Submission to CER's review of Onshore Pipeline Regulations (OPR)
From: [redacted]
Date: June 30, 2022

1. Overview

This submission is detailed and therefore rather lengthy. Its length is partly due to CER's request that commenters "provide any examples... as they are very helpful for explaining the issue" (Discussion Paper, p. 1).
Its length is also due to my belief that other submissions are unlikely to address many of the aspects that I have raised. My hope is that the provision of detailed, verifiable information will be useful to people who will decide whether OPR needs to be amended.

My submission will focus on two broad elements that are illustrated by the examples that will be presented. Those elements are:
1. deficiencies in the regulations (ie. within the text of the OPR itself; and
2. deficiencies in CER's administration of existing OPR requirements.

In order to assist the reader I have done my best to relate my observations throughout to at least one of the following:
- the relevant section of the OPR;
- one of the Discussion Paper's 29 questions;
- one of the six sections/topics that are listed in the Discussion Paper ("DP").
Bold text has been used to help the reviewer locate these references.

2. "Lessons Learned" (DP Section 1)

DP Question #1: What could be improved?
Answer: CER should ensure that companies comply with the requirements of the OPR and that CER fulfill the expectations that it has set for itself regarding public safety.

In the preamble to Question #1 the DP states, "CER focuses its compliance verification on those things that pose the highest risk of harm to people..." (p. 2). Unfortunately, CER has not focused its attention or, most notably its compliance verification, on the very sites with the highest risk of harm to people.

Risks to public safety vary widely along any transmission pipeline: there are usually long stretches with very low population densities. At the other extreme there may be a few large, "sensitive use" sites that are clearly within the impact zone of a nearby pipeline. The term that I will use to describe these facilities is "high-consequence sites" (HCSs).

With respect to pipelines, high-consequence sites may be defined as sharing the following characteristics:
- very close proximity to pipeline (in most cases, immediately adjacent), clearly within the potential impact radius (PIR);
- large population (over 100 people);
- obvious evacuation limitations;

- unfavourable topography (flat or downhill, paved surfaces, sewers, underground parking and other low or confined spaces, etc);

HCSs that have been reported to CER include “sensitive use” facilities such as schools, high-rises, seniors' facilities, a Holiday Inn, a major transit hub and a new hospital wing. Thankfully, HCSs near pipelines are rare: this researcher has so far discovered only about twenty in southern Ontario between Burlington and Ottawa/Cornwall.

Both CER and pipeline companies espouse a "risk-informed approach" that prioritizes the areas of greatest concern. Given both the rarity and the potential for harm at HCSs, one would expect that pipeline companies and their regulator would have paid particularly close attention to these sites.
Unfortunately, the situation at these sites has invariably been the reverse.

3. “Engagement and Inclusive Participation” (DP Section 3)

DP Question #7: How can the OPR support collaborative interaction between companies and those who live and work near pipelines?
Answer: First, companies should fulfill their obligations under **OPR Section 6.5.1** and S**ections 33 - 35**, especially at sites where large, vulnerable populations cannot be evacuated quickly.
Second, OPR should require companies to create and maintain a database of existing HCSs.
Third, OPR should include requirements that could deter such development in the future.

The OPR is therefore in need of a few amendments if important goals (eg. improved safety at existing HCSs and the prevention of future HCSs) are to be achieved.

The need for amendments will be addressed later but first let’s examine the situation as it currently exists.

3a. Public awareness deficiencies at HCSs

The pattern at these HCSs has been remarkably consistent: the larger the site, the less people knew. Indeed, the most common response given to this researcher by people at these sites was one of total unawareness: they had no idea that there was a pipeline nearby.

This is the reverse of what CER should want. Although farmers and other pipeline land-owners usually demonstrate excellent awareness of their pipelines (which may be hundreds of metres from their homes), high-rise inhabitants, teachers and hotel staff invariably reported that they had not received even the most basic information (eg. "You have a pipeline nearby").

Not only is this pattern undesirable, it is contrary to our very sensible federal regulations. Section 6.5 and sections 33-35 of the OPR require pipeline companies to "take all reasonable steps" to inform "anyone who is exposed to the risks" of three things:
- the location of the nearby pipeline;
- what to watch out for (ie. indications of a pipeline problem);
- how to respond during an emergency (**OPR section 35**).

Apart from the fact that federal regulations require it, there are several good reasons for ensuring that people who are close to pipelines are well aware of them. Pipeline releases in urban areas are rare but they have the potential to present a severe threat.

Fresh hydrocarbon vapours are volatile and highly flammable. There is usually no shortage of potential ignition sources in urban areas. Indeed, safety material from pipeline companies is often explicit in its warnings. Enbridge's material states:
It is important that you do not create a spark if you suspect anything abnormal along the pipeline route. Potential ignition sources include smoking materials or open flames, cell phones, pagers, flashlights, keyless entry remotes, motor vehicles, light switches, telephones or other electrical devices.

What the Enbridge document fails to mention explicitly are elevators and fire alarms, both of which are electrical devices and both of which (absent information to the contrary) would be among the first things that people would use during a perceived emergency.

The inability to safely activate the fire alarm or use elevators has serious implications for HCSs because their relatively large populations must be evacuated quickly if volatile vapours have enveloped and/or entered their building. “Shelter in place” appears to be very poor advice under such circumstances.

Despite the requirements of **section 35** this vital information is rarely provided to the very people who most need to receive it: eg. teachers, high-rise tenants, hotel workers, front-line TTC personnel, etc.

Nor is the most fundamental information of all in terms of allowing people to understand the scale of the risks that they might suddenly be confronted with: the volume of flammable liquid that can reasonably be expected at their location during a worst-case release.

Since there is no requirement under sections 33 - 35 for companies to provide details such as potential release volume to people who are exposed to the risks or even to first responders and municipal decision-makers, companies do not provide it.

Nor is there any requirement to advise anyone regarding the potential consequences that could be inflicted by a large release, especially if ignition were to suddenly occur. This

deficiency is both significant and illogical: people are routinely warned and often sign waivers re. the potential consequences of go-karts, amusement rides and surgeries, but city planners and adjacent home buyers are not warned about what could occur within minutes following a major pipeline release.

Recommended amendment: Section 35 should be amended to require companies to inform recipients of a fourth category of information: pipeline details such as operating pressure, diameter, potential release volumes and potential impact radius (PIR).

3b. Need for a database of HCSs

This researcher has asked CER and various companies whether a database of existing high-consequence sites has been established. To date, the response has been negative in all cases.

It is important that large, vulnerable sites be identified and catalogued for multiple reasons: so that companies can monitor those sections of pipe extra-closely, so that public awareness programs can be more vigorous at those locations and so that regulators can prioritize these sites in their compliance verification activities.

It is worth noting that the US Office of Pipeline Safety requires operators to maintain a list of "Identified Sites" such as schools, nursing homes, malls, facilities where more than 20 people congregate, buildings that house "people who are difficult to evacuate," etc.

Recommended amendment: OPR should be amended so that it includes a definition of high-consequence sites (HCSs) and a requirement that both pipeline companies the CER create and maintain a database of the identified sites.

3c. Need to prevent new HCSs

In addition to monitoring existing HCSs more closely and ensuring that our current regulations are upheld, CER should consider taking an active role in preventing additional HCSs from being created. If provincial and municipal authorities were following their own policies and guidelines there would be no need for a federal agency like CER to insert itself into matters such as land use planning and approvals. Unfortunately, as with the OPR requirements regarding public awareness programs, existing land use safeguards are not being followed.

Ontario's Provincial Policy Statement (PPS) is clear in both its wording and its intent. Section 3.0 states, *Development shall be directed away from areas of natural or human-made hazards where there is an unacceptable risk to public health or safety or of property damage, and not create new or aggravate existing hazards.*

Despite this directive, we find multiple examples of recent development proposals that have placed schools, high-rises and even a 7-storey hospital wing next to high-pressure pipelines.

Some of these earlier sites were identified to the NEB during the 2013 hearings on Line 9. That sworn evidence, including photos and detailed information, used to be available at the NEB website:
https://apps.neb-one.gc.ca/REGDOCS/Item/View/956763

An important point with respect to the 2013 evidence is that Enbridge was invited to correct or refute any of my assertions including the serious allegation that the company had failed to comply with various OPR requirements relating to public awareness and public safety. Although Enbridge used its Reply Argument (Oct. 2013, 39 pgs) to refute claims that were made by multiple intervenors, the company declined to challenge any of my assertions.

Two of the sites included in the 2013 evidence are seniors' facilities in Scarborough. Both are immediately beside two transmission pipelines. One of these HCSs is a 12-storey facility built within 20 feet of the pipelines. It is worth noting that this facility was built several years after Ontario's pipeline regulator, TSSA, enacted the following setback requirement: *A minimum setback of 200 metres shall be maintained from the centerline of pipelines to institutions where rapid evacuation may be difficult, such as hospitals, nursing homes, penal institutions, and institutions for the physically and mentally handicapped.*

As was pointed out above, if elevators and other electrical devices cannot be used during a pipeline emergency, then virtually every multi-storey building would face a situation where evacuation would be difficult and rapid evacuation would be impossible. This would be even more-so with residents who are elderly or infirm.

This researcher pressed City planners for an explanation as to how the two seniors' facilities came to be placed next to pipelines when the PPS, the TSSA guideline and common sense dictate otherwise. When a reply from the senior planner was finally received, this what it said:
Further to our previous responses, it is staffs [sic] *position that the referenced developments are consistent with Provincial Policy Statements and that the development is good planning.*

Clearly, there is a serious problem when planners in our largest city believe that placing large geriatric populations beside pipelines constitutes "good planning." More recent examples include a pair of very tall high-rises at 3415 Weston Road in Toronto. Their tenants will sleep next to five refined products pipelines.

An important element, one used by planners in their defense of such planning decisions, is that when pipeline companies are circulated by planners regarding development proposals near pipelines, companies rarely express safety concerns. Neither pipeline company expressed concern regarding the two seniors' facilities in Scarborough and there is no evidence that any of the companies expressed concern regarding the new Weston site.

Recommended change to CER Guidance: CER should insist that companies, when circulated, provide an accurate description of the potential worst-case consequences of a release next to the proposed development (eg. probable release volume, potential impact radius (PIR), various ignition & non-ignition scenarios, etc).

3d. "Trust and confidence" (DP pg. 6)
DP Question #9: How could the CER improve transparency through the OPR?
Answer: With respect, this is not a useful question for two reasons. Trust and confidence involve much more than transparency. Second, it should not require regulations such as OPR in order for an agency that serves the public to be transparent in its dealings.

In the paragraph that precedes this question the DP refers to "who the CER listens to and learns from." I would like to remind CER of the decade-long history of my concerns (they were first raised in September 2012).

This issue (of ongoing unsafe development) and other post-2013 concerns were presented in great detail to a Section 15 Panel in October 2016 in Kingston. Three NEB Members were assigned to this Panel: Dr. Lytle (presiding Member) and Members Kelly and Richmond.

The 2016 Panel was created following two events.
First, NEB allowed me to take two of its personnel on a 'tour' of a half-dozen HCSs in Toronto (Aug. 2015). These observers were able to view first-hand the proximity, topography, size & scale and even the degree to which people on-site were unaware of their nearby pipeline.

Second, NEB personnel including Chair Peter Watson were in attendance at a Public Safety Forum that was set up by Pipeline Safety Trust (May 2016 in Calgary). I had been granted 8 minutes to present a quick Powerpoint of photos and information regarding a few of the HCSs.
That slide deck may be examined here:
https://pstrust.org/wp-content/uploads/2016/05/Munroe-Presentation.pdf

Mr. Watson told me later (his June 2017 phone-call) that he had been quite struck by the Calgary slides and the supporting information. In his follow-up letter (June 23/17) Chair Watson said that in response to the Panel's review, NEB was "establishing a municipal/industry roundtable" with CEPA and the Federation of Canadian

Municipalities (FCM). I felt very encouraged by this because it appeared that NEB had finally recognized the degree to which HCSs are a legitimate concern and that furthermore, there must have been some recognition by FCM and CEPA that the situation warranted some of their attention as well.

Unfortunately, CEPA soon withdrew from the process, the roundtable folded and neither FCM nor CER has indicated any interest in reviving the matter.
That was almost six years ago.

Although FCM certainly has an interest in safe communities, etc it is not the body that is ultimately responsible for ensuring public safety next to federally-regulated pipelines. That duty is mandated to CER.

Senior CER personnel are well aware of the risks at these sites. They know, for instance, that during the Line 9 Hearings Enbridge estimated the potential release volume at the 12-storey seniors' condo in Scarborough to be in excess of 800,000 litres. The down-ramp to this condo's underground parking faces Line 9 at a distance of about 40 feet. As front-line personnel at Toronto Fire confirmed to me, the potential for catastrophic consequences would be extreme if a release were to occur, given the exceptionally close proximity and the condo's physical layout.

CER's ongoing complacency regarding the potential at this and similar sites inspires neither trust nor confidence in our federal regulator.

Indeed, the situation here has many parallels with what is being exposed in UK during the ongoing Grenfell Inquiry. For decades, companies and UK regulators turned a blind eye to development that was clearly unsafe and contrary to regulations which were not enforced, etc.
Then the unthinkable (though not unprecedented) happened.

That the 'unthinkable' is entirely possible is confirmed by even a cursory examination of the scientific literature regarding the accidental release & ignition of liquid fuels. Municipal planners seem to be entirely unaware of this literature: if they were, they would be much less likely to endorse the development of HCSs.
CER, on the other hand, should be more aware of this literature than any other agency in Canada.

Since it is unlikely that OPR will be amended or that CER will change its approach without clear evidence that such changes are actually needed, please allow me to present information that I hope will convince the reader that changes are not only warranted but may be somewhat urgent.

4. Safety and Environmental Protection (DP Section 5)
First, an observation: It is puzzling that although Section 5 of the DP covers both Management Systems (which is the title of **Section 6** in the OPR) and Emergency Management Program (which is the heading for **Sections 32 – 35** in the OPR) the DP contains no mention of public awareness programs nor any reference to the requirements under these Sections of the OPR regarding the communication of specific information to people who are exposed to the risks.

4a. Case example: Seniors' condominium (Scarborough, 12 storeys)
The unusual risks at this building may provide the best example of why changes are needed. Detailed information (including photographs) regarding this site have been provided to CER/NEB on multiple occasions: there is no need to repeat all of it here.

What is relevant at this point is the potential release volume from the larger of the two pipelines that lie within about 20 feet of the condo's south wall.

When asked during the Line 9 hearings about the potential release volume at this location, Enbridge stated:
"Assuming a flow rate of 300,000 bpd, the calculated volume of oil that could be released at Kennedy Road in the event of a rupture is 5,210 bbls. This value is the total volume that could be released and includes volumes upstream and downstream of this location. It also assumes that all crude within the pipeline not isolated by elevation or remote controlled sectionalizing valves would be released."

Enbridge's estimated volume equals 828,323 litres. The flow rate of Line 9 (300,000 bpd) converts to 551 litres (3.47 barrels) per second. Enbridge also stated, "This valve [ie. the nearest upstream valve] is remotely operated and can be closed in approximately three minutes of receiving a close command from the Command Centre."

However, pipeline companies typically give estimates of around 13 minutes for isolation of a release of liquids: 10 minutes to detect and verify the leak, followed by shutdown of the pumps and gradual closing of the valves.

We can also extrapolate that Line 9 could discharge approximately 115,000 litres within the first 3.5 minutes following a full-bore rupture.

If Line 9 happened to be carrying Bakken crude at the time of the release and if that fuel were sprayed & aerated, we could then have a situation that is comparable in many respects to a real-life event that was examined by expert investigators.

The 2005 explosion at BP's Texas City refinery involved the six-minute release of approximately 106,000 litres of gasoline [Bakken crude was found to be as flammable as gasoline by TSB investigators following Lac Megantic]. A vapour cloud formed, was ignited by a nearby truck, and then exploded killing 15 people and injuring another 180.

The CSHIB report is available here (March 2007, 341 pgs):
file:///Users/macuser/Downloads/CSBFinalReportBP%20(1).pdf

Two years late a team of Spanish researchers examined the same accident and compared its outcomes to those predicted by three models. Table 5 in their study is titled, "Probability of death by thermal radiation up to 150 m" (pg. 378). This table indicates 100% death probability within 75 metres, dropping to 89% at 100 metres. As the authors point out in Conclusions, "Damages predicted from thermal radiation were also within the actual range of fatalities [at Texas City}" (p. 379).
The Spanish study is here (2009, 8 pgs):
file:///Users/macuser/Downloads/279547-Article%20Text-382967-1-10-20140724.pdf

Returning to the vulnerability of the Scarborough seniors and given the potential for harm that a release of 'only' 106,000 litres could inflict within 100 metres, we get a sense of what a total volume eight times larger might inflict.

The risks at this 12-storey condo are greatly compounded by the fact that the down-ramp for the building's underground parking faces the two pipelines at a distance of about 40 feet. This ill-advised design feature could facilitate a flow of liquid fuel into the building itself, thus creating the potential for a catastrophic internal explosion.

Such potential raises questions about emergency response, how these vulnerable seniors, their staff and Toronto Fire personnel at Station 242 could possibly plan for a pipeline emergency, and the adequacy of OPR to address the needs at this and other HCSs.

4b. Public Awareness Programs
OPR inadequacies re. public awareness may be partly due to the way the OPR is structured.

First, although the primary purpose of OPR is safety, it seems as if OPR's authors were of the view that all that is required in order for people to be safe is to ensure pipe integrity: harm cannot occur as long as the product is contained.

That focus is reflected in the seven major sections that deal with active pipelines (ie. the sections covering management, design, materials, joining, construction, testing, and operations & maintenance).

However, we know that despite everyone's best efforts at containment, pipeline releases do occur, sometimes with fatal consequences; hence the importance of ensuring that the nearby public is both vigilant and well-informed. These precautions are unrelated to pipe integrity yet they may prove to be life-saving when needed.

Public awareness programs are not listed in OPR's Table of Provisions nor even as a sub-category under Operations and Maintenance. The closest we find to this topic are

statements in Section 6.5.1, in sections 33, 34 & 35, and in the supplementary Guidance notes. The resulting impression is that within OPR, public awareness warrants little more than a few paragraphs that are subsumed under the heading, "Emergency Management Program" (OPR sections 32 - 35).
That impression (ie. that public awareness programs are of minor importance) is reinforced by the omission of public awareness programs in the DP.

4c. Section 6.5.1
This section is titled, **Management System Processes**.
Subsection 6.5.1.c requires companies to identify and analyze all hazards and potential hazards and **Subsection 6.5.1.d** requires companies to establish and maintain an inventory of same.

However, OPR provides no definition of "hazard." I have repeatedly asked NEB/CER whether companies' inventories of hazards include hazards created by pipelines or whether the inventories include only hazards that threaten the pipeline.

I have never received an answer to that question but a few months ago I received clarification from CER. Their email (March 11, 2022) quoted the definition provided in CSA's Z662-19. The second part of that definition states that a hazard is "anything that has the potential to cause harm to people, property, or the environment."

According to this definition, the required inventories of hazards and potential hazards should include situations where the pipeline itself has the potential to cause harm. Companies will understandably argue that there is nowhere along any pipeline that there is zero potential for harm. That is true; hence the need for clarification and amendment.

CSA's Z662 is not the OPR. It is the OPR that provides the legal requirements regarding hazards yet OPR does not define the term, nor is CSA's definition workable with regard to OPR's legal requirements.

Recommended amendment: OPR should include a definition of "hazard" that includes both the hazards to pipelines and any exceptional hazards that emanate from pipelines (since both have "the potential to cause harm").

Subsection 6.5.1.f is of great importance with respect to public awareness and companies' obligations thereto. This subsection requires companies to have a process for developing & implementing controls in response to the identified hazards and risks.

As with "hazards," however, OPR contains no definition of the "controls" that must be developed & implemented. The email received from CER (March 11/22) provides some explanation:

"For terms that are not defined in the regulation such as "control", the CER defers to the common use definition of the word. With respect to OPR section 6.5 (1)(f), the CER is applying the terms as measures undertaken to identify and reduce harm."

Consequently, it appears that companies must have a process (presumably, one that leads to actual outcomes that are effective) to reduce harms that would otherwise not be prevented or mitigated.

Most significant, however, is what comes next in this Subsection: companies must also have a process "for communicating those controls to anyone who is exposed to the risks."

Under a "risk-informed approach" the priority population should be people who are most exposed to the risks: those who would be, in the event of a pipeline release, both most affected by the consequences and least capable of escaping from those consequences.

Those populations are precisely those that are the focus of this submission: the children, seniors, high-rise tenants, hospital patients & staff, etc who reside or work within HCSs. As was already mentioned on page 2 (section 3.a, Public awareness deficiencies), the level of public awareness that has been discovered at HCSs has been extremely low: at least 90% of respondents indicated no awareness of any nearby pipeline, much less any knowledge of its details (eg. diameter, pressure, flow rate).

Nowhere is there a greater disjuncture between an OPR requirement and the on-the-ground reality than there is with respect to **Subsection 6.5.1.f**.
I feel quite safe in saying, based on numerous interactions with a range of people at multiple HCSs over several years, that there was not, nor is there likely to be, a single person at any of these sites who has received any communication regarding the required controls.

What people at HCSs need is not a list of generic measures taken by pipeline companies in order to preserve the integrity of their pipes (eg. One-Call, no encroachment, integrity management programs, in-line inspections, etc).
Instead, people at these unusual facilities need detailed, actionable, site-specific information about the control measures that they should employ in response to a perceived pipeline failure.

As indicated in the Case Example (page 8, above), the rapid release of large volumes of fresh fuel constitutes a threat that is potentially life-threatening. It is vital that everyone on-site respond quickly and correctly, hence the importance of their receiving detailed information well in advance of an unprecedented emergency.

That information can only come from pipeline companies: they are the experts when it comes to their pipeline and the range of consequences that it could potentially inflict.

Recommended amendment: Subsection 6.5.1.f is certainly in need of clarification but how that may be achieved is beyond the scope of this submission.
As with "hazards" there is a need for "controls" to be defined especially when it is those very controls that must be communicated to anyone who is exposed to the risks.

The latter category is enormous, of course: "anyone" is virtually synonymous with "everyone." This places a nearly impossible burden on pipeline companies who are required to keep transitory populations such as high-rise tenants informed about the relevant controls.

That said, it requires only one uninformed person to activate an ignition source amid a vapour cloud and the result could be catastrophic; hence the very sensible intent of this subsection.

A workable solution may lie in having a database of identified HCSs. Doing so would be consistent with a risk-informed approach and second, prioritizing and informing the most vulnerable populations are goals that are both achievable and necessary (whereas informing everyone who is exposed to the risks may not be).

Verification that companies have achieved the requirements of **Subsection 6.5.1.f** and of **Sections 33 - 35** can be determined fairly easily by having CER's compliance officers ask open-ended questions of front-line personnel at these sites.
When on-site people are asked "What have you been told about the nearby pipeline?" and their most frequent response is a quizzical, "What pipeline?" we know that the required communications have not been successful.

The failure of CER's public awareness auditors to ask the intended recipients of these communications was addressed several years ago in an email that was sent to Chair Watson.
[This submission is already too long so I will simply refer the reader to a document that should be on file at CER (ie. my email of July 28/15 to Chair Watson via Steven Rowe, 3 pgs).]

5. Lessons not yet learned?

If there is anything that the years-long Grenfell Tower Inquiry ought to teach us, it is that people who are entrusted with public safety need to pay attention to what has gone wrong in other jurisdictions, learn from the investigative analyses of those tragic events, and make prudent, proactive adjustments to legislation, regulations and policies.

Canada has never had a civilian mass casualty event due the failure of a transmission pipeline. That fact seems to underlie the willingness of decision-makers at multiple levels to allow the placement of vulnerable populations next to major industrial hazards.

Other nations have not been so fortunate. The consequences of the sudden release of large volumes of flammable liquids are well known, as is the possibility, however unlikely we believe it to be, that a release can actually occur next to one of these vulnerable sites.

Americans paid little attention to pipelines until Bellingham. British authorities were willing to 'run the odds' on combustible cladding until Grenfell. We Canadians should be smart enough to make the necessary changes before a catastrophic incident finally happens, not afterward.

It may be many years before the OPR is reviewed again. If safety at existing HCSs is to be improved and new HCSs are to be prevented, now is the time for long-overdue amendments and more vigorous verification & enforcement to occur.

Thank you for considering my concerns and my suggestions.
Sorry to go on so long....

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