

My name is Louise Lantaigne and I am a resident of Waterloo Ontario. As a delegate at the previous Line 9 hearing, I continued to correspond with Enbridge afterwards to share concerns about pipeline integrity issues.

C55-2-2 page 1 I reviewed seismic risks along the route of Enbridge Line 9 by observing data from Natural Resources Canada. The map shows locations of seismic activity in Eastern Canada. In the Second paragraph it states: each year approximately 450 earthquakes occur in Eastern Canada. It also gives reference to the fact that over each decade there is an average of three earthquakes over magnitude 5.

Recent examples of Magnitude 5 or higher in Eastern Ontario includes June 23rd, 2010 when a magnitude 5 earthquake took place in Buckingham Quebec and on May 17, 2013, there was a Magnitude 5.2 earthquake in the Ottawa Valley.

Page 4 same report, last line of Historical Seismicity states, “An Earthquake occurs in the Western Quebec Seismic Zone every 5 days on average.”

C55-2-3 page 2 of PDF (page 1 of report) The US Geological Survey produced a report titled “The ShakeOut Scenario Supplemental Study” prepared by Donald Balantyne. **First paragraph** states: “There is a long record of oil and gas transmission pipeline failures in California earthquakes due to ground shaking and liquefaction. The large majority of these have been joint failures where the joints were constructed using oxyacetylene welds installed prior to approximately 1930.

Same report Page 4 PDF (page 3 of report) **third paragraph** states: Buried pipelines are vulnerable to permanent ground deformation and wave propagation (shaking). Ground deformation can include fault rupture, landslide, and liquefaction and associated lateral spreading and settlement. Pipe damage mechanisms include: compression/wrinkling, joint weld cracking/separation (particularly for oxy acetylene welds), bending/shear resulting from localized wrinkling, and tension.

Same report, Page 5 PDF (page 4 of report) **third paragraph** states; Historically, steel pipelines with high quality electric arc welded joints perform very well in this shaking environment. Pipelines with joints using oxy acetylene welds can have failure rates nearly 100 times greater than those with electric arc welded joints.

Ontario has a lengthy oil and gas well drilling and production history dating back to 1858. According to the Ontario Ministry of Natural Resources, tens of thousands of wells have been drilled in southwestern Ontario prior to modern well design and plugging regulations that were first enacted in 1958. If the pipeline is in proximity to an old oxy acetylene gas line, or contains sections welded with oxyacetylene processes, that poses a serious risk. During the Source Water Protection Act in the Grand River Watershed, I witnessed Waterloo Regional Staff stated that unregistered gas lines were identified as a risk to source water protection. They exist along the watersheds where Line 9 passes.

Does Enbridge or the NEB have any data regarding the location of existing oxy acetylene gas lines in close proximity to Line 9?

Is it possible to confirm beyond the shadow of a doubt that Line 9 itself is free of oxy-acetylene welds?

C55-3-1 page 1 last sentence, paragraph 2 A student by the name of Daniel Burd won a science contest. The hypothesis is that if PE-degrading microorganisms do exist in Nature, then it will be possible to isolate them and use them for degradation of plastic bags.

Last line of the same page states: A few soil samples were collected at a local landfill in Waterloo Ontario, then mixed together and used as a source of potential PE degrading microorganisms.

Page 5, same report it shows in **Table 6** that after 6 weeks time, 43% of the PE film strips were consumed by two naturally occurring bacteria. **First paragraph of Conclusions** identifies the bacteria as Sphingomona and Pseudomonas.

C55-2-5 page 10 I contacted Enbridge's solicitor Mr. Dumford by email on February 15, 2013 and provided a link to a power point I created regarding the seismic risks, oxy acetylene welds and the findings of Daniel Burd's PE eating bacteria. **Page 10** illustrates how the Kalamazoo pipeline ruptured due to dis-bonded PE tape. **Page 11**, I asked, "Is there any data to either prove or disprove the roll that Sphingomonas and Pseudomonas may play in regards to "tenting" issues regarding PE tape which can result in tears leading to corrosion issues? Is it reasonable to predict the lifespan of the oil pipes or PE tape in the absence of this data?"

Enbridge did not provide me answers to those specific questions, but professors of microbiology at the University of Waterloo stated to me it would be worth investigating.

C55-2-6 Paragraph 8 On February 13, 2013 in an article titled, "Enbridge Officials grilled about pipeline plan" Mr. Ken Hall, Senior Advisor of Public Affairs for Enbridge was quoted saying the following: "The way we look at our pipeline is that it basically doesn't have a lifetime -- it is indefinite. It is only that way because you have to take care of it. If we maintain our pipeline out there, it can last for hundreds of years. We're always in the process of renewing it-- that's the purpose of the integrity management program. For us a pipeline that is 40 years old is not old by any means."

C55-2-7 is from the Canadian Energy Pipeline Association's website regarding the History of Pipelines. It states **last sentence of the first Paragraph**, In 1862 Canada would complete one of the world's first oil pipelines, from the Petrolia oil field in Petrolia ON. to Sarnia. Same page, first line, second paragraph states: By 1947 only three oil pipelines moved products to market in Canada.

Based on the information provided by the Canadian Energy Pipeline Association, it is reasonable to state there is a lack of empirical evidence to suggest that an oil pipeline can function for "hundreds of years".

C55-2-6 page 2 paragraph 5 In the article, "Enbridge Officials grilled about pipeline plan", Senior Advisor of Public Affairs Ken Hall states: "Shutoff valves are not on non-navigable waters." He explained the pipeline wall's width of a quarter of an inch increases to half an inch when it goes under various bodies of water."

C55-2-8 Item 26. When the Federal Government approved of Omnibus Bill C-45 they removed 90% of Canada's tributaries that were previously protected by the Navigable Water's Act including reaches of the Grand River and other tributaries that flow where Enbridge Line 9 crosses. The vote for bill C-45 happened without reasonable scientific evidence to support the abashment of protective legislation. It passed without proper consultation with First Nations communities which is, in my view, illogical, unethical and unlawful.

C55-2-9 page 5 Section 1 and 2, towards the top of the page. I sent an email on February 15 2013 to Enbridge Solicitor Mr. Dumford asking where shut off valves are currently located for the Grand and Nith Rivers. I also asked where the nearest emergency response team was located. Solicitor Margery Fowke responded in an email sent on March 5, 2013. In her response she states: Enbridge has an isolation valve on the east side of the Grand River and an isolation valve 4.8 km (3 miles) west of the Nith River. She also wrote: "Enbridge has an emergency response team in Flamborough. That is the closest response team."

C55-2-10 it features a map of the Grand and Nith Rivers. If you intersect a line going east of Cambridge to a line going northbound from Caledonia, the corner point is approximately where Flamborough is located. According to mapquest, the drive from Flamborough to Ayr is 45 minutes. It is reasonable to state the driving time from Flamborough to reach the shut off valve 4.8km west of the Nith would take over one hour.

C55-2-6 page 1 last sentence. In the article Enbridge officials grilled about pipeline plan, Barry Callele, director, pipeline control systems and leak detection, said "A leak of two percent of the pipeline would release approximately 14,000 litres in five minutes. The capacity of the line is 300,000 barrels a day."

Using that math in a scenario for the Grand River, an hour of leak of 2% of the pipeline = 168,000 litres or roughly 1057 barrels of oil.

The Grand River is the main water supply for Brant, Brantford and Six Nations. Brantford only has a reservoir capacity of two days. Should the intake of the Grand be closed for an extended period of time these communities would be challenged to find alternative water supplies. The flow of the Grand discharges into Lake Erie, the most shallow and vulnerable of the Great Lakes. Contaminates in the Grand could also end up in the intake area of the proposed Lake Erie Pipeline.

C55-2-9 page 3 second to last paragraph. On March 6, 2013, I sent an email to Solicitor Fowke that informed her about the significant flood risks for the Nith River based on data by the Grand River Conservation Authority. This river is excluded from the Navigable Water's Act therefore there is no federal mandate to have a shut off valve in spite of the recognized flood risks. The Nith discharges into the Grand River.

C55-2-11 page 1 is a brochure created by the Grand River Conservation Authority titled, Preparing for Flooding, A guide for Residents of New Hamburg. The illustration features the Nith River Watershed. **On Page 2,** it illustrates the number of properties located in the flood zone as well as photos of previous floods in this location. This is upstream from Line 9.

C55-2-9 page 4, in the March 6th email to Solicitor Fowke, I gave her a link to the Toronto's Future Weather and Climate Driver Study by the Toronto Environmental Office produced on October 30, 2012.

C55-2-12 page 15, Toronto's Future Weather and Climate Driver Study states **first paragraph**, first sentence, "Using a weather-climate model approach, this study projects the future weather changes that Toronto may expect in 2040-2049. On the same page, last sentence of the second paragraph it states, the model predicts more extreme rainstorms and marked rainfall increases in July (80%+) and in August (50%+)

C55-2-13 page 3 and 4. During the first NEB hearing for Line 9 phase A, as a delegate I secured a written response from Enbridge regarding their Integrity Management System. To monitor pipes, they conduct Aerial Patrols approximately every 2 weeks, underwater survey of water body crossings and depth of cover surveys. They state in the **last paragraph**, Such surveys are generally conducted "At 5 year intervals."

C55-2-14 page 1 In an article published June 26, 2013 in iPolitics titled "Alberta flooding made a bad month worse for oil and gas pipelines" it references multiple spills associated with the Alberta flood including a rupture of a line carrying processing water owned by Apache Canada near Zama City on May 19 2013, a leak of produced water by Penn West Petroleum in the hamlet of Red Earth on June 19, 2013, the rupture of a Legacy Oil and Gas Ltd. gas line due to debris slamming into the gas line where it crossed a river in Turner Valley. On **Page 2 second and third paragraph**, it states, "There was a second potentially flood-linked spill near Cheecham just south of Fort McMurray on Saturday from Enbridge Pipelines Inc.'s oil-carrying Line 37. Enbridge believes around 700 barrels spilled before the leak could be sealed."

C55-2-15 second paragraph Globe and Mail article titled "Enbridge restarts Wood Buffalo pipeline closed following Alberta Flooding" states: "The company says the leak of Line 37 was caused by heavy rainfall, which triggered ground movement on the right-of-way.

Currently 80% of Waterloo Region's water supply is from groundwater and 20% is from the Grand River. Provincial growth targets will expand the population from 553,000 to 742,000 over the next 18 years. That's an extra 159,000 people moving to Waterloo Region with many of the proposed developments encroaching upon recharge areas. Regional Officials are considering a pipeline to Lake Erie to increase water volumes to support future growth with the waste waters being diverted back through the Grand River.

The current design constraints of Enbridge Line 9 as installed in 1976 secured a coverage of 1 meter of soil on top of the pipe to protect the system. That is according to the flyer "Enbridge's Line 9 pipeline Delivering Energy to Quebec and Ontario Refineries" as published by Enbridge. That depth has little regard for the extra flow and flow rates from urban growth, storm water runoff, sprawl over recharge, increasing human effluent, a possible Lake Erie pipeline and climate change variables.

Line 9 crosses multiple aquifer systems throughout Ontario and Quebec including the Waterloo Moraine, the Paris Galt Moraine and the Oak Ridges Moraine. All these areas have similar growth issues.

The Line 9 oil pipeline built in 1976 in the pre-Walkerton era. Back then planners believed natural clay was totally impervious. Since that time scientists realize it only slows the rate of flow, it doesn't stop it. In the 1970's people didn't have the tools to vertical fractures, or to delineate zones of influence from draw down impacts that pull contaminants towards well systems. They had a lack of data regarding the unpredictable sediment composition of complex multilayered aquifers such as the Paris Galt and Waterloo Moraine. Back in the 70's many believed if you put gas on sandy soil it magically evaporated, not realizing they were actually contaminating bedrock aquifers. We have come a long way in terms of hydrogeological analysis and the assessment of contamination risks.

The need is there to revisit the baseline data that allowed this pipe. We need new bore holes, new sediment studies, 12 month creek analysis and updated flow and flow rates if we are to plan with regard to the actual post development impacts since 1976.

The fate of our municipal water supplies should not be left to the discretion of companies or engineering firms who choose to use outdated data to save a buck.

I helped stop a dump in Tiny Township and helped cancel quarry pits and pit expansions at Mount Nemo in Burlington, the Highland Quarry in Melancthon, Capital Paving in West Montrose, St. Mary's Quarry in Flamborough. I also went to the Ontario Municipal Board for case: PL071044. The common factor of all these projects was Stantec.

In all cases there was inadequate monitoring to accurately calculate existing runoff conditions, infiltration conditions and groundwater discharge and therefore these components of the water balance may be grossly inaccurate. The same issues repeated and in my view, Enbridge Line 9 is no different.

Bore holes were too few or too shallow, data was old, there was a lack of regard for flow and flow rates, lack of regard for spring thaw, lack of 12 month creek analysis and lack of regard for sediment type. Lack of regard for post development impacts. Modflow was used but data was subjective making it difficult to replicate.

The reason this situation happens over and over again is because Canada lacks policy to mandate reasonable test times and methodology. The need is there to establish that.

I would like the NEB to facilitate more dialogue with municipalities, First Nations, the Provinces and the public to discuss how anticipated growth and climate change scenarios will impact the existing pipeline infrastructure particularly in regards to flow and flow rates.

I would like to request mandatory pipeline closures during incidents of heavy flooding, ice jams or seismic activity along with inspections of pipelines in tributaries after these events in order to assure system integrity before the lines are turned back on.

The need is there to establish reasonable criteria for the mandatory placement of shut off valves, particularly in areas where tributaries are prone to ice jams, flooding and severe erosion. We cannot allow the industry to govern itself nor should we permit the use of discretionary powers of elected officials to avoid the use of safety protocols. To allow the removal of protective

strategies poses a National Security threat to our economy, to communities and to the shared Great Lakes water resources of both Canada and the US.

There is a need to establish the criteria for reasonable design constraints that can withstand anticipated growth and climate change impacts in order to build a safer more resilient system for the long term.

As a Metis I am concerned about the inequity of enforcement protocols for violations of environmental laws in proximity to First Nation's reserves.

If toxic discharges occurs in Ontario municipalities, the average citizen has the right to report the incident to the MNR or MOE and the matter can be investigated and charges can be laid. If it happens again, the company may be fined higher as an incentive to prevent future incidents. However, if the incident occurs on a First Nation's reserve, the Province lacks jurisdictional powers to get that first offence processed because it is considered a Federal issue, not their jurisdiction. The Federal Government often responds saying pollution is a Provincial issue, not their jurisdiction. As a result, First Nation's are given the run around without the first charges laid, there is no cumulative damage costs for repeat offenders. The result is a situation which gives a vantage for polluting firms to set up next to Reserves in spite of the fact it creates a tort damage against First Nation's people. In order to mitigate this power inequity, I implore the NEB to adopt the following:

Create a clause in the draft agreement to provide First Nation's communities with a letter of credit worth 100% the value of the pipeline that crosses the area of their territorial lands. Should there be a spill or rupture of the pipeline due to poor maintenance, structural or mechanical failure they reserve the right to cash that check and use those funds at the discretion of their own community.

This procedure does not negate standard protocols but is added on top of standard protocols to provide an additional economic benefit to the otherwise fiscally and procedurally disadvantaged communities should a spill occur. This will also help to provide an economic incentive to assure that pipeline systems are functioning as designed.