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## **Order of Appearances**

### **Enbridge Northern Gateway Pipelines Panel #2**

#### Pipeline and Terminal Design and Engineering Panel

Ray Doering	Peter Acton	Barry Callele
Drummond Cavers	Tom Fiddler	Shane Kelly
Clive Mackay	James Mihell	Peter Wong

#### Examinations

Jesse McCormick for the Haisla Nation 8117

Kelly Izzard 9043

Joy Thorkelson for the United Fishermen and Allied Workers' Union 9320

### **Examination by Jesse McCormick for the Haisla Nation 8117**

#### **Spill containment at the tank farm**

The evidence of Dr. Previne Malhotra ([Exhibit D80-27-14](#)) contains the statement that, “While conformance with international standards is important, it is not sufficient with projects with very high consequence of failure.” Northern Gateway Pipelines replied to this statement from Dr. Malhotra’s report ([Exhibit B83-2](#)). It said, “Since the proposed tank farms will be in remote areas and have secondary spill containment and control, Northern Gateway should not be required to exceed the seismic provisions of API 650.”

Mr. McCormick asked if the secondary containment at the Kitimat terminal would be able to accommodate the full volume of all the tanks.

Mr. Wong replied that there will be 14 tanks of 78,000 cubic metres each, and NGP is installing 250,000 cubic metres. So, the answer to your question, said Mr. Wong, is “No.” The code requirement would actually be for 181,000 m<sup>3</sup> of containment impoundment.

Mr. McCormick asked if “Northern Gateway is justifying a higher level of risk for seismic design based upon the fact that less people would be impacted by any associated failures than would be if the terminal were located in an area with a higher population?” Mr. Doering replied, “No, the standard would be the same regardless of location.”

Mr. McCormick persisted with the question until the Chairperson advised him to move on. 8196

### **Aggregating hazards**

Following this, a lengthy and confusing discussion took place between Mr. McCormick, some of the witnesses and occasionally the Chairperson. Its resolution is not clear, but Mr. McCormick’s concern appears to be related to the concept that the aggregate risk of a spill or incident on a pipeline system increases in some relationship to the number of hazards on the system and the application of the variable seismic hazard along the length of the system.

Mr. McCormick asked, “For instance, if there’s section one and the risk is 1 percent and there’s section two and the risk is 1 percent, the risk for them together is 2 percent, is it not?” Mr. Mihell replied, “If you start adding 1 percent plus 1 percent plus 1 percent, you’re going to have eventually more than 100 percent. ... If you have two independent probabilities of occurrence, then the likelihood of having at least one of those things happen is greater than the individual probability of either one.” 8359, 8371

### **Seismic evaluation**

This discussion included reference to the seismic evaluation filed by NGP ([Exhibit B39-17](#)). This analysis measured seismic acceleration at eight locations from Kitimat to Bruderheim, and found that they were, according to Mr. Cavers, “relatively low at the west end [and] become lower as it goes east.” 8289

Mr. Cavers said they would be either updating the number of locations or at least looking at whether it is required. But, he said, the variations are very small and are low, so the outcome of the analysis is unlikely to make a material difference. 8319

By way of illustration, he said in Vancouver we might be looking at 46% g in peak ground acceleration (PGA), but with NGP “we’re down in the low teens” and “down to 6% by the time we hit the Rocky Mtns.” 8335

### **Deformation of storage tanks**

Referring again to NGP’s reply to Dr. Malhotra’s report ([Exhibit B83-2](#)), Question 79, Mr. McCormick asks about deformation of storage tanks. This leads to another lengthy

discussion about a technical matter, terminological confusion, and building to or exceeding the requirements of the code (API 650). It begins at 8374.

### **Can't get probability of a hazard down to zero**

Mr. McCormick asked about the return period of a magnitude 7.5 earthquake which is 10,000 years, and whether seismic events of lesser magnitude could cause significant shaking or catastrophic failure. Mr. Cavers said that would not happen, "because we are mitigating it so that that doesn't occur." 8422

"Do I understand your evidence to be, Mr. Cavers, that there's a zero percent chance of any earthquake of a magnitude lesser than 7.5 to have any impact on the pipeline that would result in a catastrophic failure?" Mr. Cavers replied, "We can never get the probability of a hazard down to zero, but we are endeavouring to get the probability of a hazard that causes a loss of containment consequence down below 10 in the minus 5, that's 1 per 100,000 years for an individual event along the pipeline." 8443

### **Cathodic protection and pipeline coatings**

Mr. McCormick established that cathodic protection will be implemented on both pipelines, and that it is a method for reducing pipeline corrosion. The optimal functioning of cathodic protection requires adequate pipe-to-soil electrical potentials, which is done by adjusting the rectifier settings. This in turn requires regular readings, monthly is "pretty standard practice, according to Mr. Mihell, and regular adjustments.

After this, interested readers should head for the transcript for the full discussion and terms like "coating disbondment" (could happen, but unlikely) and "hydrogen embrittlements." (even less likely) 8471

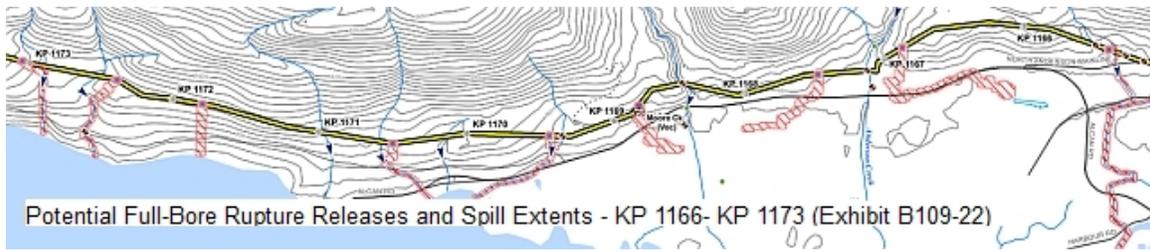
### **Valves and valve placement**

In September 2012 with its reply evidence, JRP IR 12.2(c) [Exhibit B109-4](#), NGP announced additional remotely-operable block valves bringing the total to 132 on each pipeline. 8591

The valve placements are intended to achieve these guidelines or criteria: 1. to limit the potential volume out to 2000 m<sup>3</sup> for watercourses identified as having a high fish sensitivity ranking; 2. to employ location selection criteria for valve placement based on commitments made in July 20, 2012; 3. a full bore release based on a 10 minute detection and response time and a 3 minute time for full valve closure; 4. the valve selection process was guided by the spill trajectory modeling undertaken in 2011 and by the SQRA filed in May 2012.

### **Full bore rupture spill modelling**

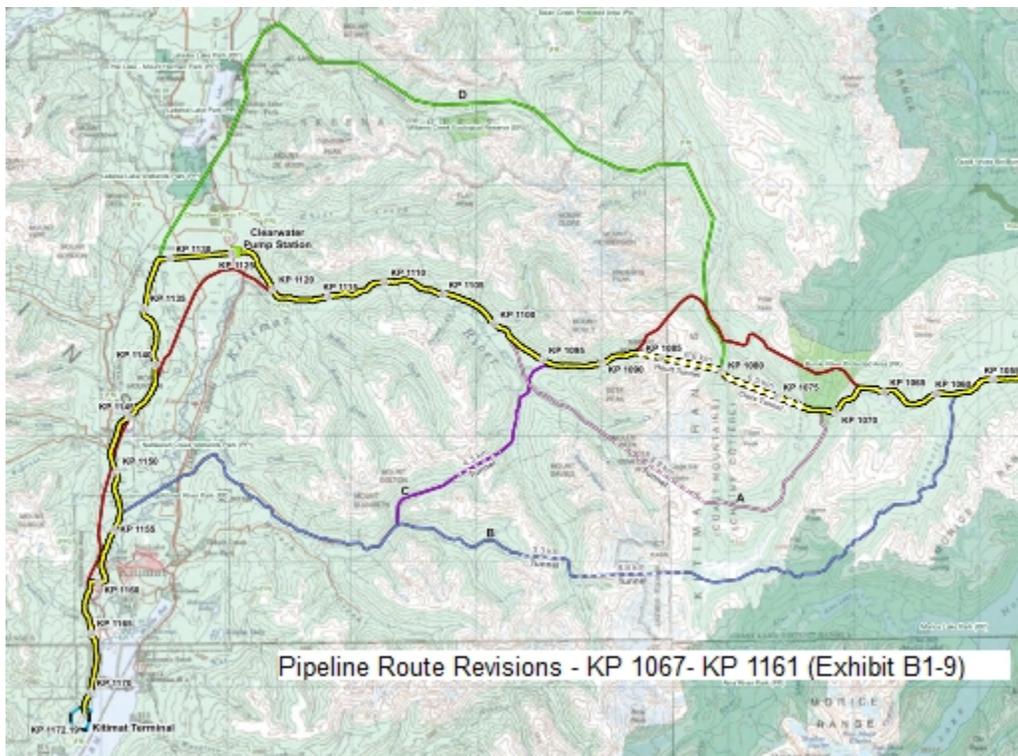
NGP was asked by the JRP to determine the maximum potential full bore rupture release volumes along each one-kilometre segment of the pipeline. [Exhibit B109-22](#) is a sample map of that modelling. Each spill represents the extent of and volume of oil that would spill in 13 minutes, the maximum amount of time NGP states will cause either the Kitimat or Edmonton control centre to decide that a shut down is necessary (10 minutes) and for the valves to close (3 minutes). 8604



**Water crossings**

Of 777 water crossings, 671 are fish-bearing. In addition, of 871 power-line crossings, 171 may be fish-bearing. Mr. Doering stated that there will be very few new road crossings, as existing forestry roads will be used. Mr. Langen suggested that the line of questioning may belong with the Environmental Socio-Economic Assessment Panel, and Mr. McCormick agreed. 8771

Mr. McCormick asked a number of questions about early route options and decisions. 8823.



After noting that NGP’s risk-based approach is an iterative process, Mr. McCormick asked, “Am I correct in stating that the additional information that has become available since the filing of the application indicates that the Kitimat River Valley presents a number of significant challenges which Northern Gateway was not aware of when it first selected the Kitimat Terminal location?” Mr. Doering agreed, but pointed out that mitigations have been described which have been or can be applied. 8923

### **Closing comments of Mr. McCormick**

An intervenor, Josette Wier, requested that NGP provide some spill modelling for scenarios in which snow or other inclement weather prevented access to the region or to the location of a spill. NGP refused, on the grounds that the modelling would be “overly burdensome and not reflective of probably incidents.” Mr. Doering agreed that meteorological conditions are an important matter and this topic is appropriate to discuss with the Kitimat Valley issues in Prince Rupert. 9001

Mr. McCormick stated in closing that his questions go to two important themes: 1. there is important information that has not yet been filed or that has not been filed and 2. there’s a great deal of information that has been identified as going to detailed design and will be filed after the JRP has had its opportunity to make its decision. 8999

### **Examination by Kelly Izzard 9015**

#### **Pitka Creek and Nak'adzki River: spill modelling and risk**

Mr. Izzard stated that Pitka Creek and the Nazk'adzki (Necoslie) River flow into the south end of Stuart Lake in close proximity to the Nazk'adzki First Nation Reserve and the community of Fort St. James.

His concern is that the maps produced by NGP do not show the extent of a full bore spill into Pitka Creek. [Exhibit D100-5-2](#) is a map produced by NGP for Mr. Izzard specifically, and it shows the spill extent as extending to a significant degree into Stuart Lake.

#### **An effect of intervention**

His intervention has almost certainly resulted in an increased awareness and responsiveness within NGP as well as within his community, of the Pitka Creek crossing, the location of block valves, and the volume of oil that could spill dropping from 5,000 m<sup>3</sup> to 2,300 m<sup>3</sup>. Mr. Doering said, “Maybe there’s still some more work that we can do to -- to get that down.” 9252

### **Examination by Joy Thorkelson for United Fisherman and Allied Workers Union 9320**

#### **Impacts on commercial fishing communities**

Ms. Thorkelson’s first topic is routing and impacts on communities. Mr. Doering said that primarily means attempting to locate the pipeline away from population centres, or in rural areas, groups of houses.

Ms. Thorkelson asked about disparate fishing communities which might be impacted by an oil spill, but which are a long distance from the pipeline itself. What consideration did those communities receive. Mr. Doering’s conceded it was an important consideration, but his answer was not very specific. 9343

She referred to the four western route alternatives in Exhibit B1-9 (see above on Page 4) and suggested that possible impacts on the commercial fishing industry were not a consideration. 9347

The lengthy answers from witness panel members mention consideration of impacts on fish, but are otherwise without reference to commercial fisheries. Mr. Doering ends by saying, "That's another example of consideration of fishery sensitivities from the perspective of pipeline routing. That's one that we definitely try to do a better job on. 9372

Ms. Thorkelson described the curtailment of commercial fishing to protect the Nanika Sockeye which run up the Morice River to the Nanika River. An oil spill could "cost our fishermen half of their earnings on the Skeena River. ... And I can't find anywhere where that kind of thing has been considered, about the impacts to the commercial fishery."

### **Construction camps**

Ms. Thorkelson addressed concerns with work camps. The application states that there will be "approximately 8 construction camps [with] 500-800 personnel that will be needed." She pointed out that these won't be "set up today, take down tomorrow" camps. They will be purpose-built industrial operations, as well.

She matched that up with the construction schedule in the areas of concern to her, which will be in the first two summers. Then she brought in the Fresh Water Fish and Habitat technical data report and its information about LRPs or "least risk periods". Her question was, how would they put that all together with all the streams, in just two summers.

Mr. Fiddler stated that they actually have three and half years, and can be quite selective and non-sequential about stream crossings. Ms. Thorkelson remarked, "So there won't be a temptation because you've got a big construction camp, you've got all your equipment there, you've got the pile drivers and everybody else you need lined up at the site ... and your contractor -- subcontractor wants to go and work in Prince Rupert on putting in Canpotex or something, so what are you going to -- you're not going to feel the economic crunch to get going and busy working on those crossings?" 9439

Mr. Fiddler said, "No, it's not uncommon. ... We'll optimize timing windows and do pre-builds of isolated crossings and what I mean by "isolated" is little segments of pipe."