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To: NEB Modernization Expert Panel

Re: National Energy Board Modernization – Expert Panel Review

The Ontario Rivers Alliance (ORA) is a Not-for-Profit grassroots organization acting as a voice for several stewardships, organizations, and private and First Nation citizens who have come together to protect, conserve and restore healthy river ecosystems.

ORA has been awarded Intervenor Status in the Energy East Pipeline Application (EEPA)[1] review, and consequently many of our recommendations are based upon our observations and experience in preparing evidence for these Hearings.

ORA is writing further to Dr. Alan Hepburn's presentation to the NEB Modernization Expert Panel session in Gatineau, Quebec, on February 22, 2016. However, this submission covers a more fulsome and expansive overview of our concerns and recommendations.

1. Governance and Structure

Problem:

The NEB has proven to be an industry friendly structure aiming to support and promote energy markets for the oil and gas and pipeline industry - yet the NEB is also charged with regulating, approving, monitoring and enforcing compliance of this same industry. ORA submits that this is a conflict of interest, and raises real questions about the independence and objectivity of the NEB, and just how well the environment and public safety is being protected. The federal government's reliance upon tax revenues and the need for job creation from the energy industry has led to a significant lack of environmental rigor in its decision making.

Under Part VI of the NEB Act, the NEB collects energy statistics, monitors energy markets, assesses Canadian energy requirements, and identifies trends in energy systems. This function should be left up to the oil and gas and pipeline industry, as it conflicts with a mandate to promote safety, security and environmental protection in the regulation of pipelines and energy projects.

The recent NEB ruling of reasonable apprehension of bias in favor of TransCanada, came as a result of the NEB panel's inappropriate conduct in relation to their meeting with Jean Charest while he was acting as an advisor to TransCanada. This conduct only came to light through a Freedom of Information Application. Confidence in energy

[1] Energy East Pipeline Project, Application by Energy East Pipeline Ltd., TransCanada. References to this Application indicate Volume and Section (V;S)

projects can only come when we have an open, transparent and accountable government.

It is absolutely essential that the regulator responsible for protection of the environment and public safety maintain an arms-length distance from the supply, demand and market-related interests.

The regulator in charge of regulating the energy industry must have a strong and credible science-based emphasis on protecting the environment and communities. The Board, Chair, CEO and Review Panel members must have no conflict of interest, or ties, or relationships with those working, promoting, or investing in the energy sector.

Whichever regulator is ultimately responsible for project approvals, and safety of the environment and the public, must be an independent body that has no ties or interest in the well-being and/or promotion of the energy industry or energy markets.

Recommendation:

1. Environment Canada is the most appropriate regulator to be charged with approving, monitoring, compliance, enforcement, and decommissioning of energy related projects (including pipelines) that could place the environment and/or public safety at risk.
2. The NEB should only be charged with a mandate to collect and provide energy statistics, monitor energy markets, assess energy requirements, identify trends and promote the interests of the energy industries.

2. Energy Information, Reports and Advice

c) One-stop Site for Data

Problem:

Data regarding energy information from the oil and gas and pipeline industry, hydroelectric facilities, and other energy producers, as well as incident/accident reports, equipment failures, spills, clean-up and recovery, etc., are currently spread out over several provincial and federal regulators, with no consistent, complete, or fully open database or reporting mechanism that is transparent, consistent, and fully open to the public.

Recommendation:

1. There must be one central government database containing detailed reporting on all provincial, federal and territorial monitoring, compliance, incidents and accidents, including their cause, spill volumes, amount recovered, impacts, fines, etc., and all data should be made available to the public in an accurate, accessible and user-friendly database for review and download.
2. All language, guidelines, requirements, spill data and clean-up efforts from the provincial regulators should be in full alignment and consistent with requirements for transparency, accuracy and consistency.
3. Increased transparency, accountability and consistency in terms of processes, decisions, inspection, monitoring, compliance, spill reporting, language, requirements, and public access.

c) An Accurate, Truthful and Evidence-based Application Problem:

The EEPA consistently downplayed and glossed over the risks and hazards by indicating a low probability of a spill, and a high degree of confidence in the safety of the environment, ecology, and human health.

Wang and Fingas (2003)[2] characterize oil spills as *"…a global problem, in particular in industrialized countries*", it is presumable that a target of no spills is unrealistic as well as not aligned with historical evidence. At the same time, many of the conclusions found in the EEPA downplay the risk by indicating a high degree of confidence in safety, a low probability of a spill event, forecast no or little adverse long-term effects from spills, and characterize spills as short-term events. A few examples out of many, where the application claims:

- *Because the probability of a spill is low and the majority of pipeline spills are relatively small, effects would generally be localized and short-term (days to weeks)* (V19; S4.2.6.8z); and
- *With the implementation of mitigation in the spill contingency plan, the potential effects from a hazardous material spill on fish and fish habitat, and hydrology, are expected to have no adverse long-term effects* (V19; S6.4.6.1).

We all know that this is not true. Firstly, the Emergency Response Plan was not provided for public review, and the stated low probability of spills and short-term and localized effects appears out of sync with current knowledge about frequency and volume of oil spills as well as the long-term issues with clean-up and remediation afterwards (e.g. Maidstone Spill, Saskatchewan, 2016 [Thomson, 2017])[3]. Compounding this is the uncertainty that exists within the scientific literature around the topic of winter conditions and oil spills. There is a significant gap of knowledge related to how crude oil and water/ice/snow interact, and much work left to do related to how to address spills in these conditions. In addition to this, there is the general uncertainty that surrounds all oil spill events (i.e. as they can be classified as a wicked environmental problem). As a consequence, it is impossible to quantify the risk present in winter conditions, and risk assessments are questionable at best in this situation.

The Application approaches risk as follows:

> *For the purposes of the risk assessment that has been conducted by Energy East, the term "risk" refers to how likely it is that a hazard (i.e., the causal mechanism that could potential lead to an accident or malfunction situation)*

[2] Wang, Z and Fingas, M. 2003. Fate and Identification of Spilled Oils and Petroleum Products in the Environment by GC-MS and GC-FID. *Energy Sources*. 25:491–508.

[3] The article concludes that "…it is notoriously difficult to completely clean up after an oil spill, and if there is seepage into the ground it could make it to water or nearby wells… river crossings are the most at risk for pipeline failures because of ground slumping, which is what happened this past spring near Maidstone. There has been more slope movement over the past 5 to 10 years because of high water tables and what seems to be a wetter phase in the climate".

> *might lead to an event (the frequency) and the potential consequences of that hazard event (i.e., impacts) on environmental, ecological, socio-economic and human health factors (the receptors). By linking the frequency of a hazard event with the hazard event's anticipated consequences, an evaluation of the potential risk of an identified hazard event to various receptors can be made. (V12; S1.2)*

In this case, the linking of the frequency of a hazard event with the hazard event's anticipated consequences is not feasible:

> The anticipated consequences of the hazard event are both debatable and unknowable to a significant degree. The environmental and socio-economic consequences of a spill depend on multiple factors such as: whether it takes place in an easily accessible area or in rugged and fast moving body of water in a remote area of northern Ontario, whether it is the sole source of drinking water for a community, or whether it effects an endangered species. Reaction time and clean-up efficiency are additional unknown variables. The spill itself is a complex event with effects that cannot be predicted. At the same time, the Application sees spills as generally having no long-term adverse effects – a claim also consistently challenged in scientific literature and public records.

In essence, risk and effectiveness of clean-up cannot be evaluated properly if it is not adequately quantified in the application. Additionally, it is challenging to assess the risk of the project retrospectively by relying solely on past experience, as the project itself changes the parameters of the assessment (i.e. there will be a new product and more volume being shipped daily in this scenario). Any quantification arising from past experience of oil spills would need to be adjusted to fit within these new parameters.

This presents a challenge to the NEB's mandate to make recommendations and decisions based on the Canadian public interest. The missing information (i.e. ERP and IMP) in the Application creates a high level of uncertainty, as it is impossible to assess whether or not this project results in an overall public good or public interest (NEB, 2016c). The risk associated with the project is either generally unknown or unknowable which makes balancing the benefits of the project against the residual burdens (burdens that exist after mitigation through conditions) an impossible task. Additionally, the possibility of a prompt and effective response and clean-up from a spill into a stream, river, lake or wetland in Ontario is both to a large degree unknowable and is likely to be severely challenged by winter conditions.

Downplaying the risks may have worked before we acquired the body of evidence over the past decades of oil and gas and pipeline activity; however, inaccurate reporting of risk only undermines confidence and breeds a lack of trust and confidence, not only in the applicant, but also in the NEB.

Recommendation:

1. An application must include only evidence-based, accurate and meaningful risk assessments for spills, response, clean-up and recovery, as well as potential environmental, ecological, socio-economic and health impacts.

2. Strict standards and guidelines must be in place to deter applicants from making misleading claims.

c) Indigenous Engagement and Consultation
The regulator must also ensure that First Nation representation and interests are integral to the decision-making process.

Recommendation:
The regulator must have a strong First Nation representation on its Advisory Board, Review and Hearing Panels.

3. Mandate and Regulatory Framework

a) Major Watercourse Crossings and Highly Significant Receptors
Problem:
Pipelines transporting crude oil from Alberta must cross thousands of streams, rivers, lakes, and wetlands in their path across the country. What draws the greatest apprehension from stakeholders over pipelines is the possibility of a spill into the environment, especially into our waterways, and the devastating effects this can have on freshwater ecosystems, and on entire communities that rely on these waterbodies for their drinking water supply, tourism, recreation, and their economy - both for the short term and long term.

Consequently, one would expect that the regulatory framework surrounding pipeline approval, construction, monitoring and compliance would be well defined and undergo the highest scrutiny and rigor; however, that hasn't proven to be the case.

For instance, the current process is very lacking when an applicant is left to determine where shutoff valves (to stop the flow of oil) will be placed in the event of a rupture or spill. The main criteria used to determine if and where shut-off valves will be placed is to determine what constitutes a major water crossing (MWC) and a highly significant receptor (HSR). Yet, there is no definition or process articulated in the Canadian Standards or legislation to guide an applicant in how to even identify and/or determine what constitutes a MWC, other than "*if a product release poses a significant risk to the public or environment*" (V4, Appendix 4-13).

Similarly, the methodology used to assess the maximum transport distance, in the event of an oil spill is determined by the applicant.

> "*In the absence of a defined process within the Canadian Standards on how to identify potential risk receptors that require special consideration, the Applicant broadly adapted a process from TransCanada's Liquids Integrity Management Program, used for the Keystone pipeline. Consequently, the method applied in the Application identifies HSRs and assesses the potential interaction between the proposed crude oil pipeline and each HSR, including unusually sensitive areas encompassing municipal water intakes, ecologically sensitive areas, commercially navigable waterways and populated areas"* (V4, Appendix 4-13).

Any portion of the pipeline that could potentially affect a HSR is identified using potential physical transport pathways between the pipeline and HSR, and will be much larger than the area simply intersected by the pipeline. Spilled oil flows along transport pathways that include overland flow, subsurface flow, and/or, downstream transport – and is undoubtedly ORA's greatest concern.

The EEPA concluded that in the physiographic region of the Canadian Shield,

> "*the mean maximum downstream transport distance used to identify any potential HSRs was 34.2 km. For the Missinaibi River, based on actual river data, a transport distance of 50.6 km was used as a buffer to identify HSRs*" (V4, Appendix 4-13).

This method of assessment for a maximum transport distance appears very inadequate when contrasted against known examples. For instance, the plume of the Husky Oil spill on the North Saskatchewan River (2016) was reported to have travelled 370 km downstream. Additionally, it was recently reported that recovery and containment of the spill in the Yellowstone River was made difficult due to ice cover, and oil sheens were reported as far away as Williston, North Dakota - almost 100 miles [160 km] downstream. It was also estimated that less than 10 percent of the oil was recovered.

If the applicant has underestimated the maximum transport distance, that means the assessment of whether a product release would pose a significant risk to the public and environment has logically also been underestimated. In the end, it is unclear if the applicant's development of a methodology to identify potential risk receptors and MWCs is based on past spill events, scientific findings, or the economic implications of these and other variables.

The EEPA also did not include a full list of waterbodies or high resolution maps of the waterbodies that would be crossed or that could be impacted by the project.

Recommendation:

1. A clearly defined standard process must be legislated to ensure all applicants use a non-biased, effective, consistent, and science-based method to determine maximum transport distance, HSRs and MWCs in relation to a pipeline crossing.
2. A watershed approach using the precautionary principle must be used where a pipeline intersects within the area of influence of a stream, river, lake or wetland when considering maximum transport distance, HSRs or MWCs.
3. All pipeline water crossings within a defensible area of influence must be considered a HSR.
4. Full listings of all waterbodies and high resolution maps of the full pipeline route must be provided in the application for public review.

b) Application Completeness

Problem:

The NEB currently deems an application complete when no Emergency Response Plan (ERP) or Integrity Management Plan (IMP) have been provided in the application for stakeholders to review.

Local stakeholders and First Nation communities have serious concerns about pipeline leaks and their potential impacts on public health and safety, on the environment, and on local economies. There is great concern for how a spill into the environment - a stream, river, lake, wetland, or back yard, will be addressed. It is impossible to assess the risk of a project when the ERP and IMP are missing from the Application.

Recommendation:
The ERP and IMP must be required up-front before an application is deemed complete.

c) Leak Detection

Problem:
There is a need to improve the ability to detect leaks below the detection threshold, and to shut a pipeline down immediately. However, no pipeline company will voluntarily attempt to improve the capabilities of their detection design because if a small leak is detected, it must be located, repaired and cleaned up, and this can be an expensive process.

The first line of defense against pipeline leaks is the computerized Leak Detection System (LDS) - without it the pumps would pump oil into the environment until the operator started to wonder why the line pressure had collapsed, and with it leaks below the minimum detection threshold would go unchecked until there was a visual sighting. So, the LDS is useful, in that it provides real time information for ruptures, and perhaps a significantly delayed indication of smaller leaks until it reaches the leak detection threshold, at which point it becomes useless by definition.

Spills below the detection threshold of the real-time system have the potential to be much larger, and over time could accumulate to thousands of cubic meters before being detected.

Techniques like periodic pressure testing and the use of “Smart Balls” could dramatically improve performance.

Recommendation:
1. More demanding requirements for detecting leaks far below the current 1.5% threshold should be mandated to greatly reduce the environmental impact of low flow leaks.
2. Immediate shutdown should be required when such leaks are detected.
3. Performance of the real-time leak detection system should be verified by physical testing on a regular schedule. This should be used for both initial verification of the design, and for periodic confirmation of operator performance.
4. Failure to meet performance standards should result in suspension of the operating license until appropriate corrective action has been taken.
5. To encourage compliance, significant fines should be imposed based on each barrel of oil or product is released into the environment.

d) Leak Detection Target

Problem:
There is no definition in the Standards for what would constitute an environmentally significant leak or spill, nor has a minimum leak detection target been set by the regulator – this has again been left up to the applicant to determine.

The present version of the relevant Canadian Standards, CSA Z 662-15, does not require that appropriate leak detection capability be provided. Annex E of the

Standards, “recommended practice for liquid hydrocarbon pipeline leak detection”, is not mandatory and does not prescribe a specific leak detection threshold or target, therefore, it is not a performance standard. Consequently, an applicant has no incentive or reason to improve leak detection performance, or leak volumes and frequencies.

Recommendation:

1. Legislative guidelines must clearly define an “environmentally significant leak” to establish a threshold, and then mandate pipeline projects to meet that leak detection threshold.
2. Once these thresholds have been defined, the applicant must be required to demonstrate that their project design and leak detection system can meet those limits.
3. Criteria for the volume of an environmentally significant spill should be established, taking the nature of the area of influence into account.

e) Leak Frequency and Volume Performance

Problem:

There are no guidelines to define how leak frequency predictions are to be calculated, and therefore are open for error. This is a problem when stakeholders are concerned with the amount of risk a pipeline presents.

The values of the modification factors used in an application to claim leak frequency performance should be irrefutable and justified.

For instance, the EEPA calculated spill frequencies based on industry historic data that is not available for public download and, therefore could not be verified. Also, modification factors were used to account for technological variables, with no justification provided for the magnitude of these factors.

Additionally, for any relevant estimates of spill frequency and volume it is important to use data from pipelines of similar capacity. For instance, data pertaining predominantly to the large number of small pipelines would have limited relevance, and would skew the risk factors when comparing with the larger (42”) long-haul pipelines.

It is essential that data from pipelines of similar capacity are used to assess pipeline leak frequency and volume, otherwise the relevant data will be masked by a lot of irrelevant and watered down statistics. This masking is an effective way to downplay the risks.

Recommendation:

1. Data used for historical comparisons should be restricted to pipelines of a similar capacity.
2. An analytical justification for the modification factors used in calculating line failure frequencies should be provided in an application.
3. Modification factors should also be computed for a number of other factors, all of which would increase the predicted spill frequencies.
4. Once the baseline data is corrected to eliminate irrelevant small pipelines, the spill volumes predicted by the Applicant should also be corrected for the size of

the proposed pipeline, compared to that of the pipelines used for historical comparison.

f) Monitoring, Detection and Reporting

Problem:

There have been several pipeline spills where shutdown and reporting have been delayed – to name a few:

- A 2016 Husky Oil spill into the North Saskatchewan River, went on for over 7 hours before being shut down, and spilled 225,000 liters of oil.
- A 2015 spill in Alberta by Murphy Oil went undetected for 45 days and spilled 1,429,000 liters – their fine was only $175,000 – hardly enough to deter any future spills or encourage reform of company behavior when they could make that back in a few hours of operation.
- Also, a 2013 spill in Alberta by Pengrowth Energy went undetected for 48 days and spilled 537,000 liters of oil, and was fined only $250,000.

Recommendation:

1. Strict legislation and guidelines must be in place to specify immediate shut-down, and rigorous monitoring and reporting.
2. Regulatory staff (not self-monitoring) must be in place to adequately monitor and ensure compliance.
3. Full, consistent and transparent spill reporting across Canada – cause, location, volume released, volume recovered, monitoring record, etc….
4. Heavy fines designed to deter leaks and ruptures must be in place.

g) Engineering Design

Problem:

The scope and considerations of an Engineering Assessment are not defined for a conversion from natural gas to crude oil.

The CSA Standard requires an Engineering Assessment to be performed when there is a change in service fluid, but the scope of considerations is left up to the applicant to determine. An Engineering Assessment should start by providing a list of key operating parameters so that the impact of these changes can be addressed systematically, but this was not done in the EEPA.

The scope of the assessment should consider aging, loading, seismic stress, malicious damage, proximity to adjacent gas line/s, and whether the route and bed were optimized for oil transport. For example, crude oil is 17.4 times heavier than natural gas, and a 50-year-old pipeline bed was not prepared for that weight. The Application also does not address its colocation alongside two natural gas pipelines. A hydrostatic test is required for new pipelines, but the applicant has chosen not to do it on the converted pipeline.

Recommendation:

1. Legislated requirements must be introduced to define the required scope of an Engineering Assessment where there is a change in service fluid, and the predicted frequencies of failure need to be adjusted accordingly.

Conclusion

In general, the NEB process has been shown to have a weak legislative framework and a lack of scientific rigour, and this, coupled with the number and volume of disastrous pipeline leaks, has caused stakeholders to lose confidence and trust in the NEB and pipelines in general.

Please contact me if further clarification is required. Thank you for this opportunity to comment!

Respectfully,

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