

A close-up photograph of a blue metal pipe, likely part of an oil pipeline. The pipe is heavily corroded and covered in dark, crusty deposits. A large, rusty bolt is visible on the pipe. A yellow label with some markings is attached to the pipe. The background is dark and out of focus.

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OIL PIPELINE SAFETY FAILURES IN CANADA

Oil pipeline incidents, accidents and spills and the ongoing failure to protect the public

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EXECUTIVE SUMMARY

This report examines the safety track record of oil being moved through pipelines in Canada along with the effectiveness of federal (and provincial in the case of Québec) enforcement measures aimed at ensuring pipeline safety in the country. This study combed through the National Energy Board (NEB) and Transportation Safety Board (TSB) databases for all Canadian provinces with pipelines (results in Appendix A) and zoomed in on four pipelines that run through Québec (two of them also operating in Ontario).

Oil pipeline incidents in Canada are increasing, not decreasing

Alarmingly, 55% of Québec's pipeline incidents since 2008 have occurred in 2017 alone, and while this figure is based on National Energy Board data that includes both oil and gas pipelines, it should be noted that 86% of those incidents happened on oil pipelines. The spike in pipeline incidents in Québec is virtually all attributable to the Trans-Nord pipeline, but it would be very wrong to presume that, in general, pipeline safety is on the rise and pipeline incidents are on the decline. Québec is not the only province seeing an increase in incidents: British Columbia saw more incidents in 2017 than in any previous year since 2008, Ontario had higher incidents in both 2016 and 2017 than in any other year since 2008, and Alberta saw more incidents on its federally-regulated pipelines in 2017 than in any year since 2012. Pipeline incidents are also rising for Canada in general: the NEB data show that in 2017, there were 173 pipeline incidents across the country – a significant increase from 122 incidents in 2016.

The agencies and datasets tracking pipeline problems – inconsistencies abound

Federally-regulated pipelines – those crossing international or interprovincial borders-- are regulated by the National Energy Board, but pipeline safety is monitored and tracked also by the Transportation Safety Board. Both agencies maintain pipeline incident

datasets, but unfortunately, the datasets differ in terms of timeframe, updating schedules and reporting rules and a lack of agreement between datasets is not uncommon. This makes it hard to construct a complete and accurate picture of pipeline safety for any given pipeline. Responsibility for safe operation of pipelines operating wholly within Québec is shared by several agencies. Unfortunately, Québec's incident database does not necessarily include all spills and cannot be searched by company name, among other inconveniences.

Québec as a case study

Four oil pipelines run through Québec. The Trans-Nord pipeline, operated by Trans-Northern Pipelines Inc., and Valero's Pipeline Saint-Laurent both transport refined oil products (e.g., gasoline, diesel, jet fuel), while Enbridge's Line 9 pipeline and Montréal Pipeline Limited's Portland-Montreal Pipeline both transport crude oil to refineries. Based on a comprehensive analysis of data on spill and other pipeline incidents (e.g., exposed pipe, overpressures, equipment malfunctions, fires, etc.) compiled and reported by federal and provincial agencies, this report reveals facts and trends that stand in stark contrast to claims made by industry and governments about "world class" pipeline safety regimes and "state-of-the-art" equipment and procedures. The numbers paint a disturbing picture.

Trans-Nord's exceptionally poor, unacceptable track record

Since 2004, the Trans-Nord pipeline has experienced far more pipeline safety incidents than any other pipeline in Québec, and things are getting worse rather than better. A total of 79 pipeline incidents were reported on the Trans-Nord pipeline from January 2004 to December 2017 (for Québec and Ontario together). As well, the Trans-Nord pipeline has seen reporting lags of not just days and weeks, but months and even years between the time when incidents occur and when they are reported to the

National Energy Board. Transportation Safety Board data indicates that 75% of all incidents occurred on the pipeline itself rather than on other components like pump stations or valves. National Energy Board data indicates that the largest proportion, nearly 70% of incidents, arose in part from engineering and planning problems. Additionally, NEB data indicates that widely-touted SCADA technology detected only 39% of Trans-Nord spills and incidents. TSB data indicates a 49% detection rate.

The big picture: spills and incidents on Québec's four oil pipelines since 2004

From 2004 to 2017, Québec experienced over 100 pipeline safety incidents. Of these, 23 involved spills of either refined petroleum products or crude oil, with the total amount spilled amounting to nearly 1,000 barrels. Spills, however, tell only part of the story on pipeline safety. Other types of reportable incidents, such as operating at pressures beyond design limits and exposed pipe in water bodies, often involve serious situations that pose health, safety and environmental risks in Québec, and which left unresolved may lead to spills in the future.

Missing in action – enforcement of federal and provincial pipeline safety laws and regulations

The disturbing trend of rising oil pipeline incidents in Canada makes it fair to ask what is happening in relation to government enforcement mechanisms designed to ensure the safety of oil pipelines. To enforce compliance with pipeline safety laws and regulations and reprimand non-compliance, both the federal and Québec governments have a variety of tools at their disposal such as warning letters, compliance orders related to safety or environmental protection, administrative penalties and fines, and even prosecution.

In practice, however, federal and provincial enforcement mechanisms are not making oil pipelines in Québec substantially safer. The Trans-Nord pipeline, for example, has received numerous safety orders from the National Energy Board since 2010, yet incidents

have increased. It remains to be seen whether the 10 new Board Letters and Safety Orders issued in 2017 will see results. Meanwhile, records posted online by the National Energy Board indicate that there have been zero Inspection Officer Orders since 2012 and zero Administrative Monetary Penalties at the federal level. Within Québec, one administrative monetary penalty – for \$2,500 -- has been imposed upon Trans-Nord. In this context, the continuation of Trans-Nord's pipeline incident troubles is no surprise. Strengthening enforcement for federally-regulated pipelines is essential. Additionally, Québec might benefit from enacting a provincial pipeline safety law for its provincially-regulated pipelines, similar to those currently in place in Alberta, Saskatchewan, Nova Scotia and New Brunswick.

Summing up: How can oil pipeline incidents possibly be on the rise in Québec? The answer lies in undue reliance on pipeline safety hype and ineffective regulation

From the analysis of spill and incident track record of oil pipelines in Québec since 2004 presented in this report, a disturbing picture has emerged that requires serious attention. Oil pipeline incidents affecting the environmental health and safety of Québec's communities are on the rise, and the Trans-Nord refined products pipeline is disproportionately responsible for this trend.

Despite assurances by industry and governments, and despite the rhetoric and regulations, why are pipeline spills and incidents still happening? The answers seem to flow from two troubling realities: claims of "world class safety" regimes and "state-of-the-art" technology for oil pipelines have amounted to little more than meaningless marketing mantras, while lax federal and provincial enforcement are letting oil pipelines continue to pose unacceptable risks in Québec and beyond. These findings underscore the urgent need to move beyond oil and to take stronger measures to protect against pipeline safety spills and incidents during the transition to a cleaner energy future.

A. INTRODUCTION

Stretching across Canada – across towns, villages, farms, and water bodies – are a number of pipelines carrying fossil fuels. These pipelines carry oil in several forms, as well as natural gas and related products. This report focuses on the safety records of the long-haul pipelines, referred to as transmission pipelines, that transport oil in this country through the analysis of the National Energy Board (NEB) and Transportation Safety Board (TSB) databases (the province-by-province and Canada-wide results for NEB data are shown in Appendix A).

There are four such pipelines operating in Québec: two that transport refined oil products (e.g., gasoline, diesel, jet fuel) and two that transport crude oil to refineries.

- **Trans-Northern's Ontario-Québec Pipeline**
Referred to in this report as the “Trans-Nord pipeline”, to reflect the name by which it is known in Québec, this pipeline carries refined petroleum products for vehicle and aviation transport, as well as some heating fuel, from Montréal to Ontario.¹
- **Enbridge's Line 9 Pipeline**
Enbridge's Line 9, delivers Western Canadian crude oil and crude oil from the U.S. Midwest² to Montréal on a pipeline originating in Ontario that is supplied by other Enbridge lines to the west.
- **Montréal Pipeline Limited's Portland-Montreal Pipeline**
The Portland-Montreal Pipeline transports crude oil to Montréal from Portland, Maine, which receives crude by tanker from sources located primarily overseas, although recent years have seen very low volumes of crude transported on this line.
- **Valero's Pipeline Saint-Laurent**
The Pipeline Saint-Laurent transports refined petroleum products from Valero's Jean Gaulin Refinery in Lévis to its distribution terminal in Montréal East.³

The first three pipelines listed above cross provincial or international borders, or both, and are regulated by the National Energy Board (NEB). The Pipeline Saint-Laurent, however, runs entirely within Québec's borders and is regulated by agencies in Québec.⁴ The map in **Figure 1**, below, shows the routes of these four oil pipelines within Québec.⁵

1 National Energy Board, “Provincial and Territorial Energy Profiles – Quebec”, undated. Available at <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/qc-eng.html#s2>. Trans-Northern also owns a pipeline in Alberta, which is why they refer to the pipeline that runs through Québec and Ontario as the “Ontario-Québec pipeline” (Trans-Northern Pipelines Inc. “Our Pipelines”, Undated. Available at: <http://tnpi.ca/our-pipelines/>).

2 National Energy Board, “Provincial and Territorial Energy Profiles – Quebec”, undated. Available at <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/qc-eng.html#s2>.

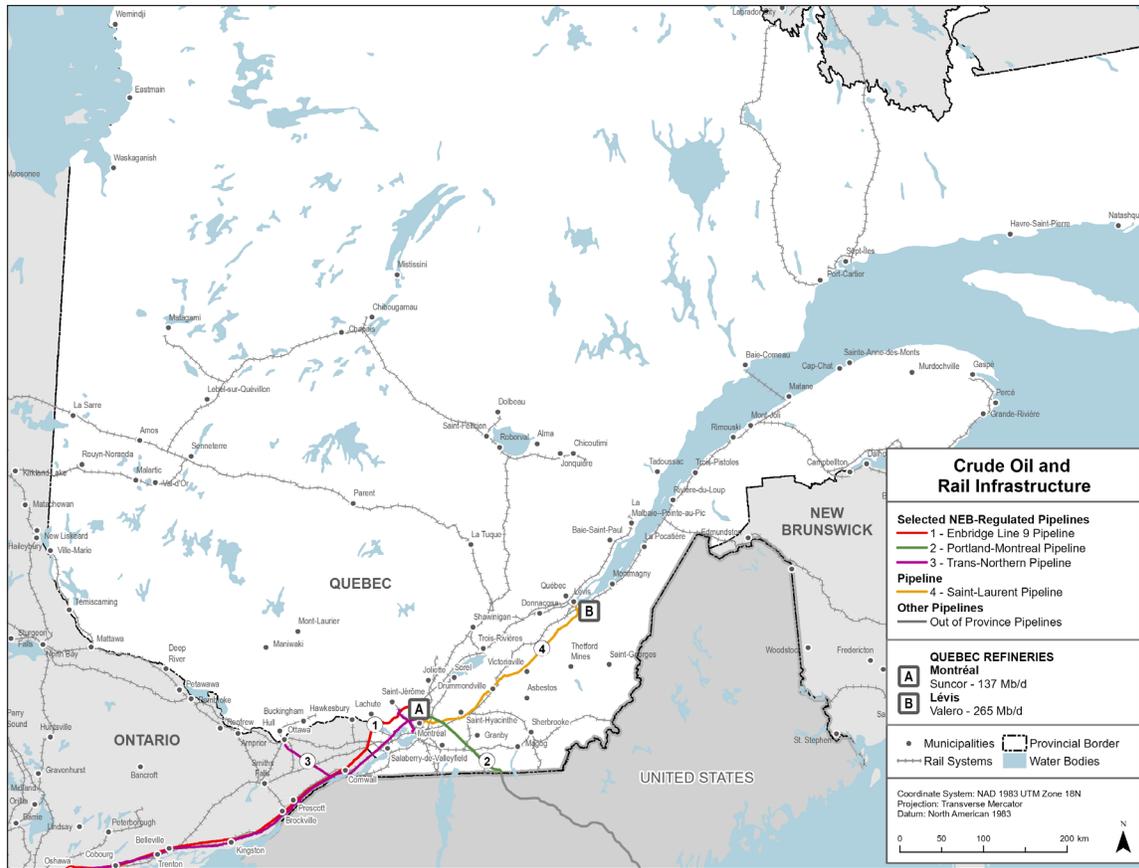
3 *Ibid.*

4 Principally, these include the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC), the Ministère de la Sécurité publique, the Régie du bâtiment du Québec (RBQ) and the Ministère de la Justice.

5 National Energy Board, National Energy Board, “Provincial and Territorial Energy Profiles – Quebec”, web-page last modified January 4, 2018. Figure 3, Crude Oil Infrastructure Map. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/pdf/mp-qc-l-eng.pdf>

FIGURE 1

Map of the four oil pipelines that cross Québec (and related infrastructure)



The purpose of this report is to examine how safely – or not – oil is being moved through pipelines across Québec. Despite government boasting about “world class” pipeline safety regimes⁶ and industry claims about “state-of-the-art”⁷ equipment and procedures, our review of pipeline performance in Québec, using data compiled by government agencies, demonstrates that these lofty claims ring hollow. The hard facts point to the need for substantial and serious improvements. In Québec, these needs must be addressed quickly, because when it comes to pipeline safety, things are getting worse rather than better.

Indeed, a brief look at NEB data on pipeline spills and other incidents (e.g., exposed pipe, valve and other equipment malfunctions, fires, etc.) shows that Québec’s pipeline safety problems are becoming **more** frequent – not less! Alarmingly, **55% of Québec’s pipeline incidents since 2008 have occurred in 2017 alone**⁸ (see the bright red bar in **Figure 2**). While this figure includes both oil and gas pipelines, it should be noted that 86% of the incidents involved oil pipelines.

55% of Québec’s pipeline incidents since 2008 have occurred in 2017 alone

6 See e.g., “Safety and Security of Energy Pipelines in Canada: A Report to Ministers”, energy and Mines Ministers’ Conference, Sudbury, Ontario, August 2014, page 6 includes a one-page highlighted box titled “Canada’s World Class Pipeline Safety”. Available at: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/www/pdf/publications/emmc/14-0177_Pipeline%20Safety_e.pdf.

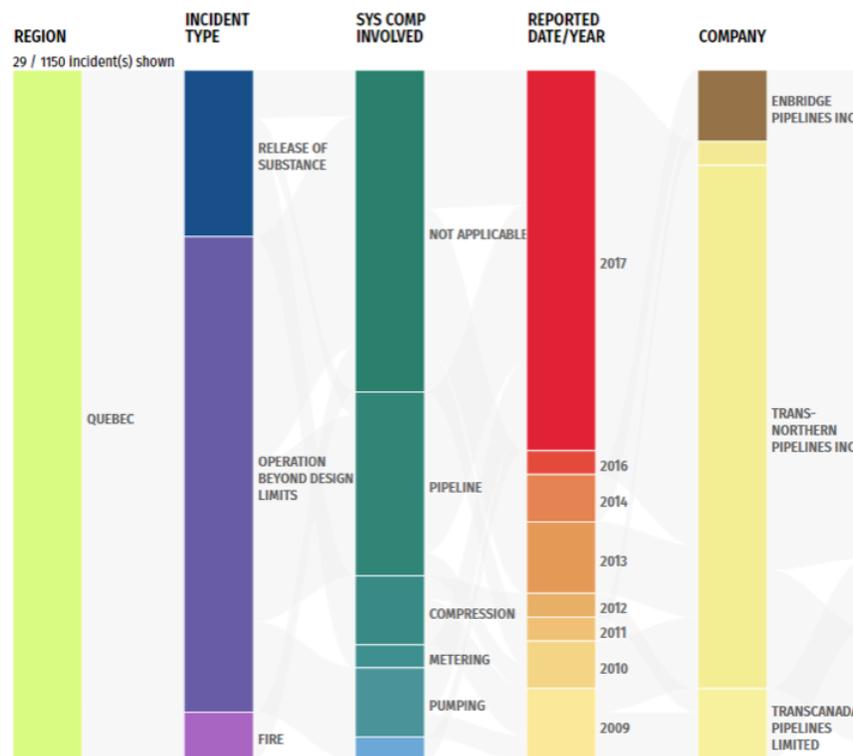
7 See e.g., Trans-Northern Pipelines Inc., “Our Commitment”, undated, describing “state of the art” equipment used to monitor their pipelines. Available at <http://tnpi.ca/our-commitment/>.

8 National Energy Board. “Incidents at NEB-regulated pipelines and facilities”. Undated. Available at: <https://apps2.neb-one.gc.ca/pipeline-incidents/>. It must be underscored that, as explained below in this report, the NEB data captures only some of the many pipeline incidents and spills happening in Canada, so the data here does not represent all incidents.

Based on the NEB data spanning from 2008 to 2017,⁹ Québec is seeing vastly more incidents now than in previous years compared to other provinces. British Columbia had the next highest proportion of incidents in 2017 relative to incidents in earlier years – at 23.5%, and the comparable proportion for other provinces is even lower. **Appendix A** presents graphic comparisons of Québec with other provinces on a province-by-province basis. Québec also has the highest proportion of unclosed incident investigations compared to other provinces: 31% compared

FIGURE 2

A snapshot of Québec pipeline incidents generated from NEB pipeline incident data¹⁰



to 14% for British Columbia and smaller percentages for the other provinces,¹¹ and this is largely due to the many recent Trans-Nord pipeline incidents still under investigation.

Returning to **Figure 2**, which represents data on not only 25 incidents on oil pipelines but also four incidents on gas pipelines, we see that more incidents fall under the category of “Operation Beyond Design Limits” than “Release of Substance”, but this should bring no comfort. According to the NEB, incidents categorized as “Operation Beyond Design Limits” can include overpressures, vibration beyond design limits, slope movements causing movement in the pipeline beyond design limits, pipe exposures in rivers or streams and introduction of an inappropriate product.¹² **Figure 2** also shows that, in Québec, more incidents are occurring on the pipelines themselves compared with pumping (oil), compression (gas) or metering stations, noting that the NEB considers the question of which components are involved as “Not Applicable” in a large number of cases.

9 National Energy Board. “Incident Data”. 2018-03-31 (Current data). Comprehensive file. Available for direct download at: <https://www.neb-one.gc.ca/sftnvrnmnt/sft/dshbrd/mp/dt/2018-03-31ncdntcmprhnsv-eng.csv>

10 National Energy Board. “Incidents at NEB-regulated pipelines and facilities”. Undated. Available at: <https://apps2.neb-one.gc.ca/pipeline-incidents/>.

11 *Ibid.*

12 National Energy Board, “Safety Performance Portal – Glossary of Terms”. Undated. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/sft/dshbrd/mp/glossr-eng.html>.

It is important to note, in painting this overview of Québec pipeline safety statistics, that the figures just mentioned are those that appear only in the NEB's dataset on pipeline incidents. As will be explained below, the federal Transportation Safety Board (TSB) maintains a similar dataset that sometimes includes incidents that do not appear in the NEB dataset. The analysis of Québec's oil pipelines in this report relies on data in on both datasets (except for provincially regulated Pipeline Saint-Laurent).

The increase in pipeline incidents in Québec in 2017, apparent in bright red in **Figure 2**, is virtually **all** attributable to one pipeline: Trans-Nord. It would be very wrong to presume, however, that Québec's increase in incidents is somehow out of the ordinary and simply the result of one company's poor behaviour, and that despite this trend, pipeline safety is improving. Québec is not the only province seeing an increase in incidents: British Columbia saw more incidents in 2017 than in any previous year since 2008, Ontario had higher incidents in both 2016 and 2017 than in any other year since 2008, and Alberta saw more incidents in 2017 than in any year since 2012. Pipeline incidents are also rising for Canada in general: the NEB data show that in 2017 there were 173 pipeline incidents across the country – a significant increase from 122 incidents in 2016. (See the province-level and Canada-wide graphics in **Appendix A** for details).

Québec is not the only province seeing an increase in incidents: British Columbia saw more incidents in 2017 than in any previous year since 2008, Ontario had higher incidents in both 2016 and 2017 than in any other year since 2008, and Alberta saw more incidents in 2017 than in any year since 2012.

B. KEEPING TRACK OF PIPELINE PROBLEMS: THE AGENCIES AND DATASETS

A fundamental and necessary step in keeping the public safe from pipeline spills and other incidents is careful and reliable record-keeping. In this report, the term “incidents” will be used to refer to both spills and all other types of incidents reported to regulators, including the operation of pipelines “beyond design limits” (a term including but not limited to pipeline pressure situations and numerous other circumstances, as will be explained in more detail below), fires, explosions, and damage by third parties.

It is a simple but critical truth that pipeline spills and other incidents cannot be properly handled for purposes of emergency response or longer-term safety planning if reporting is not immediate, precise and thorough. While the reporting of incidents for data collection purposes is not the same as the real-time incident reporting that activates emergency responders, the accuracy and reliability of incident recordkeeping should be of paramount importance. Without accurate reporting, how can governments effectively monitor the pipelines they regulate? Without thorough recordkeeping, how can pipeline companies truly claim to be monitoring and “continually improving” the performance of their pipelines?

Depending on the jurisdiction charged with regulating a pipeline, there may be one or more different agencies who keep track of performance, compliance and violations, and they may use different reporting and record-keeping rules. As a report on pipeline safety prepared for the 2014 Energy and Mines Minister’s Conference observes, there is no standard definition for “pipeline incident” used among agencies in Canada, even among federal agencies, and “definitions vary by jurisdiction, which can influence the scale, scope and pace of a response.”¹³ This section of the report includes key details on the differences and commonalities among the datasets that track pipeline incidents in Québec.

For federally-regulated pipelines in Canada, pipeline safety is monitored primarily by two agencies – the NEB and the TSB. Pipeline safety for pipelines operating wholly within provincial borders is regulated by provincial agencies, and in the case of the Pipeline Saint-Laurent, this includes mainly the Ministère du Développement durable, de l’Environnement et de la Lutte contre les changements climatiques (MDDELCC), the Ministère de la Sécurité publique, the Régie du bâtiment du Québec (RBQ) and the Ministère de la Justice.

To better understand how government agencies compile data to track the performance of oil pipelines such as those in Québec, we present a brief overview of the datasets compiled by the federal and Québec governments. Again, while the agencies who collect and report such data do so not only for oil but also for natural gas and certain related liquids, this report focuses on the safety of oil references statistics relating only to oil pipelines.

There are some differences across pipeline spills and other incidents are within the federal jurisdiction, there are to difficulty in arriving at a complete any given pipeline. For example, one major publicly available, online dataset provides

Difficult to arrive at a complete and clear picture of pipeline safety for any given pipeline

jurisdictions in the way in which reported to public agencies. Even important differences, which can lead and clear picture of pipeline safety for difference is timeframe: while the NEB’s information on incidents beginning in January

¹³ Energy and Mines Ministers’ Conference, *Safety and Security of Energy Pipelines in Canada: A Report to Ministers* (Sudbury, Ontario). August 2014. Page 13. Available at: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/www/pdf/publications/emmc/14-0177_Pipeline%20Safety_e.pdf.

2008, the TSB's public dataset, also available online, begins January 1, 2004. The datasets are also updated according to different schedules, with the NEB data updated quarterly, and TSB data updated less frequently. The NEB and TSB reporting rules for spills prior to 2014 follow different rules for minimum reportable volumes. Details on the timeframe and reporting rule differences are provided in the profiles of the two federal datasets, below.

NEB Pipeline Spill Data

The NEB publishes data online that is derived from its internal database of incidents and accidents reported by pipeline companies.¹⁴ Since January 2015, companies report incidents through an "Online Event Reporting System" that allows them to enter information directly into the NEB's internal database.¹⁵ (Prior to January 1, 2015, incidents were reported to the NEB by phone). The NEB's public data includes incidents considered "reportable" under both the *Onshore Pipeline Regulations*¹⁶ (OPR) and the *Processing Plant Regulations*, both authorized under the *National Energy Board Act*.¹⁷ These two sets of regulations define "incident" in a similar manner, thus it suffices to refer simply to the definition from the OPR, as described in the NEB's *Incident Data: Methodology* document,¹⁸ which states that under the OPR an "incident" means an occurrence that results in:

- a. the death or serious injury to a person;
- b. a significant adverse effect on the environment;
- c. an unintended fire or explosion;
- d. an unintended or uncontained release of low vapour pressure (LVP) hydrocarbons in excess of 1.5 m³;
- e. an unintended or uncontrolled release of gas or high vapour pressure (HVP) hydrocarbons;
- f. the operation of a pipeline beyond its design limits as determined under CSA Z662 or CSA Z776 or any operating limits imposed by the board.

Low vapour pressure hydrocarbons (item d, above) include crude oil and some refined oil products, whereas high vapour pressure hydrocarbons (item e, above) include propane, butane and other natural gas liquids (e.g., ethane, pentane), but can also include crude oil in certain cases.¹⁹

Timeframe

The NEB dataset contains incident data from January 2008 forward. The NEB states that its dataset is updated quarterly.²⁰ The analysis in the present report, however, is based on the NEB data available through December 31, 2017. Incident data is organized by the date on which company reported the incident to the NEB, but dates for discovery (detection) of the incident and original occurrence, when it is known, are also provided. This information is critical for uncovering lags between occurrence, discovery and reporting, such as the frequent and sometimes extreme time lags seen with the Trans-Nord pipeline (discussed in Section C of this report).

Minimum Spill Volumes

14 National Energy Board. "Incident Data". Current and past datasets available at: <https://www.neb-one.gc.ca/sftnvrnmnt/sft/dshbrd/mp/dt-eng>.

15 National Energy Board, "Incident Data: Methodology". Undated. Page 3. Available at https://apps2.neb-one.gc.ca/pipeline-incidents/data/Incident%20Data%20Methodology_EN.pdf.

16 Government of Canada. *National Energy Board Onshore Pipeline Regulations*, SOR/99-294. Available at: <http://laws-lois.justice.gc.ca/PDF/SOR-99-294.pdf>.

17 Government of Canada. *National Energy Board Processing Plant Regulations*, SOR/2003-39. Available at: <http://laws-lois.justice.gc.ca/PDF/SOR-2003-39.pdf>.

18 National Energy Board, "Incident Data: Methodology". Undated. Page 2. Available at https://apps2.neb-one.gc.ca/pipeline-incidents/data/Incident%20Data%20Methodology_EN.pdf. This document provides descriptions of many but not all of the fields in its publicly available spreadsheet of incident data.

19 CBC, "Pipeline safety incident glossary". Undated. Available at <http://www.cbc.ca/news2/interactives/pipeline-incidents/glossary.html>.

20 National Energy Board, "Incidents at NEB-regulated pipelines and facilities". Undated. Available at: <https://apps2.neb-one.gc.ca/pipeline-incidents/>.

The criterion for spill volumes that must be reported under NEB regulations flows from Section 1, «Interpretation» of the NEB Onshore Pipeline Regulations (OPR). Specifically, the current rule requires reporting of any spill volumes in excess of 1.5 m³ for Low Vapour Pressure hydrocarbons. The 1.5 m³ threshold has been in place for many years. It appears in the earliest version of the OPR that is accessible online, a version that came into force in March 2006, as well as in a report titled *A Comparative Analysis of Pipeline Safety Performance 2000–2002*, published in January 2004. It is safe to say that the 1.5 m³ rule has been in force for at least 18 years in relation to NEB spill reporting.

TSB Pipeline Spill Data

The TSB publishes online “selected data pertaining to accidents and reportable incidents from its Pipeline Occurrence Database System (PODS) for use by industry and the public to advance transportation safety.”²¹ The TSB warns that older information in the online dataset is more stable than more recent information, because more recent incidents may be the subject of ongoing investigations, and that since “many occurrences are not investigated formally...information recorded on some occurrences may not have been verified.”²² The TSB dataset also provides a “Data Dictionary” describing most of the key fields in the spreadsheet for its publicly available dataset.²³

The TSB’s criteria for reportable incidents are similar but more detailed than those used by the NEB. As stated in the *Transportation Safety Board Regulations*, Section 4(1),²⁴ the criteria are as follows:

- a. a person is killed or sustains a serious injury;
- b. the safe operation of the pipeline is affected by
 - damage sustained when another object came into contact with it, or
 - a fire or explosion or an ignition that is not associated with normal pipeline operations;
- c. an event or an operational malfunction results in
 - an unintended or uncontrolled release of gas,
 - an unintended or uncontrolled release of HVP hydrocarbons,
 - an unintended or uncontained release of LVP hydrocarbons in excess of 1.5 m³, or
 - an unintended or uncontrolled release of a commodity other than gas, HVP hydrocarbons or LVP hydrocarbons;
- d. there is a release of a commodity from the line pipe body;
- e. the pipeline is operated beyond design limits or any operating restrictions imposed by the National Energy Board;
- f. the pipeline restricts the safe operation of any mode of transportation;
- g. an unauthorized third party activity within the safety zone poses a threat to the safe operation of the pipeline;
- h. a geotechnical, hydraulic or environmental activity poses a threat to the safe operation of the pipeline;

21 Transportation Safety Board, “Pipeline transportation occurrence data: Pipeline occurrence data from January 2004”. Available at: <http://www.tsb.gc.ca/eng/stats/pipeline/data-1.asp>.

22 *Ibid.*

23 Transportation Safety Board, “Data Dictionary - Pipeline occurrence data from January 2004. Undated. Available at: <http://www.tsb.gc.ca/eng/stats/pipeline/csv/dd-20170418.asp>.

24 Government of Canada, Transportation Safety Board Regulations, SOR/2014-37. Available at: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2014-37/page-3.html#h-6>.

- i. the operation of a portion of the pipeline is interrupted as a result of a situation or condition that poses a threat to any person, property or the environment; or
- j. an unintended fire or explosion has occurred that poses a threat to any person, property or the environment.

Timeframe

The TSB dataset contains incident data from January 2004 forward. The TSB states that the dataset is updated “on or soon after the 15th of each month”,²⁵ but the data currently available online ends at August 2017. As such, it is a bit less current than the NEB dataset. Unlike the NEB dataset, the TSB data is organized only by date of occurrence: dates of discovery and reporting are not included.

Minimum Spill Volumes

Prior to July 1, 2014, there was no minimum volume for reportable incidents in the TSB regulations on pipeline incident reporting. The regulations prior to that time stated that a “reportable commodity pipeline incident” meant “an incident resulting directly from the operation of a commodity pipeline” where “an uncontained and uncontrolled release of a commodity occurs....”.²⁶ In July 2014, however, the TSB put into place new regulations that raised the minimum reporting threshold for pipeline leaks and spills from the previous level of zero (no minimum amount) to 1.5 m³,²⁷ in order to match the threshold used by the NEB in its dataset.

Additional discrepancies between NEB and TSB datasets on pipeline incident reporting

In addition to the timeframe and minimum volume reporting differences between the NEB and TSB datasets mentioned above, the two datasets show a rather disturbing lack of agreement. Often, an incident reported in one dataset will not appear in the other dataset, and the cause for the discrepancy is unclear. For example, there are spills and fires that appear in one dataset that do not appear in the other, even when the reporting system differences are taken into account.

Québec Spill Data in the Registre des interventions d’Urgence-Environnement

In Québec, the Regulation respecting hazardous materials (Règlement sur les matières dangereuses), administered by the Ministère du Développement durable, de l’Environnement et de la Lutte contre les changements climatiques (MDDELCC) under Québec’s *Environment Quality Act (Loi sur la qualité de l’environnement*²⁸), requires every company or person who accidentally spills or releases a hazardous material into the environment to report the incident to the MDDELCC. The Ministry maintains a public, online registry, the Registre des interventions d’Urgence-Environnement,²⁹ which contains information on spills and releases of all hazardous liquids, chemicals and materials (e.g., solids, dust) not just oil.

The Registry, however, includes information **only** on spills or hazardous release incidents that involved field interventions by Urgence-Environnement, an agency within the MDDELCC that provides technical support to municipalities responding to environmental emergencies. As such, the Registry does not necessarily contain information on all spills.

25 Transportation Safety Board, “Pipeline occurrence data from January 2004”. Available at: <http://www.bst-tsb.gc.ca/eng/stats/pipeline/index-ff.asp>.

26 Government of Canada, *Transportation Safety Board Regulations*, SOR/92-446. Available at: <http://canlii.ca/t/193q>. This version of the regulation was replaced by SOR/2014-37.

27 Government of Canada, *Transportation Safety Board Regulations*, SOR/2014-37. Available at: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2014-37/page-3.html#h-6>.

28 Publications Québec. Q-2, Environment Quality Act. <http://legisquebec.gouv.qc.ca/en/ShowDoc/cs/Q-2>.

29 MDDELCC, Registre des interventions d’Urgence-Environnement. Available at: http://www.mddelcc.gouv.qc.ca/ministere/urgence_environnement/index.asp.

Perhaps this explains why a spill of jet fuel from the Trans-Nord pipeline in Montréal on July 14, 2010, reported in both the NEB and TSB datasets, does not appear in the Registre des interventions d'Urgence-Environnement. While neither dataset reported a specific volume figure for this spill, it should be noted that Québec's Registry contains entries on spill events even where the volume is unknown or very small (even 1–3 litres), so the exclusion cannot be explained on the basis of spill size.

As has been described by others,³⁰ the Registre des interventions d'Urgence-Environnement is anything but user-friendly. It does not allow searches of the entire dataset for particular kinds of incidents, like pipeline spills. Additionally, companies or others responsible for the spill are not mentioned by name in the Registry reports. Company names are mentioned only in the press releases that are sometimes referenced by link only in the spill or incident report. Also inconvenient is the fact that queries are only possible within one administrative region of Québec at a time, and cannot be made in a single pass across the entire dataset. Furthermore, the search results provide only the date, the city or town and the general type of incident (e.g., spill of petroleum product, fire, explosion, gas leak, car accident, sunken cars or equipment with fuel tanks, etc.). The words "pipeline", or in French, *oléoduc* do not appear in even the general descriptors.

Timeframe

The registry covers incidents from April 1, 2008, to the present. Each entry presents the information known at the time of publication in the registry, and details are not updated unless the intervention is marked as «in progress».³¹

Minimum Spill Volumes

Unlike the NEB and TSB datasets, the Registry does not have a minimum reporting threshold. It does, however, exclude spills from vehicles involved in road accidents.

30 See e.g., Christian Duperron, "Carte interactive: les principaux incidents environnementaux au Québec traités par Urgence-Environnement". March 2, 2014. Available at: https://quebec.huffingtonpost.ca/2014/07/05/carte-interactive-interventions-urgence-environnement_n_4887357.html

31 MDDELCC, Registre des interventions d'Urgence-Environnement. Available at: http://www.mddelcc.gouv.qc.ca/ministere/urgence_environnement/index.asp.

C. QUÉBEC'S FOUR OIL PIPELINES AND THEIR TRACK RECORDS

Explanatory notes for understanding the track record information:

1. Elimination of duplicate incidents between the NEB and TSB dataset

As explained above, the NEB and TSB datasets track incidents somewhat differently. Given the structural differences between datasets, the most comprehensive way to provide an accurate “track record” on pipeline safety for each of the federally-regulated pipelines is to pool the data from both sources. When using pooled data, it is of course critical to eliminate duplicate events, and the utmost care was taken for the present analysis: individual events in the NEB dataset were compared with individual events in the TSB dataset on an incident-by-incident basis in order to identify and remove duplicate incidents. This approach produces a robust and reliable total figure for spills and other incidents³² for federally-regulated oil pipelines.

The elimination of duplicates was not necessary for the Portland–Montréal Pipeline because spills and other incidents on this pipeline appear only in the TSB dataset. The absence of incidents in the NEB dataset, however, is due to timeframe and reporting criteria differences.

2. Inclusion of incidents outside of Québec

Two of Québec's pipelines – Enbridge Line 9 and Trans-Nord – also cross Ontario. Thus, in order to get a complete picture of safety issues on those two pipelines, it is essential to examine incident data across both provinces. As such, figures from both Québec and Ontario are provided in the following summaries for the Trans-Nord and Enbridge Line 9 pipelines.

Trans-Nord Pipeline

The Trans-Nord Pipeline carries refined petroleum products – gasoline, diesel, aviation fuel and heating fuel – westward from Montréal to the Toronto region in Ontario.³³ It is owned by Trans Northern Pipelines Inc., which is in turn owned by Imperial Oil Ltd (69.6 percent-owned by ExxonMobil³⁴), Shell Canada Ltd. and Suncor Energy Inc.³⁵ The pipeline is 850 km long, although that distance includes a segment that carries refined oil eastward, from a refinery in Nanticoke, Ontario to Toronto, as well as several smaller spurs.³⁶ (See **Figure 3** for a map of the pipeline).

32 The meaning of “spills and other incidents”, as used in this report, is explained in Section B.

33 National Energy Board, “Provincial and Territorial Energy Profiles – Quebec”. Undated. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/qc-eng.html#s2>.

34 Exxon Mobil, “Locations – Canada”. Undated. Available at: <http://corporate.exxonmobil.com/en/company/worldwide-operations/locations/canada#About>.

35 Registraire des entreprises du Québec. Entry for “Trans-Northern Pipelines Inc.” Available at: https://www.registreentreprises.gouv.qc.ca/RQAnonymeGR/GR/GRO3/GRO3A2_19A_PIU_RechEnt_PC/PageEtatRens.aspx?T1.JetonStatic=b64330b0-b4e1-416a-8afb-a51ca4363157&T1.CodeService=S00436.

36 National Energy Board, “Pipeline Profiles: Trans-Northern Pipeline”. February 2018. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/pplnprtl/pplnprfls/crdl/trnsnrthrn-eng.html>.

FIGURE 3

Map of the full length of the Trans-Nord Ontario-Québec pipeline³⁷



The company states that the Trans-Nord Pipeline transports 172,900 barrels per day of refined products, but it must be understood that this figure is for the entire length of the pipeline, not just for the segment running from Montréal to Toronto.³⁸ The NEB explains that the capacity varies across different segments of the pipeline.³⁹ This refined products pipeline is 16 inches in diameter between Montréal and Sainte-Rose, and less than 11 inches in diameter in most other parts of its route through Québec.⁴⁰

The Trans-Nord pipeline was built in 1952,⁴¹ and whether due to age or other factors, has seen an increasing number of serious problems. In its “Pipeline Profile” for this pipeline, the NEB notes that in October 2010, the NEB ordered a system-wide pressure reduction to 80% of the maximum operating pressure (MOP)⁴² “as a result of several incidents and a lack of evidence that the TNPI Integrity Management Program was adequate and effective.”⁴³

³⁷ *Ibid.*

³⁸ Trans-Northern Pipelines Inc. “Our Pipelines”. Undated. Available at: <http://tnpi.ca/our-pipelines/>.

³⁹ National Energy Board, “Pipeline Profiles: Trans-Northern Pipeline”. February 2018. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/pplnprtl/pplnprfls/crdl/trnsnrthrn-eng.html>.

⁴⁰ National Energy Board, “Trans-Northern Pipelines Inc. (TNPI) – Amending Safety Order AO-001-SO-T217-03-2010 and TNPI letter dated 21 September 2016”. October 24, 2016. Schedules A and B. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/rprts/brdlttrdr/2016/SO-T217-03/so-t217-03-2010-ao-002-eng.pdf>.

⁴¹ National Energy Board, “Pipeline Profiles: Trans-Northern Pipeline”. February 2018. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/pplnprtl/pplnprfls/crdl/trnsnrthrn-eng.html>.

⁴² *Ibid.*

⁴³ National Energy Board, “Trans-Northern Pipelines Inc. (TNPI) Integrity Management Program Application to Increase Pressure Pursuant to Safety Order SO-T217-03-2010” August 29, 2013. Page 1. Available at <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/rprts/brdlttrdr/2013/SO-T217-006/so-t217-006-eng.pdf>.

In September and October 2016, the NEB issued two amending safety orders. These new orders replaced the 2010 Safety Order and imposed an additional 10% pressure restriction on certain Trans-Nord pipeline sections in Ontario and Quebec, bringing the total restriction to 70% of MOP for large sections of the pipeline. Some sections, partly or entirely in Québec, however, including the Montreal to Sainte-Rose Loop and the section from Sainte-Rose to Farran's Point, were allowed to remain at 90% of the MOP. When the September 2016 order was made, however, two members of the NEB issued this dissenting opinion:

TNPI has had six years to comply with numerous Safety Orders issued by the Board, but they have failed to fully comply. We are not confident that yet another similar Safety Order will guarantee that the changes necessary to make the pipeline as safe as possible will actually be made this time. We agree with the Majority that if and when all of the measures described in the Amending Safety Order are implemented, the pipeline system will be as safe as possible. However, until those safety measures are fully implemented, it would have been our preference to have the pipeline system shut down in the interim because TNPI's current operational controls do not meet the requirements of the National Energy Board Onshore Pipeline Regulations or CSA Z662-15⁴⁴ (emphasis added).

Unfortunately, safety issues continue to plague the Trans-Nord pipeline and the NEB has signalled it is losing patience with the company, particularly in relation to previously unreported overpressure events. On September 8, 2017, the NEB stated that "These overpressure incidents give us significant concern with TNPI's management of its pipeline system".⁴⁵ The NEB also said it was reviewing whether further actions would be required, "including the need for additional enforcement actions."⁴⁶

In addition to overpressure problems, exposed pipe over a creek that flows toward the Rivière des Outaouais (Ottawa River), upstream of Montréal's drinking water intakes, has greatly concerned local residents.⁴⁷ While the exposed pipe was first noticed by a Saint-Lazare homeowner in June 2016,⁴⁸ only in October 2017 did the company make known its plans to replace the affected pipe, which crosses Ruisseau Paiement.⁴⁹ A September 18, 2017 letter from Trans-Northern to area residents about the replacement plan indicates that the replacement is necessary to maintain the integrity of the pipeline because the thickness of the pipeline's covering had diminished over the years due to erosion.⁵⁰

Trans-Nord Incident Track Record

A review of the NEB and TSB pipeline incident data since 2008 provides the hard facts and alarming numbers behind the situations such as those described touched upon above. Combining the information from both the NEB and TSB datasets, and removing incidents common to both datasets, there

79 pipeline incidents reported on the Trans-Nord pipeline from January 2004 to December 2017

44 National Energy Board, Letter Decision, 20 September 2016, Appendix A, Dissent of Member Richmond and Member Ballem, File-OF-Surv-Gen-T217 01. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/rprts/brdlttrdr/2016/SO-T217-03/so-t217-006-ao-001-32-eng.pdf>.

45 National Energy Board, September 8, 2017 Letter to Trans-Northern Pipelines Inc, "Over Pressure events on Trans-Northern Pipelines Inc. (TNPI) system". Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/rprts/brdlttrdr/2017/SO-T217-03/so-t217-03-2010-2017-2-eng.pdf>.

46 *Ibid.*

47 Eric Plouffe and Catherine Kovacs, "Un pipeline en partie hors terre continue d'inquiéter à Saint-Lazare". Radio-Canada. July 5, 2017. Available at: <http://ici.radio-canada.ca/nouvelle/1043622/pipeline-saint-lazare-boise-continue-inquierer-trans-nord-environnement>.

48 *Ibid.*

49 Alexandre Shields, "Travaux d'urgence sur un pipeline de 1952 dans la région de Montréal". Le Devoir. October 12, 2017. Available at: <https://www.ledevoir.com/societe/environnement/510272/travaux-d-urgence-sur-un-pipeline-de-1952-dans-la-region-de-montreal>.

50 *Ibid.*

were **79 pipeline incidents reported on the Trans-Nord pipeline from January 2004 to December 2017** (Québec and Ontario combined). Of these, 10%, involved spills. The other 90% involved incidents such as operating outside of design limits, problems with valves and other equipment, or third-party damage to a pipeline. As mentioned in Section A, the phrase “Operating Beyond Design Limits” in the NEB dataset can include overpressures, vibration beyond design limits, slope movements causing movement in the pipeline beyond design limits, pipe exposures in rivers or streams and introduction of an inappropriate product.⁵¹ The NEB further explains that: “Operation beyond design limit is typically linked to an over-pressure of the product in the pipe; however, if a pipe was exposed to excessive vibration and was not designed for this, this could be considered operation beyond design limits.”⁵²

For incidents involving spills, the combined data from the NEB and TSB datasets indicates that the **total reported volume for spills on Trans-Nord between January 2004 and December 2017 was 148.1 cubic metres (m³)**, equivalent to about **932 barrels**. This figure, however, is lower than it should be because **spill volumes are missing on 4 of the 8 spills for Trans-Nord**. The missing information cannot be attributed solely to differences in the reporting rules for the NEB and TSB datasets because 3 of the 4 spills with missing volumes appear only in the TSB dataset and occurred before the TSB adopted the rule that only spills exceeding 1.5 m³ need be reported.

One of the spills with missing volume information was a jet fuel spill on July 14, 2010, in the Montréal area, and NEB data on this spill include many worrisome descriptors: “Substandard Acts, Failure to follow procedure or policy or practice; Damage or deterioration mechanism, Material Loss, External Material Loss, Poor Condition of External Coating, Holidays.”⁵³ Investigative reporting by one media source uncovered documents indicating that the NEB eventually estimated that some 1,500 L of aviation fuel had been spilled during this incident, but yet the data provides no figure.⁵⁴ This is a strong example of the undercounting of spill volumes in incident data.

The NEB data categorizes each incident to summarize “what happened”⁵⁵ (see **Table 1**, below) and this sheds light on Trans-Nord pipeline incidents, but *only* if one looks deeper into the meaning behind the category labels. **About half of all Trans-Nord incidents reported to the NEB since 2008 occurred due to “External interference”, but the title of this category is misleading.** It can give the impression that it indicates events outside the company’s control. In fact, however, “external interference” includes situations such as “damage or deterioration mechanism”, “defective tools, equipment or materials”, “inadequate preparation or planning”, “inadequate instructions or procedures” and “presence of harmful materials”.⁵⁶ Similarly, the category “Natural force damage” includes problems like washout, erosion, scouring and “geotechnical failure”, which are all within the company’s realm of responsibility. The full breakdown of incidents by category are presented in **Table 1**.

51 National Energy Board, “Safety Performance Portal – Glossary of Terms”. Undated. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/sft/dshbrd/mp/glsr-eng.html>.

52 *Ibid.*

53 National Energy Board. “Incident Data”. 2018-03-31 (Current data). Comprehensive file. Incident No. INC2010-073. Available for direct download at: <https://www.neb-one.gc.ca/sftnvrnmnt/sft/dshbrd/mp/dt/2018-03-31ncdntcmprhnsv-eng.csv>.

54 Jeff Yates, “Un pipeline construit en 1952 qui inquiète”. *Métro*. February 10, 2016. Available (with documents obtained from the NEB concerning this spill) at: <http://journalmetro.com/actualites/national/914986/un-pipeline-construit-en-1952-qui-inquiete/>.

55 Column R in the NEB dataset. *Supra* note 9. Please note that in order to see Column R and other lettered columns referred to in the footnotes which follow, the downloaded NEB data must be converted to Microsoft Excel. See also, the definition of the “What happened” category, in National Energy Board, “Incident Data: Methodology”. Undated. Page 5. Available at https://apps2.neb-one.gc.ca/pipeline-incidents/data/Incident%20Data%20Methodology_EN.pdf.

56 Column Q in the NEB dataset. *Supra* note 9.

TABLE 1

Distribution of incidents on the Trans-Nord pipeline 2008-2017 according to categories used by NEB to describe “what happened”.

Categories describing “what happened”	% of Trans-Nord pipeline incidents*
“External interference”	50
“Incorrect operation”	21
“Natural force damage”	18
“Equipment failure”	9
“Corrosion and cracking”	5
“To be determined”	14

* Categories are not unique. Often, more than one category is used to describe the same incident.

The NEB’s “Why it happened” category in the dataset⁵⁷ is more helpful in understanding the circumstances behind the Trans-Nord pipeline incidents, and these are summarized in the table in **Table 2**, below. **The category of causes with the highest percentage of incidents on Trans-Nord from 2008 to 2017 was “engineering and planning”: nearly 70% of all incidents were said to have arisen at least in part from engineering and planning issues.** Meanwhile, natural or environmental forces accounted for only 5% of incidents. Other categories and their associated percentages are seen in the table below.

TABLE 2

Distribution of incidents on the Trans-Nord Pipeline 2008-2017 according to categories used by the NEB to describe the “causes”.

Categories describing “why it happened”	% of Trans-Nord pipeline incidents*
“Engineering and planning”	70
“Maintenance”	23
“Human factors”	12.5
“Standards and procedures”	9
“Failure in communication”	9
“Tools and equipment”	7
“Natural or environmental forces”	5
“Inadequate supervision”	2
“Inadequate procurement”	2
“To be determined”	14

* Categories are not unique. Often, more than one category is used to describe the same incident.

57 Column T in the NEB dataset. *Supra note 9.*

As we can see from this table, very few of the circumstances involved in Trans-Nord incidents reported to the NEB from 2008 to 2017 would appear to be outside company control or responsibility.

The TSB data on the type of incident or accident⁵⁸ is somewhat less helpful since over half of the Trans-Nord incidents fall into a catch-all category labelled “Other”. For the remainder of the incidents, the TSB data show that about 25% of Trans-Nord pipeline incidents involved disturbances of the supporting environment, 14% involved a spill, 7% involved third-party damage and 2% involved a fire.

75% of incidents on the Trans-Nord pipeline involved the pipeline directly, rather than other components

With respect to the pipeline system components involved in incidents, both federal datasets show clearly that **more incidents happened on the pipeline itself than on other components, like pump or meter stations, valves, or other equipment.**

The NEB data indicates that **36% of Trans-Nord incidents specifically involved problems with the pipe body. This was vastly higher than incidents at pump or meter stations (5%) or valves (5%).** Unfortunately, however, the component information in the NEB data is incomplete: no data was provided about components affected in over half of the Trans-Nord pipeline incidents reported in the NEB dataset.

The TSB dataset, by contrast, contains no missing data for components involved in the incidents, and as such it provides a helpful check on the NEB data. **According to the TSB data, 75% of incidents on the Trans-Nord pipeline involved the pipeline directly, rather than other components.** This compares with approximately 14% for incidents on valves or other equipment (e.g., gaskets, capacitor), and 11% for incidents at pump or meter stations.

NEB data indicates that widely-touted SCADA technology detected only 39% of Trans-Nord spills and incidents. TSB data indicates a 49% detection rate for SCADA.

Data on how spills and other pipeline problems are first detected, available in both the NEB and TSB datasets, reveals that automated detection technology plays a minor role. The widely-touted **SCADA (Supervisory Control and Data Acquisition) technology detected spills and other incidents in only 39% of Trans-Nord pipeline incidents in the NEB data, and 49% of such incidents in the TSB data.** These percentages are lower than one might imagine from claims often seen in relation to SCADA and other automated incident detection and monitoring methods.⁵⁹

Beyond the SCADA method, the NEB and TSB categories for describing incident detection are not directly comparable. Nonetheless, both datasets show that for Trans-Nord incidents, most incidents were detected by people on the ground, either by employees or contractors on site, by inspectors, those doing right-of-way surveillance, or by the public. The table in **Table 3**, below, sums up these findings.

58 Column “ACC_INC_TYPE” in the TSB dataset. *Supra* note 21.

59 See e.g., Trans-Northern Pipelines Inc., “Our Commitment”, undated, describing “state of the art” equipment used to monitor their pipelines. Available at <http://tnpi.ca/our-commitment/>.

TABLE 3

Table of detection method for Trans-Nord pipeline incidents 2004 – 2017 (by dataset)

Detection method (categories differ by dataset, except for SCADA)	NEB dataset % incidents detected	TSB dataset % incidents detected
SCADA	39	49
“Other control system” (non-SCADA)	5	Not avail.
“Employees and contractors”	25	Not avail.
“Pipeline Employee”	Not avail.	26
“Public”	3.5	Not avail.
“Outside party”	Not avail.	14
“Inspections and site visits”	23	Not avail.
“Right-of-Way surveillance”	Not avail.	9
“Other method”	Not avail.	2
“Unknown”	3.5	Not avail.

Finally, the NEB data⁶⁰ reveal disturbing and inexcusable time lags between occurrence or discovery and reporting of Trans-Nord incidents. Across all types of incidents (spills and other), the NEB data show only a handful of Trans-Nord incidents (7 of 56) whose “reported date”⁶¹ is the same as either the “occurrence date” or “discovered date”.⁶² **Much more alarming, however, is that the time lags between occurrence/discovery and reporting of Trans-Nord pipeline incidents range from one day to weeks, months and even years.** While it may be the case that company response to incidents begins to occur at the date of discovery, which is typically but not always the same as the date of occurrence, **a serious problem exists when incidents are not being reported in the NEB dataset for long periods of time after occurrence or discovery because extreme time lags impugn the reliability and credibility of that dataset for purposes of monitoring and regulating pipeline safety.** Of the 56 incidents reported in the NEB dataset:⁶³

... disturbing and inexcusable time lags between occurrence or discovery and reporting of Trans-Nord incidents.

- **8 incidents had lags between 1 and 3 weeks long for occurrence vs. reporting,**
- **6 incidents had lags between 1 and 10 months long, and**
- **6 incidents had lags between 1 and 8 years long.**

60 Only the NEB data provides the dates of discovery, reporting, and occurrence (although occurrence dates are sometimes missing). The TSB data, by contrast, includes only the date of occurrence.

61 Column C in NEB Incident data. *Supra* note 9. The NEB’s “Incident Data: Methodology” document states that “Reported date/year” in its data indicates the date the company reported the incident to the NEB. Page 4 of the document. Available at https://apps2.neb-one.gc.ca/pipeline-incidents/data/Incident%20Data%20Methodology_EN.pdf.

62 Column O for “Occurrence data and time” and Column P for “Discovery date and time” in the NEB incident data. *Supra* note 9.

63 As explained in the Section B of this report, this number does not represent the full number of incidents for Trans-Nord because the NEB dataset does not contain all Trans-Nord incidents. The total, again, across both NEB and TSB datasets, with duplicate events eliminated, is 79 incidents.

Extreme delays also appear, in some cases, between the date of occurrence and the date of discovery:

- **1 incident had a lag of 1 week between occurrence and discovery**
- **5 incidents had lags of between 4 and 10 months between occurrence and discovery, and**
- **9 incidents had lags of between 1 and 2 and a half years.**

It strains credulity to accept that there could be any legitimate excuses for delays as long as these.

Enbridge Line 9

Enbridge's Line 9 is a crude oil pipeline that has been transporting oil from Ontario to Québec since December 2015, when the company reversed the direction of its flow.⁶⁴ The 832 km pipeline begins in Sarnia, Ontario, here it receives crude oil supplied mainly from Western Canada⁶⁵ via Enbridge's Line 5 and Line 78⁶⁶, and terminates in Montréal, where the crude is refined (**see Figure 4**, below). Line 9 has a capacity of 300,000 barrels per day following an increase in capacity implemented at the same time that the eastern-most segment, referred to as Line 9B, was reversed.⁶⁷ While this 30-inch pipeline⁶⁸ currently carries "mainly light crude", it "is capable of transporting heavy crudes".⁶⁹

FIGURE 4

Map of Enbridge Line 9⁷⁰



64 National Energy Board, "Pipeline Profiles: Enbridge Mainline". Undated. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/pplnprt/pplnprfls/crdl/nbrdgmnl-eng.html>.

65 Line 9 can also deliver crude from the U.S. Bakken region. Enbridge, "Line 9B Reversal and Line 9 Capacity Expansion Project". Undated. Available at: <http://www.enbridge.com/ECRAI.aspx>.

66 Enbridge, "Pipeline System Configuration, Q1, 2018". Undated. Available at: <https://www.enbridge.com/~media/Enb/Documents/Infographics/ENB%20Mainline%20Pipeline%20System.pdf>; See also: NEB, Enbridge Pipelines Inc. - Line 9B Reversal and Line 9 Capacity Expansion Project - OH-002-2013, File OF-Fac-Oil-E101-2012-10 02, Enbridge Response to Marathon Petroleum Trading Canada LLC, Information Request No. 1, at page 2, responding that "Line 5 and Line 6B have the ability to supply crude oil to be transported" by Line 9B. Available at: <https://docs.neb-one.gc.ca/l-eng/llisapi.dll/open/964924>.

67 National Energy Board, Enbridge Pipelines Inc. - Line 9B Reversal and Line 9 Capacity Expansion Project - OH-002-2013. Undated. Available at: <https://www.neb-one.gc.ca/pp/ctnflng/mjrpp/l9brvrsl/index-eng.html>.

68 Enbridge, "Pipeline System Configuration, Q1, 2018". Undated. Available at: <https://www.enbridge.com/~media/Enb/Documents/Infographics/ENB%20Mainline%20Pipeline%20System.pdf>.

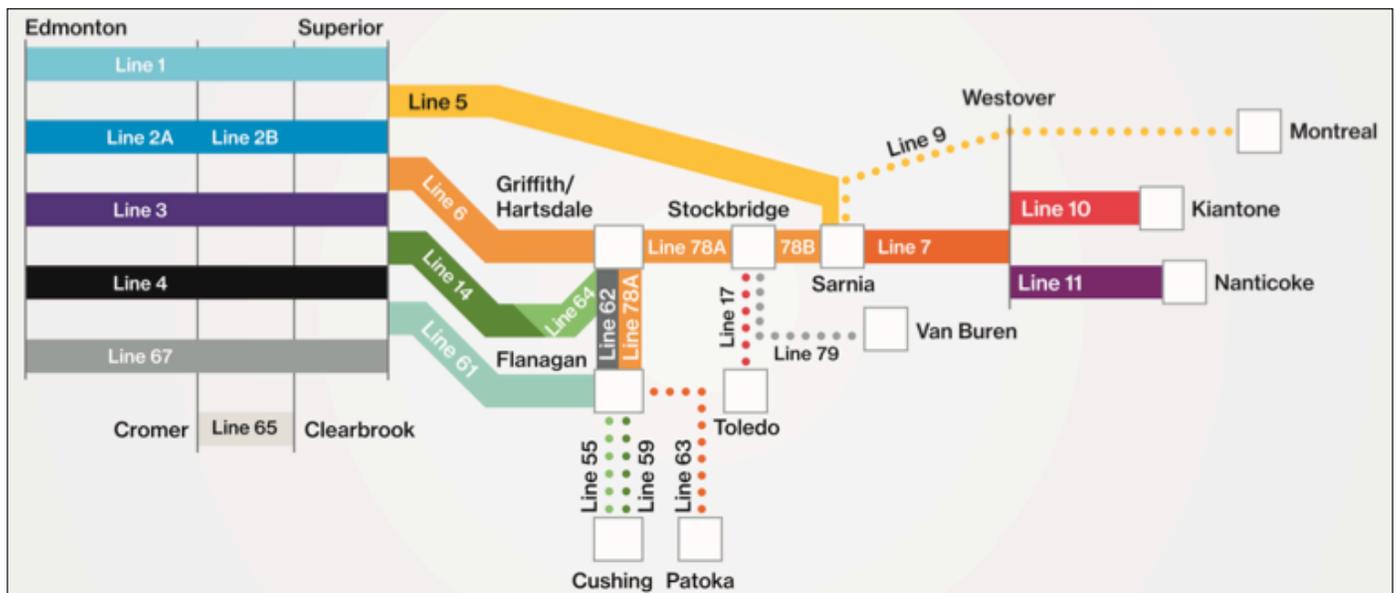
69 Enbridge, "Line 9B Reversal and Line 9 Capacity Expansion Project". Undated. Available at: <http://www.enbridge.com/ECRAI.aspx>.

70 Enbridge, "Line 9B Reversal and Line 9 Capacity Expansion Project". Undated. Available at: <http://www.enbridge.com/~media/Enb/Documents/Projects/Line9/Line%209%20Projects%20map%20FINAL%20Dec%2018%202012.pdf?la=en>.

Line 9 is over 40 years old,⁷¹ and it crosses or passes near to many waterbodies and sensitive areas in Ontario and Québec, including a crossing under the Ottawa River on the Québec side of the border between the two provinces. (See Figure 5, below).

FIGURE 5

System diagram (2018) showing flow to Line 9 from Enbridge's Canadian and U.S. pipelines⁷²



During NEB hearing on the Line 9B Reversal and Capacity Expansion Project in 2013, an engineering analysis conducted by one expert indicated that “Line 9B is situated in significant high consequence areas”.⁷³ Due to its proximity to large populations and sensitive waterways and wetlands, a spill from the pipeline would be disastrous. An analysis made by the same engineer of the pipeline’s condition and how it would behave following flow reversal with new and heavier types of crude oil led him to state: “I must conclude there is a high risk that Line 9 will rupture...” due to corrosion and other integrity-related problems, and “that Enbridge’s IM approach, which relies on ILI and related engineering assessments, will not prevent rupture under the operating conditions resulting from the implementation of the Project.”⁷⁴ (emphasis in original; “IM” refers to Integrity Management; “ILI” refers to in-line inspection.)

Other risk factors identified in the context of the same analysis included an inadequate system for detecting leaks and ruptures, inadequate emergency response plans and response times for high consequence events, an over-reliance on inline inspection and its resistance to hydrotesting, a failure to heed key integrity management recommendations of the U.S. National Transportation Safety Board following the catastrophic July 2010 rupture of an Enbridge pipeline in Michigan, as well as deficiencies in the pipeline company’s management and safety culture.⁷⁵

⁷¹ Line 9 has been in operation since 1976, approximately 42 years ago. It is not known exactly how much of the current pipeline has been replaced over the years.

⁷² Enbridge, “Pipeline System Configuration, Q1, 2018”. Undated. Available at: <https://www.enbridge.com/-/media/Enb/Documents/Infographics/ENB%20Mainline%20Pipeline%20System.pdf>. Note that Line 78A and 78B in this diagram were formerly referred to as “Line 6B”, the pipeline that suffered a catastrophic spill into the Kalamazoo River in Michigan in July 2010. Line 6B was renamed after the spill.

⁷³ Accufacts Inc. “Report on Pipeline Safety for Enbridge’s Line 9B Application to NEB”, August 5, 2013. Conclusion 9, page 26. Available at: <https://docs.neb-one.gc.ca/ll-eng/llisapi.dll/fetch/2000/90464/90552/92263/790736/890819/956564/956632/981386/C13-6-3 - Attachment B- ACCUFACTS PIPELINE SAFETY REPORT.2013.08.05 - A3J7T4.pdf?nodeid=981150&vernum=1>.

⁷⁴ *Ibid.* Page 28.

⁷⁵ Written Expert Evidence of Ian Goodman and Brigid Rowan on behalf of Équiterre (Coalition), Line 9B Reversal and Line 9 Capacity Expansion Project Application, OH-002-2013. August 8, 2013. Pages 12-12. Available at: <https://apps.neb-one.gc.ca/REGDOCS/File/Download/985663>.

Enbridge Line 9 Incident Track Record

The concerns about potential ruptures and other safety issues on Line 9 mentioned above were primarily prospective, having been made prior to the commencement of operations for Enbridge's Line 9B Reversal and Line 9 Capacity Expansion project in December 2015. A look at Line 9's general track record, as evidenced by federal government data, does nothing to allay concerns about the future performance of this pipeline.

Combining the information from both the NEB⁷⁶ and TSB⁷⁷ datasets, and removing duplicate events, there were **21 pipeline incidents reported on Enbridge Line 9 from January 2004 to December 2017** (Québec and Ontario combined). Of these, **62%, (13 incidents) involved spills**, while the remainder involved problems with valves and other equipment, disturbance of the supporting environment (including an exposure of pipe in a water body), and two fires (both in Québec).

Only 5 of the 21 incidents involving Line 9 appear in the NEB dataset, compared to 18 in the TSB dataset, which is concerning. As such the TSB data provide more complete information about the circumstances behind the Line 9 incidents, with the exception of the three incidents that appear only in the NEB dataset. **Based on the TSB data, we see that most incidents occurred on the pipeline, rather than on other components.** Specifically, for the 18 incidents tracked by the TSB, 11 indicated occurrence on the "transmission line" (although a few involved valves rather than the pipe body itself), while only 3 occurred at pumping stations, and 4 occurred at Enbridge terminals for Line 9.

For those incidents involving spills, the **total reported volume for spills on Enbridge Line 9 between January 2004 and December 2017 was 8.8 m³**, equivalent to about **55 barrels of crude oil**. This figure, however, may be lower than it should be because volumes were reported for only 3 of the 13 spills. Furthermore, the lack of volume information cannot be attributed solely to differences in the reporting rules between the NEB and TSB datasets. Four spills in the TSB dataset provided no volume details (those spills did not appear in the NEB dataset because they occurred prior to 2008), yet as explained above, the TSB had no minimum volume threshold in place prior to 2014.

In terms of method of discovery and detection, the combined NEB and TSB data indicates that **16 of 21 (76%) of the Line 9 incidents from 2004 to 2017 were discovered by pipeline employees or contractors on-site**. Again, the frequent pipeline industry claim that "state of the art" electronic equipment will successfully detect most pipeline spills falls flat in the face of data from operating pipelines. For Line 9, **SCADA detected only 2 of the 21 incidents found in the combined NEB and TSB data, and this is alarming considering that 13 (62%) of all 21 incidents involved spills**. The discovery of pipeline problems by right-of-way surveillance or an outside party happened in only 3 of the 18 incidents presented in the TSB data. **With respect to reporting time lags, the NEB data showed none for Line 9 spills**. There was, however, a two-day lag involving a May 30, 2014 fire reported somewhere on the Line 9 pipeline system in Saint-André-Est, Québec.

Portland-Montreal Pipeline

The Portland-Montréal pipeline ("PMPL") transports crude oil from a location near Portland, Maine to the Suncor refinery as well as an Enbridge terminal in Montréal. It is owned by Pipe-Lines Montréal Limitée (Montréal Pipe Lines Ltd.), and by a subsidiary of that company called the "Portland Pipe Line Corporation" located in the U.S. The Canadian company is, in turn, controlled by Imperial Oil Limited, Suncor Energy and

⁷⁶ *Supra note 9.*

⁷⁷ *Supra note 21.*

Shell Canada Limited.⁷⁸ The oil transported on the PMPL is primarily crude oil that arrives in South Portland by tanker from overseas. The 380 km pipeline crosses southern Maine, New Hampshire and Vermont before entering Canada in the province of Québec (**See Figure 6**, below). From there, the pipeline crosses agricultural, recreational and tourist areas on its way to Montréal. The PMPL is actually comprised of three pipelines located in the same right-of-way, but only the largest of the three, a 24-inch line, is still operational⁷⁹, although flows have been reduced to a trickle in recent years. Although the 24-inch line has a capacity of 410,000 barrels per day,⁸⁰ the pipeline averaged only 60,800 barrels per day in 2015.⁸¹

The primary reason for the pipeline's low and somewhat intermittent flow is that the demand in Montréal for imported crude from this line largely disappeared after the reversed Enbridge Line 9B began shipping crude oil from Western Canada in December 2015.⁸² According to the NEB, "in 2016, deliveries of imported and eastern Canadian crude oil on the Portland-Montreal pipeline fell to an average 22 Mb/d, approximately 8% of its capacity."⁸³ Occasionally, the pipeline is used for higher volumes, such as during the 2016 Alberta wildfires that disrupted deliveries of Canadian crude to Montréal on Enbridge's pipeline system, but apart from events such as that, utilization of the line is extremely low.⁸⁴

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- 78 Registraire des entreprises du Québec. Entry for "Les Pipe-Lines Montréal Limitée". Available at: https://www.registreentreprises.gouv.qc.ca/ROAnonymeGR/GR/GR03/GR03A2_19A_PIU_RechEnt_PC/PageEtatRens.aspx?T1_JetonStatic=58d41f6b-ad17-4372-884e-1a833331c96a&T1_CodeService=S00436. As mentioned in the description of the Trans-Nord pipeline in Section C of this report, Imperial Oil Limited is 69.6 percent-owned by ExxonMobil.
- 79 National Energy Board, "Canada's Pipeline Transportation System 2016 - Montreal Pipe Line Limited's Montreal Pipe Line". Undated. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/trnsprttn/2016/grp2cmpns/lnldqds/mntrl-pp-ln-lmtd-mntrl-pp-ln-eng.html>.
- 80 *Portland Pipe Line Corporation et al. v. City of South Portland et al.*, U.S. District Court, District of Maine, Order on Motions for Summary Judgment. Page 8. December 29, 2017. Available at: https://www.gpo.gov/fdsys/pkg/USCOURTS-med-2_15-cv-00054/pdf/USCOURTS-med-2_15-cv-00054-9.pdf.
- 81 Platts, "Maine reports halt of crude shipments on Portland-Montreal line in January". March 7, 2016. Available at: <https://www.platts.com/latest-news/oil/houston/maine-reports-halt-of-crude-shipments-on-portland-21055853>.
- 82 Platts, "Maine reports halt of crude shipments on Portland-Montreal line in January". March 7, 2016. Available at: <https://www.platts.com/latest-news/oil/houston/maine-reports-halt-of-crude-shipments-on-portland-21055853>.
- 83 National Energy Board, "Provincial and Territorial Energy Profiles - Quebec". Undated. Available at <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmpflis/qc-eng.html#s2>.
- 84 Dan MacLeod, "Oil flowed from South Portland again this summer. But it probably won't last". Bangor Daily News - Portland. August 25, 2016. Available at: <http://portland.bangordailynews.com/2016/08/25/news/oil-flowed-from-south-portland-again-this-summer-but-it-probably-wont-last/>.

FIGURE 6

Map of Portland-Montreal pipeline route showing international border crossing⁸⁵



Despite greatly reduced demand in Montréal and resulting low flows, the company insists that the pipeline is still operating⁸⁶ but seeks to keep its options open for reversing the direction of the flow in order to move Canadian crude south to Portland, where it would be shipped to refineries on the U.S. East and Gulf coasts, and potentially overseas. In fact, Portland Pipe Line Corporation (a wholly owned, Maine-based subsidiary of Montreal Pipe Line Limited, a Québec based company),⁸⁷ has been fighting to preserve this potential project in U.S. federal court following a ban implemented by the local municipality that bars the loading of crude oil onto ships in Casco Bay, due to air quality concerns.⁸⁸ The ultimate outcome of the case is still pending.⁸⁹

Portland-Montreal Pipe Line Incident Track Record

The PMPL is a very old pipeline system, in operation since about 1941.⁹⁰ This does not bode well for reviving its currently dormant 18-inch line for the purpose of shipping heavy and light crude oil south to Portland from Montréal, the project that is the subject of litigation.⁹¹ The 18-inch line was constructed in 1950 and has a capacity of 192,000 barrels per day.⁹² Because pipelines are not intended to operate forever, it is highly

85 National Energy Board, "Canada's Pipeline Transportation System 2016 - Montreal Pipe Line Limited's Montreal Pipe Line". Undated. Available at: <https://www.neb-one.gc.ca/nrg/ntgrtd/trnsprttn/2016/grp2cmpns/lnldqds/mntrl-pp-ln-lmtd-mntrl-pp-ln-eng.html>.

86 *Portland Pipe Line Corporation et al. v. City of South Portland et al.*, U.S. District Court, District of Maine, Order on Motions for Summary Judgment. Page 91. December 29, 2017. Available at: https://www.gpo.gov/fdsys/pkg/USCOURTS-med-2_15-cv-00054/pdf/USCOURTS-med-2_15-cv-00054-9.pdf.

87 *Ibid.* Page 6.

88 *Ibid.* Page 1.

89 Sabrina Shankman, "Maine Town Wins Round in Tar Sands Oil Battle with Industry". InsideClimate News. January 5, 2018. Available at: <https://insideclimatenews.org/news/05012018/south-portland-maine-oil-sands-pipeline-local-control-environmentalists>.

90 Portland Pipe Line Corporation/Montreal Pipe Line Limited, "About us". Undated. Available at: <http://www.pmpl.com/about-us/>.

91 *Portland Pipe Line Corporation et al. v. City of South Portland et al.*, U.S. District Court, District of Maine. Order on Defendants' Motion to Dismiss. February 11, 2016. Page 4. Available at: https://www.gpo.gov/fdsys/pkg/USCOURTS-med-2_15-cv-00054/pdf/USCOURTS-med-2_15-cv-00054-0.pdf.

92 *Portland Pipe Line Corporation et al. v. City of South Portland et al.*, U.S. District Court, District of Maine, Order on Motions for Summary Judgment. Page 8. December 29, 2017. Available at: https://www.gpo.gov/fdsys/pkg/USCOURTS-med-2_15-cv-00054/pdf/USCOURTS-med-2_15-cv-00054-9.pdf.

unreasonable to think that the relatively low level of incidents experienced on this pipeline to date will continue on a pipeline system well beyond the half-century mark.

With respect to the pipeline's track record on the Canadian side of the border, the TSB dataset contains **three incidents reported for the PMPL**, one each in years 2004, 2005 and 2014. **Both the 2004 and 2005 incidents involved spills, but no spill volumes were provided in the data.** The 2014 incident involved third-party damage but the data indicates that no spill occurred. **The NEB dataset contains none of these incidents.** Two occurred prior to 2008, the first year for data in the NEB dataset. As for the 2014 incident reported by TSB, however, it is possible that the incident did not meet the NEB's reporting criteria, but the record is unclear on this.

The TSB data for these spills indicates that one involved a valve malfunction on the 24-inch line, one involved third-party damage to the pipe itself on the 24-inch line, and one involved a spill at Tank 33 at the company's Montréal East Terminal, but again, no spill amount was provided. All three incidents were detected by pipeline employees.

While an assessment of PMPL pipeline incident data on the U.S. side of the border was not systematically conducted for purposes of this report, it is worth noting that news reports mention two significant spills. *The Lewiston Daily Sun*, on July 18, 1960, described a spill in western Maine that company employees estimated as involving approximately 1,000 barrels of crude oil.⁹³ The article states:

A break in the Portland Pipe Line a short distance from the pumping station at North Waterford made that area of Waterford a potential powder keg early Sunday morning. The pipe carrying crude oil broke on the hill above Waterford pumping station and a brook of oil came rushing down the hillside and across the highway and into a small brook where it put an eight-inch coating of oil over the water.⁹⁴

Another major spill on the PMPL, this time in northern Vermont near the Québec border, was described in a local Québec newspaper article in 1977, but few details are provided about the spill. The article states: "A break in the Portland-Montreal Pipeline poured hundreds of gallons of crude oil into Ware Brook, where it passed into Black River, eventually to flow into Lake Memphremagog..."⁹⁵

The news reports do not indicate which of the PMPL's three lines may have been involved in the 1960 and 1977 spills in the U.S. They may have occurred on either the original 12-inch line, which was retired in 1984,⁹⁶ or they may have occurred on the same 18-inch line discussed in connection with the flow reversal project now being litigated. At the time of the spill in 1960, that line was only 10 years old. It is now 68 years old.⁹⁷ There have also been several very small spills on the pipeline on the U.S. side, in Maine and in New Hampshire, in more recent years.⁹⁸

93 Lewiston Daily Sun, "Oil Pipeline Breaks at North Waterford". July 18, 1960. Page 6. Available at: <https://news.google.com/newspapers?nid=IT5EXw6i2GUC&date=19600718&printsec=frontpage&hl=en>.

94 *Ibid.*

95 The Stanstead Journal, "Portland-Montreal Pipeline Break". March 3, 1977. Page 4. Available at: <https://news.google.com/newspapers?id=LYlvAAAAIIBAJ&sjid=SkkDAAAABAJ&pg=6276,1399048&dq=portland+montreal+pipeline+break&hl=en>.

96 Portland Pipe Line Corporation/Montreal Pipe Line Limited, "Neighbor's Guide". Undated. Available at: <http://www.pmpl.com/community/>.

97 Tux Turkel, "Maine pipeline has good safety record". Portland Press Herald. June 17, 2012. Available at: https://www.pressherald.com/2012/06/17/maine-pipeline-has-good-safety-record_2012-06-17/.

98 *Ibid.*

Pipeline Saint-Laurent

The Pipeline Saint-Laurent, owned and operated by Valero, transports refined petroleum products 243 km⁹⁹ from Valero's refinery in Lévis, Québec to its distribution terminal in Montréal East.¹⁰⁰ The pipeline has a capacity of 100,000 barrels per day,¹⁰¹ and is the newest of the Québec's oil pipelines: it began sending gasoline, diesel, heating oil and jet fuel to Montréal in 2012.¹⁰² From the distribution terminal in Montréal East, the refined products that arrive on the Pipeline Saint-Laurent are distributed to the Montréal Metropolitan Region, Western Québec, Ontario and the northeastern U.S.¹⁰³ The Pipeline Saint-Laurent is 16 inches in diameter and crosses many local and regional municipalities along its route, which according to the company, "basically follows Hydro-Québec high tension lines between Lévis and Boucherville."¹⁰⁴

The pipeline's close proximity to high-voltage electrical transmission lines has been raised as a cause for some signs of premature corrosion on this relatively young pipeline. According to an investigative report by *Le Devoir*, the first signs of corrosion were detected only about 9 months after the pipeline commenced operations in 2012.¹⁰⁵ Beginning in 2016, the company conducted excavation work on certain sections of the pipeline near the Hydro-Québec line, in order to carry out what the company describes as preventative work aimed at increasing the level of cathodic protection to the pipe.¹⁰⁶ As Valero has explained, the corrosion was mainly due to the presence of electricity towers as well as wetlands near the pipeline.¹⁰⁷

Pipeline Saint-Laurent Incident Track Record

Since this pipeline runs entirely within Québec's borders, it is regulated by the Government of Québec, primarily through the MDDELCC. As such, spills and incidents on this pipeline would not appear in the NEB and TSB datasets concerned with federally-regulated pipelines. As previously explained, Québec's incident reporting system includes a single registry of spills of all types of hazardous liquids, including petroleum spills, as well as gases and solids, but only those spills and releases for which Québec's Urgence-Environnement agency intervenes with technical assistance during spill response and handling. Hence, when a spill of a refined petroleum product or other incident occurs on Valero's Pipeline Saint-Laurent, it should appear in the *Registre des interventions d'Urgence-Environnement*.¹⁰⁸ At the time of writing of this report, there appear¹⁰⁹ to be no spills or incidents recorded in the Registry for this pipeline.

A number of spills and incidents do, however, appear in the Registry in connection with Valero's *refinery*, which is the source of the refined product transported on the Pipeline Saint-Laurent.¹¹⁰ Furthermore, Énergie Valero Inc. failed to comply with MDDELCC directives in 2008 requiring rehabilitation and monitoring work following damage caused to fish habitat in a creek located on land belonging to Agriculture and Agri-Food Canada, and

99 Ultramar, (Communiqué de Presse) "Fin des travaux de construction et mise en service du Pipeline Saint-Laurent". November 19, 2012. Available at: http://www.aiem.qc.ca/images/files/Archives/Communiqués/2012/2012_11_19_Comm_Ultramar.pdf.

100 National Energy Board, "Provincial and Territorial Energy Profiles – Quebec". Undated. Available at <https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/qc-eng.html#s2>.

101 *Ibid.*

102 Valero, "Pipeline Saint-Laurent". Undated. Available at: <https://www.energievalero.ca/en-ca/Operations/PipelineSaint-Laurent>.

103 *Ibid.*

104 Valero, "Route". Undated. Available at: <https://www.energievalero.ca/en-ca/Operations/PipelineSaint-Laurent/Route>.

105 Alexandre Shields, "Réparations forcées sur l'oléoduc Saint-Laurent." *Le Devoir*. October 15, 2016. Available at: <https://www.ledevoir.com/societe/environnement/482289/energie-valero-forcee-d-effectuer-de-nouvelles-reparations-sur-son-pipeline-saint-laurent>.

106 *Ibid.*

107 Julien Arsenault, "Pipeline Saint-Laurent: Valero souhaite accélérer le processus administratif". *La Presse canadienne*, reported in *Le Devoir*. April 7, 2015. Available at: <https://www.ledevoir.com/societe/environnement/436551/pipeline-saint-laurent-valero-souhaite-acceler-le-processus-administratif>.

108 MDDELCC, *Registre des interventions d'Urgence-Environnement*. Available at: http://www.mddelcc.gouv.qc.ca/ministere/urgence_environnement/index.asp.

109 Caveat: In light of the fact that, as previously explained, company-specific searches are not possible in the Registry dataset, nor general searches for "pipeline spills" or "pipeline incidents", this is a preliminary statement, made on the basis of "eyeballing" the data for petroleum spills for the regions through which the Pipeline Saint-Laurent passes.

110 MDDELCC, *Registre des interventions d'Urgence-Environnement, Région Chaudière-Appalaches*. Available at: http://www.mddelcc.gouv.qc.ca/ministere/urgence_environnement/resultats_region.asp.

were ultimately fined \$500,000 for violation of the federal *Fisheries Act*.¹¹¹ It is important to note that the spill, involving 200,000 litres of heavy fuel oil, was discharged from a pipeline belonging to Ultramar Ltd., the former owner of the company.¹¹² The faulty pipeline, however, was not the Pipeline Saint-Laurent, which was built four years after the incident, but rather another line connected to the refinery.

Concluding Observations on the Safety Track Records of Oil Pipelines in Québec

The overall record for Québec's oil pipelines is worrisome and is summarized in **Table 4** below. From 2004 to 2017 (understanding that some 2017 incidents have yet to be reported), Québec experienced over 100 pipeline safety incidents. Over 20% involved spills of either refined petroleum products or crude oil and the total volume spilled amounted to nearly 1,000 barrels. The spill figures alone, however, tell only part of the story. Other types of reportable incidents, such as pipeline pressure problems, exposed pipe in water bodies or operating pipelines beyond design limits, can create future problems and potential risks for people and the environment.

TABLE 4

Summary of Pipeline Oil Spills in Quebec 2004 - 2017

Oil Pipeline Name	No. of Total Incidents (including spills)	No. of Spills	Known Spill Volumes (in barrels)
Trans-Nord pipeline	79	8	932
Enbridge Line 9	21	13	55
Portland-Montreal pipeline	3	2	Unknown
Pipeline Saint-Laurent	0	0	0
TOTALS	103	23	987

The analysis and findings presented in this report strongly challenge the picture of pipeline safety as often portrayed by federal and local governments, by industry and in the mainstream media. These findings, based largely upon our analysis of government data for 2004-2017 for Québec oil pipelines, are summarized below:

- Most oil pipeline incidents in Québec have occurred on pipelines themselves rather than on other components in the pipeline system, such as pump stations and terminals.
- Most oil pipeline incidents in Québec are discovered by human beings rather than by technology. Most often, it is pipeline company employees or contractors on site who detect incidents.

The analysis and findings presented in this report strongly challenge the picture of pipeline safety as often portrayed by federal and local governments, by industry and in the mainstream media.

111 Government of Canada. Environmental Offenders Registry, Énergie Valero Inc. conviction dated February 24, 2017 (noting that the original offence occurred in 2008). Available at: <https://protection-environnementale.canada.ca/registre-contrevenants/Record?RefNumber=57>.

112 *Ibid.*

- The widely-touted SCADA system of remote monitoring detected only a very small proportion of pipeline spills and other incidents.
- Crude oil and refined petroleum product spills make up only about 22% of all the oil pipeline incidents occurring in Québec since 2004, but the remaining incidents often involve serious situations that could potentially put the safety of Québec's communities or the environment at risk, and perhaps lead to spills in the future.
- Trans-Nord is by far the largest source of pipeline safety incidents to date in Québec, and the problems are getting worse rather than better – much worse, with incidents in 2017 far outstripping incidents that have happened in previous years. As well, the Trans-Nord pipeline has seen lags of not only days and weeks, but months and even years between the occurrence of problems and reporting of problems to the regulator, the NEB.

D. PIPELINE SAFETY ENFORCEMENT TOOLS AND THE EFFECTIVENESS GAP

Given the disturbing fact that oil pipeline incidents in Canada are rising, not declining, it is both fair and essential to ask why this is so. Worrisome trends of continuing and even increasing pipeline safety incidents beg the question whether federal and provincial enforcement mechanisms are doing what they are supposed to do: enforce compliance with government laws and regulations on pipeline safety.

The fundamental purpose underlying enforcement in relation to pipeline safety is to obtain compliance by companies constructing, operating and even abandoning pipelines, although it may also serve as a deterrent. At the federal level, the NEB's guiding enforcement policy statement declares that "The NEB will enforce regulatory requirements to obtain compliance, deter future non-compliance, and prevent harm by using the most appropriate tool or tools available."¹¹³

Although compliance measures such as inspections, audits, and compliance meetings obviously play an important role in pipeline safety,¹¹⁴ the present discussion is limited to an overview of those enforcement mechanisms typically used to address pipeline non-compliance, and the extent to which they are being used in relation to problems on Québec's oil pipelines.¹¹⁵ Examination of the various compliance tools used by the federal and provincial governments is outside the scope of the present report.¹¹⁶

To enforce compliance with pipeline safety laws and regulations and reprimand non-compliance, governments have a variety of tools at their disposal, such as warning letters, compliance orders related to safety or environmental protection, administrative penalties, and even prosecution. Here, we will briefly summarize the key enforcement mechanisms commonly employed by the federal government and the government of Québec to force companies operating pipelines in Québec to comply with the applicable safety laws and regulations.

Federal Enforcement Mechanisms

Administrative Monetary Penalties (AMPs) were established at the federal level following the 2012 amendments to the *National Energy Board Act*.¹¹⁷ AMPs are authorized under sections 134 to 154 of the Act and governed also by the *Administrative Monetary Penalties Regulations*¹¹⁸, in force since July 2013. The regulations, in Schedule 1, provide a list of each provision of the NEB Act or its regulations, including the *National Energy Board Onshore Pipeline Regulations*¹¹⁹ that may serve as the basis for an AMP when violations occur.¹²⁰ Violations for which AMPs may be imposed cover all phases of a project's lifecycle and include, for example, constructing a

113 NEB, *Administrative Monetary Penalties Process Guide*. 2015. Page 2. Available at: <https://www.neb-one.gc.ca/bts/ctr/gnmb/dmnstrvmntrypnlt/dmnstrvmntrypnltprcssgd-eng.pdf>.

114 See e.g., NEB, "NEB's Regulatory Framework". Undated. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/prctctng/index-eng.html>.

115 Caveat: this section is, in no way, intended to represent the full panoply of enforcement tools available for federally-regulated or provincially-regulated pipelines. The focus is on tools typically used for pipeline non-compliance.

116 For compliance activities carried out by the NEB, inspections and audits play a large role. Inspections are generally focused on a specific pipeline at a particular point in time, while audits involve longer term examinations of company programs, such as the general audit of Enbridge's pipelines presented in the *National Energy Board Onshore Pipeline Regulations (OPR) Final Audit Report of the Enbridge Pipelines Inc.* (File Number OF-Surv-OpAud-E101-2014-2015 03, March 31, 2015. Investigations carried out by the Transportation Safety Board represent another tool aimed at compliance. These investigations generally result in reports posted online by the TSB, and reports are available dating back to 1994. See: TSB. "Pipeline Investigation Reports". Undated. Available at: <http://www.tsb.gc.ca/eng/rapports-reports/pipeline/index.asp>.

117 NEB, *Administrative Monetary Penalties Process Guide*. 2015. Page 1. Available at: <https://www.neb-one.gc.ca/bts/ctr/gnmb/dmnstrvmntrypnlt/dmnstrvmntrypnltprcssgd-eng.pdf>.

118 Government of Canada. *Administrative Monetary Penalties Regulations (National Energy Board)*. Consolidated Regulations SOR/2013-138. Available at: <http://laws-lois.justice.gc.ca/PDF/SOR-2013-138.pdf>

119 *National Energy Board Onshore Pipeline Regulations*, SOR/99-294. Available at: <http://canlii.ca/t/52rx5>

120 NEB, *Administrative Monetary Penalties Process Guide*. 2015. Page 4. Available at: <https://www.neb-one.gc.ca/bts/ctr/gnmb/dmnstrvmntrypnlt/dmnstrvmntrypnltprcssgd-eng.pdf>.

pipeline without a certificate, failure to perform pressure testing, non-compliance with conditions attached to project approval, and failure to ensure that a pipeline is designed, constructed, operated or abandoned as prescribed. The Administrative Monetary Penalties Process Guide further explains:

Contravention of an order or decision made under the NEB Act, as well as failure to comply with a term or condition of a certificate, licence, permit, leave or exemption granted under the NEB Act, is also designated as a violation subject to an AMP.¹²¹

Designated NEB staff members serve as AMP Officers under sub-section 135(b) of the NEB Act but must issue Notices of Violation (the first step in the AMP process) from the NEB's head office rather than in the field.¹²² Maximum daily penalties of \$25,000 for individuals and \$100,000 for other persons (e.g., companies), are set under sub-section 134(2) of the Act,¹²³ meaning that one incident could result in multiple violations if it stretches beyond a single day.

The impact of AMPs on enforcing compliance with pipeline safety laws and regulations has been limited by the relatively sparse use of this enforcement mechanism. Since 2013, the NEB's public, online AMP registry lists only 19 AMPs,¹²⁴ and one of these involved a violation at a gas plant. None of the 18 AMPs for pipeline violations involved incidents occurring on the pipelines that run through Québec.¹²⁵

The amounts of the penalties range from \$4,000 to \$100,000, but these amounts are sometimes lower than the amounts originally set by the AMP Officer. This is because a company that does not agree with the penalty amount indicated in the Notice of Violation may request a review of the penalty by designated members of the Board.¹²⁶ Thus, for example, when Enbridge received a Notice of Violation indicating a penalty of \$52,000 for a violation it committed on Line 4, it requested a review and, in the end, the NEB reduced the penalty to \$28,000.¹²⁷

The monetary penalties for AMPs are small because the NEB Act, in section 136(2), dictates that: "The purpose of the penalty is to promote compliance with this Act and not to punish." It may easily be argued, however, that the fines levied to date through federal AMPs are simply insufficiently high to deter violations. As Nathan Lemphers, former Senior Policy Analyst at the Pembina Institute, once said, "having low fines is actually a perverse incentive for continued non-compliance."¹²⁸ Consequently, penalty levels for AMPs that are abysmally small may, unfortunately, be part of the problem rather than the solution.

Board Enforcement Orders and Safety Orders issued by the NEB represent another enforcement tool available to the federal regulator. Through Board Orders, the NEB can require companies to address existing problems that pose risks to people or the environment, and it may even restrict operations.¹²⁹ Orders issued for the purpose of restricting operations (e.g., pipeline pressure reductions), are typically referred to as Safety

121 *Ibid.*

122 *Ibid.* Page 5.

123 *Ibid.* Page 6.

124 Government of Canada. "Administrative Monetary Penalty." Undated. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/rprts/dmnmntrypnlty/index-eng.html>.

125 *Ibid.* Enbridge received several AMPs, but none related to Line 9 in Québec.

126 NEB, Administrative Monetary Penalties Process Guide. 2015. Page 8. Available at: <https://www.neb-one.gc.ca/bts/ctrg/gnbn/dmnmntrypnlts/dmnmntrypnltsprcssgd-eng.pdf>.

127 Government of Canada. "National Energy Board issues enforcement decisions". (Media release). March 2, 2016. Available at: <https://www.canada.ca/en/national-energy-board/news/2016/03/national-energy-board-issues-enforcement-decisions.html>.

128 Jason Fekete, "Energy watchdog reveals penalties for environmental violations, but goal is 'not to punish'". Postmedia News. July 16, 2012. Available at: <http://www.canada.com/news/energy+watchdog+reveals+penalties+environmental+violations+goal+punish/6942556/story.html>.

129 NEB. "NEB's Regulatory Framework". Undated. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/prctcng/index-eng.html>.

Orders.¹³⁰ Board Orders are also used to order preventative actions, such as when it orders compliance with any conditions issued at the time of project approval. According to an online list of NEB Board Enforcement Orders and Letters issued since about 2011, Board Orders or Letters pertaining to compliance have been issued in fewer than 40 files (noting that a single file may involve multiple letters and/or orders).¹³¹

The effectiveness of Board Orders and Safety Orders seems limited, at least in certain cases. The Trans-Nord pipeline, for example, has received numerous safety orders from the National Energy Board since 2010, yet incidents have increased.¹³² In response to a rise in incidents in 2017, a total of 10 new Board Letters and Safety Orders were issued but it remains to be seen whether the new orders will yield better performance by Trans-Nord. Several Board Orders have been issued to Enbridge, involving system-wide safety issues, but no such orders have been issued in relation to Enbridge Line 9 or Montréal Pipelines Limited.¹³³

Inspection Officer Orders may be issued by NEB officers when they identify a safety or security hazard or a risk to property or the environment during the course of on-site inspections.¹³⁴ NEB inspectors may use such orders to require a company to take specific actions, or even to suspend work.¹³⁵ Taking Trans-Nord as an example, the effectiveness of Inspection Officer Orders for enforcing compliance seems weak. NEB records posted online concerning Inspection Officer Orders since 2012 indicate zero Inspection Officer Orders for Trans-Nord, which is surprising in light of all of its pipeline incident issues (summarized in Section C).¹³⁶ The only other Inspection Officer Order issued for a Québec pipeline was issued to Montréal Pipeline Limited, in 2002. In general, it appears that Inspection Officer Orders are not frequently employed. The NEB's online records show that only 26 such orders have been issued since 2012 (across both oil and gas pipelines).¹³⁷ This seems extremely low in light of the fact that the NEB regulates nearly 100 pipelines across Canada.¹³⁸

Provincial Enforcement Mechanisms in Québec

Monetary Administrative Penalties (MAPs) are authorized in Québec under section 115.13 of the *Environment Quality Act* ("E.Q.A."),¹³⁹ which allows persons designated by the Minister to impose MAPs on any person (including a legal person, such as a company), or municipality that fails to comply with the E.Q.A. or its regulations. Québec maintains a public, online registry of monetary administrative penalties (*Registre des sanctions administratives pécuniaires*) but since its launch in 2012, only two of the hundreds of MAPs imposed appear to have been made in relation to pipelines.¹⁴⁰ Interestingly, both of these penalties were issued in relation to pipeline companies that are federally-regulated (Trans-Northern and TransCanada Pipelines Limited). One MAP, issued in 2017, was imposed on Trans-Nord pipeline for violations relating to construction near a creek called the Ruisseau Paiement, near Saint-Lazare (the incident at this location is also discussed under Section C., above). The amount of the penalty? \$2,500.¹⁴¹

In light of the continued problems with Trans-Nord, it is difficult to understand why only one MAP has been imposed by Québec under the E.Q.A. The very small fine, amounting to the gentlest "slap on the wrist", is

130 *Ibid.*

131 NEB. "Board Letter and Order". Undated but updated in 2018. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/rprts/brdltrrdr/index-eng.html>.

132 *Ibid.*

133 *Ibid.* There was one compliance-oriented letter issued to Enbridge, but it was a Request for Information. *Ibid.*

134 NEB. "Inspection reports – questions and answers." Undated. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/nspectnrprfq-eng.html>.

135 *Ibid.*

136 NEB. "Officer Inspection Order." Undated. Available at: <https://www.neb-one.gc.ca/sftnvrnmnt/cmplnc/rprts/nspectnffcrdr/index-eng.html>.

137 *Ibid.*

138 NEB. "Pipeline companies regulated by the NEB." Undated but updated in 2018. Available at: <https://www.neb-one.gc.ca/bts/whwr/cmpnsgltdbnb-eng.html>.

139 Publications Québec. Q-2, Environment Quality Act. Section 115. Available at: <http://legisquebec.gouv.qc.ca/en/ShowDoc/cs/Q-2>.

140 Gouvernement du Québec (Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques). Registre des sanctions administratives pécuniaires. Undated. Available at: <http://www.registres.mdelcc.gouv.qc.ca/sanctions/resultat.asp>.

141 *Ibid.*

hardly sufficient for discouraging non-compliance. In this context, the continuation of safety incidents on the Trans-Nord pipeline is not surprising.

The only other MAP mentioned in Québec's MAP registry in relation to pipelines was a fine of \$5,000 imposed on TransCanada Pipelines Limited in September 2015 in relation to geophysical work carried out in Cacouna in relation to the now-defunct "Energy East" pipeline project. The work had been carried out in the absence of proper authorization under section 22 of the E.Q.A.¹⁴²

Convictions for Offences under Québec Laws or Regulations

Québec's Ministry of Sustainable Development, Environment and the Fight Against Climate Change (Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques) also maintains a public, online registry of convictions (Registre des déclarations de culpabilité) obtained in relation to violations of three Québec laws – the E.Q.A., the Pesticides Act and the Dam Safety Act – and their associated regulations.¹⁴³ The registry, which was launched in 2011, contains no record of any convictions for violations involving any pipeline companies.

Other Legislative Possibilities: Provincial Pipeline Laws

For Québec, it seems clear that federal and provincial enforcement mechanisms are not making oil pipelines substantially safer and must be strengthened and/or more aggressively employed. With respect to enforcement at the provincial level, however, Québec could consider enacting a "Pipeline Safety Act" and associated regulations as other provinces have done, including Alberta,¹⁴⁴ Saskatchewan,¹⁴⁵ Nova Scotia¹⁴⁶ and New Brunswick.¹⁴⁷ Such laws generally apply only to provincially-regulated pipelines, although it must be noted that Alberta's *Pipeline Act* does appear to apply even to federally-regulated pipelines in limited circumstances relating to pipeline "leaks and breaks".¹⁴⁸ Provincial pipeline laws sometimes include enforcement and penalty provisions.

For Québec, it seems clear that federal and provincial enforcement mechanisms are not making oil pipelines substantially safer and must be strengthened and/or more aggressively employed.

¹⁴² *Ibid.*

¹⁴³ Gouvernement du Québec (Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques). *Registre des déclarations de culpabilité*. Undated. Available at: <http://www.registres.mddelcc.gouv.qc.ca/condamnations/recherche.asp>.

¹⁴⁴ Government of Alberta. *Pipeline Act*, RSA 2000, c. P-15. Available at: <http://canlii.ca/t/522rl>.

¹⁴⁵ Government of Saskatchewan. *Pipelines Act*, 1998, SS 1998, c. P-12.1. Available at: <http://canlii.ca/t/53028>.

¹⁴⁶ Government of Nova Scotia. *Pipeline Act*, RSNS 1989, c. 345. Available at: <http://canlii.ca/t/jpdk>.

¹⁴⁷ Government of New Brunswick. *Pipeline Act*, 2005, SNB 2005, c. P-8.5. Available at: <http://canlii.ca/t/533d8>.

¹⁴⁸ Government of Alberta. *Pipeline Act*, RSA 2000, c. P-15, section 35(6). Available at: <http://canlii.ca/t/522rl>.

E. CONCLUSION AND RECOMMENDATIONS

This report, based upon an analysis of government incident and spill data in Canada since 2004, lays bare facts and trends that strongly challenge claims often heard about pipeline safety – namely, that “world class” pipeline safety regimes, “state-of-the-art” technology and “industry-leading” monitoring procedures can and do work to keep the public and the environment safe.

It is indeed difficult to reconcile claims like these with what emerges from a close look at government statistics on pipeline spills and incidents in Québec, where incidents are on the rise (as they are in various other provinces). The continued rise of pipeline spills and incidents in Québec suggests that undue reliance has been placed on both exaggerated pipeline safety claims by industry and on ineffective enforcement (sometimes based on insufficient laws and regulations).

In Québec, Trans-Nord refined products pipeline is disproportionately responsible for this trend, but that does not indicate that pipeline safety is improving generally or in other provinces. Pipeline incidents in 2017 topped previous years in several other provinces as well, indicating an industry-wide rather than company-level problem.

Even the tools for tracking pipeline safety undertaken for this report required databases maintained by the NEB were widespread. While many in the timeframes and reporting some were not. Such lack of obtain accurate track-records common finding between the notable: automated incident underperforms, detecting less than Québec’s incident database has its of user-friendly and is thus of limited with tracking pipeline safety incidents in

The continued rise of pipeline spills and incidents in Québec suggests that undue reliance has been placed on both exaggerated pipeline safety claims by industry and ineffective enforcement.

incidents are problematic. The analysis a close look at the pipeline incident and the TSB, and inconsistencies were attributable to differences rules used by the two agencies, agreement makes it difficult to of pipeline performance. One datasets, however, is particularly detection technology consistently 50% of all incidents. Finally, even own problems: it is nearly the opposite use to the public or others concerned Québec.

Our analysis of pipeline incident track-records for the four oil pipelines running through Québec showed that Québec experienced over 100 incidents between 2004 to 2017. But perhaps the most striking finding is the exceptionally poor track record of the Trans-Nord pipeline. Trans-Nord had nearly 80 incidents, across both Québec and Ontario, from January 2004 to December 2017, and incident reporting was delayed on many of these incidents. Delays of weeks, months and even years occurred between the time incidents occurred and when they were reported to the NEB.

The alarming incident track-record of the Trans-Nord pipeline makes clear that enforcement measures for this federally-regulated pipeline are simply not working. Despite receiving numerous safety orders from the NEB, incidents are on the rise. Equally troubling is the fact that Trans-Nord has yet to receive an Administrative Monetary Penalty from the NEB, and the AMP it received in Québec for violation of the *Environment Quality Act* amounted to only \$2,500. There is only one investigative report on record for Trans-Nord, and it was authored by the TSB in 2002. Meanwhile, the NEB has issued zero Inspection Officer Orders in relation to the frequent problems on Trans-Nord. While federal enforcement measures may be helping on certain pipelines in certain cases, they are failing in relation to Trans-Nord.

In conclusion, it is unacceptable that, despite assurances by industry and governments that oil pipelines can be constructed and operated safely, pipeline spills and incidents are still happening. Promises about “world class safety” regimes and “state-of-the-art” technology for oil pipelines are not translating into safer pipelines. Meanwhile, the under-enforcement (and sometimes non-enforcement) of federal and provincial pipeline safety laws and regulations are creating a situation in which oil pipelines are continuing to pose unacceptable risks in Québec and beyond.

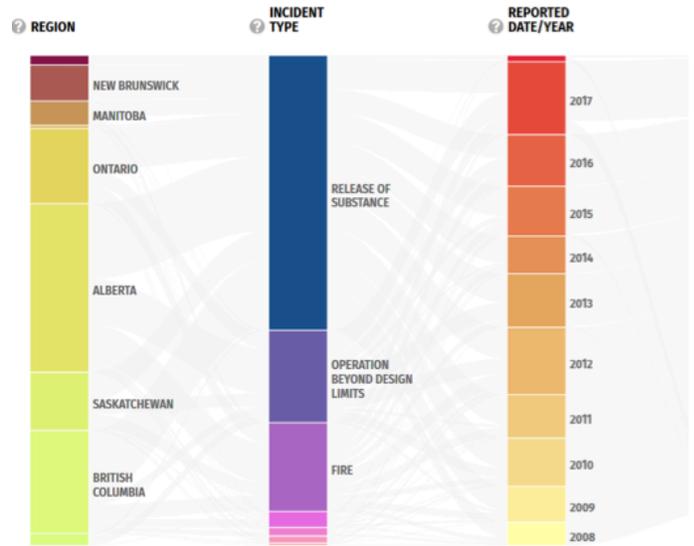
Based on the analysis and findings presented in this report, Équiterre recommends the following actions at the federal and provincial levels to help keep Canadian communities and the environment safe from the risks associated with oil pipelines:

- Take stronger and more urgent action at both provincial and federal levels to decrease reliance on petroleum-based fuels and products. Moving beyond oil and hastening the transition to a cleaner energy future is a key step in reducing the need for oil transport by pipelines and other modes.
- Reduce or resolve inconsistencies between the NEB and TSB pipeline incident databases in order to allow easier, more accurate tracking of individual pipelines and companies. Overhaul Québec’s incident tracking system, the *Registre des interventions d’Urgence-Environnement*, in order to make it more transparent and user-friendly.
- Demand immediate federal action on Trans-Nord: call for new investigations from the Transportation Safety Board and greatly increased enforcement by the NEB, using all available mechanisms.
- Demand that the federal government undertake a review of its own enforcement practices in relation to pipeline incidents, and allow citizens to fully review and critique the results prior to the creation of new policy or legislative proposals.
- Explore the creation of a Pipeline Safety Act for Québec, building on the best features of similar provincial legislation in other Canadian jurisdictions.

APPENDIX A

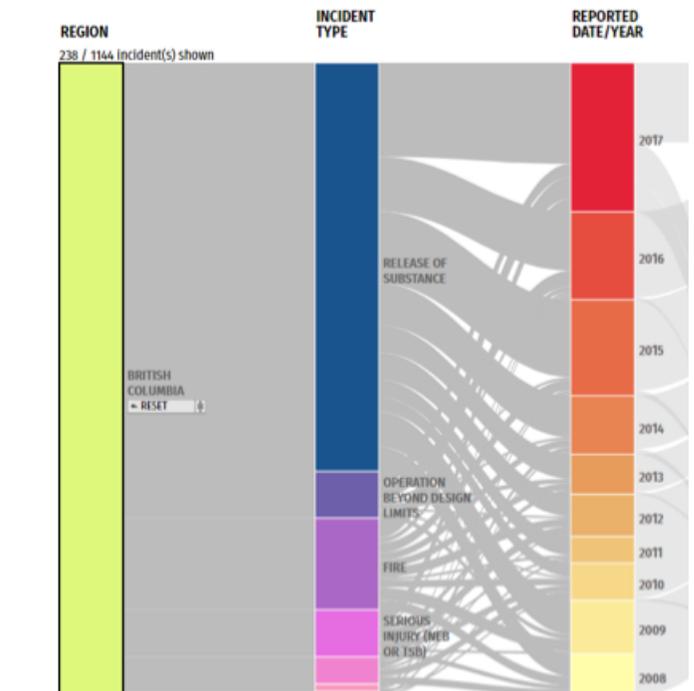
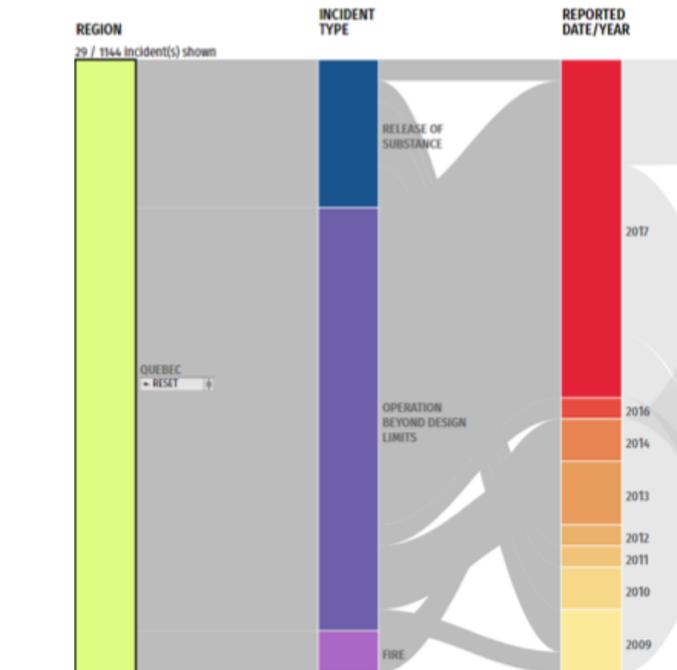
Proportion of Total Incidents Occuring Yearly - Canada-Wide and Province - Specific ¹⁴⁹

Canada: 15.1% of all reported incidents since 2008 occurred in 2017. More incidents happened in 2017 (173) than in any previous year. The next highest incident count (159) occurred in 2012.



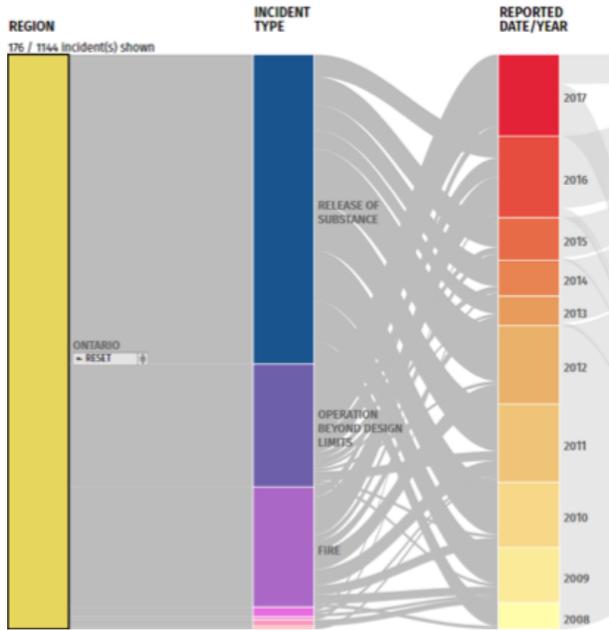
Québec: 55% of all reported incidents occurred in 2017

BC: 23.5% of all reported incidents occurred in 2017

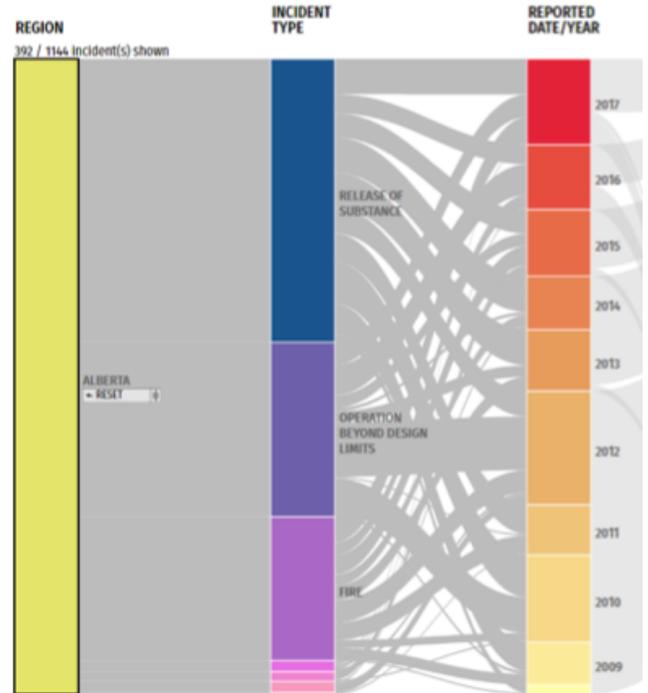


149 All data in Appendix A is based on National Energy Board pipeline incident data. See "Incidents at NEB-regulated pipelines and facilities". Undated. Available at: <https://apps2.neb-one.gc.ca/pipeline-incidents/>.

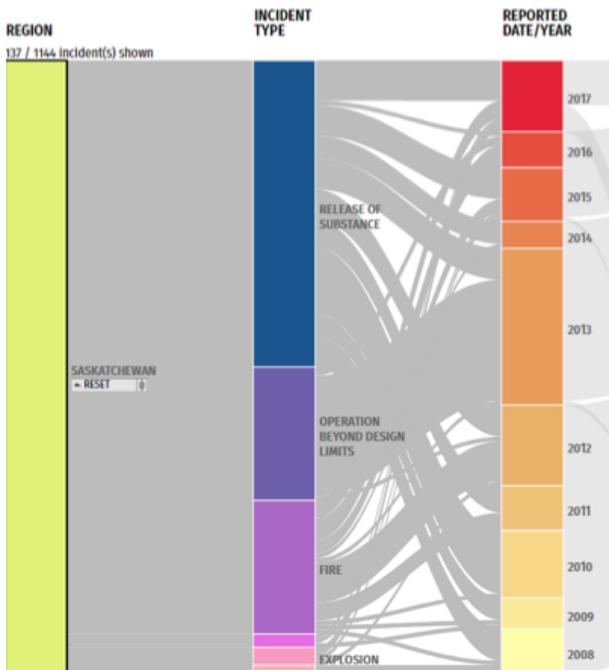
Ontario: 14% of all reported incidents occurred in 2017



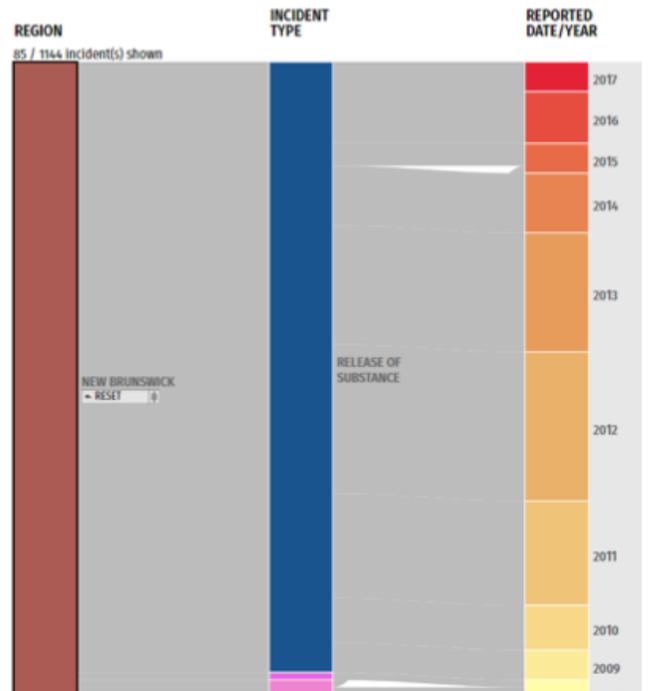
Alberta: 13.5% of all incidents occurred in 2017



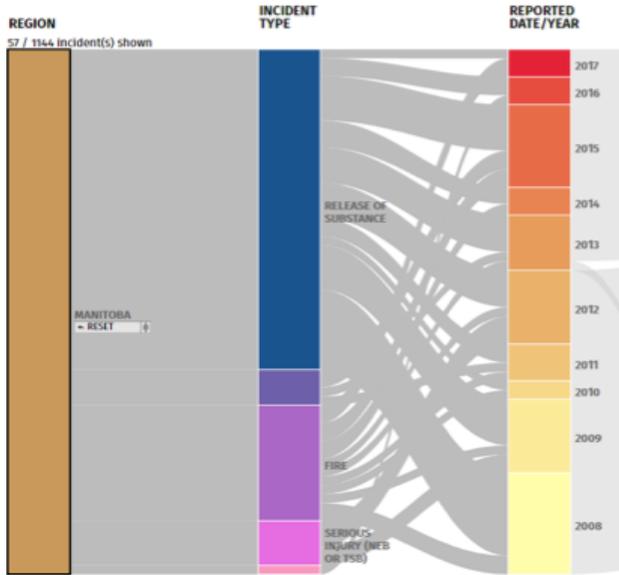
SK: 12% of all reported incidents occurred in 2017



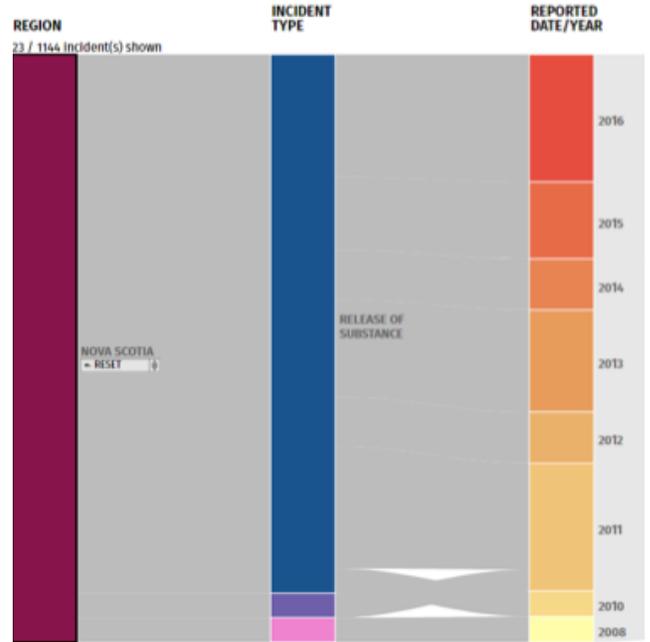
NB: 5% of all reported incidents occurred in 2017



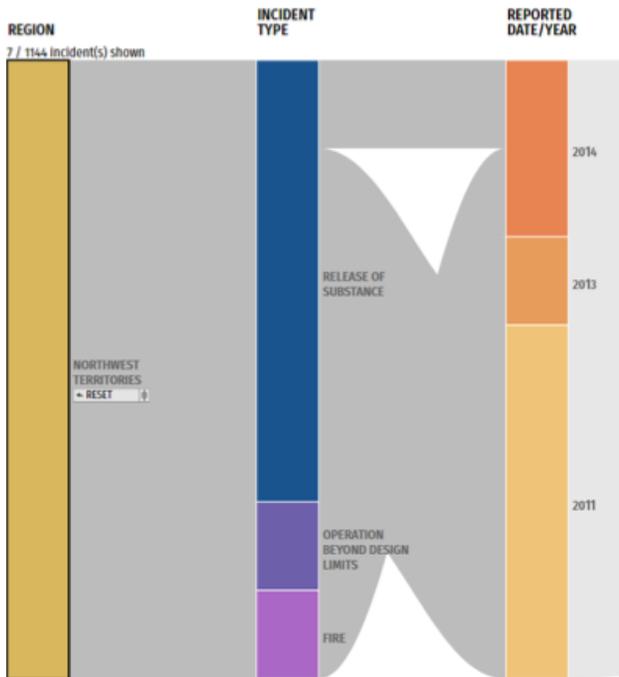
MB: 5% of all reported incidents occurred in 2017



NS: 0% of all reported incidents occurred in 2017



NWT: 0% of all reported incidents occurred in 2017



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