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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 |
| Drummon Cavers | Tom Fiddler | Shane Kelly |
| Clive Mackay | James Mihell | Peter Wong |

Examinations

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| Chris Peter for C.J. Peter Associates Engineering 6975 |
| Tim Leadem for the Coalition 7217 |
| Jesse McCormick for the Haisla Nation 7695 |

Examination by Chris Peter for C.J. Peter Associates Engineering 6975

The previous day, Mr. Peter sought to have made public information that had been redacted in a document ([Exhibit B64-9](#)). The Panel’s decision this morning was to leave the information confidential and Mr. Peter was cautioned not to seek to elicit the confidential information in his questions.

Line pipe

Mr. Peter's questions and many of the answers are technical and detailed. Readers with a particular interest in the subject are invited to read the transcript directly.

Enbridge is specifying a pipe steel referred to as EES102, the details of which are confidential, but it is based on the public standard CSA Z245.1-07. Mr. Mihell says that EES102 is a more stringent standard.

At one point, NGP was considering using X80, a higher strength, thinner wall steel. According to Mr. Doering, they decided instead to use X70 heavier wall pipe in response to general concerns. 7011

The toughness of steels begins to decrease below certain temperatures, and above certain temperatures, according to Mr. Mihell. He referred to upper shelf and lower shelf. 7101

PHMSA's Keystone vs Northern Gateway

Mr. Peter pointed to a document entitled Recommendations for Keystone XL from the U.S. Pipeline Hazardous Material Safety Administration (PHMSA). He noted that the US regulator is specifically addressing toughness requirements, where that does not appear to be the case in Canada.

Mr. Mihell speculated: "It begs the question why might a regulator impose minimum toughness requirements on an oil pipeline. I can only speculate that perhaps Keystone was wanting to hydrostatically test with air." 7130

Mr. Peter proposed instead that this may have something do to with weather, rather than air testing. Mr. Cavers says NGP's design temperature is minus five because it is for the most part a buried pipeline, and not subject to substantial temperature variation. 7141

Wall thickness then and now

In its original application, Northern Gateway included nine different wall thicknesses. These were required for pressure containment of the operating pressure in that segment of pipe at a design factor of 0.8. Mr. Doering confirmed that this was correct. 7165

Mr. Peter said that Northern Gateway is now showing only two wall thicknesses for its oil pipeline, thicker than before, wall thicknesses which correspond to design factors of .72 and .80 respectively. Mr. Doering confirmed this, too. 7169

Mr. Mihell explained that NGP had moved to a two-wall thickness design to address a commitment by the project to move to heavier wall pipe, to address and mitigate some of the potential risks on pipelines, to make that pipeline safer and to address some of the concerns of citizens ... and to reduce the potential of a rupture on the pipeline in environmentally sensitive areas. "We've moved to a two-wall thickness design pipeline for that reason, not for any reason that might have been stipulated by PHMSA. 7184

Peter piques the Panel's interest

Mr. Peter said that Keystone went to a single-wall thickness because of PHMSA, and suggested that Enbridge appears to be moving in the same direction, thereby containing the maximum operating pressure on all segments of the pipeline rather than containing the individual segments for the maximum operating pressure for that segment of the pipe. Why would Enbridge not be willing to follow Keystone's XL lead, and use Category II pipe (pipe with proven notch toughness) for its Northern Gateway project? 7187

NGP's Ms. Estep objected. But this time, the Chairperson said, "We'd like to hear the answer to the last question that you asked." 7193

Mr. Doering cited NGP response to JRP IR3.1(c) in [Exhibit B32-2](#): "...Category II pipe will be considered [...] during detailed engineering..." 7199

Examination by Tim Leadem for the Coalition 7217

(ForestEthics Advocacy, the Raincoast Foundation and Living Oceans)

Mr. Leadem stated his intention was to "canvas the following issues:" water course crossings, supervisory control and data acquisition (SCADA), and the semi-quantitative risk assessment (SQRA).

Water crossings

Of 777 water crossings, Mr. Doering summarized that 83 were designated as "individual review sites", 37 or 38 may be trenchless crossings, 19 may be bore crossings, 11 may be HDD (horizontal directional drilled) with the recent addition of Chist Creek, and 4 may be aerial crossings. Most stream crossings will involve open-cuts or trenching. 7226

Construction phase

Mr. Doering stated that the estimate for the construction phase is 3.5 years, and the critical path items are the Clore and Hoult tunnels, and the Kitimat terminal site. 7318

Hunter Creek

Mr. Leadem noted that the HDD at Hunter Creek is estimated to take 4.5 months for the oil pipeline and 3.5 months for the condensate pipeline. Mr. Fiddler stated that at this time they don't know if those will be drilled sequentially, or at the same time, with two rigs. "They will have different arcs based on the size of pipe." 7288

If HDD does not prove feasible at Hunter Creek because of the fractured condition of the rock, isolation methods may be employed (working in the streambed, with the work area temporarily isolated from the stream), and microtunneling (more costly, common in Europe, and none of the witnesses have experience with it) is being examined.

Continual changes

Mr. Leadem expressed concern "there's continual changes to the design, continual changes to the route and at some point, I'm trying to understand what exactly will be built. And now I'm told that there's going to be a route revision V, ... a different route ... than the one that we've all been focused upon, which is U." 7354

Mr. Leadem asked questions about HDD, problem conditions (such as granular material), practical lengths (2000 m), need for a water supply, and the possibility of hydraulic fractures. 7387

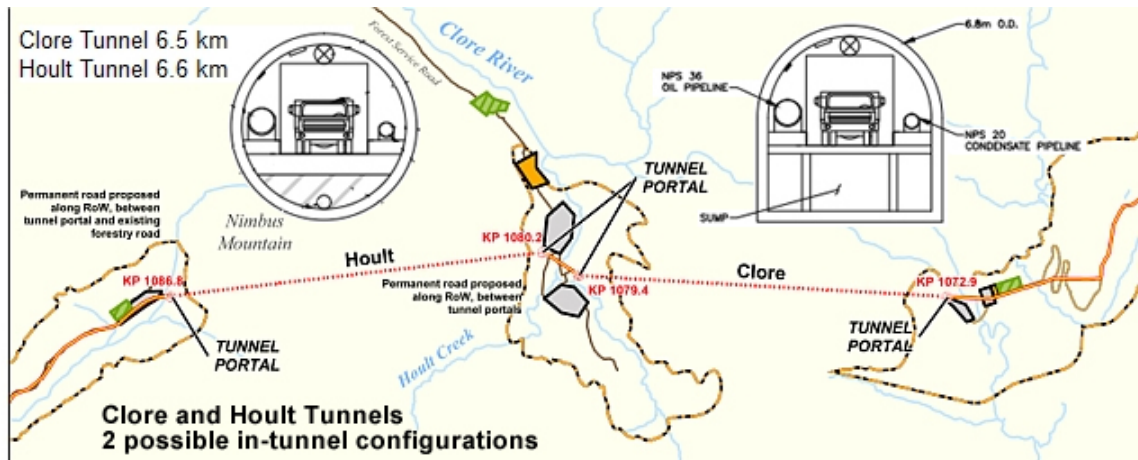
Clore and Hoult tunnels

He also asked a series of questions about the Clore and Hoult tunnels and the methods of construction, location and size of waste dumps, temporary bridges. Mr. MacKay said that two methods of construction are being considered: boring, or drill-and-blast. 7411

Mr. Leadem asked about acid generating rock and acid rock drainage (ARD). Mr. Leadem and Mr. Cavers explained that of 119 samples selected with visible pyrite thus most likely to exhibit ARD, tests shows less than 5% potential for acid generation. The conclusion is that they will not encounter potentially acid generating (PAG) rock. 7444

During construction they will examine the rock that comes out and test with an onsite lab.

Mr. Leadem's questions about construction methods and design begin at 7500.



SCADA – Supervisory control and data acquisition

SCADA employs a number of remote terminal units (RTUs) which will feed data to Enbridge's Edmonton control centre and to the Kitimat terminal. At least one, but usually two, programmable logic controllers (PLCs) will be implemented at each pumping station. There will be a controller at the valve sites, and pressure transmitters. 7538

Extensive discussion of testing and commissioning begins at paragraph 7564.

Mr. Leadem asked if NGP would be willing to have its SCADA and leak detection systems (LDS) open for inspection by independent non-regulatory bodies. Mr. Callele said the company would comply with regulations, but does not want to set a precedent by agreeing to do this. "It tends to ripple throughout the industry one way or the other." 7588

Construction

Mr. Leadem began this section asking about construction planning and strategy, including contracting & contractors, importing workers, quality assurance, welding. 7598

He asked, “Are you confident that you’ll be able to find the crews and the actual personnel to carry out that work here in Canada?” Mr. Fiddler replied, “We will work with organized labour as well as the contractor community to manage foreign labour if necessary.” 7617

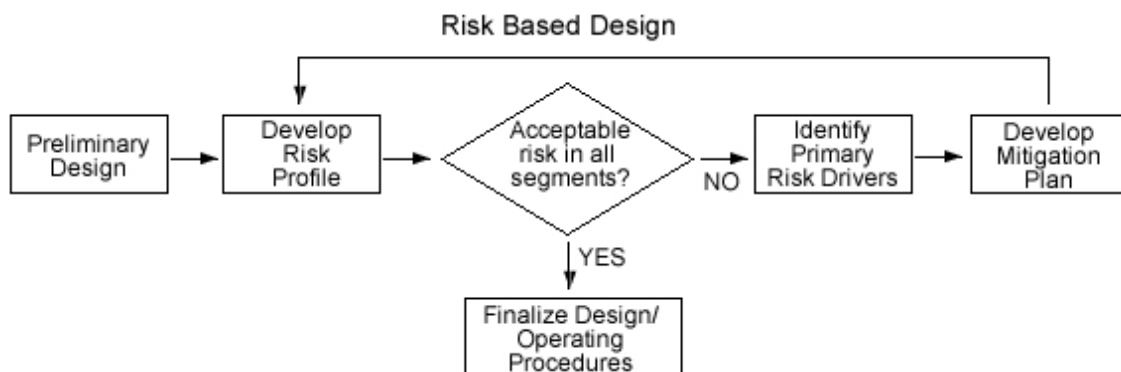
Mr. Fiddler pointed to NGP’s response to JRP IR11.5 [Exhibit B101-2](#) in which the company provides details on welding methods, tests, and inspection.

Mr. Leadem asked, “We see incidents such as what happened in construction at Wisconsin. Can you really assure the people of Canada that you’re to be trusted, your company can be trusted to do this job?” Mr. Doering and Mr. Fiddler replied, to which Mr. Leadem said, “I suppose the good people of Wisconsin were told more or less the same thing before construction debris was placed in their wetlands.” 7666

Examination by Jesse McCormick for the Haisla Nation 7695

SQRA: Semi-Quantitative Risk Assessment

Mr. McCormick stated that the Haisla Nation is scheduled for 12 hours of questioning with this witness panel, and the first topic is risk. Mr. McCormick asked for [Exhibit B75-2](#), the Semi-Quantitative Risk Assessment (SQRA), and verified that “in order to determine if acceptable risk has been achieved in all segments, it will be necessary for Northern Gateway to determine what the acceptable risk levels are.” 7733



ALARP: “As low as reasonably practicable”

Mr. Mihell described the ALARP process that is used in risk based design – “As low as reasonably practicable”. Mr. McCormick determined that monetary costs do factor into ALARP. Then he asked who determines what is reasonable and what is acceptable. 7758

Mr. Doering replied that “It is the responsibility of the Proponent.” 7766

Mr. McCormick then asked, “Has Northern Gateway determined context-relevant acceptable risk targets for the overall project?” The extensive discussion of this and related questions, with numerous examples related to geotechnical hazards, begins in the transcript at paragraph 7770

Mr. McCormick returned to the SQRA and asked whether the risks, as identified in this document, are acceptable to Northern Gateway. 7833

In his reply, Mr. Cavers said, “As geotechnical engineers, we tend to concentrate on the hazard or the frequency of occurrence,” and he drew attention to the risk matrix by which every kilometer segment of the pipeline is ranked for risk. “We’d like to be in the dark green side with most of our risks, though some might go into the light green.”

Mr. Doering said that the risk levels are not acceptable to Northern Gateway, but as presented in the SQRA, mitigation has not yet been



Figure 7: Risk matrix

applied. Mr. Mihell said that the SQRA is “not to try to claim social license, it’s to inform design.” The SQRA deals with technical, quantifiable matters.

ALAWTIOK: “As Low As We Think Is Okay”

Mr. McCormick summed up what he has heard as, “Northern Gateway has identified ALARP, ‘As Low As Reasonably Practicable’, as the driving objective of its risk assessment. Whereas, to many, I believe it would sound more like ALAWTIOK, which would be, ‘As Low As We Think Is Okay.’” 7857

Pacific Trails Pipeline

Clearing of the PTP right-of-way is underway, but no date to begin construction has been announced. If PTP is built before construction begins on NGP, and if the currently proposed centre line of NGP happened to be over top of the PTP, “there would need to be a small adjustment made to address that,” said Mr. Doering. There would be no sharing of right-of-way. “I expect there will be a number of areas where the Northern Gateway pipeline will be constructed parallel and adjacent to the PTP pipeline.”

Mr. McCormick asked if geotechnical work would need to be redone because of the construction effects or presence of PTP, and if NGP has a contingency plan if the corridor becomes unable to sustain further pipelines because of PTP. Mr. Cavers said that the geotechnical work is ongoing, and they don’t see why the corridor would become unable to accommodate NGP.

Among his final questions of the day, Mr. McCormick asked about forest fires as a risk to the pipeline. Mr. Mihell said the right-of-way is cleared and the pipeline is buried – a forest fire is not expected to initiate a loss of containment event.