and mitigating internal and external corrosion is sufficient to operate safely in reversed flow, subject to Condition 13. This condition would enable improved data collection for corrosion, cracks and other potential future sources of failure, for the proposed facilities. The Board agrees with Enbridge that the requirement to use a Phased Array ILI tool may be too restrictive and has therefore removed this specific requirement from condition 13. The Board is of the view that the technologies listed in that condition are sufficient and adequate. Condition 14 would serve to promote a continued integrity improvement plan for the pipeline, promoting its capability of operating safely into the future. The Board notes that the operating characteristics of the line have changed over the years and it is wise to encourage integrity improvements for this line.

Cracking
The Board finds that cracking, more than corrosion or mechanical damage, can pose the greatest risk to the integrity of the line, particularly downstream of SA due to the pressure reversal.

As mentioned above, the Board is conditionally accepting Enbridge’s assertion that reversing the flow direction and operating pressure profile of the pipeline does not require a change to the approved MOP as listed in Schedule A of the attached Order. The Board has imposed Conditions 8 and 9 that will need to be complied with prior to LTO.

The Board is of the view that, through its Crack Management Program (part of its IMP), Enbridge should adequately manage the threats associated with crack-related defects and determine that the pipeline can continue to be operated safely.

Mechanical Damage
In the Board’s view, Enbridge is aware of the status of its line, knows the damage that exists, has tools to assess this damage, and remains committed to preventing, addressing and repairing mechanical damage to the standards set out in CSA Z662. The Board is of the view that through its MDMP (part of its IMP), Enbridge should be able to adequately manage the threats associated with mechanical damage to ensure the integrity of the line is maintained.

NW to WT Lateral
The Board notes that the Project does not involve reversing the flow on this lateral. The Board is satisfied that the integrity of this lateral is being adequately managed and agrees that the revised conditions as a result of the Project do not pose additional threats to the integrity of that lateral.

Pumping Facilities at SA, NW and WT
The Board is of the view that the facilities are adequately managed and are of low risk to rupture.

Overpressure Control, Pressure Surge Analysis and Leak Detection
The Board finds that Enbridge’s proposed approach to overpressure protection, surge protection, and leak detection, which is a continuation of the approach it has maintained on the line in its previous operational configuration, is acceptable. The Board has imposed Condition 10 on

The Board finds that Enbridge’s approach to identifying and mitigating internal and external corrosion is sufficient to operate safely in reversed flow, subject to Condition 13. This condition would enable improved data collection for corrosion, cracks and other potential future sources of failure, for the proposed facilities. The Board agrees with Enbridge that the requirement to use a Phased Array ILI tool may be too restrictive and has therefore removed this specific requirement from condition 13. The Board is of the view that the technologies listed in that condition are sufficient and adequate. Condition 14 would serve to promote a continued integrity improvement plan for the pipeline, promoting its capability of operating safely into the future. The Board notes that the operating characteristics of the line have changed over the years and it is wise to encourage integrity improvements for this line.

Cracking
The Board finds that cracking, more than corrosion or mechanical damage, can pose the greatest risk to the integrity of the line, particularly downstream of SA due to the pressure reversal.

As mentioned above, the Board is conditionally accepting Enbridge’s assertion that reversing the flow direction and operating pressure profile of the pipeline does not require a change to the approved MOP as listed in Schedule A of the attached Order. The Board has imposed Conditions 8 and 9 that will need to be complied with prior to LTO.

The Board is of the view that, through its Crack Management Program (part of its IMP), Enbridge should adequately manage the threats associated with crack-related defects and determine that the pipeline can continue to be operated safely.

Mechanical Damage
In the Board’s view, Enbridge is aware of the status of its line, knows the damage that exists, has tools to assess this damage, and remains committed to preventing, addressing and repairing mechanical damage to the standards set out in CSA Z662. The Board is of the view that through its MDMP (part of its IMP), Enbridge should be able to adequately manage the threats associated with mechanical damage to ensure the integrity of the line is maintained.

NW to WT Lateral
The Board notes that the Project does not involve reversing the flow on this lateral. The Board is satisfied that the integrity of this lateral is being adequately managed and agrees that the revised conditions as a result of the Project do not pose additional threats to the integrity of that lateral.

Pumping Facilities at SA, NW and WT
The Board is of the view that the facilities are adequately managed and are of low risk to rupture.

Overpressure Control, Pressure Surge Analysis and Leak Detection
The Board finds that Enbridge’s proposed approach to overpressure protection, surge protection, and leak detection, which is a continuation of the approach it has maintained on the line in its previous operational configuration, is acceptable. The Board has imposed Condition 10 on
Enbridge which requires a Leak Detection System (LDS) Manual to be filed with the Board 60 days prior to an application for LTO. The LDS Manual must include details on Enbridge’s policies and procedures for leak detection and provide a rationale for the design of its LDS, as well as information on how it will use the LDS to respond to any leaks.

The Board is of the view that Enbridge remains committed to its IMP and that the company is best positioned to know its pipeline and operating procedures. The Board expects that Enbridge will collect and apply information and learnings relating to pipeline integrity (such as the recommendations from the NTSB report about the Michigan pipeline rupture) into its program to the greatest extent possible.

**Engineering and Integrity Conclusion**

The Board acknowledges that Enbridge has significant experience with safely transporting products of the type proposed and operating the facilities presented in this Application, using the tools and approaches outlined in its submissions to the Board in support of its Application.

The Board is of the view that the new facilities and components required for the Project will conform to current standards and regulatory requirements.

The Board notes that Enbridge intends to transport light crude oils as defined in its submissions. Enbridge’s current NEB-approved tariff for Line 9 (as it currently operates in an east to west direction from Montreal, Québec to Nanticoke, Sarnia and the International Border near Chippewa, Ontario) does not allow it to transport heavy crude oil. Under the tariff, Enbridge can only ship and impose a toll for the transportation of light and medium petroleum products with defined densities and viscosities. In the future, if Enbridge wishes to transport heavy crude oil on Line 9, it will need to apply to the Board for this change under Part IV of the NEB Act. The Board accepts Enbridge’s statement that it would not transport any product that cannot be transported safely. The Board would, however, as part of its Part IV tariff assessment, review the quality specifications, including temperature, contained in the tariff at that time.

The Board reminds Enbridge that commitments made in its Application, subsequent filings and throughout the OH-005-2011 proceeding, conditions of approval and regulatory requirements are binding on it. The Board is of the view that, based on the reasons expressed above, Enbridge has adequate plans to identify integrity issues and managed them safely and effectively to protect the integrity of its pipeline.
Decision

Having considered and weighed all of the evidence before it, the Board is satisfied that it is in the public interest to approve the Project.

The Board exempts Enbridge from the provisions of paragraph 30(1)(a) and section 31 of the NEB Act. As explained previously in this Letter decision, the Board is not granting an exemption under section 47 of the NEB Act. Enbridge is directed to apply for LTO prior to commencing operation of the pipeline under reversed flow conditions.

Based on the foregoing reasons, which includes the companion EA Report, the Board approves Enbridge’s Application, subject to the conditions set out in the attached Order XO-E101-010-2012 found in Appendix II.

R. R. George
Presiding Member

G.A. Habib
Member

L. Mercier
Member

Calgary, Alberta
July 2012
ORDER XO-E101-010-2012

IN THE MATTER OF the National Energy Board Act (NEB Act) and the regulations made thereunder; and

IN THE MATTER OF Enbridge Pipelines Inc. (Enbridge) Line 9 Reversal Phase I application dated 8 August 2011, made under section 58 of the NEB Act (Application), filed with the National Energy Board (Board) under File: OF-Fac-Oil-E101-2011-01 01.

BEFORE the Board on 27 July 2012.

WHEREAS Enbridge filed its Application with the Board, dated 8 August 2011, for additions and modifications to allow the reversal of flow on the segment of Line 9 from Sarnia to North Westover in the province of Ontario (Project), at an estimated cost of $16,914,000;

AND WHEREAS, pursuant to the former Canadian Environmental Assessment Act (CEA Act), the Board had considered the information submitted by Enbridge and initiated an environmental screening of the Project;

AND WHEREAS the CEA Act was repealed and the Project is not subject to the new Canadian Environmental Assessment Act, 2012;

AND WHEREAS the Board performed its own environmental assessment of the Project under Part III of the NEB Act;

AND WHEREAS the Board has determined that, taking into account the implementation of Enbridge's proposed mitigative measures and the conditions of approval, the Project is not likely to cause significant adverse environmental effects;

AND WHEREAS a public hearing was held pursuant to Hearing Order OH-005-2011;

AND WHEREAS the Project pipeline segment is described in Schedule A, attached to and forming part of this Order;

AND WHEREAS the Board has examined the Application and considers it to be in the public interest to grant the relief requested, in part;
IT IS ORDERED that, pursuant to sections 58 and 20 of the NEB Act, the applied-for Project, as specified in Schedule A, attached to and forming part of this Order, is exempt from the provisions of paragraph 30(1)(a) and section 31 of the NEB Act, subject to the following conditions:

In these conditions:

“the Project” refers to the Enbridge Line 9 Reversal Phase I Project which is defined as: the additions and modifications required to allow the reversal of crude oil flow within the segment of the existing 762 mm (30-inch) outside diameter Line 9 between the Sarnia Terminal and the North Westover Station, in southwestern Ontario. These additions and modifications are related to pumps, piping, valves, a pig trap, and densitometers at the Sarnia Terminal, the North Westover Station, the Westover Terminal and at a location 4.12 km west of the North Westover Station. A new electrical building would also be built at the Westover Terminal.

“commencing construction” includes groundbreaking and other forms of site preparation for the Project that may have an impact on the environment.

“applying for Leave to Open (LTO)” means: making an application under section 47 of the NEB Act. The Board must then grant LTO before Enbridge is allowed to flow product eastward.

“for approval” means: where any condition requires a filing with the Board “for approval” in advance of performing a certain activity, that activity must not commence until the approval is issued.

“MOP” means: the maximum operating pressures as reproduced in Schedule A attached to and forming part of this Order.

General Conditions

Compliance
1. Enbridge must comply with all of the conditions contained in this Order unless the Board otherwise directs.

Project Design, Location, Construction, Installation and Operation
2. Enbridge must cause the approved Project to be designed, located, constructed, installed and operated in accordance with the specifications, standards, commitments made and other information referred to in its application or as otherwise agreed to in its related submissions.
Environment

3. Enbridge must implement or cause to be implemented all of the policies, practices, programs, mitigation measures, recommendations, procedures and its commitments for the protection of the environment included in or referred to in its application or as otherwise agreed to in its related submissions.

Prior to Construction

Emergency Plan - Construction

4. Enbridge must file with the Board, at least 15 days prior to commencing construction, the Project-specific Emergency Plan that would be implemented during the construction phase, and which includes complete spill contingency measures that Enbridge would employ in response to accidental spills attributable to construction activities.

Prior to and During Construction

Construction Schedule

5. Enbridge must file with the Board, at least 30 days prior to commencing construction, a construction schedule identifying key construction activities for the Project, and must notify the Board of any modifications to the schedule(s) as such modifications occur.

Commitments Tracking Table

6. Enbridge must:
   a) file with the Board and post on its company website, at least 30 days prior to commencing construction, a Commitments Tracking Table listing all commitments made by Enbridge in its application, in its related submissions, or during the OH-005-2011 proceeding in relation to the Project, including reference to:
      i) the documentation where the commitment is referred to (for example: the application and subsequent filings; responses to information requests; the transcript reference; any permit, authorization or approval requirements; condition filings; or other),
      ii) the accountability for implementing each commitment, and
      iii) the timelines associated with the fulfillment of each commitment;
   b) update the status of the commitments in a) on Enbridge’s website until such time that all commitments have been fulfilled, and advise the Board in writing of such updates where the status has changed; and
   c) maintain at its construction office(s):
      i) the relevant environmental portion(s) of the Commitments Tracking Table listing all regulatory commitments including, but not limited to, those commitments resulting from Enbridge’s application and subsequent filings, responses to information requests, transcript references, condition filings, and any conditions from permits, authorizations and approvals,
ii) copies of any permits, approvals or authorizations for the Project issued by federal, provincial or other permitting authorities, which include environmental conditions or site-specific mitigation or monitoring measures; and

iii) any subsequent variances to any permits, approvals or authorizations in ii).

During Construction

Construction Progress Reporting
7. Enbridge must file with the Board, on a monthly basis, construction progress reports in a form satisfactory to the Board. The reports must include, but not be limited to, information on:
   a) the activities carried out during the reporting period;
   b) any environmental, socio-economic, safety and security issues and issues of non-compliance; and
   c) the measures undertaken for the resolution of each issue and non-compliance.

Prior to Applying for Leave to Open

Updated Engineering Assessment
8. Enbridge must file with the Board, at least 30 days prior to applying for LTO the pipeline in the reversed direction, an updated Engineering Assessment, which includes a remaining life analysis for cracks, demonstrating that the pipeline between North Westover Pump Station and Sarnia Terminal is fit-for-service in the reversed flow direction at 5,281 kPa (766 psi). If Enbridge chooses to apply a different operating pressure for this analysis, please provide justification.

Repair of Known Critical Integrity Features
9. Based on the maximum operating pressure (MOP) and integrity status information used in the updated Engineering Assessment (A2Q7D7), prior to applying for LTO the pipeline in the reversed direction, Enbridge must:
   a) repair all the features that meet CSA Z662-11 repair criteria (depth and safety factor based on the MOP including the criterion for cracking depth equal to or greater than 40% nominal wall thickness) in the pipeline sections between Sarnia Terminal and Westover Terminal as identified by additional assessments and/or re-assessments committed to in the Project application;
   b) repair the defects which triggered the current pressure restrictions specified in Enbridge’s response to NEB Information Request 3.7 b), regardless of the existing operating pressure; and
   c) file a report that includes, but is not limited to, a list of features repaired, feature sizes, safety factors prior to repair, and repair date.

…/5
Leak Detection System (LDS) Manual
10. Enbridge must file with the Board, at least 60 days prior to applying for LTO the pipeline in the reversed direction, the LDS manual for the Project. The LDS manual must include, but not be limited to, the following:
   a) senior management policy and commitment to leak detection;
   b) the roles, responsibilities, and authorities of personnel in the event of a suspected leak;
   c) the theory and rationale for each LDS design and application;
   d) the methodology and instrument requirements;
   e) performance indicators such as the accuracy, reliability, and sensitivity of the LDS;
   f) leak alarms and diagnostic messaging as well as related procedures;
   g) any information to be provided by the LDS to assist in operating the LDS and responding to any potential leak;
   h) the estimated maximum amount of product released before a leak is detected;
   i) the process to be followed with respect to the continuous improvement, non-conformity, audits and corrective protocols;
   j) the procedures for LDS record keeping, training, and performance evaluation; and
   k) the plan for maintenance, testing methods (i.e., simulated signal, fluid withdrawal, etc.), and frequency of testing.

Cracking Management (North Westover Pump Station to Westover Terminal)
11. Enbridge must submit to the Board, prior to applying for LTO the pipeline in the reversed direction, a plan to manage cracking features in the pipeline section between North Westover Pump Station and Westover Terminal. This plan must include the timeline associated with the assessment methodology, and the rationale for selecting the timeline.

Post-Construction and Operations
Condition Compliance by a Company Officer
12. Enbridge must file with the Board, within 30 days following the receipt of Board approval for LTO the pipeline in the reversed direction, a confirmation, by an officer of the company, that the Project was completed and constructed in compliance with all applicable conditions in this Order. If compliance with any of these conditions cannot be confirmed, the officer of the company must file with the Board details as to why compliance cannot be confirmed. The filing required by this condition must include a statement confirming that the signatory to the filing is an officer of the company.

In-Line Inspection (ILI)
13. Enbridge must, within 18 months following the receipt of Board approval for LTO the pipeline in the reversed direction, for the segment of pipeline between Sarnia Terminal and North Westover Pump Station:
   a) run ILI tools capable of detecting, characterizing, and sizing cracking, metal loss, and geometry features using ultrasonic, high resolution Magnetic Flux Leakage and mechanical finger technologies, respectively;
b) repair or mitigate, through measures such as excavations and pressure restrictions, all features, identified by these latest ILI runs, that meet CSA Z662-11 repair criteria (depth and safety factor based on the approved MOP including the criterion for cracking depth no greater than 40% nominal wall thickness); 

c) conduct a statistically representative field validation and investigative dig program to assess the detection, characterization and sizing performance of these latest ILIs; 

d) using the new ILI data, review the integrity status of cased crossings, specifically the ones not monitored by the Cathodic Protection program; and 

e) file with the Board, a report of Enbridge’s findings resulting from a), b), c) and d), which demonstrates the pipeline segment’s continued fitness-for-service. This should include, but is not limited to, the identified remaining features, their locations (mile post and km post), and their safety factors.

**Long Term Integrity Improvement Plan**

14. Enbridge must file with the Board, within 18 months following the receipt of Board approval for LTO the pipeline in the reversed direction, a proposed long-term integrity improvement plan to mitigate and monitor remaining ILI-reported corrosion (internal and external), geometry and cracking features in the pipeline sections between Sarnia Terminal and Westover Terminal indicating, but not limited to, their timelines, the rationale for selecting those features, and the planned re-inspection interval.

**Order Expiration**

**Order Expiration**

15. Unless otherwise directed by the Board, this Order shall expire on 27 July 2013, unless construction in respect of the Project has commenced by that date.

**NATIONAL ENERGY BOARD**

Yours truly,

Sheri Young
Secretary of the Board
### Pipeline Specifications

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Direction</td>
<td>Eastbound – North Westover Pump Station (NW) to Sarnia Terminal (SA)</td>
</tr>
<tr>
<td>Location (MP)</td>
<td>MP 1862 (NW) to MP 1742 (SA)</td>
</tr>
<tr>
<td>Approximate Length</td>
<td>194.12 km (segment only)</td>
</tr>
<tr>
<td>Outside Diameter</td>
<td>NPS 30 (762 mm)</td>
</tr>
</tbody>
</table>
| Wall Thicknesses   | 6.35 mm x 140.808 km  
7.14 mm x 43.644 km  
7.92 mm x 4.279 km  
8.74 mm x 0.042 km |
| Pipe Material      | Steel |
| Pipe Grade         | API 5L X52 (359MPa) |
| External Coating Type | Dual Powder (FBE-type); Yellow Jacket; Single Layer Polyethylene Tape |
| Product            | Crude oil which will meet tariff specifications |
## SCHEDULE A (continued)
### National Energy Board Order XO-E101-010-2012

### Maximum Operating Pressures (MOPs)

<table>
<thead>
<tr>
<th>Pipeline (or Discharge Pressure)</th>
<th>Approved MOP</th>
<th>Board Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarnia Terminal</td>
<td>5281 kPa (766 psi)</td>
<td>AO-2-OPSO-J1-1-76</td>
</tr>
<tr>
<td>North Westover Pump Station</td>
<td>8012 kPa (1162 psi)</td>
<td>OPLO-1-10-71</td>
</tr>
<tr>
<td>Section of pipeline between Sarnia Terminal and North Westover Pump Station:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KP 2804.67 to KM 2826.137</td>
<td>5551 kPa (805 psi)</td>
<td>OPLO-E101-13-99</td>
</tr>
<tr>
<td>KM 2826.137 to KM 2903.031</td>
<td>4037 kPa (586 psi)</td>
<td>OPLO-E101-13-99</td>
</tr>
<tr>
<td>KM 2903.1 to KM 2961.804</td>
<td>4422 kPa (641 psi)</td>
<td>OPLO-E101-13-99</td>
</tr>
<tr>
<td>KM 2961.804 to KM 2997.500</td>
<td>4714 kPa (684 psi)</td>
<td>OPLO-E101-13-99</td>
</tr>
<tr>
<td>Westover Terminal</td>
<td>6840 kPa (992 psi)</td>
<td>OPLO-1-10-71</td>
</tr>
</tbody>
</table>