Day 15 - September 27, 2012 - Edmonton

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Synthetic crude optimizes marketability and price

The Wood Mackenzie netbacks report includes this quote: "SCO [synthetic crude oil] is a fungible crude as it can be processed in any given market maintaining its implicit value based on the market's nature of price and location. SCO netbacks maintain their competitive nature across the array of markets despite the potential FCC technical limits mentioned previously. This is not the case for WCSB heavy crude oil volumes, as these volumes, if not valued into the appropriate configuration (coking), possibly would result in significant discounts, which lower netbacks." 1693

Dr. York explained that there are limits on this: "any market that gets over-supplied, whether it's a heavy crude oil market that gets over-supplied or if you have too much light crude oil going into a refining centre, that you could get discounts."

Noting the AFL's interest in creating more jobs locally, Ms. Chahley asked Dr. York if he could quantify what percentage of heavy crude could or should be converted to synthetic crude without incurring price discounts. He did not try to quantify it, but noted again that "Our report shows that, at the current price that we see in the market for SCO, new upgraders are not commercially viable." 1719

Ms. Chahley drew him to a statement made in a reply to an information request: "Based on our updated analysis, over 25% of WCSB bitumen production is upgraded to SCO by 2025."

Four ways to match supply with markets and not incur price discounts

Ms. Chahley summarized her understanding of matching supply and types of oil to markets without incurring lower prices for producers. She asked Dr. York, "the conclusion that you draw is that it is preferable for the market -- for the industry, if you like, to keep the heavy oil out of the cracking refineries because that's where we get the lower price." He confirmed this. 1762

"Could that be accomplished by slowing down the pace of production?" He acknowledged that would be one of the methods.

Could we convert to more synthetic crude oil? He agreed with that.

And is a pipeline to the West Coast another option? He agreed.

Are there other solutions, Ms. Chahley asked. "You could reposition Alberta refineries

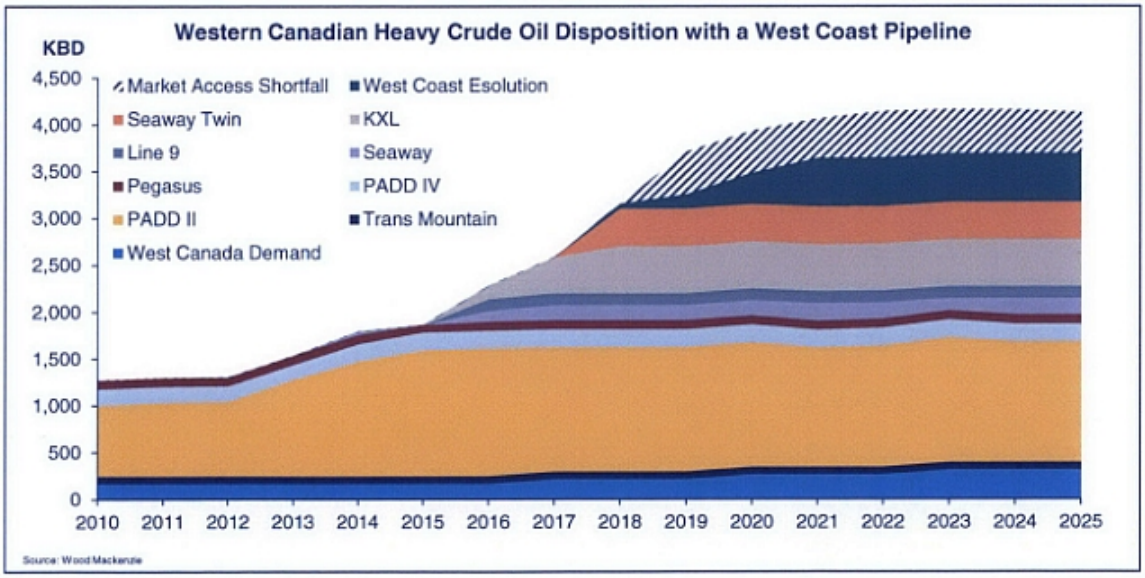
which, at this point, would largely mean expanding them assuming that they could put the refined products to a market."

Ms. Chahley stated that the Alberta Federation of Labour would particularly like that because those jobs in refineries are some of the best jobs in our economy in Canada. Is capital cost the only restriction on doing that? Dr. York said the commercial viability includes the capital costs and the ability to deliver products to markets "that would provide it a value." Ms. Chahley summarized, "That last option would be to, in fact, be selling more finished products into the market as opposed to the raw or blended products."

The $8 discount explained again

Ms. Chahley returned to the $8 discount and described it: the producers are getting price 'x' up to when they fill the market in the coking refineries and if they then sell further into the cracking refineries, it's at that point in time that the price lowers (by $8 a barrel) and works back to affect all barrels sold. 1807

She then asked, If the pipeline is built to avoid this impact, all it's going to do is prevent the producers from receiving less money for their goods. NGP "isn't a price lift, it's saving us from a price discount."
Turning to the table and chart provided by Dr. York as a result of an undertaking in yesterday's hearing session, (E8-20), Dr. York confirms Ms. Chahley's question that up to 2017, including Keystone XL coming onstream, the $8 discount has not kicked in yet because no heavy crude is going to cracking refineries.



Northern Gateway staves off the $8 discount for one year

In 2018, the Seaway Twin pipeline is online, and taking another 400,000 barrels per day of heavy crude. At this point, the US markets (PADD III) are "short market" by about 56,000 barrels, that is they are unable to take more heavy crude.

But in the chart, a West Coast pipeline has come online, taking up the surplus heavy crude and providing an alternative for those 56,000 barrels so they don't get sold into cracking refineries in the US.

Ms. Chahley asked if 56,000 bpd would be sufficient to trigger the $8 price discount. Dr. York said their study did not take a position on that.

By 2019, according to the Wood Mackenzie figures, supply of 450,000 bpd of heavy crude from Western Canada is facing "market access shortfall." That volume unable to access the coking configuration, according to Dr. York, is more than sufficient to trigger the $8 price discount.

Ms. Chahley asked if "[a fair] conclusion from your analysis is that the West Coast Solution will prevent the $8 discount for one year? " Dr. York replied, "This one solution prevents it for one year." 1931

Dr. York continued, "What we show is that if you don't correct that market access shortfall, then you incur an $8 discount on every heavy barrel that's sold." Ms. Chahley asked, "And that effect would happen from 2019 through to 2025 on this analysis?" Dr. York: That's correct. 1940

Ms. Chahley also brought up the results from a similar analysis done by Dr. York using volume numbers provided by NGP. As with the Wood Mackenzie study, 2018 shows no market access shortfall, but 2019 shows a shortfall of 452,000 bpd, which increases over the time horizon. 1944

Ms. Chahley and Dr. York engaged in an extensive but unresolved. discussion about the conclusions that can be drawn from his analysis, the $8 discount and the role of Northern Gateway. It ends, unresolved, when Ms. Chahley asked, "What conclusion would you have us draw about the impact of Northern Gateway particularly?"and Dr. York replied, I have no conclusion. 1953 - 2031

Examination by Hana Boye for the Haisla Nation 2077

Ms. Boye noted that Muse Stancil used Aspen SIMS, a production planning and optimization solution developed by Aspentech. Dr. York said Wood Mackenzie uses an inhouse product called Petro Plan for simulating petroleum refinery operations, and that it is described in the appendix of Exhibit E8-3-2.

She asked a number of questions about the workings of Petro Plan. Readers who are interested should begin at paragraph 2143.

Ms. Boye asked about price differentials. Dr. York replied with a quick summary: "Maya tends to be at a discount to WTI, as does Mars, Arab heavy tends to be at a discount to WTI. Brent historically has been at a discount but now is at a premium, and Dubai tends to settle at a premium to WTI."

In subsequent questions, Dr. York described which "markers" are used in which PADDs, and included Edmonton, where the markers are Cold Lake and Edmonton Light. 2162

Condensate price or toll rate changes and effects on netback

In her approach, Ms. Boye asked what appeared to be a number of disconnected questions. With respect to condensate prices she asked if the import price were to rise by $10, would the netback price fall by about $3 (based on a 30/70 dilbit blend). Dr. York replied in the affirmative. 2371

She later confirmed that an increase in toll rate reduces netback by the same amount. 2404

Ms. Boye asked what would producers do if for some reason condensate was not available. Dr. York said they could use other materials, such as natural gas liquids (NGLs) or light crude oils, produced domestically. 2436

Dr. York said Ms. Boye would have to ask Enbridge about consequences on oil rates, if the condensate line were not built or and if the cost of the marine terminal had to be borne by the oil pipeline.

She asked Dr. York to name some risks to the Wood Mackenzie forecasts. Dr. York said, "A dramatic change in the global price of crude oil [50% or more], global economic collapse, black swan -- a variety of black swan events like political disruption in various parts of the world, a dramatic decrease in development costs in other parts of the world -- crude oil development costs. 2444

Upgraders and producers who own upgrading facilities

Ms. Boye asked a sequence of questions about upgraders, and which new ones Dr. York had considered. He replied Suncor's Voyageur, an expansion of the Horizon project, and the Northwest upgrader. 2494

She asked if he was aware that Suncor was rethinking the Voyageur upgrader. He replied, that announcement came after the analysis. 2498

Ms. Boye asked, "Dr. York, why would oil producers who have access to upgraders and refiners through direct ownership suffer a discount in their operations when they have control over their product and the value added at that product? Dr. York replied, "They don't suffer a discount, they just shift it from the upstream to the downstream operations, or vice versa." Ms. Boye: "So … producers who are refiners are not affected by the $8 discount you state in your report?" Dr. York: "That would be correct." 2566

Ms. Boye and Dr. York had a conversation in which Dr. York used the terms marker and benchmark. She asked him to explain the terms. He replied that the benchmark is typically where, commercially, you're going to quote. The marker is where you tend to

value the crude. The markers tend to be closer to the crude that you're selling; the benchmarks tend to be a more liquid crude which may not be near each other in quality. 2633

The Asia Premium

Ms. Boye quoted from the 2011 Wood Mackenzie report: "… growth in Middle East heavy crude oil production far surpasses the increase in regional heavy crude demand; thus the surplus of heavy crude oil supply from the Middle East is expected to grow." She asked where this heavy crude is from. Dr. York replied, "predominantly (more than 50%) from Saudi Arabia, but also there is some in Kuwait, Iraq and I believe the UAE." 2664 Asked where China's demand for 2 million barrels would come from, Dr. York said it would be a market solution, and would include the Middle East, Canada, Russia. Asked what it would take to erode the Asia Premium, Dr. York said Saudi exports would have to fall to zero. And were that to happen, the netbacks in Edmonton would not necessarily change. 2674

Ms. Boye confirms that the Asia Premium for heavy crude is $2.50 per barrel out to 2025.

Examination of Terry Vulcano 2798

Mr. Vulcano asked questions of Mr. Holly about upgraders – how many, status of applications, and approval processes. Mr. Holly did not know the answers, and said that the Government had filed evidence about the netback, and he was unable to answer questions about other matters.

The "Hog cycle"

Mr. Vulcano asked Mr. Holly if he were familiar with "the hog cycle where too many producers start production when the market is in high demand and, two years later, there's too many hogs in the market? Isn't that what's happening with the upgraders on a larger scale?" The Chairperson advised him to stick to questions on the evidence that has been filed.

Referring to "deep conversion" refinery projects in PADD II, Dr. York said "they are installing what is called a "coking unit" which allows for better processing and higher yield -- clean product yields of heavy crudes," in recognition "that there were better economics for them to reposition their refineries for heavy crude." These will increase demand by 265,000 bpd, or about 20% of the demand for heavy crudes in PADD II. 2859

Mr. Vulcano asked what likelihood there was that the increased supply from Western Canada would be absorbed. Dr. York replied that 100% would be absorbed.

Global "ideal" demand is forecast to increase between 2005 and 2020, with total installed refinery capacity growing by approximately 9 million bpd, of which 6 million bpd will be heavy crude configuration. 2902

At the end of Mr. Vulcano's questions, Mr. Kruhlak advised that this would finish the Province of Alberta's participation in the questioning hearings and it would not appear in Prince George or Prince Rupert. 2944

Introduction of the Haisla Nation Witness Panel by Hana Boye 2947

Ms. Boye introduced Dr. Mattias Ruth and Ms. Rebecca Gasper.

Dr. Matthias Ruth, Professor, School of Public Policy and Urban Affairs and the Department of Civil and Environmental Engineering, Northeastern University, Boston. [D80-27-19 CV] [D80-76-2 Direct Evidence] [D80-27-18, D80-51-2, D80-75-2, D80-75-3, D80-75-4 Evidence]

Ms. Rebecca Gasper, Doctoral student, Center for Integrative Environmental Research, University of Maryland; Climate and Energy, World Resources Institute, Washington, D.C. [D80-27-20 CV] [D80-76-2 Direct Evidence] [D80-27-18, D80-51-2, D80-75-2, D80-75-3, D80-75-4 Evidence]

Ms. Boye stated that the academic qualifications and experience of the two witnesses qualifies them to provide expert evidence in the area of ecological economics and evaluation of ecological goods and services. She has discussed this with NGP and there is no objection.

Examination by Bernard Roth for Northern Gateway Pipelines 3044

Questioning the qualifications of the witnesses

Mr. Roth began his questions by questioning the qualifications of Dr. Ruth and Ms. Gasper: "I could not find any indication in them that either of you have had any experience in assessing the environmental effects associated with the construction and operation of oil and gas pipelines." He questioned whether the witnesses had been to Haisla territories, whether members of the Haisla Nation had reviewed the evidence, agree with it, and adopt it. Ms. Boye undertook to obtain answers to the questions.

Three valuation methodologies

Mr. Roth confirmed that their report uses three valuation methodologies for ascribing costs to the conservation of natural lands, the first being "revealed preference", the second being "contingent valuation" or hedonic pricing, and the third being "replacement costs"; 3075

Revealed preferences are observations of prices paid for services directly related to ecosystems and you give as examples market methods such as pricing of timber from a

forest or fish from a stream. Hedonic pricing methods estimate the value of an ecosystem based on the price of land. Replacement cost is what would have to be paid in the market for a substitute to replace or develop alternatives for an ecosystem good or service. 3077

Noting that the original version of the report valued impacts from the NGP between $1.3 billion and $6.1 billion, but the revised report estimated the cost of impacts between $254 million and $775 million, Mr. Roth asked if this was mainly because of errors that NGP identified. Dr. Ruth said no. 3083

Mr. Roth asked about their valuation methodology. Dr. Ruth explained that it involved a three-step process consisting of literature surveys: directly relevant pertinent to the Haisla territory, other similar ecosystems, and the "grey literature; consulting reports and the like." 3094

Asked which of the valuation methodologies were used in which instances, Dr. Ruth replied that they could go through the report line by line. Mr. Roth said it's not important enough, but "would there have been a preponderance of reliance on one particular methodology?" Dr. Ruth said his sense was the most of them were contingent valuation studies. 3102

Aboriginal benefits vs social and ecological cost of the project

Mr. Roth quoted a paragraph from the report [D80-75-4] which enumerated the Aboriginal benefits claimed by Enbridge. The paragraph ends, "Together, these commitments total around [...] $980 million. These equity commitments are far exceeded by even the most conservative estimate of social and ecological cost. Our lowest estimates of social and ecological costs are 3 times as great—and our highest estimates [are] 200 times as great—as the equity commitments pledged by Enbridge." 3110

Mr. Roth continued: $106 billion relate to oil sand extraction, $55 billion are associated with tanker emissions, and $45 billion are associated with fuel consumption of fuel products "that emanated" from NGP – a total of $206 billion. "How are these relevant to Northern Gateway's benefits offerings to Aboriginal communities?" Mr. Roth asked.

He then referred to the $2.4 billion in ecological costs related to construction, and suggested that this is the appropriate comparator to the almost $1 billion in benefits. Dr. Ruth replied, "You're correct to the extent that none of these other costs reverberate back to affect the Aboriginal communities."

Northern Gateway and Pacific Trails Pipeline routes

Mr. Roth put up a map of the Northern Gateway pipeline route, and asked Dr. Ruth if he'd ever seen this before. He focussed on Bish Cove and the LNG terminal site where preparatory work is being done for the terminal. He asked a number of questions concerning how Dr. Ruth and Ms. Gasper and their methodology would value and ascribe costs in this situation. For the most part, they replied they could not answer the questions based on so little information. Ms. Boye stated for the record "that Dr. Ruth and Ms.

Gasper have not been asked to identify or to evaluate the study of the KLNG site and "it's our position that this site is beyond the scope of this hearing and beyond the scope of their of their research."

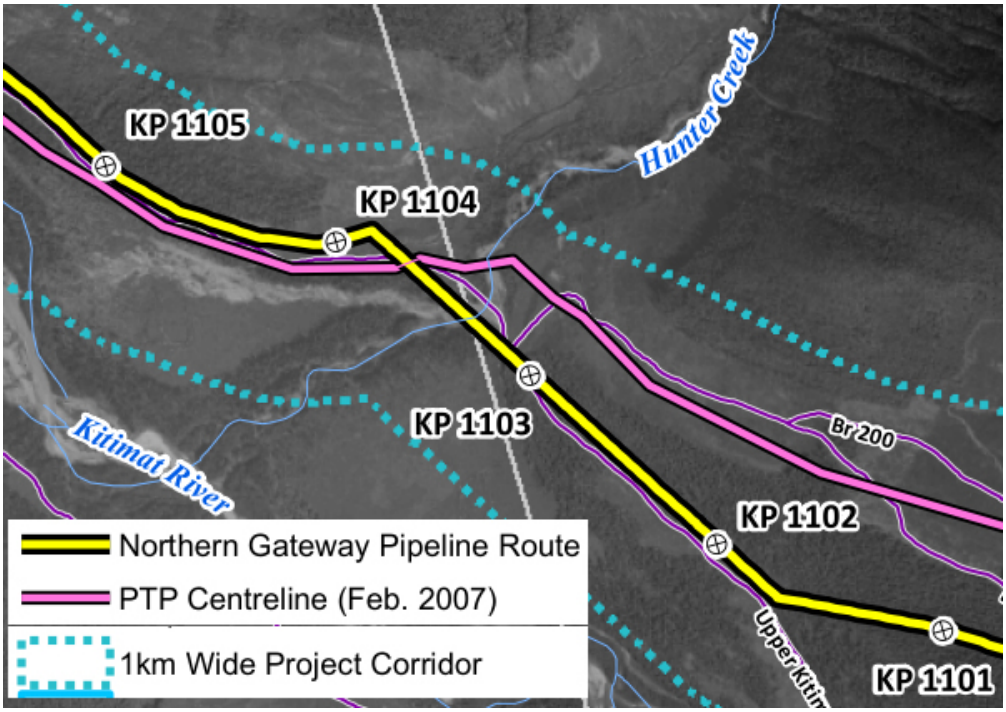
Testing the methodology – until the Chairperson steps in

Further questions by Mr. Roth explored details of the methodology. He spent more time on the KLNG site until the Chairperson asked him to just go to his questions and put the KLNG terminal site and photos aside. Mr. Roth stated to the Chairperson that his "series of questions is going to something that I submit goes to a very important aspect of what you've been mandated to do which is consider the potential impacts of the Northern Gateway Project on lands that are subject to claims of Aboriginal title and Aboriginal rights. And we are going to be relying on this very heavily in our argument at the end of the day so this is a fairly key feature in this case." 3296

Readers interested in the details of the discussion should start at paragraph 3152

Pacific Trails Pipeline and Northern Gateway at Hunter Creek

Mr. Roth put up a map of a section of the NGP where Hunter Creek flows into the Kitimat River. In close proximity to each other, the Pacific Trails Pipeline and the NGP both cross Hunter Creek. Right-of-way clearing for the PTP is currently underway, and Mr. Roth showed a photograph of the clearing at Hunter Creek. He said that PTP is planning on an open cut crossing of Hunter Creek. An open cut means that a trench is dug in the river for the pipe. NGP plans to directionally drill under the river for its pipe.



Mr. Roth's question was "If Northern Gateway is doing … a directional drill and not

disturbing the Hunter Creek at all, is it appropriate to suggest that there are effects on the fish habitat within Hunter Creek?" Dr. Ruth said that he wasn't qualified to assess that, and that in any event his work was "agnostic" to technologies.

When Mr. Roth said that Dr. Ruth was not a fisheries biologist or a pipeline construction engineer, Dr. Ruth responded that he had PhD in geography, a Masters Degree in economics, was a professor of both civil and environmental engineering and public policy so he had some understanding of "how some of this plays out." 3362

Mr. Roth asked if areas of pre-disturbance, already cleared areas, which may exceed 82% of the right-of-way, will affect the calculation of ecological values "if there's no trees there already?" Dr. Ruth answered that it could, to the extent that any additional disturbances will have disproportionally larger impacts on the remaining areas. 3411

Haisla support for Pacific Trail Pipeline and Kitimat LNG not a proxy for NGP

Dr. Ruth was unaware that the Haisla Nation was supporting the Pacific Trail Pipeline and the Kitimat LNG projects. Mr. Roth asked if these facts and the economic benefits associated with their support and potentially future benefits – would these "reflect a revealed preference that would place an ecological goods and service value on the type of disturbance we're talking about?" Dr. Ruth replied that answering that would be difficult without "hard facts and scientifically proven information." 3442

Later, he says that if the Haisla were fully aware of the costs, that would be stating their revealed preferences for the PTP pipeline, but not necessarily of the Enbridge proposal. "The Haisla agreement to the first pipeline was with regard to the first pipeline. It was not with regard to the second that's coming on top of the first. 3479, 3465

Extensive discussion followed, with little in the way of a resolution. Interested readers should start at paragraph 3442

Costs including ecological estimates

Mr. Roth turned to Table 24 in Exhibit D80-75-3 in which Dr. Ruth and Ms. Gasper give costs of the project as given by Enbridge with additions of their ecological estimates, addition of oil spills, and compare those to the benefits of the project. The spill scenarios were the seven hypothetical ones provided by Enbridge in the Application. 3484

Table 24 Comparison of Enbridge's calculated costs and ecological cost estimates with benefits of the proposed project[74].

	Costs, Enbridge alone (US$billion)	Costs including ecological estimates, average (US$billion)3% discount rate	Costs including ecological estimates, range (US$billion)	Costs including ecological estimates, including oil spills (US$billion)	Benefits (US$billion)
	Land (0.56)	Land (0.56)	Land (0.56)	Land (0.56)	Oil industry (28)
	Materials (1.40)	Materials (1.40)	Materials (1.40)	Materials (1.40)	Labour income (48)
	Construction (3.80)	Construction (3.80)	Construction (3.80)	Construction (3.80)	Value added to GDP (6.3)
	Project execution (0.66)	Project execution (0.66)	Project execution (0.66)	Project execution (0.66)	Government revenue (81)
		Ecological costs (20)	Ecological costs (3-212)	Ecological costs (3-212)	Oil industry revenue (28)
				Oil Spills (0.0012-13)	
Total	**6.4**	**26.4**	**9.4-276**	**9.4-289**	**148**

Mr. Roth asked about the risks of those spills, but Dr. Ruth said they did not look at likelihood of spills. 3506

Mr. Roth suggested that spill costs would only constitute 0.065 percent of the total ecological costs if they were discounted for the probability of those events occurring.

Mr. Roth also suggested that in using cost estimates of the EPA in their work, that Dr. Ruth and Ms. Gasper used them incorrectly. Instead of using them as a one-time all-in cost of a spill, they added 100% in year one, to 90% in year two, to 80% in year three and so on for nine years. Dr. Ruth and Ms. Gasper both argued that they used the EPA costs correctly and appropriately. 3542

LNG projects produce significant CO2 emissions

Mr. Roth filed an aid to cross-examination which reported that Australia has approved a LNG project that will release 41 million tonnes of CO2 equivalent into the environment annually. He suggested that it could be a revealed preference of the Province of British Columbia to undertake LNG projects notwithstanding their significant greenhouse gas emissions. 3584