JOINT REVIEW PANEL

Northern Gateway Pipelines Limited Partnership

Enbridge Northern Gateway Project

NEB File OF-Fac-Oil-N304-2012-10 12

Hearing Order OH-4-2011

Argument of the Province of British Columbia

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1. Her Majesty the Queen in Right of British Columbia (the "Province") makes the following argument with respect to the application by Northern Gateway Limited Partnership ("NG") for a certificate of public convenience and necessity ("CPCN") pursuant to s. 52 of the *National Energy Board Act,* R.S.C., 1985, c. N-7 with respect to the project as referred to in the hearing order referenced above.

Introduction

2. Throughout this proceeding, the Province has focussed on select matters of central importance: in the event of a spill from either the proposed pipeline itself, or from tankers calling at the proposed terminal, the ability of NG to respond to such a spill in a timely and effective manner so as to reduce as much as possible its environmental and other effects.

3. With respect to the pipeline itself, NG has asserted that it will be able to effectively respond to all spills. With respect to the marine aspect of the project, NG has committed to responding to a spill of up to 32,000 tons within 6-12 hours, and to have the capacity to recover that amount of oil within 10 days.

4. However, NG has presented little evidence about <u>how</u> it will respond in the event of a spill. Put another way, it is not clear from the evidence that NG will in fact be able to respond effectively to spills either from the pipeline itself, or from tankers transporting diluted bitumen from the proposed Kitimat terminal.

5. Each project must be evaluated on its own merits. As the National Energy Board has held, "the public interest is dynamic, varying from one situation to another...[T]he criteria by which the public interest is served may also change according to the circumstances." The project before the JRP is not a typical pipeline. For example: the behavior in water of the material to be transported is incompletely understood; the terrain the pipeline would cross is not only remote, it is in many places extremely difficult to access; the impact of spills into pristine river environments would be profound. In these particular and unique circumstances, NG should not be granted a certificate on the basis of a promise to do more study and planning once the certificate is granted. The standard in this particular case must be higher. And yet, it is respectfully submitted, for the reasons set out below, NG has not met that standard. "Trust me" is not good enough in this case.

Emera Brunswick Pipeline Co. (Re), 2007 LNCNEB 3, para. 46

6. While the Joint Review Panel ("JRP") may of course consider other factors in its recommendation, the Province submits that the JRP must accord very significant weight, in the case of this project, to the fact that NG's plans for terrestrial and marine spill response remain preliminary, and that it cannot, today, provide assurance that it will be able to respond effectively to all spills. Given the absence of a credible assurance in this regard, the Province cannot support the approval of, or a positive recommendation from the JRP regarding, this project as it was presented to the JRP.

7. In the alternative, should the JRP recommend approval of the pipeline, the JRP must impose clear, measurable and enforceable conditions that require NG to live up to the commitments it has made in this proceeding.

The Statutory Framework

8. The JRP is tasked with recommending to the Governor in Council ("GiC") whether a CPCN should be granted to NG, and with preparing a report with respect to the environmental assessment of the project setting out the JRP's rationale, conclusions and recommendations, including mitigation measures. The GiC will then make decisions under s. 52 of the *Canadian Environmental Assessment Act, 2012,* and will direct the Board to issue a CPCN with respect to the project, to dismiss the application, or to reconsider its recommendation.

> *National Energy Board Act,* ss. 52-54
> *Jobs, Growth and Long-term Prosperity Act,* SC 2012, c. 19, s. 104
> *Canadian Environmental Assessment Act, 2012* (enacted by S.C. 2012, c. 19, s. 52), ss. 43, 52
> Amended Agreement between the National Energy Board and the Minister of the Environment Concerning the Joint Review of the Northern Gateway Pipeline Project ("Joint Review Agreement"), Ex. A2X0I0, ss. 9.1 and 9.3

9. In making its recommendation with respect to the issuance of a CPCN, it is clear that the JRP may take into consideration a very broad array of factors.

See *Emera Brunswick Pipeline Co. (Re),* 2007 LNCNEB 3, paras. 41-48

See also *Nakina (Township) v. Canadian National Railway Co.* [1986] F.C.J. No. 426 (C.A.)

10. Recent amendments to the *National Energy Board Act* have not materially changed the scope of what the JRP may consider in making its recommendation. Section 52(2) now makes reference to considerations that appear to be "directly related to the pipeline". With respect to the issues of principal concern for the Province, referenced above, namely the potential for and response to spills from the proposed project, the addition of these words is not material. In addition, s. 4.1 of the Joint Review Agreement provides: "Nothing in this Agreement should be construed as limiting the ability of the Panel to have regard to all considerations that appear to it to be relevant pursuant to section 52 of the NEB Act."

11. Under the Joint Review Agreement, the JRP also has broad authority with respect to the recommendations it will make under the *Canadian Environmental Assessment Act, 2012*. In addition to other provisions of that Act, under s. 43 the JRP must prepare its report in accordance with its terms of reference. Section 4.1 of the Joint Review Agreement states that its purpose is to coordinate the environmental assessment of the project by providing for a review of the "Environmental Effects" likely to result from the project; see also paragraph 2 of the terms of reference. "Environmental Effects" are broadly defined to include "any change that the project may cause in the environment". The factors to be considered by the JRP are set out in Part II of the terms of reference. As Mr. Priddle stated on September 8, 2012:

> Yes. I believe that if the Panel found that there were to be significant adverse environmental effects and related adverse socio-economic impacts caused by this project, after proper allowance for mitigation of those environmental and socio-economic impacts the Panel should recommend against the issuance of a certificate.

TR Vol 73, line 20194

Canadian Environmental Assessment Act, 2012, ss. 5, 19

The Pipeline

12. As noted above, one of the principal concerns that the Province has with respect to the Project is the potential for spills from the pipeline itself, and the ability of NG to effectively respond to a spill.

Spills from the pipeline may occur

13. NG does not dispute that spills from the pipeline may occur. While the project will be new, and built using modern technology, the fact remains that pipeline spills do happen. Indeed, Enbridge had 11 releases greater than 1000 barrels between 2002 and 2012.

    TR Vol 92, line 14993
    TR Vol 77, lines 25160-64
    See also NG response to Haisla IR 1.7(c) (attachment), Ex B39-4

14. The Province has concerns about the assertions NG has made regarding the probability for full-bore releases resulting from geohazards. NG asserts that full-bore spills will be very rare. However, this assertion must be considered in light of the fact that NG's analysis of the geohazards that the pipeline could face is at a preliminary stage.

15. The rugged topography of West Central British Columbia is prone to slope failures. Terrain instability may pose significant challenges for linear development.

    TR Vol 110, lines 7528-9

16. Despite these challenges, NG admits that its assessment of existing and potential geohazards along the pipeline route is not complete and that further investigations and more detailed geohazard mapping are required. For instance, although NG acknowledges that the potential presence of glacio-marine clays in the lower Kitimat Valley can threaten the integrity of a pipeline, its report on glacio-marine clay fails to identify a significant area of potential instability that had been previously reported in the relevant literature.

    TR Vol 85, lines 5306-336
    Preliminary Hazard Assessment of Glaciomarine Clay, Kitimat Valley, Ex B45-10

17. Similarly, while NG acknowledges the risks posed by areas of permafrost along the pipeline route, such areas have not yet been identified.

    NG Response to BC IR 2.12, Ex B47-28, p. 38(c)
    TR Vol 85, lines 5728-33

18. Although Northern Gateway has conducted additional field reconnaissance for the purposes of its Updated Semi-Quantitative Risk Assessment ("SQRA"), most of the information gaps identified above remain outstanding. Further, much of the work undertaken by NG to date remains preliminary. The Updated SQRA concedes, for

instance, that, "as additional work is undertaken, the assessments provided may be revised" and that "it is likely that some of the assessments will change as additional information is received".

Semi-Quantitative Risk Assessment, February 2013 Update Route Rev V, Ex. B196-2, pp. 85 and 92

19. Since all geotechnical hazards have not been identified with the investigations carried out to date, and since comprehensive investigations will not be completed until the detailed design phase, NG has but a rough idea of the mitigation measures that may be employed in order to mitigate the geotechnical hazards that may be encountered.

TR Vol 85, lines 5359-66

20. The evidence of Natural Resources Canada ("NRCan") supports the view that the geohazard mapping conducted by NG to date is inadequate; for example, NRCan takes the position that NG's mapping would have been more effective if it had extended to the height of land, instead of being restricted to a corridor of 1 km on either side of the pipeline.

TR Vol 110, lines 7441-4

21. The preliminary nature of NG's geohazard analysis calls into question the strength of its predictions of full-bore release frequency. The Updated SQRA explicitly acknowledges the uncertainty that remains associated with the results of the geohazard analyses carried out to date:

> It should be recognized that the data presented ... are conditional on the application of the proposed or equivalent mitigations ... Note that the mitigation strategies and locations are preliminary and will be further considered and refined at the detailed engineering stage of the Project.

The risk assessment outlined in the Updated SQRA is based on mitigated geotechnical risks, and, as evidenced by the tentative language throughout Appendix C, the mitigation strategies and locations identified to date remain both preliminary and imprecise. Accordingly, the Province submits that limited weight should be accorded to the spill frequency predictions set out in the Udpated SQRA.

Semi-Quantitative Risk Assessment, February 2013 Update Route Rev V, Ex. B196-2, p. 98
Appendix C, pp. 511-40

22. In addition, it must be remembered that full-bore spills are less frequent than smaller spills, which could still have a significant environmental effect. Indeed, since risk equals consequence times probability, smaller spills could pose a higher risk as they are more frequent. While NG has produced considerable evidence with respect to the likelihood and effects of full-bore spills in the SQRA and the Ecological and Human Health Risk Assessment ("EHHRA"), the evidence concerning the potential for other spills is limited. While the Province supports assessing the effects of any spill based on a full-bore release, as it would allow for an analysis of the worst-case scenario, focus on full-bore releases should not eliminate consideration of the potential impact of smaller events.

23. NG's response to EcoJustice IR No. 1.21 concerned the information provided in Table 3.2 of Volume 7B of the application. NG stated that that table, which includes probabilities for medium sized spills, would be "replaced by a detailed characterization of each pipeline kilometre and region as part of the ongoing risk assessment work". The Province assumes that this refers to the SQRA. It also state that the potential maximum spill volume from a rupture from each kilometre of the pipeline had been quantified, and "now replaces the concept of large and medium spills". However, unlike Table 3.2, the SQRA and EHHRA focussed only on full-bore releases, a relatively rare event.[1] Similarly, the quantification of spill volumes from each kilometre of the pipeline focussed only on full-bore releases.

    Ex B3-20, Vol 7B, p. 3-2 (adobe p. 20)
    Response to JRP Request for Additional Information, Ex. B20-2 p. 6 (adobe 10)

24. The risk posed by smaller-than-full-bore releases must also be considered. As noted above, this is because risk to the environment is a combination of both probability and consequence. A "medium" size spill (30 m^3 – 1000 m^3) clearly has enough volume to cause serious harm and the evidence states that the return period for spills of that magnitude is 40.65 years for the pipeline, as opposed to the longer return periods for full-bore releases.

    NG response to EcoJustice IR No. 1.21, Ex B41-25, p. 32-33

25. Similarly, NG also calculated spill return periods for pinhole and greater-than-pinhole events. Taking the figures NG for "greater-than-pinhole" releases results in a spill return

[1]Attachment 2 to the SQRA, Ex. B75-2, prepared by Dynamic Risk Assessment Systems Inc. includes a threat assessment for leaks of various sizes from several types of failures. However, it is not clear how that information was used in the SQRA, other than for full bore ruptures.

figure of 76.7 years.[2] The Province also has concerns about the information that NG has provided in this regard. First, because it focussed on spill events, there is no information about spill size, which, we submit, is a critical issue in considering the risk posed by these kinds of events. Second, NG does not include the potential for spills that could occur as a result of "operating and maintenance procedures" that deviate from the norm. Finally, NG assumes that all geotechnical threats would result in a full-bore rupture. This assumption appears to be incorrect.[3]

Ex B-195, Undertaking U-49, p. 2
TR. Vol 147, line 20293; 20276-8; 20281

26. As a result, the Province is concerned that the evidence before the JRP with respect to spills other than full-bore ruptures underplays their potential frequency, and therefore the risk that they pose to British Columbia.

27. In summary with respect to the potential for spills from the pipeline, while the Province acknowledges that such spills may not be a common event, the Province submits that the information NG has provided is incomplete, and may downplay the potential for both large and smaller spills.

If a spill happens, it will have severe effects

28. NG also does not dispute that, in event of a spill, particularly into a watercourse, the effects would be severe for the ecosystem. As Dr. Stephenson succinctly put it, "...it doesn't take a lot of wit to come to the conclusion that a major oil spill would have significant adverse effects on a river."Dr. Horn also noted that "adverse and significant acute effects can occur; ...adverse and significant chronic effects can occur." That severe acute effects on fish and other wildlife populations could result from a spill into a river is indisputable.

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[2] We have calculated this by using the standard arithmetic relationship for determining the overall return period for failure over the entire length of the pipeline (all segments and their respective return periods listed in table 2) in the same manner as in NG response to EcoJustice IR No. 1.21, Ex B41-25.

[3] Attachment 4 of the SQRA, Ex B75-2, Report on Quantitative Geohazard Assessment, p.3, s. 1.0 paragraph 2 (adobe 159) states "The present Geohazard assessment was undertaken with respect to a Loss of Containment event. The Geohazard assessment has considered that all loss of containment events would be full bore rupture events regardless of the size of the opening in the pipeline. This is a conservative assumption because **there is a broad spectrum of opening sizes from full bore rupture down to pinholes that could be considered under various geohazard scenarios.**"

TR Vol 97, line 20913
TR Vol 98, line 21935
TR Vol 147, line 20318-9
Ex. B3-20, p. 7-23 (adobe 65)

29. As was reported in the EHHRA, in the event of a spill, significant portions of the studied rivers (up to 71% under high flow conditions) could be swept by an oil slick sufficiently thick to cause injury to wildlife or vegetation.

    Ex. B80-4, pp. 7-54 to 55

30. NG further acknowledges that, in certain circumstances, a spill could result in significant and adverse chronic effects on certain species, such as salmonids, and that the magnitude and spatial extent of such effects are difficult to predict.

    TR Vol 146, line 18725

31. NG concedes that the effects of a spill on fish could span over several generations: at certain times of the year, multiple year classes of certain fish species could be affected. Furthermore, the effects of a spill on threatened species, such as eulachon, for instance, would not necessarily be reversible. Already weakened populations may simply not recover.

    Ex. B3-20, p. 7-23 (adobe 65)
    TR Vol 146, line 18702-3
    TR Vol 146, line 18793-6
    TR Vol 167, lines 16097 and 16133

Spill response planning is necessary

32. Because of the potential for spills, and their impact, NG has committed to develop a comprehensive spill response capability. Indeed, NG has stated that it intends to have a "world-class response capability" for the Project. Given the real potential for spills to occur, and the devastating effect of a spill should a significant one take place, the Province submits that NG must show that it would be able to effectively respond to a spill. As set out below, the Province submits that it has failed to do so.

    General Oil Spill Response Plan, Ex B21-2, p. 1-1
    TR Vol 91, line 13094

33. NG asserts that it intends to be able to respond effectively and efficiently to any spill that may occur. However, it also states that doing nothing is a possible response to a spill. In fact, Dr. Taylor stated that spill response may consist of monitoring and allowing "natural attenuation" to occur.

    NG response to Haisla IR 2.2(b), Ex B45-8, p. 5
    TR Vol 91, line 13164
    TR Vol 92, lines 14495-503; 14531-2
    TR Vol 146, line 18889

Responding to a spill from the pipeline would encounter many challenges

34. Although it asserts that it will be able to effectively respond to any spill, NG admits that responding to a spill from the pipeline will be challenging. In particular, it admits that a spill into a watercourse at a difficult to access location would present the greatest difficulty for clean-up and remediation.

    TR Vol 91, line 13182-5

35. Many parts of the pipeline will be located in remote areas, located some distance from road networks and population centres. For example, many of the rivers identified in the Control Points TDR are identified as remote or having no access. Road access to the pipeline and places where a spill might travel down a watercourse is important to allow for effective spill response.

    TR Vol 91, lines 13190, 13224-6
    Technical Data Report: River Control Points for Oil Spill Response, Ex B17-1 ("Control Points TDR"), p. 2-5

36. In some cases, the steepness of the terrain will make responding to spills very challenging. NG acknowledges that the Coast Mountains' topography is extreme.

    TR Vol 86, lines 6191-5

37. As the JRP noted during cross examination by the Province of NG with respect to the Clore River, it has had the opportunity to take a view of the entire route. It will therefore know the steep and rugged terrain through which the pipeline would pass.

TR Vol 92, line 14065

38. The presence of woody debris could also pose a challenge to spill response, requiring a shift of response activities to upstream locations.

    Geotechnical Response to Photographic Evidence Regarding Proposed Liquid Petroleum Pipelines from Nimbus Mountain to the Kitimat River Estuary Proposed Northern Gateway Pipelines, Ex. B83-7, p. 57 (adobe 60)

39. If a spill were to occur during a period of high flow conditions, a common occurrence in British Columbia rivers, then some aspects of the response may have to be curtailed, or at least delayed until the high flow event recedes. At certain water velocities, booms become ineffective, and are potentially unsafe to operate.

    TR Vol 97, lines 20293 and 20296; 20368
    TR Vol 98, line 21661

40. The presence of heavy snow could also impede access during response operations, requiring use of snowmobiles, snow cats, and helicopters. In the Upper Kitimat and Hoult Creek Valleys, snow accumulation can reach 8-9 metres. However, weather may limit the ability of helicopters to aid in spill response.

    TR. Vol 93, lines 15796-7; 15807
    Ex B83-10, Kitimat Report, s. 4.6.3 (adobe 27)
    TR Vol 95, lines 17935-942

41. Many of these challenges are recognized by NG. In the Preliminary Kitimat River Drainage Area Emergency Preparedness Report ("Kitimat Report"), NG refers to the challenges of winter conditions, avalanches and debris slides, heavy snow, spring melt, Fall freeze-up, patchy ice, and fast-flowing watercourses.

    Ex B83-10, Kitimat Report, page 4-4 to 4-6 (adobe 26-8)

The challenge of responding to a spill is complicated by the potential for dilbit to sink

42. These challenges are compounded by the fact that in certain conditions diluted bitumen ("dilbit") can sink in a watercourse. This occurred in the case of Enbridge's spill in Michigan. This was, as a result, an issue of significant importance to the parties in this proceeding.

43. The evidence presented by NG in this regard is inconsistent. For example, some evidence it presented suggests that dilbit may sink when it enters water, after a process of weathering; other evidence it has submitted suggests that dilbit will only sink if it combines with sediment. In its response to Haisla IR 1.46, NG states that "If diluted bitumen becomes heavily weathered some oil may sink in fresh water environments." Similarly, in its response to Dave Shannon's IR No. 1, NG states that

> Diluted bitumen emulsions will remain buoyant in waters with densities greater than approximately 1.015 g/cc. If the water density drops below approximately 1.015 g/cc, in zones of fresh-water intrusion, weathered and emulsified diluted bitumen products may sink to the depth where the density increases to above 1.015 g/cc.

Similar also is NG's response to Dr. Weir's IR No. 2.6, where NG states:

> The weathered diluted bitumen would have a density approaching 1.0 g/cc, which indicates that once the diluted bitumen weathers it may be susceptible to sinking in fresh water.

Finally, in the Kitimat Report NG states that:

> Examples that may lead to oil not remaining on the water surface include:
> - Oils with specific gravities equal to or greater than the receiving medium (fresh- or saltwater)
> - Oils that have weathered and, in losing lighter-end fractions, have reached a specific gravity equal to or greater than the receiving water
> - Oil that is near the same density as the receiving water and that is characterized as a 3-dimensional flow (non-laminar to turbulent flow such as found in streams, rivers, areas with fast tidal currents, breaking waves)
> - Oil with sediment (mixed into oil or adhered to oil droplets)...
>
> ...submerged oil may eventually sink with increased weathering, if in receiving water with lower density, **or** if sufficient sediment is incorporated. [Emphasis added.]

NG Response to Haisla IR 1.46, Ex B-39-3, p. 166
NG Response to Shannon IR No. 1, Ex B37-6, p. 3
NG Response to Weir IR 2.6, Ex B37-12, p. 11
Ex B83-16, Preliminary Kitimat River Drainage Area Emergency Preparedness Report, Appendix D, page D-2 (adobe 30)

44. On the other hand, another NG witness stated that dilbit cannot sink, as this would be contrary to an "immutable fact of physics". In cross examination, Dr. Horn, Mr. Belore

and other witnesses maintained that dilbit will only sink in the presence of suspended solids, or after a long period of weathering.

TR Vol 91, line 13441
TR Vol 134, line 3016
TR Vol 100, lines 24227-9
TR Vol 135, line 3187

45. However, NG's evidence with respect to the type of sediment that could combine with dilbit to form material that may sink in water is unclear. Dr. Horn testified that "fine grain sediments...provide the greatest amount of surface area which is one of the reasons that oil sank in [Michigan]". On the other hand, Mr. Belore appeared to suggest that, in the marine context at least, finer sediments reduce the potential for oil to sink as they are lighter. The evidence with respect to the material that may bind to dilbit and contribute to its sinking is unclear.

TR Vol. 97, line 20694
TR Vol 135, lines 3258-64

46. NG's views with respect to the flow conditions under which dilbit may sink is also contradictory. On the one hand, it states that "Higher flow rates and increased turbulence typically will entrain more oil into the water column leading to the potential for oil to enter pore spaces in permeable sediments." On the other, it states that "Oil sinking is unlikely to occur in areas with fast currents..."

NG Response to Haisla IR 1.46, Ex B39-3, p. 166
Ex B83-10, Kitimat Report, p. 4-4 (adobe 26)

47. Evidence provided by other parties suggests that dilbit may sink when weathered. In particular, Environment Canada's evidence in this proceeding contrasts sharply with NG's. For example, Environment Canada states that:

> Northern Gateway's response planning model does not account for sinking oil or for oil suspended particulate matter interactions...For oils with densities close to that of water, like both the diluted bitumen and synthetic crude products, **even small amounts of sediment can cause sinking.** Environment Canada is concerned that oil sinking and oil-sediment interactions have been underestimated in the provided scenarios. In the cases of both the Enbridge-

Kalamazoo and the Kinder Morgan-Burnaby spills, significant oil-sediment interactions occurred.

...

The changes to dilbit as it ages in the environment may affect cleanup. Although initially buoyant in water, **with exposure to wind and sun, as well as by mixing with water and sediment in the water, the density of dilbit can increase to the point that the oil may sink.** Recovery and mitigation options for sunken oils are limited. [Emphasis added]

Federal Government Participants' response to Gitxaala IR 1.4.9, Ex E9-21-09, p. 29

Federal Government Participants' response to Haisla IR 1.39(a), Ex E9-21-12, p. 71

48. Not only has Environment Canada expressed the view that even small amounts of sediment may cause oil to sink, its witness also stated under cross-examination that high velocity rivers may carry high suspended sediment concentrations, and that, at certain times of the year, sediment load could enter the marine environment. Although NG acknowledges that sediment loads and oil-sediment interactions are a critical factor in predicting the behaviour of spilled oil, it has not, in Environment Canada's opinion, provided a complete baseline data set on sediment loads, despite requests that such data be provided.

TR Vol 167, lines 17188-9; 17200-1

49. While NG has submitted information respecting the laboratory testing of dilbit, an Environment Canada expert testified that tests conducted in a laboratory setting provide only limited information that cannot be relied upon in isolation to predict the fate and behaviour of hydrocarbons spilled into the environment. Instead, information gathered from real spill events must inform the analysis, and consideration must be given to the conditions, including water temperature, suspended sediment concentrations and wind speed, to be encountered in the "real world".

TR Vol 170, lines 21369-73
TR Vol 169, lines 17254-7 and 17271-2

50. Environment Canada has also made it very clear that the evidence provided to date by NG does not allow for a full understanding of the behaviour of spilled dilbit. In the opinion of Environment Canada witnesses, the evidence has not provided sufficient

clarity with respect to the weathering, evaporation or sedimentation processes dilbit may be subjected to in the environment. Given the unique nature of this product, further research is warranted before one can ascertain whether dilbit will sink or remain on the water surface. Those concerns were echoed by an expert retained by the Gitxaala Nation.

TR Vol 169, lines 19569-616
TR Vol 169, line 19814
TR Vol 169, lines 19829-34
TR Vol 175, lines 28587-99

51. In addition, the evidence of other parties raises the possibility of the need to respond to submerged oil. NUKA research, on behalf of the Haisla Nation, opined that "submission documents overall still grossly underestimate the potential for sunken or submerged oil, particularly for pipeline spills to rivers." EnviroEmerg Consulting, for the Living Oceans Society summarizes well the uncertainty that remains with respect to the behaviour of oil:

> There are no definitive statements in the [Environmental Impact Statement] EIS to explain if bitumen diluted with condensate will emulsify, sink or do both if spilled. The supporting technical data analysis in the EIS is based on laboratory tests. There are no in-situ field tests, empirical studies, nor real incidents to validate these findings. This raises significant uncertainty that current spill response technologies and equipment designed for conventional oil can track and recover the diluted bitumen in temperate marine waters. In essence, the assumption that the diluted bitumen can be recovered on-water has yet to be tested.

Ex D80-27-09, p. 39
Ex D122-7-4, adobe p. 16

52. In short, what dilbit will do when it enters water remains unclear. NG recognizes this lack of clarity itself. As was stated by one of its witnesses, "it's extremely difficult to predict the behaviour of this product".

TR Vol 146, line 18705

53. NG admits that additional research needs to be done with respect to understanding how dilbit behaves in watercourses, and has committed to additional research in this regard. While NG has stated that this research is being proposed because "there is always room for improvement", the Province submits that this research can only have been proposed

by NG if there remained significant uncertainty about how dilbit will behave. What does appear to be common ground is that dilbit will sink if it becomes heavier than water; one way this may occur is if it comes into contact with suspended sediments. In fact, NG acknowledges that the fraction of the total oil volume that sinks can exceed 50% of the entrained oil. In the EHHRA, NG estimated that, in the event of an unmitigated full-bore spill into Hunter Creek, between 16 and 31% of the dilbit would find its way to the sediment.

NG response to JRP IR 10.8, Ex B74-2, pp. 26-7
TR Vol 92, line 13638-42
TR Vol. 135, lines 3140-3142
TR Vol 96, lines 19873-5
TR Vol 97, lines 20675-77
Ex B83-10, p. 2-3 (adobe 17)

54. It also common ground that responding to sunken oil is difficult. In fact, about a year after the Enbridge spill that took place in Michigan, submerged oil was still being remediated. More than two years after the incident, oil continues to migrate on the stream bed and accumulate at a certain location. The Environmental Protection Agency has recently made a further order with respect to the dredging of submerged oil and oil-contaminated sediment. NG in fact acknowledges that:

> While technologies for response to floating oils have advanced given the greater tendency for oils to float, ... there remains an 'importance [sic] and apparent need for improving countermeasures for [submerged oils].

TR Vol. 91 lines 13422-24; 13469;
TR Vol 94, lines 16913-4
Ex B83-10, Kitimat Report, page 2-3 (adobe 17)
EPA Order for Removal Under Section 311(c) of the Clean Water Act, March 14, 2013, Docket No. CWA 1321-5-13-001

55. Despite this fact, NG acknowledges that the information it provided in this proceeding with respect to the tactics it would employ to deal with submerged oil remain preliminary and not mature. These techniques have also not been evaluated for use in British Columbia conditions. NG says these tactics will only be developed in the detailed planning stage following federal government approval. The Province submits that with respect to the measures NG says it intends to employ in responding to submerged or sunken oil in the marine environment, NG has in fact provided contradictory information. Although he stated that "we have not gone into any detail concerning any response techniques", Dr. Owens testified that methods for dealing with such oil would

be part of NG's response capability, while Dr. Maki indicated that "no specific further measures are really planned or warranted."

TR Vol 91, lines 13501- 13513
TR Vol 92, lines 13581-2
TR Vol 135 lines 3272-3; 3844;
TR Vol 139, line 9976-7

56. Further, even if oil does not reach river or ocean bottoms, oil that becomes entrained in the water column presents its own spill response challenges. NG acknowledges that it knows of no techniques to effectively remove dissolved oil from the water column.

TR Vol 146, line 18809; 18826-31
NG response to JRP IR 10.8, Ex B74-2

57. In addition, the "overwashed" or "neutrally buoyant" oil which lingers in the water column is particularly difficult to track, and constitutes a distinct threat to the organisms present in the water column.

TR Vol 169, line 19783
TR Vol 175, line 28591

58. The Province has serious concerns about the lack of clarity and certainty about what dilbit will do if it were to enter the water, the preliminary and indeed contradictory nature of the evidence with respect to NG's remediation strategies and actions to address sunken oil, and the fact that its proposed tactics have not been evaluated for use in British Columbia. These factors, taken together, suggest that, at least as of today, NG is not yet prepared to deal with sunken oil in the event there were a spill of dilbit into a British Columbia watercourse. By itself this is a cause for serious concern in relation to the fundamental question in this proceeding, namely whether the JRP should recommend approval of this project. But at the very least, this means that a strong condition must be imposed requiring further research on the behaviour of dilbit.

Despite all these challenges, NG's plans for spill response are only preliminary

59. Despite the challenges to responding to a spill from the pipeline, including the challenge of responding to submerged and sunken oil, NG's plans for responding to a spill have not yet been developed. NG has committed only to providing its detailed oil spill response plans to the National Energy Board 6 months in advance of operations. In the context of this project, the Province remains very concerned that NG has not yet demonstrated its ability to respond effectively to spills from the pipeline.

TR Vol 73 line 15840

60. When specifically asked "In the absence of that planning...to address the challenges that we've been discussing, how is it we are to be confident that Northern Gateway will, in fact, be able to effectively respond to a spill?" NG replied that "There is a lot of work that needs to be done."

TR Vol 92, lines 13913-915

61. Of particular concern, despite its admission that a spill into a watercourse in a remote location would pose a significant challenge, NG has not yet determined those locations it could access to respond to a spill, including the control points utilized for capturing and recovering oil passing that location. Such access will only be determined, if possible, during detailed planning. At this time, NG also does not know what portion of water bodies would be boat-accessible in the event of a spill. The 2010 Michigan spill, which was the subject of much questioning during the hearing, occurred in a populated area, where there were many potential access locations. This will of course not be the case if a spill were to occur in a remote river in British Columbia.

TR Vol 91, line 13232, 13248-13255
TR Vol 98, lines 21596-7

62. While NG has prepared a document showing some possible control points that might be used for spill response in the event of a spill in some rivers, NG concedes that its work in this regard is preliminary, and only pertains to some of the control points that would ultimately have to be established. NG helpfully provided additional information to that which was originally filed with respect to the travel distance between pump stations or the terminal and certain potential control points. However, travel times to the control points that have been identified do not take into account mobilization time, and assumes all roads are drivable.

Control Points TDR
Ex B150, Undertaking U-40
TR Vol 91, line 13266, 13283-90, 13298, 13304
TR Vol 92, line 13730, 13925

63. Given the incompleteness of NG's evidence in this regard, the Province submits that NG cannot currently assert that there would in fact be viable control points where a spill could travel to. In addition, even if accessibility to control points had been fully validated, in order for NG to assert that it could respond effectively to a spill, it would also have to know the means by which personnel and equipment would gain access to respond to oil that had come ashore or sunken to the sediment. Given the preliminary nature of the evidence presented by NG, this is of course not known.

64. The Province is very concerned that, in the event of a spill, some places where a spill could reach will be inaccessible, and therefore not amenable to spill recovery actions. While NG states that it will be able to access control points at any location along the pipeline, it has simply not provided the evidence in this proceeding to substantiate this assertion. The Province submits that, as of today, it is not possible for NG to assert, nor for the JRP to conclude, that NG will be able to access all those places where a spill may travel, and to respond effectively.

    TR Vol 91, lines 13337-8, 13345-6

65. When asked to explain how it will respond to a spill, NG generally states that this will become clear when its detailed plans are revealed. For example, NG was requested by the Haisla to provide information on the proximity of roads to locations where a spill could travel. As Ms. Griffith explained, the reason for the request was to determine whether NG's promise to develop spill response plans after project certification could "truly be characterized as a mitigation measure". NG objected to this request, and the JRP ultimately upheld this objection. The JRP's ruling was based in part on NG's commitment to produce a "plan...developed to move forward towards developing the emergency response plan". That plan was delivered the next day (October 31, 2012). Unfortunately, what was produced was, in Ms. Griffith's words, a "plan for developing plans", or in Mr. Milne's words, "a plan for a very comprehensive program to develop the response program..." that offered no further insight into the ability of NG to access locations where a spill may migrate after it has entered a watercourse.

    TR Vol 96, lines 19131-2; 19153-61; 19172
    TR Vol 97, line 20145-47; 20153
    Ex. B158-2

66. In addition to access, there are a number of other challenges to operating in British Columbia in respect of which NG has completed only very preliminary work.

- The pipeline could be covered by heavy snow at different times of the year; NG states that it will have to review alternative methods of access to deal with this, but has presented no specific evidence on how this challenge will be addressed.
- NG has not yet developed specific plans about how it would deal with oil recovered from a spill, and has not yet determined disposal locations.
- NG has not yet determined the location or the contents of the equipment caches to be used to respond to spills.
- It has not determined year-round access to the pipeline, which will be evaluated as part of detailed planning.

TR Vol 92, line 13750-52; 13799-800; 13809-810
TR Vol 91, line 13382
NG response to JRP IR 10.5, p. 6, Ex. B74-2

Examples showing the challenge of responding to a spill

67. A number of examples of the challenge NG would have in responding to a spill were discussed during the course of cross examination. They highlight the fact that the ability to respond to a spill wherever a spill may occur or travel has not been validated. One example was a potential spill into the Clore River. This potential spill location was identified by Dr. Taylor as likely the most challenging one along the route. As discussed below, the spill extent maps produced by NG show that a full-bore spill into the Clore River could, over a 12 hour period, flow through the entire length of the river, and continue on into the Copper River. However, in the Control Points TDR, no control point has been identified for the Clore River; NG states that these will only be identified post-approval. In fact, Dr. Taylor noted that the most likely deployment location would be almost at the end of the Clore River near the confluence with the Copper River. Given the steep terrain through which the Clore River passes, depicted on NG's spill extent maps, this is not surprising. In addition, NG has not yet ascertained how long it would take for spill response personnel to arrive at this location. In the absence of any control point identified, or the means by which the locations along the river bank between control points would be accessed, the Province submits that NG cannot assert today that it would have ability to respond effectively (if at all) to a spill were it to enter the Clore River.

TR Vol 92, lines 14040-44; 14098; 14110; 14122-23
Ex. B109-13

68. Similarly, the Province has concerns with respect to the ability of NG to respond to a spill in the Morice River. At page 27 of the their report entitled "Potential Effects of an Oil Pipeline Rupture on Reach 2 of the Morice River" [D155-6-09], the authors indicate that:

> The remote location, challenging physical environment, diversity of fish species, and complex habitat characteristics will severely constrain Enbridge's ability to undertake both an effective response or successful long-term remediation should a spill occur.
>
> In our opinion the proponent has not provided the information needed to demonstrate that an oil spill from a pipeline rupture adjacent to reach 2 could be effectively controlled or remediated.

While Mr. Bustard, the co-author of this report, testified that he was not a pipeline engineer, and had no experience with emergency response, he also testified with respect to his extensive knowledge of rivers in Northwest British Columbia. The Province submits that this practical knowledge should be given considerable weight by the JRP. Notably, NG chose not to cross examine the authors on this aspect of their report, and their opinion has not been contradicted.

TR Vol 107, lines 1736; 1757; 1781-3

69. On cross-examination, NG testified, first, that arrangements for access to this area will be made in the event the project proceeds. In addition, it testified that the area near the Morice River is the subject of a route revision which will move the pipeline some 2-3 km further south than the existing route "V". While moving the route further from the river will reduce the potential for a spill to reach the river, and the province supports changes to the route that will do so, it is not clear whether this possibility has been eliminated. In fact, NG's spill extent maps, modified after route "V" show the potential for the extent of a spill should one take place. In addition, there would be a crossing of the Morice River, which could therefore be the source of a spill into that waterway. While NG is considering a horizontal directional drill crossing, whether that will indeed be the case has yet to be determined. In addition, NG stated that access "will be available as it was for the prior route". On the other hand, NG also stated that "The [route] refinement however, no longer parallels the Morice West Forestry Service Road (FSR) and Crystal Creek FSR and offers fewer opportunities to use existing rights-of-way". Therefore, it is unclear whether the route revision would reduce potential access

to the Morice. Therefore, the ability to effectively respond to a spill into the Morice River remains unclear.

TR Vol 92, lines 14566 -14587
TR Vol 87, lines 7361-4; 7371-6
Ex B101-7, Attachment 4 to JRP IR 11.10(c)
Ex B190-8, Fig. A-114

70. Similarly, the Province is concerned about the ability of NG to respond to a spill in the Upper Kitimat Valley. When asked by the Douglas Channel Watch

> "...in the context of the Upper Kitimat Valley, does this mean because of the steepness of the terrain and limited road access to the river, that containment at some locations at the source will be impossible, and the majority of your efforts will be at the first accessible locations downstream?"

NG was only able to reply that:

> "again it depends on the specific conditions. But as Dr. Taylor indicated, in the development of the response plans we would need to look at various scenarios, various times of year, develop plans so that it would identify the appropriate response locations at those times."

TR Vol 93, lines 15620-21

71. NG was also asked by Mr. Overstall about a potential spill into the Sutherland River. NG was asked whether, in light of the time to mobilize personnel and equipment, a spill would reach past the one identified access point before it entered the main stem of the river. Mr. Taylor's answer, while lengthy, merely recited the general approach that would be taken to respond to a spill in this location. He did not respond to Mr. Overstall's question, however.

TR Vol 98, lines 21887-902

72. When asked how long it would take for NG to contain a full-bore rupture on steep terrain in this area, NG again only stated its intention to undertake a spill response planning process in the coming years, which would involve a capacity review which would examine the kind of scenario advanced by Douglas Channel Watch.

TR Vol 93, lines 15666-68

73. These examples underscore the fact that, despite its claims, NG cannot today assert that it will be able to respond effectively to all spills.

NG's performance measures for responding to a spill are unclear

74. As noted above, despite NG's stated confidence in being able to respond to a spill at any location, its plans for responding to such a spill remain only conceptual. Its access and emergency response plans have not been developed. In fact, it is not able to commit to a firm time by which a spill will be responded to. While it has set a "target" with respect to spill response times of 6-12 hours, this figure has not yet been borne out through detailed plans. Indeed, NG states that response times will vary. In any event, the 6-12 hour response time is considerably more than the period of 2-4 hours identified in the Control Points TDR for travel times to control points. Moreover, the 6-12 hour response time is only for arrival on site. It would take additional time to mobilize the necessary forces to respond to the spill. For large, Tier 3 spills, this time would be further extended by the need to bring in resources from further away. For the Norman Wells spill, excavation equipment arrived four days after the spill was detected (an unknown period after it started); before that, cleanup activities were limited to securing the site, clearing the area and construction of berms.

TR Vol 92, lines 14323-328; 14368

TR Vol 93, lines 15457-8; 15518; 15840

TR Vol 95, lines 17949-55

Control Points TDR, p. 3-1

75. Moreover, as noted above at para. 33, above, it is not at all clear what NG means by "response" when doing nothing is a possible response to a spill, and when spill response may consist of monitoring and allowing "natural attenuation" to occur. If doing nothing or monitoring constitute responses, it goes without saying that NG could "respond" to each spill. Whether this is an effective response is a different question entirely. Exactly what NG means by responding to a spill remains unclear, as is the effectiveness of that response.

NG's evidence respecting potential spill extents

76. NG's targeted spill response time of 6-12 hours needs to be set against the reality that, in the case of a watercourse spill, oil may travel many kilometres downstream while NG is still mobilizing. In this proceeding NG has provided considerable information with respect to how far and fast oil can travel in a watercourse. For example, with a spill into Hunter Creek, NG has stated:

> Based on water velocities, a release at this location could reach the Kitimat River estuary 60 km downstream **within four to ten hours**, depending on river discharge. [Emphasis added.]

Dr. Horn has indicated that these figures are very conservative, and that the actual times to reach Kitimat would be a longer period. However, no other definitive evidence on these times was presented by NG.

Ex B3-21, p. 9-22
TR Vol 93, lines 15690-94

77. With respect to response times in this example, NG states that "estimated response time for containment is two to four hours from initial incident". However, it acknowledges that the "actual response actions and times may differ depending on circumstances at the time of the incident". Based on NG's own evidence, if river discharge is high, and weather, snow or other conditions are challenging at the time of a spill, the oil will have travelled for tens of kilometres before any effective response is brought to bear.

Ex B3-21, p. 9-22 and 9-26

78. NG also produced a series of spill extent maps in response to a JRP request. These depict the potential path of oil spilled into watercourses crossed by the pipeline over a 12 hour period, and assume that valves close within 13 minutes of a spill. The maps depict locations where a spill could enter a watercourse; however, there may be other locations where a release could enter the watercourse, notably with respect to the Kitimat River. NG stated that these maps were not as sophisticated as the analysis, using the SIMAP model, reflected in the EHHRA. However, the spill extents in the EHHRA are not time-limited, unlike those produced in response to JRP IR 12.2. Further, NG acknowledged that these maps are useful from the spill response perspective. As Dr. Horn noted:

> **These models were run as more of a response perspective.** They were not intended to -- they were not intended to show the ultimate fate of the hydrocarbons; **they were intended to show the intended path of hydrocarbons as it moved down gradient and down river**. This is mainly from a response perspective, so one would know approximately how far downstream one could expect hydrocarbons to move under given times.
>
> ...
>
> One of the goals of modelling is to answer a question. And the question of B109-13 is, **approximately where down river should you expect the oil in the event of a spill under conservative assumptions that don't slow the oil down that much**? [Emphasis added.]

Similarly, Mr. Doering noted that these maps are one of the tools NG can rely on in developing spill response plans.

Ex B109, NG Response to JRP IR 12.2(h) (attachments)
TR Vol 92, lines 14025-6; 14030 (as corrected)
TR Vol 88, lines 8707-11
Ex B47-26, NG Response to Response to Northwest Institute IR No. 2 and 3, p. 2
TR Vol 88, lines 9075; 9237

79. Dr. Horn also acknowledged that it was possible, even if unlikely, that the spill extents could be worse than depicted on the maps. He stated also that the modelling was stopped after 12 hours because "it's assumed that there would be a response at that point". In addition, the spill extents depicted assume valve closure in 13 minutes. Spills could of course be larger if the valves were not closed in that time period.

TR Vol 95, lines 18192-98
TR Vol 96, lines 19427; 19434-7

80. The spill extents shown on the maps produced by NG at the JRP's request are the best evidence before the JRP with respect to where spills into watercourses could travel over a fixed period of time. In many cases the maps depict oil travelling for many kilometres over the 12 hour model run. For example, the map showing the Clore River area, discussed above, depicts oil travelling through the entire length of that river and past its confluence with the Copper River before exiting the page.

Ex B109-13

81. During the proceeding, NG frequently stated that the estimates it has provided for spill trajectories are "unmitigated". That is, they assumed no action would be taken to reduce the movement of the oil. However, if spill response personnel have only just arrived at the spill within 6-12 hours, without any commencement of physical spill response, then by that time the oil may have moved many kilometres, severely complicating the task of oil recovery and remediation. This could be the case even if response times are shorter in a given instance. However, as noted above actual response times are yet to be determined. In other words, the "unmitigated" spill extents that are depicted on the maps produced by NG may, unless this response time were exceeded, be no different than the actual extent of the spills. According to the evidence before the JRP, by the time resources are brought to bear on a given spill into a watercourse, the spill may have spread so far that environmental effects would be severe before any response is commenced.

    TR Vol 92, line 14032

Enbridge does not follow procedures or learn from mistakes

82. Concerns about NG's inability to respond to a spill are magnified by Enbridge's conduct with respect to the spill which took place in Michigan. NG concedes that, in that case, there were procedures in place that were not followed. NG asserts that it now has in place a number of "golden rules", including that whenever there is a doubt with respect to whether the spill detection system has detected a leak, the pipeline must be shut down. However, NG concedes that this rule was in place before the Michigan spill; it self-evidently was not followed. In fact, the rule under which Enbridge would shut down its pipeline system within 10 minutes of an abnormal occurrence which could be immediately analyzed was put into place following a spill in 1991. At that time, similar commitments were made indicating that procedures would change and that a spill of that nature wouldn't take place again.

    TR Vol 92, lines 14812-5; 14765; 14772; 14789-91

83. NG does not take issue with the National Transportation Safety Bureau's ("NTSB") conclusion that Enbridge's response to past integrity management related accidents focused only on the proximate cause, without a systematic examination of company actions, policies, and procedures that may have been involved.

    TR Vol 92, lines 14943-4
    NTSB Report, Ex B92-3, page 114 (adobe 129)

84. In addition, it is not clear how Enbridge can assert that its formal continuous improvement program has been effective in the past. In a Transportation Safety Board ("TSB") report concerning a spill near Regina in 1999, the TSB noted that

> Enbridge's overall integrity management program was not successful in identifying the presence of a radial corrosion fatigue crack zone at the occurrence site, possibly because it could not completely distinguish between groove-type defects and environmentally assisted cracking (EAC)-type defects, nor the rate of growth of the latter.

In cross examination, Mr. Kresic took no issue with this finding.

TR Vol 94, line 16416-7
TR Vol 92, lines 14849-50; 14869

85. Mr. Kresic stated that, at this time of the spill, in 1999, the technology to detect the crack did not exist. However, he stated that, starting in 2000, such technologies were starting to take off, and by the time of the Michigan spill, such technologies were in place.

TR Vol 92, lines 14875 and TR Vol 94, line 16550

86. Despite the existence of these technologies, for some 10 years before the Michigan spill, the NTSB concluded that:

> However, until the time of the Marshall accident, **Enbridge's crack management plan focused only on fatigue cracks.** The growth rates of environmentally assisted cracks (such as corrosion fatigue cracks) can be an order of magnitude or more greater than nominal fatigue crack growth rates.

NTSB Report, Ex B92-3, page 90 (adobe 105)

87. In cross examination, Mr. Kresic acknowledged that:

> ...the most significant learning that we took from that, of...all of the parameters identified by the NTSB..., is the characterization of the inspection instruments that we had and their inability to find that feature.
> ...
> And so we've had to take a number of actions, including pressure restrictions. We've had to apply new technologies, conduct additional field investigations, and expand our program into a -- basically, a wider net.

> With the program that we have right now, we would have detected and managed Marshall.

TR Vol 92, lines 14875-80

88. In short, despite the fact that the relevant technologies had been in existence for some 10 years, and despite the existence of crack-related failures that led to the development of such technologies, Enbridge had failed to put in place a program that would have detected the Marshall spill.

89. Similarly, the following exchange between NG and Mr. Robinson bears citation at length:

> I wanted to turn to Adobe page 13 of the NTSB report that we're in. This is under the Executive Summary. And I am going to read two passages here because I think they're important; starting at the sentence above the first bullet. And it starts with:
>
> > "The rupture and prolonged release were made possible by pervasive organizational failures at Enbridge Incorporated (Enbridge) that included the following: deficient integrity management procedures, which allowed well-documented crack defects in corroded areas to propagate until the pipeline failed."
>
> And then I would just like to move down further on that page. Starting there, and we'll probably have to roll on to the next page.
>
> > "The inadequacy of Enbridge's integrity management program to accurately assess and remediate crack defects. Enbridge's crack management program relied on a single in-line inspection technology to identify and estimate crack sizes. Enbridge used the resulting inspection reports to perform engineering assessments without accounting for uncertainties associated with the data, tool, or interactions between cracks and corrosion. A 2005 Enbridge engineering assessment and the company's criteria for excavation and repair showed that six crack-like defects ranging in length from 9.3 to 51.6 inches were left in the pipeline, unrepaired, until the July 2010 rupture."
>
> I'm just wondering if you can explain how Enbridge, despite being warned, at least as early as 1999, that it's [sic] integrity management program was inadequate and with a continuous improvement program in place, ends up in 2010 with pervasive organizational failures and deficient integrity management procedures?

TR Vol 94, lines 16751-53; 16761

90. In his response to the question, Mr. Kresic did not take issue with the NTSB's findings in this regard.

    TR Vol 94, line16761

91. In the Province's submission, Enbridge has not demonstrated an ability to learn from its mistakes in order to avoid spills. While NG witnesses provided lengthy statements in cross-examination about the changes Enbridge has made to its corporate culture in an effort to reduce the potential for spills in the future, given its pattern of making similar commitments in the past, there are serious reasons for concern that the commitments it has made in this proceeding will be hollow.

Spill detection

92. Concerns with respect to NG's ability to respond to a spill are not allayed by the evidence presented by NG with respect to the steps it intends to take to detect a spill, and thereby minimize its effects.

93. For example, while NG is committed to "world-class leak detection", NG will not commit to a precise leak detection threshold before construction of the pipeline takes place. Its estimate for leak detection remains in the 1-3% of nominal flow over a period of 2 hours, depending on the pipeline segment. A spill of 3% of the nominal flow rate for 2 hours would equal approximately 208,000 litres.

    TR Vol 86, lines 5801-2; 5810-13; 5857-59; 5787-93
    TR Vol 89, line 10635

94. NG also confirmed that, with the internal techniques it currently plans to use, slow-rate leaks such as that which took place with the Norman Wells pipeline which resulted in a spill of 111.3 to 238.5 cubic metres, will not be detectable. Similarly, a 2009 leak near Fort McMurray was not detected for 2-3 hours, and resulted in a spill of over 900,000 litres. The minimum detectable leak size for the project will only be determined during detailed engineering. This is of particular concern, because a slow-rate leak, in a remote area, may ultimately result in a large spill if it is not detected. In addition, NG agreed that for some leaks, the timing of a leak cannot be determined, and it may not be possible to determine how long the pipeline had actually been leaking.

    TR Vol 86, lines 5964-68; 5989-92; 5997

Ex B39-4, attachment to NG response to Haisla IR 1.7(c), p. 1
TR Vol 94, lines 16815-6
TR Vol 95, line 17821
Ex B39-3, NG response to Haisla IR 1.12 page 45

95. Another spill took place near Hardisty, Alberta, in 2001 on an Enbridge line. This was detected quickly by Enbridge's automatic detection system. However, as the leak took several hours to find on the ground, a large spill of approximately 3800 cubic metres of crude oil was released.

TR Vol 94, lines 16934-44
Ex D66-4-4

96. Although NG asserts that it is committed to world class leak detection, it has not yet determined if it will use certain additional external leak detection methods, such as fiber optic cable based leak detection, despite the fact that many of these methods have been in use for some time, and are commercially available; this determination will apparently only be made during detailed planning. For example, detection using vapour tubes, which NG describes as having the lowest detection limit, has been in existence since the 1970s. NG explained that these products are still undergoing vendor testing; however there is no reason why this could not have been completed by now. Enbridge has been in the pipeline business for some time, and the project has been in the planning stages for many years.

TR Vol 86, lines 6001-13; 6027; 6045, 6049; 6235
Ex B39-3, NG response to Haisla IR 1.12(d) page 46
TR Vol 70, lines 15772-4

97. It is also difficult to accept NG's assertion of having a world-class spill detection system in light of a recent order made by the National Energy Board - Order SO-E101-001-2013. In its letter to Enbridge accompanying the order, the National Energy Board noted that a 2011 inspection revealed that Enbridge's Emergency Shut Down (ESD) systems were not compliant with applicable requirements respecting ESD push-buttons and alternate sources of power. Enbridge later acknowledged that 117 of its 125 pump stations did not comply with alternate source of power requirement, and 83 of them did not comply with the ESD push-button requirement. Enbridge committed to develop a corrective action plan for all its pump stations across its system by October 31, 2012. Enbridge did

not do so. Rather it requested and was granted additional time to develop the plan. The National Energy Board held as follows:

> The Board's priority is to protect Canadians and the environment. **Pipeline companies are required to continually assess the hazards of their operations and upgrade their facilities to remain in full compliance with regulatory requirements.** As a result of implementing effective management systems, a company ensures that pipeline systems are designed, constructed, operated and maintained to comply with those requirements. The Board, therefore, directs Enbridge to include in its corrective plan, **actions designed to correct the systemic deficiencies that have led to the current non-compliance.** [Emphasis added.]

Letter to Enbridge dated March 15, 2013, File OF-Surv-FIns-E101 2011 (http://www.neb-one.gc.ca/clf-nsi/rsftyndthnvrnmnt/sfty/brdrdr/nbrdg_rft2013_001-eng.html)

98. NG also is not willing to commit to an automatic shut down in the case of a suspected leak, as opposed to a person making the shut down decision; it is only willing to "investigate the feasibility of automatic shutdown implemented at the supervisory level after the 10 minute analysis". With respect, if the 10-minute shutdown rule is intended to be hard and fast, this should be made automatic, thereby removing the need for the exercise of human discretion. This would speak directly to the problems that arose in the Michigan spill, where the alarm and the 10-minute shut-down rule were ignored.

NG Reply to Haisla IR 4.87, Ex. B132-2, p. 138
NG Commitment O-06-04

99. At the very least, NG should be required to adhere to its "10 minute rule" based on very clear criteria. In questioning Mr. Baumgartner stated that:

> **The 10-minute period is to do further analysis should an alarm come in** or another leak trigger be realized by an operator to confirm that there is a leak.
>
> Our procedures right now are, if something happens on the system and -- like a drop in pressure, an unexpected drop in pressure or a leak detection alarm or something like that goes off, **immediately what our operators will do is look for other indicators of a leak to compliment [sic] that.**
>
> And if they see other indicators like a higher flow or a drop in flow -- an unexpected higher flow, drop in flow those types of things -- then they will immediately shut the pipeline down.

TR Vol 96, lines 19470-72

100. The Province submits that the so-called 10-minute rule as explained by Mr. Baumgartner is so amorphous that it provides little comfort that a situation like the Michigan spill would be avoided in the future. This problem is not adequately addressed by NG's commitment O-06-04, which refers only to column separation.

101. It is also submitted that some alternative leak detection techniques available to NG, such as aerial surveillance and third party notification, which may be effective in other locations, would have less effectiveness in British Columbia due to remoteness and snow cover.

TR Vol 86, lines 5955-7

102. Finally, while the data is not entirely clear, particularly in the period prior to 2010, many leaks were not detected by automated leak detection systems. Of the 11 releases that Enbridge had that were greater than 1000 barrels in the period 2002 to 2012, only 5 were detected through automated means (CPM or SCADA), and 6 were detected with other methods.[4]

TR Vol 97, lines 20418-9

103. In summary, while NG asserts that its spill detection systems will be world-class, it has not yet chosen to adopt spill detection technologies that would achieve that objective.

How much information is enough?

104. As set out above, there are serious concerns about the ability of NG to respond adequately to spills from the pipeline, particularly spills into watercourses. The challenges of terrain, access, remoteness and weather are compounded by the possibility that, as occurred in Michigan, dilbit can sink. Enbridge's Michigan spill, and the apparent inability of that company to institute continuous improvement increases this concern, as does the apparent unwillingness of NG to consider and adopt state-of-the-art spill detection measures.

[4] A number of other numbers were also provided by Mr. Callele. He testified that 60% of all Enbridge releases since 2010 and 67% of the Enbridge releases in the top 10% of reported spills by volume were detected by automatic means (TR Vol 88 line 9079). The fact remains that many spills went undetected by those means.

105. NG presumably considers and will argue that the information it has provided in response to these concerns is adequate for the current permitting stage; that is, the assessment being conducted by the JRP. However, it is NG that has asserted its ability to effectively respond to any spill from the pipeline. It is NG that has asserted that it intends to have in place world-class spill response capabilities. Having made these claims, presumably for the purpose of obtaining a positive recommendation from the JRP, NG cannot then say that their claims must simply be accepted. NG cannot simply say "trust us". We submit that NG must be able to demonstrate that the mitigation measures it proposes are in fact practicable and effective.

106. Indeed, it would not have been impossible for NG to provide this kind of information to the JRP. Mr. Underhill noted that NG has filed an example of what response plans could look like – the Kitimat Report. However, even that report is not comprehensive; its examples are preliminary, and are only "indicative". And while it identifies many of the challenges that spill response would face, it is very short on specifics on how those challenges would be met.

TR Vol 95, line 17568
Kitimat Report, Appendix A, pages 6-1 and A-1

107. It is clear that the JRP's broad mandate under the *National Energy Board Act* allow it to consider the presence or absence of detailed information in deciding whether or not to recommend approval of the project. As the Board stated in *Emera Brunswick Pipeline Co. (Re), supra,* what should be considered in formulating an opinion with respect to whether a given project is in the public convenience and necessity is highly fact-specific:

> The public convenience and necessity test is predominantly the formulation of an opinion by the tribunal. This opinion must be based on the record before it; that is to say, the decision must be based not only on facts but with the exercise of considerable administrative discretion. Similarly, there are no firm criteria for determining the public interest that will be appropriate to every situation. Like "just and reasonable" and "public convenience and necessity", **the criteria of public interest in any given situation are understood rather than defined and it may well not serve any purpose to attempt to define these terms too precisely. Instead, it must be left to the Board to weigh the benefits and burdens of the case in front of it.**
>
> Since **the public interest is dynamic, varying from one situation to another** (if only because the values ascribed to the conflicting interests alter), it follows that **the criteria by which the public interest is served may also change according to**

the circumstances. In addition, it is worthwhile to note that while the Board may be guided by past decisions, it need not be bound by them; indeed, it may be imprudent to be so bound given the dynamic nature of the public interest, and the inherent exercise of administrative discretion in the Board's decision-making process.

While in certain cases the unequivocal failure of an applicant to satisfy the Board on a single critical component may be enough for the Board to conclude that, on that fact alone, the project cannot be found to be in the public convenience and necessity, such failure on a single factor is unlikely. More common is the situation where the evidence in one or more of the areas of examination is stronger than that presented with respect to other relevant matters. In such cases, the Board will, on the basis of the evidence before it and within the specific circumstances of each application, apply administrative discretion and expertise in its overall determination of whether the applied-for pipeline is required by the present and future public convenience and necessity. In doing so, the Board must also, after carefully weighing all of the evidence in the proceedings, exercise its discretion in balancing the interests of a diverse public.

Accordingly, under the NEB Act, the factors to be considered and the criteria to be applied in coming to a decision on public interest or the present and future public convenience and necessity may vary as a result of many things, including the application, the location, the commodity involved, the various segments of the public affected by the decision, societal values at the time, and the purpose of the applicable section of the NEB Act.

[Emphasis added.]

108. The Province also notes that the National Energy Board's 24 April 2002 letter *Security and Emergency Preparedness and Response Programs*, referenced in proposed condition 171, provides:

> During [a]...section 52 application, the NEB may examine and evaluate company plans, procedures, practices, work activities as well as hazard assessments and company's policies to make and overall determination as to the appropriateness and effectiveness of a company's [emergency preparedness and response] program.

109. The Province submits that requiring NG to demonstrate the practicability of the mitigation measures it has proposed is also entirely in keeping with the precautionary principle. The potential for a spill, combined with its potentially devastating effect, strongly suggests the need for NG to clearly show that any spill could be effectively

mitigated. In *114957 Canada Ltée (Spraytech, Société d'arrosage) v. Hudson (Town),* [2001] 2 S.C.R. 241, at paras. 31 and 32 the Supreme Court of Canada underlined the importance of this principle in exercising regulatory decision-making:

> [I]nternational law's "precautionary principle"... is defined as follows at para. 7 of the Bergen Ministerial Declaration on Sustainable Development (1990):
>
> > In order to achieve sustainable development, policies must be based on the precautionary principle. **Environmental measures must anticipate, prevent and attack the causes of environmental degradation.** Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation...
>
> The principle is codified in several items of domestic legislation...
>
> Scholars have documented the precautionary principle's inclusion "in virtually every recently adopted treaty and policy document related to the protection and preservation of the environment".... As a result, there may be "currently sufficient state practice to allow a good argument that the precautionary principle is a principle of customary international law"... [Emphasis added.]

See also s. 6.3 of the Joint Review Agreement, and s. 2.2 of the "Scope of Factors – Northern Gateway Pipeline Project".

110. It is also, we submit, entirely in keeping with the principles underlying environmental assessment. In *Friends of the Oldman River Society v. Canada (Minister of Transport),* [1992] 1 S.C.R. 3 LaForest J.A. states that:

> Environmental impact assessment is, in its simplest form, a planning tool that is now generally regarded as an integral component of sound decision-making. Its fundamental purpose is summarized by R. Cotton and D. P. Emond in "Environmental Impact Assessment", in J. Swaigen, ed., *Environmental Rights in Canada* (1981), 245, at p. 247:
>
> > The basic concepts behind environmental assessment are simply stated: **(1) early identification and evaluation of all potential environmental consequences of a proposed undertaking**; (2) decision making that both guarantees the adequacy of this process and **reconciles, to the greatest extent possible, the proponent's development desires with environmental protection and preservation.** [Emphasis added.]

111. Indeed, the factors that must be included in any environmental assessment include "mitigation measures that are technically...feasible": *Canadian Environmental Assessment Act, 2012* s. 19(5). See also the fourth bullet in the factors set out in Part II

of the JRP's terms of reference, which are in the appendix to the Joint Review Agreement.

112. In short, if NG is relying on its ability to respond effectively to a spill for a positive recommendation from the JRP, then it must show that it will in fact have that ability. The Province submits that NG has not shown that ability in this proceeding.

113. The Province submits that requiring NG to show now that it will in fact have the ability to respond effectively to a spill is particularly important because there will be no subsequent public process in which that ability can be probed and tested. NG has pointed out that its oil spill response plans will be provided to the NEB for review, and has committed to a third party audit of its plans. However, it also acknowledges that there will be no means by which those plans could be tested through a public process.

    TR Vol 92, lines 13917; 14473-4

114. As the JRP stated during the course of this proceeding, it is often difficult to determine how much information is needed at this stage of the approval process. In some cases, and for some aspects of a project, it may be sufficient to require a proponent to, for example, commit to the preparation of plans post-certification. However, the Province submits that this does not apply, in this particular case, to the preparation of oil spill response plans. Although a spill of dilbit may not be likely in any particular location of the project at a particular time when considered in isolation, the possibility of a spill is very real, as Enbridge's track record demonstrates; the potential for devastating effects on watercourses is obvious; and there is serious reason to question NG's ability to respond effectively to a spill. Given these facts, in this particular case the Province submits that NG should be able to show, in advance of certification, that it will be in a position, once operations commence, to live up to its spill response assertions. NG has not done so. The Province submits that the JRP should, in making its recommendations, give this factor significant consideration.

115. In addition, Enbridge's track record strongly suggests the importance of being confident that NG's can live up to its assertions. Requiring NG to do so is particularly apt given the spill which occurred in Michigan, and the NTSB's findings with respect to Enbridge's spill preparedness, which NG accepts. In the NTSB report, it held that:

> In summary, **the spill response was hampered by inadequate resources on site; lack of spill response organizations under contract near Marshall, Michigan;**

> **and use of spill response equipment that was not appropriate for the environment and weather conditions. These deficiencies were all a result of poor response planning.**
>
> PHMSA issued its June 23, 2010, facility response plan advisory bulletin to notify pipeline companies of the need to review and update their plans to ensure adequate resources are available to comply with emergency response requirements. Enbridge responded that, 5 days before the Marshall accident, it had concluded that its plan was complete and appropriate for responding to a worst-case discharge. However, **Enbridge's actions following the discovery of the oil in Marshall revealed that the plan had not considered all possible operating environments and appropriate response methods.** PHMSA stated that it plans to include a review of lessons learned when it reviews the Enbridge facility response plan due for renewal in 2015 or when Enbridge next amends its plan. [Emphasis added.]

Ex. B92-3, p. 112 (adobe 127)
TR Vol 92, line 14467

Summary respecting the pipeline

116. The Province submits that the evidence on the record does not support NG's contention that it will have a world-class spill response capability in place. The challenges posed by the pipeline route, the nature of the product being shipped, the conceptual nature of its plans to date and Enbridge's track record mean that the Province is not able to support the project's approval at this time. The Province submits that its concerns in this regard should be seriously considered by the JRP as it considers the recommendation it will be making to the federal government.

Marine Oil Spill Response

117. The Province's concerns respecting the pipeline are mirrored with respect to its marine aspects. Once again, the Province submits that NG has not shown that it will in fact have in place a world-class spill response regime capable of responding to any spill.

118. As with a spill from the pipeline, NG acknowledges that a spill in the marine environment would have significant effects. NG's environmental effects assessment recognizes that a spill in the Confined Channel Assessment Area (CCAA) or the Open Water Area (OWA) could have significant and adverse effects on a wide range of vegetation, invertebrates, fish, waterbirds, and marine mammal species, through both short-term mechanisms (acute toxicity from ingestion, inhalation or oiling) and long-term mechanisms (chronic effects from loss of habitat or uptake of contaminants).

Risk Assessment and Management of Spills – Marine Transportation, Ex. 3-40, p. 23
TR Vol 169, lines 19946-50

119. Drawing upon Alaska's experience following the Exxon Valdez spill, a number of experts representing Environment Canada and the Department of Fisheries and Oceans have opined that the effects of an oil spill into the marine environment can persist for decades. For instance, the scientific evidence has shown persistent effects on sea otters and killer whales two decades following the Exxon Valdez spill. According to these witnesses, NG's assertion that, after the initial impact of an oil spill, the marine environment will naturally restore itself to its pre-spill state must be qualified. Recovery rates vary widely for different species and can span over decades, and there are exceptions to the general tendency toward natural restoration.

TR Vol 167, line 17050
TR Vol 169, lines 19977-20016 and 20038-9
TR Vol 175, lines 28615-8 and 28679-80

120. Finally, while NG puts much emphasis on the role of clean-up and restoration activities in mitigating the adverse environmental effects of a spill, the evidence shows that clean-up efforts can in some situations do more harm than good.

TR Vol 175, lines 28682-6

121. As a result, as with terrestrial spill response, NG asserts that it intends to have a world-class capability in place. This means ensuring that the required equipment and personnel can be mobilized in a timely and effective manner regardless of the nature and extent of the spill.

TR Vol 134, lines 1870-72

122. NG has also committed to "extended responsibility" for spill response in the marine portion of the project. This includes committing to "maintain or contract a response organization capable, under the planning standards, of containing and recovering within 10 days or earlier, up to 32,000 tonnes [approximately 36,000 m^3] of on-water oil." This standard would apply in the confined channel area, with additional time for travel outside that area. In addition, extended responsibility involves other activities NG intends to undertake to prevent marine oil spills, including setting operational limits, tanker vetting, crew vetting, the use of escort tugs, increased navigational aids, and the ability to be able to respond very quickly to a spill with sufficient capacity. With respect

to the latter, NG has committed to responding to a spill of up to 10,000 tonnes within the confined channel area within 6-12 hours.

TR Vol 134, lines 2222-2227; 2238-2240; 2263; 2282; 2522; 2528; 2757

123. The Province is certainly supportive of this commitment to extended responsibility. However, it is important to place it in context. The commitment NG has made to on-water recovery does not match that of northern British Columbia's nearest neighbour, Alaska, which has set as a standard recovering a 47,700 cubic metre spill within 72 hours. While NG has stated that it is difficult to compare response planning standards, NG has invited that comparison by claiming to aim for a "world-class" response capability. Indeed, it has asserted that it will have "manpower and equipment levels for planned response that will exceed international practice", and have recovery capacity that places it among the top terminal port operations worldwide.

TR Vol 134, lines 2067; 2089-90
NG response to BC IR 2.34(c), Ex. B40-6, p. 98
Application Vol. 8C, Ex B3-37, p. 5-12 (adobe 44)

124. The distinction between the Alaskan standard and the one proposed by NG with respect to on-water oil recovery may be an important one. As noted above, NG has itself emphasized the need to respond rapidly to a spill. The difference between containing and recovering oil within 10 days and the Alaska standard of 3 days may mean, depending on the specific circumstances, that a greater amount of oil would be unrecovered, or be on a shore. If NG claims to be "world-class", it should be required to adopt a standard which is no less stringent than that of northern British Columbia's closest neighbour. Indeed, NG has itself claimed that it will better the response capability in Alaska:

> Today, in Prince William Sound, we look at them and we look at how they have established, created, and improved their system to the one it is today. We appreciate the lessons that they have learned and we will use those lessons learned...**We will compare ourselves to the capacity and capability that is there at the present time...and we will improve on that.**

TR Vol 138, line 8561

125. Further, it is clear that NG's response planning remains at a conceptual level. Many of the details respecting its spill response remain undefined at this time. It has only prepared very preliminary work with respect to the equipment it intends to obtain and

the personnel it would intend to retain or have in place. The identification of vessels of opportunity is also something that will only be determined at detailed planning. The number of personnel it will have available to immediately respond to meet the 6 to 12 hour planning standard for spill response will also be considered in the future through resourcing plans.

TR Vol 132, lines 3345 and 3351; 3437 and 3442; 3513-14; 3522;

126. NG has also not prepared Geographic Response Plans ("GRPs") which would identify specific equipment and the personnel needed to respond to spills in a specific geographic context following a systematic analysis of the physical features at a given location. Further, NG will not commit to the preparation of GRPs for the entire route, but only for "key sites in the CCAA and the OWA". (Even this is unclear; NG also states that GRPs would be done "mostly in the confined channel areas.") Sites will be "selected based on the potential for oiling and the presence of coastal environmental and/or socio-economic sensitivities." They explain that this is because they would "prioritize the areas in the vicinity of the spill that you would protect in the event of an incident." However, NG itself acknowledges that "the entire marine area is what we would consider a sensitive area" and is a "high consequence area". It also assumes that all areas along the northern and southern approaches are at risk of being oiled in the event of a spill. Finally, NG also acknowledges that GRPs have been done for the entire coast of Washington State.

TR Vol 135, lines 4336-7; 4319; 4386; 4326; 4332-3;
TR Vol 136, lines 4641-3;
Ex. B3-39, Application Vol. 8C, p. 5-15
Ex. B3-42, Application Vol. 8C, p. 10-3
Ex. B164-13, NG Reply to JRP IR 14.4, Attachment 1, p. 3-3 (adobe 15)

127. NG has also not yet prepared an analysis that would show when conditions would preclude the safe and effective deployment of oil spill equipment, although it makes the statement that mobilization of spill equipment would be precluded only 2% of the time in the confined channel assessment area, with a corresponding figure of 26% in the open water area. The gap analysis that is in evidence shows different figures, with Fall/Winter numbers for locations in the confined channel and open water areas of 13.5% and 68.5% respectively. Therefore, at this time the most reliable figures before the JRP indicate that in these seasons, there are significant periods during which spill response will be impossible or severely constrained.

TR Vol 134, lines 2783-6

A Technical Analysis of Marine Transportation Statements for the Enbridge Northern Gateway Project, Ex. D122-7-05, p. 82 (adobe p. 45)

Oil Spill Response Gap and Response Capacity Analysis for Proposed Northern Gateway Tanker Oil Spills in Open Water and Protected Water Operating Environments, Ex. D-80-56-3, pp. 22 and 27 (adobe pp. 23 and 28)

128. NG does not appear to differ with the results in the gap analysis that was completed for the Haisla Nation (Ex. D-80-56-30). Indeed, the "preliminary analysis" that NG has completed apparently only applies to "initial containment", as opposed to "active mechanical collection and recovery". The Province is not clear on the distinction being drawn by NG here, but it is evident that the figure of 2% does not relate to "active mechanical collection and recovery", and that the figures in the Haisla gap analysis are not seriously challenged by NG.

TR Vol 140, lines 11542-47; 11560-1

129. In any event, NG declined to produce the "preliminary analysis" it does have, as it was "not in a state that would be appropriate to file".

TR Vol 140, line 11560

130. In addition, it is also clear that NG has not yet completed an assessment of the equipment it will need to meet the commitments it has made with respect to marine spill response. The details of that equipment remain to be determined, as with so much of what NG has committed to, in detailed planning.

TR Vol 140, lines 11409-411

131. NG's commitment to a response within 6-12 hours is a planning standard; it is not a response time that will necessarily be met in all conditions, particularly in severe weather conditions. It would be 6-12 hours "in most conditions".

TR Vol 134, lines 2548-9; 2535; 2553-4

132. Moreover, as with response to a spill from the pipeline, it is not clear what NG means by this response standard. The Province originally assumed that the 6-12 hour timeframe was intended to describe the time by which spill response would actually commence. However, in cross-examination Dr. Owens stated that "monitoring is a response". (Indeed, with respect to open water spills, Dr. Owens noted that for most open ocean spills, no oil from a spill is recovered; the oil remains in the environment, with potential

adverse effects.) In addition, NG has stated that initial action by escorting tugs would constitute a response. While the Province recognizes that NG intends to have tugs escort tankers in the confined channel area, and that these are intended to have significant spill response capability, this fact calls into question what NG actually means when it puts forward the 6-12 hour response time. Tugs escorting tankers should be able to respond almost immediately to any spill from the tanker they are escorting. If monitoring constitutes a response, and response from at-hand tugs constitutes a response, the Province simply does not understand what NG intends when it puts forward its 6-12 hours response time. In the absence of this clarity, the JRP should accord this commitment little weight.

TR Vol 140, line 11321; 11610-11 and 11622-3
TR Vol 134, line 2206, 2241
See also NG response to CFNs IR 1.21(f), Ex B38-2, pp. 90-91

133. While NG has asserted that it will be able to meet its commitment to spill response in the marine environment, the Province submits that it has not yet shown that it can live up to its claim to have proposed a "world-class" response capability. In light of the conditions that a spill response could face, the conceptual nature of NG's preparations to date, and the lack of clarity respecting its performance measures for spill response, the Province submits that NG has not shown that it will be able to establish a spill response regime capable of responding effectively to spills in the marine environment, let alone one that is "world class".

TR Vol 135, lines 4138-4148

Navigation and Shipping

134. Of course, the JRP may consider not only the potential effects of a spill, and the proposed preparations to respond to such a spill, but also the likelihood of such a spill taking place.

135. The Province acknowledges that, in very general terms, tanker spills worldwide have declined in recent years. However, the information provided by NG in its Quantitative Risk Assessment, Ex B23-34 ("QRA") does not provide the JRP with a firm factual basis for reaching conclusions with respect to the potential for spills from tankers serving the proposed project.

136. First, while the QRA makes many assertions with respect to the potential for spills, the report provides little factual foundation for the assertions it makes, despite the fact that its authors, Det Norske Veritas ("DNV"), acknowledge that such a factual basis should be explained.

TR Vol 158, lines 1296-7

137. For example the process that the QRA followed was for international incident statistics to be adjusted for the project's proposed tanker routes by employing local "scaling factors" determined through a hazard identification or "HAZID" process. The use of scaling factors to relate international incident statistics to the local conditions and the specifics of the project therefore makes the facts supporting the means by which the scaling factors were set, and the methodology followed for setting them, crucial to understanding the validity and probity of the QRA's results. However, the QRA does not set out in detail how the scaling factors were set through the HAZID process, and then ultimately arrived at following a revision carried out in Norway.

QRA, pp. 5-50 to 51
TR Vol 158, lines 1556-7

138. Because of the way in which the scaling factors are set, the Province submits that limited weight should be attached to the QRA results. First, although the QRA purports to be a quantitative risk analysis, it is clear that the scaling factors were set in a qualitative fashion. Given the nature of the HAZID process, which involves combining the views of experts and local participants, this is understandable, but calling the QRA a "quantitative" analysis when it is in fact based on subjective inputs is a misnomer.

QRA, p. 5-42
TR Vol 138, line 1326

139. More importantly, however, the scaling factors themselves are almost meaningless because of the number of elements built into them, and the lack of any explanation of the weight of those elements in each of the scaling factors. For example, one single scaling factor related to powered grounding ($K_{\text{navigational difficulty}}$, appearing at QRA page 5-56) has lumped into it visibility, currents, marking of the passage, disturbance from other vessels and meteorological data. Despite the number of elements in this scaling factor, and their complexity, the only indication before the JRP with respect to their impact on safe navigation is a number which purports to compare the navigational

difficulty of a given route segment with the international average, and a very brief comment, that in most cases simply indicates "average conditions". In one case at least, it was not clear to the DNV witness what combination of elements had led to a higher scaling factor, although limited visibility was all that the comment referenced. With this limited explanation, and in the absence of supporting facts concerning the means by which the scaling factors were arrived at, there is simply no way in which the JRP could rely on the conclusions made in the QRA.

TR Vol 138, lines 1640-42; 1658; 1670-71

140. There are other important examples of a lack of factual foundation located elsewhere in the QRA. For example, nowhere in the QRA is it shown how the figure of 20%, used in the sensitivity analysis portion of the report with respect to the scaling factor for grounding, was arrived at.

QRA p. 7-104
TR Vol 138, line 1770-73

141. The QRA also places a great deal of emphasis on the tug escort system proposed by NG to reduce the potential for incidents involving tankers. In fact, DNV asserts that NG's plan will have a risk reducing effect of 80% for groundings, 90% for drift groundings and 65% for total incident frequency overall. However, the factual basis for these figures is entirely absent from the QRA. They are not based on a specific study, but on a confidential study prepared for another location, which DNV cannot share with the JRP. The limitations implicit in this are obvious. First, the JRP does not have the benefit of the factual basis for the assertion being made, and therefore has no basis to accept the bald assertion made by DNV. Second, the fact that the study on which the figure of 80% is based was for a different location means that its validity in the specific context of this project is limited. Indeed, NG's own witnesses stated that:

> I think you also have to be careful of applying a -- a wide range of probabilities, as Mr. Scalzo just mentioned, to a particular project.
>
> For instance, escort tugs are very effective in mitigating drift groundings, slightly less effective in power grounding and quite a bit less effective in collisions.
>
> So if the one project that Mr. Scalzo was reporting concerning had a -- where drift grounding was not a major issue and collision was the primary concern,

those tugs would be less effective. **So again, you have to look at it on a project-by-project basis.**

...

But I just want to further what Mr. Michel said that **it is important to look at these on a case-by-case or individual route -- area and route -- route basis as -- as to the extent of mitigation and it does vary by the type of risk and the type of location.** [Emphasis added.]

QRA, p. 8-119
TR Vol 158, lines 1783-6
TR Vol 156, lines 32292-5; 32302

142. In the QRA, DNV also asserts that the consensus from participants at local meetings was that there was no condition along the proposed routes that pose an "unmanageable risk to safe marine navigation...". Yet what was said by the individuals participating in these meetings was not recorded in detail, and the QRA does not contain a record of what was said.

QRA, p. 4-46
TR Vol 158, lines 1402 and 1405

143. The QRA is also limited, it is submitted, by the fact that its analysis is prepared on a segment-by-segment basis. Each segment of the proposed routes is analyzed and assigned scaling factors in order to relate them to the international incident data that act as the QRA's base information. However, it is not clear to the Province that the project's tankers will in fact always utilize the route segments depicted in the study. While NG states that it would "instruct" tanker operators to use the routes referenced in the current application, and that they would be used except in "exceptional" circumstances, the routes would not, in the absence of a condition in this regard, be included in NG's enforceable tanker regulations, but rather in the port handbook. Ultimately, the route chosen will be up to the pilot aboard. Without a clear requirement that tanker operators use the routes set out in the QRA, its predictions for the probability of spills for the project are of limited value.

TR Vol 157, lines 210, 234-5; 240-44; 293-5; 305-6

Conclusion regarding the marine portion of the project

144. As with the potential for spills from the pipeline, NG acknowledges that spills remain a possibility. It also acknowledges the significant effect that a spill would have on the marine environment. It has therefore committed to "extended responsibility" for spill response. It has asserted that it will have world-class spill response capability that will be able to respond effectively to any spill. The Province certainly supports NG's commitments in this regard. However, the Province submits that NG has not yet shown that it will be able to live up to these commitments. In the absence of detailed plans, and in particular GRPs, the Province remains deeply concerned that any response to a significant spill, were it to occur, would be limited in its effect, and that serious impacts on the marine environment, and the livelihoods of those who rely on it, would result. For this reason, the Province is not able to support approval of the project, and submits that its concerns respecting NG's ability to respond to a spill should be given serious consideration by the JRP.

Costs and Benefits

145. NG has asserted certain benefits that will result from construction and operation of the project. In particular, NG has emphasized the effect the project would have on the ability of oil producers in western Canada to diversify their markets. NG has estimated an increase of approximately $2 in the price of western Canadian crude as a result of access to Asian Pacific markets (the so-called "Asia uplift").

    TR Vol 70, lines 15803-4

146. Set against these benefits, of course, are the potential effects of the project, some of which are discussed in this argument. In addition, the JRP should note that there are limitations to the benefits NG asserts. While higher crude prices may benefit the Canadian producer, they would not benefit Canadian refiners. In addition, while NG has assessed the benefit to the Canadian economy as a result of the Asia uplift, it has not assessed the costs in this regard. These costs have not been included in the cost-benefit analysis. Also, while the asserted benefits of the project include additional revenues to government, no deduction is made for costs that government may have to bear as a result of the project. The Province also notes that the cost of the enhancements to the project that NG announced in July 2012 were not included in its cost-benefit analysis.

    TR Vol 70, lines 15803-4; 16037
    TR Vol 73, lines 19694-8; 19706-7; 20010-15; 20020-1; 20194;
    TR Vol 76, lines 23942-6; 24311-4; 24350-8

147. There is also a lack of clarity in the evidence about some of the inputs that NG used to compare the project with the "base case". In the Update of Market Prospects and Benefits Analysis for the Northern Gateway Project, the authors state that:

> One of the key enhancements to the Crude Market Optimization Model since 2010 is the **addition of the capability to transport Western Canadian crude via rail to British Columbia ports and the U.S. Gulf Coast refineries.** In the Base Case (no Northern Gateway), Western Canadian crude is being railed to British Columbia ports by 2019, and to both British Columbia and the U.S. Gulf Coast by 2020. **The start-up of Northern Gateway has the effect of eliminating the need for all rail shipments in the first 5 years of the forecast period, and very sizable reductions in rail transport in subsequent years....**
>
> For the heavy Canadian crudes, by enabling the Canadian crude producer to access the Asia-Pacific market with meaningful volumes, Northern Gateway allows the Canadian crude producers to both stop selling to their least attractive refiner clients (attractive from a pricing perspective) and **reduces their need to ship heavy crude via comparatively expensive rail transport.** [Emphasis added.]

Ex B83-3, p. 5 (adobe 8)

148. Despite this assertion, in cross examination both Ms. Geartner and the Chair had to ask Mr. Earnest on several occasions to provide the data that supported his comment in his report that rail costs are typically more expensive that pipeline costs. After lengthy discussion, it appeared that Mr. Earnest had based his statement simply on a general knowledge of rail costs. For example:

> THE CHAIRPERSON: And the Panel's continuing to try to understand, **was that the basis for the general comment that you made?** Was it that comparison of the rail versus pipeline costs from Edmonton to the Gulf Coast that led you to make that statement?
>
> ...
>
> MR. NEIL EARNEST: ... **So my comment is just based on a general knowledge that pipelines are less costly than rail** whenever you have both rail and pipeline in the same route.
>
> ...
>
> THE CHAIRPERSON: Ms. Gaertner, if we were to get the costs of the comparison between the pipeline and rail from Edmonton to the West Coast, would that meet your needs that you're seeking in this undertaking?
> MS. GAERTNER: Edmonton to the West Coast and to the Gulf, I think. I think we need both of them if those -- if that's what he's relied upon.

THE CHAIRPERSON: Mr. Earnest, **is that what you've relied upon?**
MR. NEIL EARNEST: ...Not to be difficult, just to be precise, **I relied on my knowledge for that comment about the costs of pipeline versus rail**, or they're both going from the same origin, same destination. [Emphasis added.]

TR Vol 77, lines 24761, 24765, 24768-772

149. Although NG provided an undertaking (U-20, Ex B122-1) that compared rail costs versus pipeline costs between the Gulf Coast, British Columbia and Edmonton, it remains unclear whether those figures were in fact those relied on by Mr. Earnest in his report. This then calls into question the validity of his assertions regarding the benefit that NG provides relative to the transport by rail built into the base case.

150. Finally, the Province wishes to address in particular one statement made by NG during the proceedings in Edmonton. The following exchange took place on September 18:

> Ms. Boye: ... I just want to ask whether you can recognize that it's not possible to know from Northern Gateway's Application the exact extent to which the project will have impacts beyond the [Project Development Area] and into the [Project Effects Assessment Area]?
>
> MR. MARK ANIELSKI: Let me say that it's -- no, it's not possible, and **the onus, I would say, is on provincial governments to have done their due diligence on assessing the cumulative impact of linear disturbance at the watershed level.** In the ideal world, we would have that evidence. I could tell you a 25-metre right-of-way isn't much bigger than old seismic lines in Alberta which were15 metres.
>
> So the **cumulative impact of all this linear disturbance really should be assessed by provincial governments** to help us in any project evaluation to assess the incremental impacts of the next project or the next seismic line. **We lack that evidence. We lack that information. So this is really an onus on governments, in my opinion.** [Emphasis added.]

TR Vol 75, lines 22682-4

151. These statements by Mr. Anielski are simply incorrect. The onus in this proceeding is not on governments, including the government of British Columbia, but on NG. This includes information with respect to cumulative impacts, which are referenced on p. 25 of the Hearing Order.

First Nations Involvement

152. As indicated in our letter to the JRP of December 7, 2012, an important issue for the Province in these proceedings is the extent to which First Nations have had the opportunity to fully participate. It is entirely appropriate for the interests of First Nations to be fully considered by the JRP, and for the JRP to report on the potential impact of the project on those interests. In this regard, the Province has been monitoring the involvement of the many First Nations that intervened in these proceedings, and the Province has relied for its submissions on pipeline and marine issues on much of the evidence produced as a result of these interventions. The Province will not be making submissions on whether the JRP process has satisfied honour of the Crown or other obligations to First Nations.

Conditions

153. The Province is not in a position to support approval of the project as proposed for the reasons set out above. However, if the JRP decides to recommend that the project be approved, then it is of the utmost importance that the approval be accompanied by clear, measureable and enforceable conditions.

154. In this regard, the Province strongly supports the conditions the JRP has proposed regarding pipeline oil spill response plans, leak detection, requirements for further research into the behaviour of dilbit in the marine environment and spill response exercises (proposed conditions 112-113; 170-171; 164-165; 168). With respect to proposed condition 168, however, the Province recommends that one of the scenarios in paragraph (d) be a full bore spill into the Clore River. As noted above, NG has acknowledged how challenging responding to a spill into this watercourse would be.

155. The Province has been concerned about the risk that costs associated with a large spill will exceed the insurance coverage and other financial means identified by NG under cross-examination. Those concerns remain, to date, unalleviated. Therefore, the Province supports the imposition of Potential Condition No. 147 proposed by the JRP, and submits that the level of financial coverage required therein would address the concerns identified above to the satisfaction of the Province.

156. With respect to the marine aspects of the project, NG has proposed a number of measures to reduce the potential for marine incidents, including spill response capabilities, the use of escort tugs, improved navigation aids and operational limits for tankers operating in the confined channel area. The Province is supportive of these

commitments. The Province has reviewed the conditions proposed in respect of these commitments, and is supportive of them as well. While these have largely been included in the proposed condition 5, the Province submits that the way in which these conditions have been drafted lacks the necessary clarity, measurability and enforceability that would make them effective. The Province's recommendations for improvements to the proposed conditions are attached as Appendix "A".

157. In addition, there are a number of other commitments that NG has made with respect to the marine aspect of the project. The Province regards these as important means to help ensure that spills are prevented, or if they occur, are effectively responded to. These additional commitments are set out in Appendix "B".

158. There are three of these that the Province would like to highlight here. First, NG's commitment to establishing enforceable terminal regulations, which would include tanker speed limitations and weather restrictions, is an important commitment with respect to ensuring tankers act in accordance with the commitments NG has made. However, at this time there is no statutory approval of such regulations, by Transport Canada or any other agency. The Province regards it as critically important for there to be a comprehensive review of NG's proposed regulations that includes the input of interested persons, including the Province and potentially affected First Nations.

TR Vol 157 lines 394-5; 412
Federal Government Participants' response to Coast First Nations IR 3.4(d), Ex E9-21-06, pp. 17-18
Federal Government Participants' response to Haisla IR 1.60(e-f), Ex E9-21-12, p. 106

159. Second, NG's evidence with respect to a vessel traffic separation in certain areas where the passage is narrow is mixed. In the TERMPOL Review Process Report, it is stated that "The proponent recommends that a vessel traffic separation scheme (traffic lanes) be assessed for the area." However, in cross examination, Captain Flotre indicated that NG is not of the view that a traffic separation scheme should be considered or assessed in the confined channel area. On the other hand. Mr. Cowdell indicated that a separation scheme is a mitigation measure that could be considered. While the Province understands that Transport Canada would be responsible for establishing a vessel separation scheme, the Province submits that the potential usefulness of such a scheme should be studied further. If such a study showed that this would be a useful measure to reduce the potential for marine incidents, then the Province is confident that Transport

Canada would consider such a study in deciding whether to institute such a scheme in the confined channel area.

Ex E11-3-2, pp. 22 to 23
TR Vol 157, lines 1095-7; 1112; 1134

160. Third, with respect to the proposed condition respecting routes, as noted above, NG stated in cross-examination that the routes defined in the TERMPOL studies are the routes the tankers will use, except in exceptional circumstances, and that tanker operators would be instructed to use those routes. NG would take a keen interest if a tanker did not use the proposed routes, and would expect that to be an exceptional circumstance. All of this stands to reason, as it seems obvious that prescribed routes would, amongst other things, provide other vessel traffic (commercial, fishing and recreational) with information on where tanker traffic can be expected so those mariners can either avoid those areas or apply increased vigilance when transiting them to reduce the potential for collisions. Much of the evidence NG has provided in this proceeding is based on the routes proposed in the TERMPOL studies; this includes the QRA, which evaluates the probability of spills based on those routes. As a result, the Province submits that requiring tankers to abide by prescribed routes, except in those circumstances where doing so would be inconsistent with safe navigation, is important part of ensuring safe tanker operations.

TR Vol 157, lines 210-212; 240; 306;

161. The Province also submits that additional conditions with respect to the pipeline portion of the project terrestrial would be appropriate for the same reasons – to ensure, as much as possible, that the potential for a spill is reduced, and the response to any spill is effective and timely. These additional commitments are set out in Appendix "C".

162. With respect to the condition the Province has proposed regarding Geographic Response Plans (GRP), NG has stated that it will conduct "detailed spill planning for... all sensitive watercourse crossings". It has also stated that it would apply "enhanced emergency preparedness initiatives" to certain "higher consequence watercourses" identified in the SQRA. In cross-examination, NG confirmed that "key", "sensitive", "high risk" and "high" or "higher consequence" watercourses are all terminologically equivalent. In addition, it confirmed that tributaries that flow into high-consequence watercourses would also be considered consequence areas. Finally, NG stated that it would be willing to work with the Province and other stakeholders to identify other high

consequence areas. As a result of these commitments, it is clear that, at the least, GRPs need to cover all of these watercourses.

Ex B-17-1, River Control Points TDR, p. 1-1
Kitimat Report, p. 1-8
TR Vol 92, lines 14247-8; 14255-66;
TR Vol 88, lines 9105-7

163. In its cover letter concerning the potential conditions it has proposed, Ex A346-1, the JRP requested comments with respect to which Act (the *National Energy Board Act* or the *Canadian Environmental Assessment Act, 2012*) particular conditions should be made under. It is clear that the Panel has remarkably broad jurisdiction to set conditions under s. 52 of the *National Energy Board Act*. Section 52(1)(b) provides, in part:

> ...**regardless of the recommendation that the Board makes**, all the terms and **conditions that it considers necessary or desirable in the public interest** to which the certificate will be subject if the Governor in Council were to direct the Board to issue the certificate...

164. This power, it is submitted, is amply broad enough to cover the conditions proposed by the JRP, and by the Province.

See also *Imperial Oil Resources Ventures Ltd. (Re),* 2010 LNCNEB 5 at paras. 336 and 7

165. In the alternative, if further authority is required with respect to mitigation measures concerning the marine portions of the pipeline, there is again ample authority to make recommendations respecting mitigation measures or follow-up programs under the *Canadian Environmental Assessment Act, 2012.*

166. Some of the conditions the Province has recommended require the approval of federal agencies. This includes approval of the Terminal Regulations by Transport Canada. The Province can think of no agency that would be better placed to review and consider the adequacy of the Terminal Regulations. The Province expects that the federal government can refer to these conditions in argument if it has any objection to performing this role. If Transport Canada is unable or unwilling to perform this role, then the National Energy Board should.

ALL OF WHICH IS RESPECTFULLY SUBMITTED,

DATED: May 31, 2013

Christopher Jones and Elisabeth Graff
Counsel for the Province

Appendix A: Recommendations Respecting Proposed Marine Conditions

JRP proposed wording	Province of BC Recommendations and Comments
Marine Voluntary Commitments No laden oil or condensate tanker shall unload or load at Kitimat Terminal until Northern Gateway has implemented or caused to be implemented all of its voluntary commitments related to marine tanker traffic and enhanced oil spill response associated with the Project (Marine Voluntary Commitments). As referenced in the Project application and other evidence, including the TERMPOL Review Committee's TERMPOL Review Process report filed on 23 February 2012, these include, but are not limited to: a) simulator training for pilots and tug crews; b) live field trials in the confined channel assessment area for tankers and tug escort operations simulating both laden and ballasted condition; c) a requirement for laden tankers in the confined channel assessment area to have two escort tugs (one tethered); d) a requirement for ballasted tankers to be accompanied by a close escort tug; e) purpose-built escort tugs available for ocean rescue; f) escort tugs equipped with oil pollution emergency response equipment; g) safe transit speeds for tankers to be identified in Northern Gateway's Port Information Book; h) a requirement for tankers to modify their speed to reduce the risk of marine mammal strikes; i) the installation of radar to monitor traffic and provide additional information to the Canadian Coast Guard's Marine Communications and Traffic Services;	**Marine Voluntary Commitments** No laden oil or condensate tanker shall unload or load at Kitimat Terminal until Northern Gateway has implemented or caused to be implemented all of its voluntary commitments related to marine tanker traffic and enhanced oil spill response associated with the Project (Marine Voluntary Commitments). As referenced in the Project application and other evidence, including the TERMPOL Review Committee's TERMPOL Review Process report filed on 23 February 2012, these include, but are not limited to: a) simulator training for pilots and tug crews, **such that they have the level of skill to safely navigate and implement emergency procedures prior to the commencement of tanker operations;** b) live field trials in the confined channel assessment area for tankers and tug escort operations simulating both laden and ballasted condition; c) a requirement for laden tankers in the confined channel assessment area to have two escort tugs (one tethered) **accompanying the tanker at all times;** **c.1) a requirement that tankers not be allowed to begin transit from the place at which they would pick up a pilot unless there were a berth available for the tanker [TR Vol. 157, lines 867-8]** d) a requirement for ballasted tankers to be accompanied by a close escort tug; e) **a requirement that all* escort tugs must be** purpose-built and available for ocean rescue, **having** **(i) specifications, at a minimum, as described at pages 31-2 of the Tug Study, Ex B44-3;**

j) establishment of vessel operational safety limits that address visibility, wind, and sea conditions; k) establishment of terminal operational safety limits that address visibility, wind, and sea conditions; l) the development of a Tanker Acceptance Program by Northern Gateway that has been audited by a qualified, competent, independent auditor and the results have been made publically available; m) the development of Terminal Regulations and a Port Information Handbook; n) the non-acceptance of tankers with full width cargo tanks at Kitimat Terminal; o) the use of skilled and properly-trained terminal personnel; p) a requirement for deployment of a boom around tankers during cargo transfer operations; q) the use of tug crews trained in emergency response; and r) enhanced oil spill response capabilities including: i) establishment of a Transport Canada-certified Response Organization with a 36 000 cubic metre response capability capable of being at the site of a spill in the confined channel assessment area within 6 to 12 hours, and at the site of a spill in the open water area within 6 to 12 hours plus travel time; ii) strategic location of oil spill response equipment and vessels to meet the response time capabilities; iii) oil spill response capability at the Port of Kitimat that is equal to or greater than that of a designated port; iv) identification and prioritization of particularly sensitive areas for oil spill response in Geographic Response Plans developed in consultation with the Province of British Columbia and potentially-affected communities in the	**(ii) heated deck systems [TR Vol 134, line 2854].** ***[With respect to the reference to all escort tugs, see TR Vol 157, lines 549-50]** f) escort tugs equipped with oil pollution emergency response equipment **described on page 50 of the Tug Study, Ex B44-3**; g) safe transit speeds for tankers to be identified in Northern Gateway's **Terminal Regulations; [only the Terminal Regulations may be enforceable; the Port Information Handbook is not; see TR Vol 157, lines 398-9]** h) a requirement for tankers to modify their speed to reduce the risk of marine mammal strikes; i) the installation of radar to monitor traffic and provide additional information to the Canadian Coast Guard's Marine Communications and Traffic Services, **including those identified by BC Coastal pilots as being of particular importance, and referenced at TR Vol 158, lines 1231-33;** j) establishment of vessel operational safety limits that address visibility, wind, and sea conditions; k) establishment of terminal operational safety limits that address visibility, wind, and sea conditions; l) the development of a Tanker Acceptance Program by Northern Gateway that has been audited by a qualified, competent, independent auditor and the results have been made publically available; m) the development of Terminal Regulations and a Port Information Handbook; n) the non-acceptance of tankers with full width cargo tanks at Kitimat Terminal; o) the use of skilled and properly-trained terminal personnel;

event of a spill; and v) development of Community Response Plans. To demonstrate the above, Northern Gateway must file with the NEB, **at least 90 days prior to loading or unloading the first tanker at Kitimat Terminal**, confirmation, signed by an officer of the company, that its Marine Voluntary Commitments have been implemented.	p) a requirement for deployment of a boom around tankers during cargo transfer operations; q) the use of tug crews trained in emergency response; and r) enhanced oil spill response capabilities including: i) establishment of a Transport Canada-certified Response Organization with a 36 000 cubic metre response capability capable of being at the site of a spill in the confined channel assessment area within 6 to 12 hours, and at the site of a spill in the open water area within 6 to 12 hours plus travel time; ii) strategic location of oil spill response equipment and vessels to meet the response time capabilities, iii) oil spill response capability at the Port of Kitimat that is equal to or greater than that of a designated port; iv) **preparation of** Geographic Response Plans **as described in condition [15, as set out below]**; **iv.1) equipment, trained response personnel and logistical support needed to implement the Geographic Response Plans;** v) development of Community Response Plans. To demonstrate the above, Northern Gateway must file with the NEB, **at least 90 days prior to loading or unloading the first tanker at Kitimat Terminal**, confirmation, signed by an officer of the company, that its Marine Voluntary Commitments have been implemented.

Appendix B: Additional Marine Conditions

	Condition	Evidence Reference and Comment
1	**On-Water Spill Response Capacity** Northern Gateway, or its contracted response organization, must have in place the capacity, including personnel and equipment, to recover 36,000 m^3 of on-water oil within 72 hours, for all marine environmental conditions encountered by tankers serving the proposed terminal. In this condition, "oil" includes all hydrocarbons that may be transported to or from the proposed terminal, and that that oil as it may change following exposure in the environment.	NG has clearly committed to a standard for the recovery of on-water oil (ERM-04-09). At TR Vol 134, lines 1995-6, Dr Owens stated that NG's capacity to contain and recover oil will be the same or greater than neighbouring jurisdictions. The 72 hour recovery period recommended here would bring NG into line with the standard in Alaska, but with a lower amount of oil to accord with the worst credible spill scenario identified in the Quantitative Risk Analysis. TR Vol 134, lines 2222-3 NG acknowledges the need for a range of tools to deal with ranged both environmental and oil conditions, including tools to deal with both weathered and un-weathered oil. See TR Vol 138, lines 8262; Vol 139 lines 9978-9; Vol 142, line 14226
2	**Marine Oil Spill Response Plan** NG must require all tanker operators calling at the terminal to accept the terms of NG's marine oil spill response plan, including a requirement that tanker operators, in the event of a spill for which it is the responsible party, use the spill response organization designated in NG's plan for the purposes of immediate spill response.	TR Vol 134, lines 2152; 2263 TR Vol 135, lines 4071-2; 4117

3	**Methods for dealing with Sunken Oil** As part of its spill response capabilities, NG, or its contracted response organizations, must have in place equipment and methods to effectively locate and recover submerged and sunken oil, to the satisfaction of Transport Canada.	TR Vol 135, lines 3272-3 The commitment made by NG is very vague (ER-04-08).
4	**Dispersant Capability** Northern Gateway, or its contracted response organization, must ensure it has sufficient dispersant capability, including the ability to effectively apply it and monitor its effectiveness, located in British Columbia if that capacity cannot be obtained elsewhere in order to meet the spill response capabilities referenced in condition 5(r).	TR Vol 135, lines 3694-5
5	**Marine Emergency Preparedness and Response Exercise and Training Program** Northern Gateway must file with the NEB, or cause to be filed, at least 18 months prior to commencing operations, a Marine Emergency Preparedness and Response Exercise and Training Program ("Marine Exercise Program"). The purpose of the Marine Exercise Program is to demonstrate the continual improvement of competencies of the Response Organization ("RO") referenced in proposed condition 5(r)(i) to prepare for, respond to, recover from, and mitigate the potential effects of hydrocarbon releases in the marine environment. The Marine Exercise Program must include, but not be limited to: a) how the RO will train its personnel to respond to all hydrocarbon	NG recognizes the importance of exercising marine oil spill response plans in order for them to be effective in practice. While extensive, proposed condition 168 does not deal with exercises of the marine oil spill response regime. TR Vol 135, lines 4218-80 TERMPOL 3.18, Ex 23-16, p. 2-1 (adobe 17) TR Vol 135, lines 4218-9

	spill scenarios in various seasons including, but not limited to, releases of hydrocarbons in marine environments in winter and extreme weather conditions; b) a schedule for tabletop and full-scale (i.e., field deployment) emergency response exercises for a variety of scenarios that will be conducted prior to operations, including, but not limited to, full-scale exercises that have been informed by prior tabletop exercises, for each of the following scenarios: i) a spill of 36,000 m^3 of dituted bitumen at a location in the CCAA (for example Wright Sound); ii) a spill of 36,000 m^3 of dituted bitumen in the OWA at a location near the CCAA (for example, one of entrances to CCAA), or a location from the CCAA (for example, at the North end of Vancouver Island in vicinity of Scott Islands); c) a plan setting out the schedule and frequency of emergency response exercises for a variety of scenarios during the operational life of the Project, including, but not limited to: i) within two years of commencing operations, unannounced full-scale exercises for the scenarios noted in paragraph (b); ii) unannounced and planned exercises for drills, tabletop exercises, functional exercises, and full-scale exercises; and iii) the rationale for determining the schedule and frequency of emergency response exercises; d) a learnings implementation plan for exercises that considers how the Marine Exercise Program and related documents will be updated and amended following exercises. The learnings implementation plan must consider three main purposes: i) to test and validate plans, including Geographic Response Plans; ii) to develop RO responder competencies and provide them with the opportunity to carry out and understand their roles in	

	emergency response; and iii) to test Project-specific and well-established emergency preparedness and response procedures, including the use of incident command and unified command, where there may be several agencies and other entities involved. Northern Gateway must cover the reasonable costs of First Nations and other stakeholders' participation in the exercise of its spill response plans, both before and after commencement of operations. Condition 195 applies to this condition in the same manner as it applies to condition 168.	
6	**Reasonable Oil Spill Costs** Northern Gateway must seek to agree with the Province of British Columbia, First Nations and other persons who could incur costs in respect of oil spill response, with respect to what spill response measures would be considered reasonable, in order to facilitate participation by those entities in any spill response.	TR Vol 136, lines 4955-8
7	**Terminal Regulations – Public Process** Northern Gateway must conduct a process that allows for comments by the Transport Canada, the Canadian Coast Guard, the Province of British Columbia and the public with respect to the Terminal Regulations referenced in condition 5(m). Northern Gateway must provide to the NEB **3 years in advance of operations** its plan for conducting the process, for approval. Without limitation, the Terminal Regulations must include provisions requiring tanker operators to adhere to them, and repercussions for	See argument at para. 158

	failing to do so, up to and including refusal of service. The Terminal Regulations must be prepared for the approval of Transport Canada.	
8	**Terminal Regulations – Monitoring Compliance** Northern Gateway must include as part of the contract it has with the operators of tugs escorting tankers a term requiring the operator to report on the conformity of the tankers with the Terminal Regulations referenced in condition 5(m).	TR Vol 157, lines 111-2
9	Northern Gateway must seek from the Pilotage Authority reports concerning any contravention of the Terminal Regulations referred to in condition 5(m) by tanker operators.	TR Vol 157, lines 125-7
10	**Terminal Regulations – Audit** Northern Gateway must have its Terminal Regulations audited by a qualified, competent, independent auditor and the results be made publically available.	TR Vol 157, lines 167-9 TR Vol 135, lines 4056-7; 4096-7
11	**Ship Separation Scheme** Northern Gateway must prepare a study respecting a ship separation scheme for the confined channel assessment area. The study must be prepared by a qualified professional, and must include an evaluation of the efficacy of the scheme to reduce the potential for collision. Northern Gateway must provide the study to Transport Canada, and make it publicly available.	See argument, para. 159
12	**Quantitative Risk Assessment – Updates** Northern Gateway must prepare and provide to the NEB an update to its Quantitative Risk Assessment, 10 years from the start of	TR Vol 158, lines 1840 and 46

	operations, and further updates every subsequent 10 years, until the project has been decommissioned.	
13	**Adherence to Tanker Routes** Northern Gateway must include in its Terminal Regulations a regulation that all tankers use prescribed tanker transit routes, described in the Regulations, in the confined channel assessment area. The regulation must require tankers to adhere to the routes at all times except where safe navigation would require a deviation from the route(s). The Regulation must require that all deviations from the prescribed routes be reported to Northern Gateway and include the rationale for the deviation.	See argument, para. 160
14	**Tanker Drift Analysis** Northern Gateway must prepare a tanker drift analysis survey and rescue tug assessment covering the full length of tanker routes through Canadian waters (including along the outer coast of Vancouver Island and Haida Gwaii). Northern Gateway must provide the survey and assessment to Transport Canada and make the report publicly available. If the survey and assessment demonstrates that the escort tugs referenced in condition 5(e) will be unable to prevent the drift grounding of tankers serving the terminal, Northern Gateway must ensure that it provides sufficient tug capacity to meet this requirement.	Northern Gateway has committed to carry out a drift study that would evaluate the effectiveness of escort tugs in reaching vessels in the open water area. The Province submits that it is essential for rescue tugs to be positioned in appropriate locations to ensure that they can intercept a stricken tanker emergency in time to prevent a grounding incident based on the timelines indicated in the drift analysis at any point along the tanker routes in Canadian waters. TR Vol 157, lines 582-4 TR Vol 159, lines 3694-7 TR Vol 162, lines 8429-8437

15	**Geographic Response Plans** NG must develop the Geographic Response Plans (GRP) referenced in condition 5(r)(iv) for all sections of the coast where a spill of diluted bitumen from tankers serving the terminal could take place. The GRPs must identify specific equipment and the personnel needed to respond to spills in a specific geographic context following an analysis of the physical features and logistical requirements at a given location, and must be prepared to the same level of detail as the GRPs prepared for Washington State. Northern Gateway must develop the GRPs in consultation with the Province of British Columbia, Transport Canada and communities that could potentially be affected in the event of a spill.	See argument at para. 126 and TR Vol 135, lines 4326-37; 4360-63

Appendix C: Additional Pipeline Conditions

	Condition	Transcript Reference and Comment
1	**Automatic Shutdown** Northern Gateway must configure the pipeline such that operations would automatically shut down where the control centre identifies a potential leak, and the absence of a leak cannot be confirmed within 10 minutes.	See argument at para. 98 TR Vol 92, lines 14790 TR Vol 94, lines 16786-8 TR Vol 96, line 19520 The commitment NG has made is only with respect to investigating automatic shutdown (O-06-04)
2	**Pipeline Simulator** Northern Gateway must have in place 6 months before operations a line-specific simulator and trainer.	TR Vol 92, line 14808
3	**Road Access – Periodic Review** Northern Gateway must, on an annual basis, review the roads it will need to access the pipeline right-of-way, and those locations where a spill of hydrocarbons could travel 12 hours, and determine which roads require improvement or maintenance in order to allow permanent, all-season, access, and must carry out the identified improvement or maintenance.	TR Vol 95, lines 17701-6 While the 12 hour response time may not represent the worst-case scenario, this is the time NG has committed to respond to spills.
4	**Geographic Response Plans** The Geographic Response Plans (GRP) referenced in condition 170/171(a)(iii) NG must be prepared for all watercourses which have (1) been identified by Northern Gateway as key, high risk, high consequence or sensitive and into which a hydrocarbon spill could enter, and (2) those watercourses, into which a spill could enter, that flow into the	See argument at para. 162

	watercourses referred to in (1). The GRPs must cover the maximum potential distance that spilled hydrocarbons could travel. The GRPs must identify specific equipment and personnel needed to respond to spills in a specific geographic context following an analysis of the physical features at a given location. Northern Gateway must also prepare GRPs for all other watercourses reasonably identified by the Province of British Columbia to be high consequence. Northern Gateway must develop the GRPs in consultation with the Province of British Columbia, the NEB, and communities that could potentially be affected in the event of a spill.	
5	**Geohazards Working Group** Northern Gateway must, at least 18 months prior to commencing construction, establish an independent Geohazards Working Group, including specialists from governments, local experts and consultants for Northern Gateway. Participation by local experts must be funded by Northern Gateway. The working group must consider the need for and recommend any further data collection, including, but not limited to, additional LiDAR mapping to a specified corridor width, geophysical surveys, permafrost studies, and slope stability monitoring where deemed necessary.	TR Vol 91, lines 12725-12736 The Commitments Tracking Table sets out a commitment to "initiate discussions with expert groups and federal and provincial agencies for the purpose of creating a Northern Gateway Geohazards Working Group", but fails to set out a clear commitment to establish a Geohazards Working Group. JRP Potential Conditions No. 75-77 refer to "report(s) by the independent geohazard working group (or committee) comprised of specialists from various organizations, including, but not limited to, governments, local experts, and consultants for

		Northern Gateway", but lack specificity regarding the mandate of and funding for the Geohazards Working Group.
6	**LiDAR acquisition** Northern Gateway must acquire LiDAR mapping for the entire length of the pipeline corridor, to a corridor width of two kilometres, or wider where warranted by the natural hazards that have been identified or as recommended by the Geohazards Working Group.	TR Vol 85, lines 4935-4937 The Commitments Tracking Table sets out a commitment to "acquire additional LiDAR for the entire length of the pipeline", but fails to specify a corridor width. This proposed condition reflects the commitment made by NG on Oct. 9, 2012 with respect to mapping width.