Enbridge Northern Gateway Project
JRP Hearing Notes

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20125

Framework for Pipeline Oil Spill Preparedness

Yesterday, Northern Gateway was given Undertaking U-48 with respect to a Framework for Pipeline Oil Spill Preparedness (Ms. Griffith called it, "a plan to develop a plan"). Today, copies were distributed, and Mr. Milne's commentary is a guide to the diagram, and the plan, and can be followed in the transcript at paragraph 20150.

Examination by Ms. Jennifer Griffith for the Haisla Nation (continued)

20205

Framework for Pipeline Oil Spill Preparedness

Ms. Griffith started out with questions about the Framework for Pipeline Oil Spill Preparedness just introduced by Mr. Milne. One of her concerns is with the third-party assessment. She asked if it would assess whether NGP has met the conditions in an approval or met the expectations of the public. Mr. Milne replied that the review will be a technical assessment, and will assess approval requirements. 20205

Ms. Griffith asked, "Is Northern Gateway prepared to have terms of reference for that third-party review process incorporated into conditions of the approval?" Mr. Milne said that, "Northern Gateway would not be opposed to such a condition. … We would … look to the Review Panel to determine if it was appropriate." 20262

Worst case scenario on the Kitimat River

Putting up a 47 year discharge chart for the Kitimat River (below Hirsch Creek, and just before it enters the estuary at Kitimat) Ms. Griffith asked if NGP needs to be prepared to respond to spills during maximum discharge conditions such as the 2800 cubic metres per second shown on the chart. 20266

Dr. Taylor replied, "NGP will respond to any spill, period," and added that a period of very high discharge may curtail aspects of the response, particularly with regard to safety of personnel. Certain conditions may delay some of the response tactics that could be used, but a response will always happen.

Ms. Griffith next put up a discharge chart for 8 days in October 2012, when the flows rose from 75 cms to about 700 cms. "Would these dramatically variable flows create difficulties in cleanup scenario?" Dr. Taylor said there may be adjustments, there may be movements of equipment from one location to another during a particular event. 20313 Later, he added that as velocities increase then the tactics would be adjusted. 20352

Dr. Horn added that the site in Ms. Griffith's example is at the lowest location on the river, where all tributaries are contributing to the volume of water. Upstream discharge would be less and it would be important to know those velocities in a response situation, not just discharges at the bottom.

Discharge and velocity

In this discussion, the witnesses differentiate between discharge and velocity. Ms. Griffith asked if velocity has an impact on the effectiveness of containment equipment but discharge does not? Dr. Taylor explained that discharge is amount of water moving past a cross section. If you make it a smaller cross section it'll be moving faster. If you have the same discharge moving through a large cross section, it will move slower. 20358

Ms. Griffith asked about the complicating factors of repeated freeze/thaw events where it will snow, then rain, then snow, then rain, repeatedly. When this occurs, there are repeated snow melts that compound the input into the Kitimat River. 20371

Mr. Underhill replied that their focus has been prevention, but he did not address her concern. Mr. Green suggested she might ask Monica Wagner, in the next panel.

SCADA and CPM detected 5 of 11 spills

Ms. Griffith had follow-up questions regarding questions from Mr. Jones for the Province of BC. (Vol 92) Mr. Callele had provided statistics for how Enbridge's 11 spills over 1000 barrels were detected between 2002 and 2012. "To recap, the detection methods were CPM or SCADA: 2; Enbridge controllers: 3; public or third party: 2; local operators or air patrol: 3 and other: 1." Ms. Griffith asked, "What is meant by detection by Enbridge controllers?" Mr. Callele replied, "Through the SCADA and CPM systems." Ms. Griffith summarized: "So a total of 5 out of 11 were detected by remote detection, is that correct?" 20384

At this point, Mr. Callele confused the discussion. Later he quoted himself from Vol 92, and confirmed that Ms. Griffith was correct. 20416

She asked for details about the six spills not detected, and again Mr. Callele's answer was confusing. So Ms. Griffith asked for an undertaking for Northern Gateway to provide information on the length of time between the commencement of the leak and the time the leak was detected for the 11 releases which were greater than 1,000 barrels. Moments later, Mr. Callele qualified the undertaking by saying that he may be "unable to ascertain exact leak start time." 20452

Behaviour of condensate in the water column

Ms. Griffith enquired into the "fate" of condensate in a spill, in a conversation that begins with confusion over terms, and incorrect information in the record. Once she and Dr. Horn worked through that, they had arrived at Table B4.6 in Exhibit B80-4 which was also discussed yesterday. 20499

In a high flow condensate spill, by the time the condensate leaves the downstream extent of Dr. Horn's model (at the Kitimat Estuary where it "exits last grid"), 49.3% of the original condensate will have evaporated, 6.4% will be "dissolved aromatics" in the water column, and 32.2% will be "entrained droplets" in the water column. Once the condensate flows into stiller water, the droplets will rise to the surface where much of it will evaporate, and some will be available to skimming. 20540

Ms. Griffith asked, “Can the condensate that has become dissolved in the water be cleaned up?” Dr. Horn said, “The fraction that’s dissolved in the water column will disperse. It will dissipate. It will evaporate. It will weather. The dissolved constituents are typically not something that you would consider would be cleaned up manually.” 20522

Ms. Griffith: “A similar question with respect to the condensate that remains as droplets in the water. Can that be cleaned up?” Dr. Horn: “The condensates that are droplets within the water column are just that. They’re droplets. And condensate is much less dense than the water. So in quiescent pools, those same entrained droplets would likely surface back up to the top where they could be skimmed, where they would evaporate.”

Ms. Griffith asked if the condensate in the water could have toxic effects on aquatic organisms. Dr. Horn said it could. 20550

Comparing the Methanex model with Dr. Horn’s model

Ms. Griffith then brought up an excerpt from an environmental risk analysis prepared by Methanex Corporation in relation to condensate at the Kitimat Marine Terminal, as an aid to questioning (AQ). The model used in this report suggests that 50 to 83 percent of the condensate might be “quickly entrained into the water column generating concentrations in the upper water column high enough to cause toxicity to aquatic species.” 20553

Noting that this finding is at odds with Dr. Horn’s results in which 80% of the condensate will evaporate, Ms. Griffith asked why that was. Dr. Horn explained that this model was first of all concerned with marine behaviour of condensate, and secondly, intentionally did not allow the condensate to evaporate or degrade.

“When one does marine spills, there are two kind of worst-case scenarios and the first is: you either attempt to maximize the surface slick in your analysis by conservative approximations to make it a worst-case scenario or, as you’re mentioning, from an acute toxicity standpoint, you try and maximize the concentration of the constituents in the water column so that you essentially over-estimate the risk and the damage, which is constrained to produce a different outcome.” 20572

The discussion which follows was about the purposes of modelling, and about the questions the models are designed to help answer.

Ms. Griffith asked, “Does condensate float for longer in the marine environment than in the freshwater environment?” Dr. Horn said that saltwater is denser than fresh water, but that in both cases condensate is more buoyant than the water and will float. In any event, “the primary fate is evaporation.” 20602

The toxicity of condensate

Quoting comments about the toxic effects of condensate, noting that it is “very toxic to aquatic organisms” from a Devon materials safety data sheet (MSDS) she used as an AQ, Ms. Griffith asked if NGP will know the constituents of the condensate in its pipeline. Mr. Underhill said they sample annually, their tariffs regulate the products, and they can identify each batch being transported. 20617

Ms. Griffith asked whether spill responders with have specific precautions depending on what the particular batch of the condensate is in the pipeline? Mr. Underhill's reply suggested that a single MSDS for condensate will cover all the batches carried. 20653

Diluted bitumen

Ms. Griffith said, "It's my understanding that when bitumen when first comes out of the ground, it must be cleaned, diluted with some sort of diluent, and then heated before it can flow in a pipeline; is that correct?" Mr. Underhill said it is not heated. The purpose of dilution is to permit it to flow in a pipeline at ambient temperatures. Ms. Griffith asked then if diluted bitumen flowing in a pipeline is quite often at higher than ambient temperatures. Mr. Underhill said that is not correct. 20660

She asked about the behaviour of dilbit on entering colder water. Dr. Horn said that like all oil, it becomes more viscous, "that's thicker." Table B4.6 shows that 16%-31% of dilbit could enter the sediment. Dr. Horn agreed that was the case, but cautioned that the table is of an unmitigated spill, "nobody touches anything," and the dilbit is in the water for 16-45 days. "The point of a response is to change the mass balance." 20673

Ms. Griffith's questions also elicited the information that the substrate in the Kitimat River by virtue of its gravels, cobbles and boulders, provides less surface area for oil to adhere to than the finer-grained Kalamazoo River. 20679

Ms. Griffith established that NGP will operate the pipelines and the marine terminal, and that it will draw on Enbridge's past experiences in Venezuala and Colombia. 20697

Ms. Griffith attempted to ask some questions about compensation for damages, using a US Congress committee transcript as an AQ. She quoted from it, "Enbridge was encouraging people most affected by the spill, in the red zone, to sign the full and final settlement release for $210 per adult in the household and $105 per child." Mr. Langen objected and after discussion, the Chairperson directed Ms. Griffith to ask her questions directly. Ms. Griffith decided she may come back to these questions later. 20730

Noting in Enbridge's Valve Placement Strategy the notation "potential future pump station," Ms. Griffith asked whether the valve will be incorporated into the applied for project of 525,000 bpd or will be incorporated later as part of a future application to build out to the 850,000 bpd expansion capacity. "If Northern Gateway had no intention to seek an increase in capacity and install future pump stations, would it place a valve in that location?" Mr. Doering replied that they would build this valve just based on the distance between the two adjacent valves. 20766

Accessibility rankings and unassessed impacts

In an IR response to the Haisla (Exhibit B79-2), NGP ranked accessibility by a code of 1, 5,10,15,20, with 1 meaning major permanent access and 20 meaning no access. Ms. Griffith asked a number of questions. With respect to the "no access" locations, Mr. Doering confirmed that some access may be created which has not yet been indentified,

because it is early in the process, and the effects of which have not been assessed in the ESA. This concluded Ms. Griffith's questioning of this panel. 20844

Examination by Mr. Richard Overstall for the Northwest Institute for Bioregional Research and for the Friends of Morice-Bulkley 20884

Mr. Overstall began by "creating a link" between the Semi-Quantitative Risk Analysis (SQRA) (Exhibit B75-2) and the Ecological and Human Health Risks Assessment (EHHRA) (Exhibit B80-4) that is the subject of this panel.

The SQRA says that "The project is undertaking a more detailed evaluation of higher risk sections of the Coast Mountain portion of the Route Revision U." Mr. Doering stated that this more detailed study is the Kitimat Valley Design Construction and Operations Report (Exhibits B80-2 to B80-12) which focus on enhanced design, prevention, leak detection, consequence, minimization, methodologies, for the Kitimat River Valley. 20890

Mr. Overstall asked if there was a link between the SQRA and the EHHRA. Dr. Stephenson replied that there is a link between the two studies, but he described it as a narrow link. The EHHRA evaluates consequences of oil spills in four rivers under a variety of different scenarios. The SQRA was used to inform the selection of those rivers in terms of consequence areas. It also provided information about spill volumes that could be expected at particular locations along the pipeline route, which were used to help construct the spill scenarios that were used in the EHHRA. 20894

Two sets of probabilities

Mr. Overstall noted that both studies establish probabilities for various things. He asked, if those probabilities compound in the EHHRA. Dr. Stephenson said that the two studies are separate entities. The SQRA deals with the probability of a spill occurring. "It's an on or off switch. If there is no spill, there is no risk to ecological receptors or humans." The EHHRA deals with those latter risks. He adds that the EHHRA was conducted to meet the requirements of the Canadian Environmental Assessment Act. 20903

Testing the models

Mr. Overstall stated his intent "to test the acute and chronic health effect models put forward in evidence in the EHHRA." He will question "model assumptions regarding model validation in parameters and site-specific data." He will consider three rivers; Morice, Clore and Sutherland. 20922

Dr. Horn said that he used the SIMAP (Spill Impact Model System) model. It has a great number of outputs, including the extent of spilled oil, the concentration of hydrocarbons within the water column and the duration of exposure because these waters are moving down the watercourse. "We then carry those concentrations forward, as well as the surface oiling, as well as the shoreline oiling and vegetation oiling, to then conduct an analysis of what one would expect from a biological impact standpoint as well." 20926

Mr. Overstall turned to Exhibit B80-3, and Table 7-13 which is the mass balance of oil fates on the Morice River. He asked Dr. Horn if he could give a range of uncertainty

around the figures. Dr. Horn replied that it is difficult to quantify the uncertainty in this case, which is why he provided high and low flow cases.

Table 7-13 Mass Balance of Oil Fate for Each Modelled Scenario in Morice River

Scenario	Surface	Atmosphere	Water Column	Sediment	Ashore	Decay	Exits Last Grid*
MR-DB-HQ	0.0%	2.1%	42.0%	23.0%	23.4%	9.5%	46.5%
MR-DB-LQ	0.0%	3.1%	3.9%	51.0%	35.1%	7.0%	0.8%
MR-SO-HQ	0.0%	3.3%	59.9%	26.7%	2.3%	7.8%	58.9%
MR-SO-LQ	0.0%	7.6%	52.3%	22.2%	8.6%	9.2%	52.4%
MR-CD-HQ	0.0%	25.6%	64.5%	0.0%	2.8%	7.1%	50.9%
MR-CD-LQ	0.0%	53.9%	32.5%	0.2%	7.7%	5.7%	25.7%

NOTES:
* Currents end before end of last grid, so mass remains in last grid at end of run
Morice River = MR
Diluted Bitumen = DB; Synthetic Oil = SO; Condensate = CD
High Flow = HQ; Low Flow = LQ

Mr. Overstall questioned the validity of these results. Dr. Horn said that the SIMAP model has been used in a number of studies. Mr. Overstall asked if the modellers have experience with recently glaciated BC rivers. Dr. Horn referred to Exhibit B132-2 which provides a list of rivers. The Columbia River on the US side is the closest analogue to the Morice, Kitimat, and other northern interior B.C. salmon spawning ecosystems.

Mr. Overstall asked if they consulted with a fisheries biologist in terms of the inputs to the model. Mr. Green replied that Tim Slaney had provided input to the EHHRA. 20969

Turning again to B80-4, page 64, Mr. Overstall said that with respect to validation of the biological effects model, a casual reading would have the impression that the only in-water effects would be on lobsters. Dr. Horn's defence of the model and a lengthy discussion about its validation and its specific applicability to the salmon-bearing rivers of concern, particularly because salmon don't show up anywhere in the previous uses of the model, begins at 20989.

Location of hypothetical spills

Turning to the map of the hypothetical spill location on the Morice River in Exhibit B80-11, Mr. Overstall asked, "Would a spill closer to the proposed pipeline crossing in the Morice at the top end of this ridge influence the potential acute toxicity impacts to a greater amount of the floodplain habitats in this reach of the Morice?" Dr. Horn said that this location was chosen because at the time it produced the largest spill volume, that a spill at the crossing itself would be smaller because there are valves on both ends of the crossing. He also noted that the most recent route revision has reduced the spill volume at this location by more than half. He said that moving the spill site a few km in either direction will not change the results by much. 21039

Mr. Overstall asked if the choice of location was informed by detailed knowledge of where different species of salmon spawn, rear, and migrate at different times of the year.

Mr Green reiterated that they chose the site because it represented the largest volume. They considered all species to be present and sensitive, and they are not looking at specific species. 21062

In response to a question by Mr. Overstall about valve locations and spill volumes, Mr. Doering put up Exhibit B101-6, which shows Route Revision R, which places the pipeline well south of the Morice River, has no valve locations indicated on it, and won't be filed until "later this year." 21105

Shifting goalposts

Mr. Overstall spoke to the Chairperson: "It's very difficult for intervenors to test the evidence when the goalpost keeps shifting. We have a model that was based on the yellow location up there. (Route U)" When we try to test that, we're told, "Oh, the goalpost has shifted. We're now on Route Revision V, and it's much better, but we don't have any evidence to present to you to -- that you can test. And it could well be that what Mr. Doering and Dr. Horn are saying is true; this new location may be wonderful, we don't know." 21105

Mr. Overstall expressed his frustration. "The Panel is engaged in a quasi-judicial process in which, at some point, you've got to say, this is the proposal, this is the evidence supporting it, here it is to be tested. We may consider motions or something around that. But just in terms of my questioning, and in particular, Mr. Doering's response and Dr. Horn's response to my questions, I've got to express frustration because I can't say anything." 21115

The Chairperson tells Mr. Overstall that "It is the responsibility of all of us to keep up on it." "We'll leave it to you and the parties that you represent to decide what action, if any, you want to take." 21109

Two different processes

Mr. Overstall. "It seems to me … that Northern Gateway Pipelines is treating this process as a consultation process and some of the others of us are treating it as a testing of the evidence; a quasi-judicial process in which the Panel is going to come to a judicial decision and make recommendations to the federal government. So we've got two different processes going on here, and they don't always interact very well." 21126

Bottom roughness

Mr. Overstall turned to Exhibit B80-7, and a series of maps beginning on page 68 that depict bottom roughness, which Dr. Horn explained affects turbulence and oil entrainment. Reach 2 of the Morice River is depicted as sandy. 21128

Mr. Overstall asked for an AQ, an article by Allen Gottesfeld, and the quote, "The bed load of ridge 2 is coarse, consisting mostly of gravel and cobbles. Over 95 percent of the bed load is coarser than 2 millimetres." He asked Dr. Horn, "Do you agree with Dr. Gottesfeld's assessment of the bed load composition of Reach 2 of the Morice River? Bed material." Dr. Horn replied, "I did have an opportunity to fly this section of the river and, to the best of my knowledge, it did seem to be mostly gravel." 21153, 21172

Mr. Overstall asked how that changes the outcomes of the model with respect to a number of factors. Dr. Horn said, "It's unlikely that it would change the mass balance tremendously." Later in his response he suggests that it might change the mass balance, leading Mr. Overstall to comment on the seeming inconsistency. Dr. Horn concluded, "When you add these small changes, complexities will grow." 21175

Water velocity

Mr. Overstall put up Table B.3-11 in Exhibit B80-4 which shows contrasting methods of evaluating velocity: the Jobson Empirical Relationship and the Bridge Crossing Rating Curve. The two methods produce significantly different velocities. He asked Dr. Horn, "I'm wondering given that river velocities are, I would think, relatively easy to measure at different times of the year and given the fact that you've already stated that water velocity is the key driver of this model … why didn't you just go and make more measurements?" 21213

Dr Horn replied that the Morice River was added later due to stakeholder concerns so they did not have an opportunity to measure the river velocities.

Mr. Overstall will continue questioning on this topic tomorrow.