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Order of Appearances

Enbridge Northern Gateway Pipelines Panel #3

Pipeline Operations, Emergency Preparedness & Response Panel

Mr. Kevin Underhill	Mr. Allan Baumgartner	Dr. Frank Bercha
Mr. Dale Burgess	Mr. Barry Callele	Mr. Ray Doering
Mr. Jeffrey Green	Dr. Matthew Horn	Mr. Walter Kresic
Mr. Greg Milne	Dr. Jack Ruitenbeek	Dr. Malcolm Stephenson
Dr. Elliott Taylor		

Examinations

Examination by Dr. Jeffrey Short for the United Fishermen and Allied Workers'
Union 22478
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Examination by Dr. Hugh Kerr for Dr. Josette Wier 23575

Examination by Dr. Jeffrey Short for United Fishermen and Allied Workers' Union 22478

Dr. Short said he would be questioning on [Exhibit B80-4](#), Evaluation of the Fate and Effects of Oil Spills Along the Proposed Northern Gateway Pipeline, Appendix A of the EHHRA.

Densities of diluted bitumen

Dr. Short started with section 3.4, Oil Properties and Acute Toxicity, in B80-4 and drilled down on the specs for the densities of various diluted bitumens. Readers wishing to follow this technical discussion in detail should go to the transcript.

In [Exhibit D72-32-11](#), Environment Canada indicates that Wabasca heavy oil would sink at 0 degrees, but would float at 15 degrees. Dr. Short asked, "Did you consider ... an oil that would sink at one temperature and float at another, fresh out of a pipe?" Dr. Horn did not answer the question, but replied that this oil does not meet the tariff specs, which state that an oil must have a density of less than 0.94 before it can be put into the pipeline.

Dr. Short looked next at Albian Heavy Synthetic oil which has a density of 0.9457 at 0% weathering, but could evaporatively weather to a density of 1.0271, which would exceed that of water. Dr. Baumgartner said that Enbridge tariff specs always reference densities to 15 degrees C., and the crude oil spec is 940 kg/m³ at 15 degrees. The Albian Heavy Synthetic density at 15 degrees is 937.1 kgs/ m³, so from a density perspective, it would be accepted.

Dr. Short asked, "From this information ... would you agree that, should this oil be discharged into a freshwater body, it could plausibly sink because of evaporative weathering?" Dr. Horn said, "This isn't our evidence. If that oil was to evaporate or weather to a point where its density was greater than 1, then ... that hydrocarbon could have the possibility of sinking.

Dr. Short is concerned with the phenomenon of an oil which floats changing to an oil which sinks when the temperature changes, or evaporation weathers it. "How would you go about modelling its distribution once it was discharged in the environment? That is, how would you go about modelling the discharge of an oil that is capable of achieving negative buoyancy through evaporative weathering only?" 22632

Dr. Horn began his reply by making two points: "The time for these oils to reach a density greater than one by evaporative losses only is actually quite great. We're talking many days and there's the possibility for a response in that period of time. Second off, any oil has the potential to sink as long as there are the right parameters, including those suspended sediments that we've been talking about in great detail." 22635.

Dr. Short moved to the topic of oil toxicity, and section 2.2.2 in B80-4. He said, the risk assessment is based on a single mode of oil toxicity. He asked, "Why weren't other

modes of oil toxicity such as, effects from ingesting oil, effects on embryotoxic effects and so forth, considered in the oil toxicity risk assessment?” 22668

Dr. Horn stated that those other modes were covered in other sections of the EHHRA. “And this single mode which you refer to is actually in the acute toxicity portion of the EHHRA, a combination of all of the different exposure mechanisms, including ingestion, physical contact and a number of others. It’s the cumulative toxic effects of exposure as a whole.” Again, it gets quite detailed, and can be found in the transcript. 22670

Dr. Short also takes issue with the statement that the toxicity model “utilizes the accepted toxic units approach for organic compounds, including MAHs and PAHs, where the primary acute effect is narcosis.” 22674

Examination by Ms. Joy Thorkelson for the UFAWU (continued) 22687

Compensation and third-party loss

Ms. Thorkelson referred to [Exhibit B69-2](#), Enbridge’s response to a request from the JRP for an evaluation of the economic losses for third parties. The document reviews four full bore ruptures into high consequence areas in the past 12 years. She asked, “Is it fair to say that this exhibit is a tally of payments made by the pipeline companies by way of compensation? Mr. Underhill replied, “This is our understanding.” 22687

She asked, “Has Enbridge done an analysis of economic losses for third parties in the commercial fishing industry? Mr. Underhill replied, “No not at this time.” 22693

Ms. Thorkelson asked many questions, some of which are excerpted here. Review them all in the transcript.

“Who takes the financial responsibility for remediating fish habitat? Mr. Underhill: “That’s Northern Gateway.” “Who takes responsibility for rebuilding fish stocks?” Mr. Underhill: “Anything that is a directly attributable to the operations of Northern Gateway, any damages that are attributable to Northern Gateway are the responsibility of Northern Gateway.”

Reading from [Exhibit B3-20](#), “...the exact amount of compensation would [...] be negotiated between the resources owner or landowner and Northern Gateway.” She said, Fishermen do not own salmon. Salmon’s a common property resource that the commercial fisheries have a licence to harvest. So the question is: Are fishermen’s losses included? Would Northern Gateway cover their compensation claims? 22733

Mr. Underhill replied, “We would look at that as a business loss which is something that is addressed by Northern Gateway if it’s directly attributable to our operations. So, yes.”

Who will be compensated? Only vessel owners, deckhands, shoreworkers?

“Would fishermen include only vessel owners or their deckhands as well?” Mr. Underhill: “We would look at that as a business loss so we’d be dealing with that business in, you know, whatever it entails.”

“What about shore workers and boat-shop employees and net-loft workers, what about those who manage their own fishing-dependent business, are they entitled to compensation?” Mr. Langen objected, but the Chairperson said the Panel would like the witness panel to answer the question. Mr. Underhill again: “If there were damages that were directly attributable to an incident ... we would be addressing business losses.” I don’t know what those business losses would look like but we hope to learn more about the types of things that would be compensable through the Fisheries Liaison Committee. 22744

Ms. Thorkelson: “You’ve said “business” many times. It’s the workers I want to know about. Mr. Underhill: “I’m using business in a broader sense. The business would include workers, and these are the types of things we hope to learn more about, again, through that Fisheries Liaison Committee.” 22758

“Would Enbridge be willing, as a condition for project approval, to work out a formula for lost income for all classes of fishing industry workers?” Mr. Underhill’s answer did not respond to the “condition for project approval” part of the question, so she asked it again. This time, he replied that they have committed to establish the Fisheries Liaison Committee immediately after approval and those are the types of things that would be discussed through that committee. “So that’s what we’re prepared to commit to at this point.” 22768

Recovering from impaired fisheries, rebuilding markets

Ms. Thorkelson turned to an aid to questioning (AQ) entitled The Deepwater Horizon Oil Spill and the Gulf of Mexico Fishing Industry by Harold Upton. She quoted from it about the impairment of the local fisheries, loss of markets, concerns about seafood safety. She asked how Enbridge will deal with similar impacts with NGP. Mr. Green said that in Alaska a strict testing regime was implemented to regain market confidence, and Dr. Ruitenbeen said a similar program was put in place with the Prestige spill off Spain, Portugal and France, and with the Lake Victoria Nile perch (not an oil spill). “Through very strict safety protocols and remediation efforts, [consumer confidence was] re-established quite quickly within a -- within just a couple of years, in fact.” 22776

Her remaining questions were about risk to the commercial fishery from a spill. One of her concerns was deferred to Prince Rupert, most of the others were in part or in total assigned to the Fisheries Liaison Committee. 22815

Examination by Dr. Hugh Kerr for the UFAWU 22852

The tanks, and erosion corrosion

Dr. Kerr said he wanted to talk about “the tanks” – about welding and possible problems and inspections. He referred back to October 16 ([Vol 91](#)) and discussion with Mr. Wong, with respect to sedimentation at the bottom of the tanks. He asked, “Would you expect erosion corrosion in the pipes leading from the tank and at the entry to those pipes?” Mr. Kresic said they would not. 22852

Dr. Kerr's own calculations indicate that the outflow from the tanks will have to be greater than the threshold velocity for erosion corrosion of 3 m/s. Mr. Kresic replied that the other critical threshold is of basic sediment and water (BS&W) of 0.5% "and in transmission grade quality crudes, the requirement is to be below .5 percent."

Tank inspections

Dr. Kerr asked about the method used for tank inspections. Mr. Kresic replied that when tanks are taken out of service for inspections, according to API 653, they would do visual and ultrasonic inspections of components that have any observances of deterioration. As part of the API 650 Design and Construction of Tanks -- which would have been a topic for the previous panel - we design to limit the amount of velocity in all the manifold and tankage pipings so that there is a limit to the amount of velocity that can occur, driving towards erosion if you were to hit the sediment levels. 22901

In reply to a question, Mr. Kresic said that tanks are coated, until ten years ago with fibreglass, and more recently with plural coatings of epoxies and urethanes. He described the inspection regime for new tanks.

For in service tanks, Mr. Kresic explained, "When the tank is taken out of service for an inspection inside the tank, and if there are sediments, then those sediments are cleaned out, then at that time we would take the opportunity again to inspect the full tank floor, the condition of the coating and that would be the appropriate time to then do repairs or replacement of the coating." 22921

Dr. Kerr: "How often it would be taken out of service?" Mr. Kresic: Within API 653 it's 10 years to the initial inspection, and then based on the results of the first inspection, we can extend to 20 years for subsequent inspections.

Dr. Kerr moved into more questions about inspections, the steel used, the welds, tank behaviour in very cold weather, and a scenario in which a major earthquake hits during very cold weather.

Examination by Dr. Josette Wier 23032

Pipe thickness

Dr. Wier's first questions were about pipe thickness. Mr. Doering replied that the original wall thicknesses, in May 2010, were in compliance with CSA Z662 for wall thickness. Recently, they decided to increase the average wall thickness for the oil pipeline by about 20%. "So we are well in excess of the Canadian standards, the Z662 standards."

[Exhibit B131-2](#) is an updated table of pipeline segments, showing old and new wall thicknesses and risk ranking. For some segments, the risk ranking has increased, and Dr. Wier is concerned about that. The explanation, said Mr. Doering is "we have identified other potential geohazards." 23059

Remoteness and accessibility

“Is there a difference between remote and accessible,” Dr. Wier asked. Mr. Doering offered that accessibility is a function of the means of access within 100 metres of the pipeline right-of-way. Remoteness appeared to be a function of distance from population centres. 23070

Hard to convince

On an earlier hearing date Enbridge stated “we do have dedicated emergency response groups within our organization that specifically look at those types of things; go to oil spill conferences, go to symposiums, are members of CEPA, API, AOPL, so very much at the forefront of whatever new technology may be coming out.” (Vol 92) Dr. Wier said, “There’s something very troubling because the Kalamazoo doesn’t show -- that recent accident doesn’t show that any of that, being at the industry forefront if at all.” 23084

Mr. Underhill spoke of some of the things Enbridge learned at Kalamazoo, and \$50 million it has spent since then to augment its spill response capabilities. Nothing to Dr. Wier’s point. She replied, “This is a hard one to convince people like me.”

Exercises, promptness, and the Enbridge scorecard

She asked about spill response exercises. Mr. Burgess said that each region sets its own exercises, looks for more sensitive areas. “We often choose major rivers. And since Marshall, we’ve conducted exercises on the MacKenzie River, the Athabasca, the North and the South Saskatchewan, the Red River, the Don, the St. Clair, the Straits of Mackinac and countless others.” 23118

Dr. Wier questioned Enbridge’s meaning when it talks about responding promptly. “If it takes 12 hours to close a valve but it takes 5 minutes for somebody to drive to the site, that’s a prompt response?”

She quoted again from Volume 92 with respect to the performance in those areas of impact: safety, integrity and leak detection “...impacts the annual compensation of every employee within Enbridge.” She asked, “so everybody at Enbridge gets less money when there is a spill?” 23136

Mr. Underhill replied, “Yes, that is correct, Dr. Wier.” Dr. Wier said, “Mr. Daniel, he got a bonus for \$1.2 million the year of the Kalamazoo, so he’s not an employee? For his safety performance? It was 1.3 that he got, sorry.” She quoted from an Enbridge management information circular of Feb 2011: “Mr. Daniels received a \$1.3 million bonus after the Kalamazoo accident for the low spill statistic of the company.” Mr. Underhill began his reply, “At Enbridge we have a scorecard that sets metrics that we achieve ...” 23156

Enbridge’s plans to spill oil into rivers

Dr. Wiers’ next questions related to the 2000 cubic metres between valves or twice the Pine River spill, which was the largest ever in BC, and Enbridge’s plans to spill oil into rivers which are fish habitat, something which is expressly illegal under the Fisheries

Act. She asked, “How can you plan to introduce oil in a river when it’s forbidden?” Mr. Underhill’s reply began, “We don’t plan on doing that at all.” 23182

Expected percentage of oil recovery

Dr. Wier asked about the percent of oil Enbridge expects to recover. She asked about Michigan, but that information is not available yet. She asked about the 11 spills over 1000 barrels between 2002 and 2012 that have been referenced by PHMS. NGP agreed to an undertaking to update [Exhibit B161-1](#) with the percent of oil recovered. 23223

Modelled domain

Dr. Wier asked what is meant by the modelled domain, and how they decide to model “62 km here or the whole length of the river there.” Dr. Horn explained that “modeling domain refers to a series of grids that is overlaid upon the river.” He picks the distances based on his assessment of “the main effects of the spill.” 23292

Subsequent discussion made clear that Dr. Horn’s modelling is concerned with the acute impacts. He stated that the long-term chronic effects are also dealt with in the EHHRA.

Human Health Risk Assessment Framework

Dr. Wier posed a number of questions related to the Human Health Risk Assessment Framework, Section 8 of the EHHRA, in [Exhibit B80-3](#). Many of her questions require a level of expertise in human health and toxicology and to summarize the discussion in these notes is beyond our competence. Interested readers must go to the transcript, beginning at paragraph 23388 for her preliminary comments and questions, and for the technical questions at 23469.

After a considerable number of questions, and qualified answers, and undertakings, the Panel took a break, and returned having remembered its own decision to schedule the HHRA experts for Prince Rupert. Consequently, much of what is recorded from this point on, will likely be repeated there. Readers may prefer to skip directly to the [Examination by Dr. Kerr](#), below.

Herewith, however, are a few selections.

Dr. Wier determined that there was no medical doctor writing the human health risk section of the EHHRA and that the two witnesses speaking to Dr. Wier’s questions relating to human health aspects of the EHHRA – Drs. Horn and Stephenson - have no expertise in that area. 23388

Dr. Wier stated, “The issue I have is it’s called “Human Health Risk Assessment” and none of the people brought to the Panel have any expertise in those fields.” “I want this entered in the records that we’re talking about human health effect and we are asking people who do not have any expertise in human health effects. So this is the conundrum I’m forced to be into and I don’t think that’s acceptable.” 23445

She also expressed frustration that the HHRA was so delayed, and “we’re using hearing questions for what should have been IRs. And this is why we’re wasting so much time.” 23468

Dr. Wier asked, “Was the toxicity of combined contaminants analyzed because we don’t just breathe benzene and not anthracene or whatever?” Dr. Stephenson said, “Yes” and referred to Table 9-8, COPC¹s Within Additive Risk Groups which “shows that manner in which particular types of compounds that are considered to have additive effects were evaluated.” 23477.

“Was a range of sensitivity amidst the human population considered?” Dr. Stephenson replied, “My understanding is that the toxicological benchmarks that are used for humans incorporate safety factors that would accommodate the range of sensitivities.” He cannot speak with any authority to this, so it becomes an undertaking to confirm that “the range of sensitivity amidst human population is addressed through the factors included in the TRV².” 23477

In section 8.4 Risk Characterization she asked what are “reasonable limits” for non-carcinogenic substances. Dr. Stephenson referred her to Table 9-5, Acute Toxicity Reference Values Used in the HHRA. 23490

“Is it correct to understand that the contaminants may be present for decades?” Dr. Stephenson: “That would not be correct. These exposures are persistent for usually less than 48 hours.” Dr. Wier said she is not talking just about air, but in water and vegetation and possibly for decades. 23500

“[Is] the HQ target for each contaminant [set] at 1, or can some contaminant have a higher HQ which becomes lowered by others with lower HQ when you use them together?” Dr. Stephenson decided it was best to take an undertaking for a reply to this question as well as, “How have the authors addressed synergies and/or cumulative effects?”. 23515

The JRP belatedly remembers its own ruling

The Panel took a break, and when it returned, the Chairperson said, “We understood your concern about the fact that there isn’t someone who’s on this Panel who is -- who is an author of this part of the report and we went back to a -- a ruling that we -- that we made earlier, ... to have questions on the HHRA deferred until Prince Rupert.” So Dr. Wier was bumped to Prince Rupert and ended her questions for the day. 23529

Examination by Dr. Hugh Kerr for Dr. Josette Wier 23575

Girth welds, coatings, and inspections

Dr. Kerr quoted from the Semi-Quantitative Risk Analysis ([Exhibit B75-2](#)), “Field girth welds will be coated with a system compatible with the plant-applied external coating

¹ COPC - [contaminants|constituents|compounds|chemicals] of potential concern

² TRV – [toxicity|toxicological] reference value

system.” He asked when that coating would be applied. Mr. Kresic said after the inspection, and a day or more after the weld is completed. Dr. Kerr also asked about cleaning processes, and curing of the coating. 23583

As before, Dr. Kerr’s questions are technical and detailed - and are available in the transcript.

Dr. Kerr asked, “How do you inspect these coatings?” Mr. Kresic provided a substantive answer, including a description of the role of cathodic protection. At Dr. Kerr’s request, Mr. Kresic expanded on the use of “close space interval surveys” which involve manual readings every meter. 23612

Mr. Kresic said that running tools inline gives the best inspection and followed with descriptive explanations.

Dr. Kerr asked about the use of coatings above ground. Mr. Kresic said they typically use paint, above ground.

Dr. Kerr asked about the “analogue inline inspection dataset” mentioned in the SQRA. Mr. Kresic said it is Line 4, built in the late 1990s, an existing 36-inch, fusion bond epoxy coated pipeline, carrying dilbit. Dr. Kerr’s questions also disclosed that Line 4 uses the same sort of field joint coating as is proposed for NGP. 23690

Dr. Kerr asked about operating temperatures. Mr. Kresic brought up [Exhibit B101-2](#), which compares the analogue Line 4 with NGP. The average annual temperature of the contents of Line 4 is 11.2 degrees C compared to the expected 14 degrees C for NGP. The highest design temperatures for Line 4 and NGP are 38 and 50 degrees. Enbridge’s tariff today specifies the maximum temperature that a product can be received into its pipeline system is 38 degrees. 23707

Repairs to a section of pipe

Dr. Kerr said, “There are occasions where you have to cut out a section of pipe and then put in a new section. Is that correct? Mr. Kresic replied, “Normally, we wouldn’t need to cut it out.” We apply a repair sleeve. It’s welded directly to the existing pipeline and it becomes part of the pipeline. Dr. Kerr asked about the welding process (a fillet weld by the shielded metal arc process) and asked more questions about the repair welds. 23730

Dr. Kerr quoted from B101-2 about cracks and girth welds being the most significant construction integrity concerns for higher grades of micro alloy steels, and the critical value of diligence by individual welders, foremen, quality control personnel, and Enbridge's welding inspectors. Until he was pushed to his question by the Chairperson, he also commented on recent problems with welds at TransCanada, and a recent story from the Globe and Mail about lack of compliance with welding regulations. He asked, “How will you ensure that you will get compliance with welding procedure specifications?” More related questions follow in the transcript. 23775

Internal corrosion: dilbit vs conventional crude

Dr. Kerr asked about the comparable corrosivities of dilbit and conventional crude oils. Mr. Kresic explained that in Enbridge they have a real-life laboratory of experience on how these crudes behave within their pipeline systems under the various flow behaviors and temperatures and so on. 23832

“It’s from that that we gather our empirical information. In those pipelines we do know that heavy crudes, including dilbit, when they do have a slower flow, sediments can drop out and can collect in certain parts of the pipeline and require cleaning.”

“Over the many years of operation, we have had internal corrosion happening in some places and we’re able to monitor that with inline inspection and also apply inhibition to abate the existence of internal corrosion.”

“I don’t think we’ve ever had a mainline rupture because of internal corrosion, over 60 years of operation.” 23813

Submission by Richard Kuprewicz

Dr. Kerr introduced two documents by Richard Kuprewicz as AQs. The first is a submission to the U.S. Congress in July, 2010, called “Kuperwicz Testimony Before Congress.” Dr. Kerr highlighted statements regarding the need for more public transparency, and the downside of risk-based performance approaches: which can “step into the realm of the reckless, and prudent regulation and checks and balances don’t come into play.”

Dr. Kerr also quoted from statements in Kuprewicz about pigs (recommends “a more actually observed performance reporting format”); corrosion (“Even with the implementation of integrity management programs, corrosion both internal and external is still the primary cause of liquid transmissions pipeline failures in the U.S.”); some companies appear to be deluding (themselves? regulators? public?) with their corrosion control programs. 23882

Mr. Kresic said they don’t buy these tools, they commission their use. The tools can be very expensive – up to \$100 to develop and build – and require a large team to use and analyse. Companies like General Electric they would hire to do inspections. 23974