Trans Mountain Pipeline ULC
Trans Mountain Expansion Project
NEB Hearing Order OH-001-2014
Responses to Information Request from
City of Vancouver

1.01 Economic Feasibility

1.01.01 Future Pipeline Operations

Reference:

i. Volume 2, Appendix A *Direct Written Evidence of Steven J. Kelly, HIS Global Canada Limited*, Footnote (A55987, A3S0R1, p.30)
ii. Volume 2, Appendix A *Direct Written Evidence of Steven J. Kelly, HIS Global Canada Limited*, Section IV-2 Enbridge Mainline (A55987, A3S0R1, p.44)
iii. Volume 2, Section 1.3.1 *Federal Regulatory Framework* (A55987, A3S0Q8, p.33)
iv. Volume 4C, Section 12.0 *Preliminary Abandonment Plan* (A56004, A3S1L1, p.73)

Preamble:

Reference ‘i'' and ‘ii’ describe two pipelines; The Cochin Pipeline and Enbridge Mainline (Line 9) that have applied for approval to reverse their pipeline flow.

One way to protect infrastructure investments (like oil pipelines) from future uncertainties is if the sunken capital equipment can be repurposed if necessary.

Request:

a) Please discuss any plans of Trans Mountain to reverse the existing or proposed pipeline.

b) Please provide information about the steps (including regulatory) that would be required to reverse the existing or proposed Trans Mountain Pipeline.

c) If the Trans Mountain system is capable of operating in a reverse direction please provide details of the types of products that may be shipped and the associated handling facilities.

Response:

a) Trans Mountain has no plans to reverse the existing or proposed pipeline.

b) Please refer to the response to City of Vancouver IR No. 1.01.01a.

c) Please refer to the response to City of Vancouver IR No. 1.01.01a.

1.01.02 Operating Costs and Upgrades

Reference:

i. Volume 2, Section 2.9 Project Cost Estimate (A55987, A3S0R0, p. 5)
i. Volume 1, Section 2.5.3, Operations and Maintenance (A55987, A3S0Q7,p.68)
ii. Volume 4C, Section 2.0, Operations and Maintenance (A56004, A3S1L1, p.28)

Preamble:

In order to be economically feasible a pipeline needs to cover both the capital investment made in it and its operating costs. In order to understand the resilience of the economic case for the pipeline, the revenue per unit required for these two types of costs should be explored.

Request:

a) Please provide the operating cost per unit transported, (i.e. – the approximate minimal revenue necessary per barrel to cover just the operating costs of the pipeline) assuming that the pipeline investment operates as planned.

b) What sensitivity analysis was done on the price of oil? Please provide details of this analysis.

c) Please provide examples of operating cost evidence from other pipelines that Kinder Morgan operates.

d) Please provide an estimate of how many years the pipeline can operate before a major capital upgrade will be required. Please also indicate what such upgrades would include.

e) Please provide details of the capital upgrades made to the existing Trans Mountain pipeline and associated facilities since it began operations.

f) Please provide the likely sequencing and timing of major capital upgrades in the future based on existing pipelines.

g) Please provide information about the capital upgrades made to other pipelines owned or managed by the Kinder Morgan group, including details of the age of the pipeline and the purpose of the upgrades.

Response:

a) Please refer to NEB IR No. 1.09a – Attachment 1 for operating cost in year 1 and year 5.

Shippers who executed long term contracts to provide the financial underpinning for the Project have agreed to pay for the transportation service on a ‘take-or-pay’ basis, meaning they will pay the fixed component of the toll regardless of the volume transported.

In addition, with the exception of power, the majority of the operating costs incurred by Trans Mountain do not vary in direct proportion to the level of throughput on the pipeline, therefore a cost per unit analysis will not yield results that are consistent with cost causation.

Finally, while power costs do vary somewhat with the level of throughput on the pipeline the relationship between the cost of power and throughput is not linear and the toll principles for the expansion are such that the actual cost of power is passed through to shippers in the variable component of the toll.

b) Trans Mountain did not perform a sensitivity analysis with respect to the price of oil as it relates to the transportation service provided by Trans Mountain. Shippers who executed long term contracts to provide the financial underpinning for the Project agreed to pay for the transportation service on a 'take-or-pay' basis, meaning they will pay the fixed component of the toll regardless of the volume transported. The price of oil is a matter for consideration by shippers not Trans Mountain.

c) The information request is not relevant to one or more of the issues identified on the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

d) Trans Mountain is unclear as to what the City of Vancouver would define as a "major capital upgrade". Volume 4C of the Application describes the operations and maintenance plans for the expanded System. These plans include comprehensive operations and maintenance procedures and a robust integrity management system. In carrying out the operating and maintenance activities Trans Mountain may identify assets that require maintenance in order to continue to operate the asset in good operating condition or upgrades to enhance the performance or improve the efficiency of the asset. Regulation and standards will also guide Trans Mountain's timing and level of investment in capital assets. Trans Mountain cannot speculate as to a specific year that a major investment in capital assets will be required however Trans Mountain can confirm that it will continue to invest in capital assets in order to support the integrity and safe operation of the pipeline system over time. Please also refer to Trans Mountain's response to NEB IR No. 1.09a.

e) Please refer to the response to Eliesen M IR No. 1.10b.

f) Please refer to the response to City of Vancouver IR No. 1.01.02d.

g) The information request is not relevant to one or more of the issues on the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

1.01 Economic Feasibility

1.01.03 Environmental Sustainability Policies

Reference:

i. Volume 1, Section 2.2.2 *Principles and Goals* (A55987,A3S0Q7, p.52)
ii. Volume 2, Section 1.2.1.7 *Environmental Stewardship* (A55987, A3S0Q8, p.30)
iii. Kinder Morgan Code Of Business Conduct And Ethics, Section 12. Health, Safety & Environment, p.17 of 22.

Preamble:

Reference 'i' notes that the Project stakeholder engagement program aims to "report on social, environmental and economic concerns raised, and identify how concerns might be addressed".

The Tree Canada Partnership referenced in 'ii' states "since 1998, Trans Mountain has contributed to the planting of 13,000 trees. Over the next 80 years, this will offset 2,300 tonnes ofCO2, a main contributor to greenhouse gases".

Reference 'iii' states that "every employee is expected to share the Companies' commitment to pursue the goal of not harming people, protecting the environment…and contributing to sustainable development".

Most modern corporations say they care about environmental sustainability. Some even publish their sustainability record. But it can be difficult for the general public to determine whether a corporation actually has systems in place to align its sustainability actions with the knowledge from world-leading environmental science.

Request:

a) Do Trans Mountain and Kinder Morgan Canada generally agree with the independent assessment of climate science as expressed by the latest report of the Intergovernmental Panel on Climate Change: that human-caused emissions of CO2, methane and other GHGs are increasing global temperatures and are likely to lead to average global temperatures that are more than 2 degrees Celsius above pre-industrial levels by 2100?

b) Does your company generally agree that actions to reduce CO2 emissions are part of a corporate sustainability ethic?

c) What, if anything, does your company do to reduce CO2 and other GHG emissions from its operations?

d) Does Trans Mountain believe that new or expanded oil pipelines are likely to decrease, increase, or have no effect on CO2 and other GHG emissions? Please provide rationale for your assessment on C02 and GHG emissions.

e) Is Trans Mountain aware of independent modeling research that assesses the likely global demand for oil if humanity is to prevent global average temperatures from rising more than 2 C in this century? If aware, why has Trans Mountain not considered this research in their application?

f) Does Trans Mountain consider the 2,300 tonnes of GHG emission reductions over 80 years, as cited in reference 'ii', to be a significant amount?

Response:

a) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

b) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

c) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

d) Please see the Application, Volume 5A, Section 7.2.5 for an assessment of Project-related greenhouse gas emissions as well as the response to NEB IR No. 1.31.

e) This information request is not relevant to one or more of the issues identified on the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

f) Kinder Morgan Canada is not a large direct emitter of greenhouse gases. The 2,300 tonnes realized by our partnership with Tree Canada is not significant when compared to the reductions realized through other operational changes that have been made. These changes include improvements to storage tanks construction and operation to reduce evaporative losses; the reduction in control valve throttling; and the pollution control equipment at Westridge used to reduce emissions during tanker loadings.

1.01.04 Economic Risks

Reference:

i. McCollum et al., (2014). *Fossil resource and energy security dynamics in conventional and carbon constrained worlds*, Climatic Change.
ii. Kriegler et al., (2014).*The role of technology for achieving climate policy objectives: overview of the EMF 27 study on global technology and climate policy strategies*, Climatic Change.
iii. Volume 2, Section 3.3.1, Supply and Demand (A55987, A3S0R0, p.11)
iv. Chan et al., (2010). *Canada's bitumen industry under CO2 constraints*, MIT Joint Program on the Science and Policy of Global Change.

Preamble:

1. Reference 'i' and 'ii' summarize world leading energy systems analysts at independent research institutes who have developed models that estimate the needed changes in the global energy-economy system for humanity not to cause a greater than 2 degree Celsius increase by 2100.

   The modeling described in reference 'i' shows that in nearly every scenario the demand for oil from the oil sands must not expand in order to prevent temperature increases of 2 degree Celsius or greater, and indeed must decline by 2050.

2. Reference 'ii' states that "total Western Canadian crude production is forecasted to grow at 3.0 per cent annually from 2013 to 2037".

Request:

a) Has Trans Mountain factored the analysis mentioned in reference 'i' into its long term planning assumptions?
   1) If Trans Mountain has factored this into its long term planning assumptions please provide details of how this has been considered.
   2) If Trans Mountain has not considered these factors in to its long term planning assumptions, please provide long term plans with this analysis included.

b) How has Trans Mountain taken any of the studies and their findings in preamble section 1 into account when assessing the economic risks of this pipeline investment or in estimating the supply described in reference 'ii'?

c) What is Trans Mountain's response to reference 'iv'–the MIT study whose conclusion is "the niche for the oil sands industry seems fairly narrow and mostly involves hoping that climate policy will fail"?

d) Please explain, with reference to the models discussed above, how the business case presented in the application is consistent with Canada meeting its climate change objectives.

e) Please provide a revised business case with the assumption of no expansion of Canadian oil sand production and a decline in production in line with the estimates of non-conventional crude production in a maximum 2 degree centigrade model.

Response:

a) Trans Mountain has not undertaken this analysis. The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

b) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

c) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

d) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

e) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

1.02 Impact Assessment

1.02.01 Biophysical Assessment Update

Reference:

i. Volume 5A, Section 9.7, *Supplemental Studies, Update to the Biophysical Assessment* (A56004, A3S1R3, p.128)

Preamble:

Proponent indicates that updates to Volume 5A will be provided in Q3 2014.

Request:

a) Please provide a report indicating what details of the biophysical setting, cumulative effects assessment and confirmation of effects assessment will be supplemented in Q3 2014.

b) Please provide an exact date for the submission of the updates to the report to the NEB.

c) Please provide details of any independent review or peer review that will be conducted on these updates.

d) Please explain why you did not provide this information in the initial application.

e) Please provide specifics on what aspects of the current Volume 5A should be considered unreliable in the absence of supplemental reports.

f) If deemed reliable, please provide a report outlining what new information will be gained from the supplemental reporting.

Response:

a) Trans Mountain is continuing with field studies for lands where access was not available in 2013 and along route refinement areas where new lands being crossed in order to confirm literature results and mitigation measures, including those found in the Environmental Protection Plans (Volumes 6B, 6C and 6D). Any additional site-specific mitigation measures resulting from these studies will be provided in the updated Environmental Protection Plans to be filed with the NEB 90 days prior to construction as per NEB Draft Conditions No. 29 to 31 of the NEB's Letter – Draft Conditions and Regulatory Oversight (NEB 2014). Trans Mountain does not intend to file a biophysical assessment update.

b) Please refer to the response to City of Vancouver IR No. 1.02.01a.

c) Please refer to the response to City of Vancouver IR No. 1.02.01a.

d) A comprehensive environmental field program was conducted in 2012 and 2013 in support of the Environmental and Socio-economic Assessment (ESA). The

environmental field program was designed to support the highest standards of environmental assessment in recognition of the large scale of the Project and the many ecosystems the Project crosses. However, access was not available at some land parcels at the time of field study and consequently, field studies are continuing for lands where access was not available in 2013 and along route refinement areas where new lands being crossed in order to confirm literature results and mitigation measures, including those found in the Environmental Protection Plans (Volumes 6B, 6C and 6D). Any additional site-specific mitigation measures resulting from these studies will be provided in the updated Environmental Protection Plans to be filed with the NEB 90 days prior to construction as per NEB Draft Conditions No. 29 to 31 of the NEB's *Letter – Draft Conditions and Regulatory Oversight* (NEB 2014).

Reference:

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014.

e) Trans Mountain has prepared a comprehensive Environmental and Socio-economic Assessment (ESA) which the National Energy Board has determined to be complete as per their *Letter - Completeness Determination and Legislated Time Limit* (2 April 2014) (NEB 2014). In areas where access was not available, potential effects and mitigation measures were developed based on existing literature and desktop studies and knowledge of adjacent lands as well as the professional judgment of the assessment team. As such, the ESA and its conclusions are considered to be robust.

Trans Mountain is continuing with field studies for lands where access was not available in 2013 and along route refinement areas where new lands being crossed in order to confirm literature results and mitigation measures, including those found in the Environmental Protection Plans (Volumes 6B, 6C and 6D). This will ensure site-specific mitigation is being used to protect environmental features encountered by the Project.

Reference:

National Energy Board. 2014b. Completeness Determination and Legislated Time Limit. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project) dated 16 December 2013. April 2, 2014.

f) Information from field studies for lands where access was not available in 2013 and along route refinement areas where new lands being crossed will be used to confirm literature results and mitigation measures, including those found in the Environmental Protection Plans (Volumes 6B, 6C and 6D). This will ensure site-specific mitigation is being used to protect environmental features encountered by the Project.

1.02.02 Economic Impacts of Pipeline/Job Creation

Reference:

i. Volume 2, Appendix B *The Trans Mountain Expansion Project: Understanding the Economic Benefits for Canada and its Regions, The Conference Board of Canada*, Chapter 2: Economic Impacts Associated with the Development of Trans Mountain Expansion Project (A55987, A3S0R1, p.77)

Preamble:

Reference 'i' states the job creation outcomes if the Project is approved.

Request:

a) Please provide information regarding how many of these jobs occurring in BC will be filled by temporary workers.

b) Please provide information about the duration of employment (including expected minimum terms and expected average contract length) broken down by skill type.

c) Please provide the ratio of temporary versus full time employees?

d) Please inform how many of the jobs occurring in BC are expected to be filled by foreign temporary workers?

e) Please provide details of how many jobs will be located:
   1) within the greater Vancouver area; and
   2) within the City of Vancouver.

f) Has Trans Mountain considered the impact on availability of Canadian workers for the Trans Mountain Pipeline Expansion if other currently proposed pipelines are approved, including but not limited to the Enbridge Northern Gateway project, and the Keystone XL project.

g) Please show how the cumulative impact of all proposed pipeline developments in Canada would impact the availability of skilled workers in Canada.

Response:

a) As is the case with all major construction projects, once the project is complete the impacts associated with the project will be complete. As such, all of the jobs associated with the development of the project could be described as temporary. The jobs associated with operations would be permanent. Please also refer to the response to City of Vancouver IR No. 1.02.02d.

b) This level of detail regarding employment terms is not available at this stage of project planning. Types of positions that will be required during the construction and operations phase are discussed in Section 7.2.7 of Volume 5B (refer to the Regional Employment indicator). More detailed construction workforce estimates, as well as types and

descriptions of positions, will be developed during the detailed design and construction planning phase. Specifics regarding employment terms, including length of contracts) will be determined by construction contractors on a position-by-position basis. Detailed operations phase human resource planning will be undertaken subject to Project regulatory approval, including a finalized number of operations positions and job descriptions. For general information on job types anticipated during the construction and operations phase, please refer to the response to NDP IR No. 1.1.3a.

c) Most of the jobs will be full-time. An estimated 58,037 person years of employment will be generated by the development of the expansion project; this figure is 54,962 on a full-time equivalent basis. The operations employment is generally on a full time basis.

d) There were 2,645 temporary foreign workers in British Columbia's construction industry in 2012, equivalent to 1.4 per cent of total construction employment in the province. This share has never risen above 2.6 per cent. It is reasonable to assume that a similar share would be employed by the expansion project.

e) Please refer to the response to City Burnaby IR No. 1.02.01a.

f) As noted in the appendix of reference "i" the economic impacts assume that there is sufficient capacity in the economy to conduct the work. Reference "i" also notes on page 11 that project spending "is equivalent to 8.7 per cent and 1.9 per cent respectively of total construction expenditures in British Columbia and Alberta in 2011." This spending will also be spread out over several years, thus the effect of pipeline construction "crowding out" other types of investment is expected to be limited. As well, it is likely that any investment that is crowded out will be pushed forward or backward in time, thus the net impact would be minimal.

Trans Mountain has considered the direct construction phase labour demand of the Trans Mountain Expansion Project in the context of the demand associated with other reasonably foreseeable developments. Table 10.2-3 in Section 10.2 of Technical Report 5D-2, Socio-Economic Technical Report (Vista Strategy Corp. and TERA Environmental Consultants December 2013) presents the results of the labour force analysis conducted for preliminary analytical and workforce planning purposes, given the estimated construction phase direct workforce demand of the Project in the context of labour force size and capacity in the Socio-economic Regional Study Area. The analysis considers the labour demand associated with other reasonably foreseeable developments where construction may overlap with the construction of the Project; the other reasonably foreseeable developments considered are those included in the cumulative effects assessment in Volume 5B.

g) Please refer to the response to City of Vancouver IR No. 1.02.02f.

1.02.03 Environmental and Human Health Risk Assessments for Westridge Marine Terminal

Reference:

i. Volume 7, Section 6.0 *Potential Effects of Pipeline* Release (A56025, A3S4V6, p.16).

Preamble:

Reference 'i' mentioned that a detailed ERA and HHRA for the hypothetical Westridge Marine Terminal spill scenario described in Section 8.0 would be completed and submitted to the NEB in early 2014.

Request:

a) Please provide a copy of detailed ERA and HHRA for the hypothetical Westridge Marine Terminal spill scenario.

b) Please explain why these reports were not completed prior to the application to the NEB.

c) Please explain why these reports were not completed and submitted to the NEB in early 2014 as you stated they would be in your application?

d) Please provide any correspondence with the National Energy Board on the issue of the HHRA or ERA prior to and following the submission of Trans Mountain application in December 2013.

e) Please provide details of the methods used or that will be used in the preparation these assessments.

f) Please provide the names, education, training, and relevant experience of the individuals responsible of these assessments.

g) Please provide details of the risks identified in these assessments.

h) Please set out any assumptions made in preparing these assessments.

i) Please advise to what spill scenarios were used in these assessments.

j) Please provide details of the expected impacts to urban populations of the spill scenarios used.

k) Have relevant health authorities been involved in the preparation of these assessments? If so, please advise as to which health authorities have been involved and the nature of their involvement.

Response:

a) The detailed ecological risk assessment of the hypothetical Westridge Marine Terminal spill scenarios was provided as an attachment of the response to NEB IR No. 1.62d (Stantec Consulting Ltd. May 2014), and the detailed human health risk assessment will be filed with the National Energy Board on June 16, 2014.

Reference:

Stantec Consulting Ltd. 2014. Detailed Quantitative Ecological Risk Assessment for Loading Accident and Marine Spill, Technical Report for the Trans Mountain Pipeline ULC, Supplementary Report. Filed with the National Energy Board May 14, 2014.

b) The ecological and human health risk assessments of the hypothetical Westridge Marine Terminal spill scenarios proceeded step-wise, beginning with the preliminary qualitative ecological and human health risk assessments provided in Technical Report 7-2 in Volume 7, Ecological Risk Assessment of Westridge Marine Terminal Spills (Stantec Consulting Ltd. December 2013) and Technical Report 7-3 in Volume 7, Qualitative Human Health Risk Assessment of Westridge Marine Terminal Spills (Intrinsik Environmental Sciences Inc. December 2013), respectively. These preliminary assessments were completed in order to obtain an understanding of potential effects on the environment and people's health from two simulated oil spill scenarios involving the loading of a tanker at the Westridge Marine Terminal. The preliminary qualitative ecological and human health risk assessments indicated some potential for the environment and people's health to be affected, and informed the need for more detailed assessments.

c) Insufficient data were available for the completion of the detailed ecological and human health risk assessments in early 2014. As stated in the response to City of Vancouver IR No. 1.02.03a, the detailed ecological risk assessment of the hypothetical Westridge Marine Terminal spill scenarios was provided in the response to NEB IR No. 1.62d (Stantec May 2014), and the detailed human health risk assessment will be filed with the National Energy Board on June 16, 2014.

Reference:

Stantec Consulting Ltd. 2014. Detailed Quantitative Ecological Risk Assessment for Loading Accident and Marine Spill, Technical Report for the Trans Mountain Pipeline ULC, Trans Mountain Expansion Project. Filed with the National Energy Board May 14, 2014.

d) As stated in the Application, Trans Mountain received a letter on September 10, 2013 from the National Energy Board titled *Filing Requirements Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities*. The letter included specific requirements related to the assessment of accidents and malfunctions associated with the Project, encompassing both the Westridge Marine Terminal and marine shipping routes, and specifying the need for the assessment to

include a description of the ecological and human health risks that could occur from exposure to hydrocarbons under credible worst-case and smaller spill scenarios.

e) The methods employed in the detailed ecological risk assessment of the hypothetical Westridge Marine Terminal spill scenarios are provided in the attachment of the response to NEB IR No. 1.62d (Stantec Consulting Ltd. May 2014), and the approach used in the detailed human health risk assessment will be discussed in the Human Health Risk Assessment of Facility and Marine Spill Scenarios that will be filed with the National Energy Board on June 16, 2014.

Reference:

Stantec Consulting Ltd. 2014. Detailed Quantitative Ecological Risk Assessment for Loading Accident and Marine Spill, Technical Report for the Trans Mountain Pipeline ULC, Supplementary Report. Filed with the National Energy Board May 14, 2014.

f) Please refer to the response to Raincoast Conservation Foundation IR No. 1.01a for the CVs of the authors of the Ecological Risk Assessment and Human Health Risk Assessments.

g) The detailed quantitative ecological risk assessment for the hypothetical Westridge Marine Terminal spill scenarios was submitted to the NEB as a response to NEB IR No. 1.62d. Trans Mountain is preparing a detailed human health risk assessment (HHRA) for Westridge Marine Terminal spill scenarios that builds on the information provided in Technical Report 7-3 of Volume 7, Qualitative Human Health Risk Assessment of Westridge Marine Terminal Spills Technical Report (Intrinsik Environmental Sciences Inc. December 2013). The updated HHRA technical report will be filed with the NEB on June 16, 2014.

h) The assumptions used for the Westridge Marine Terminal spill scenarios in the detailed quantitative Ecological Risk Assessment are provided in the report as filed in the response to NEB IR No. 1.62d. The assumptions used in the updated Human Health Risk Assessment will be outlined in that report to be filed with the NEB on June 16, 2014

i) The spill scenarios used for the detailed quantitative Ecological Risk Assessment and the Human Health Risk Assessment at Westridge Marine Terminal include a small spill volume of 10 m^3 based on a hypothetical leak in a loading arm and a larger spill volume of 160 m^3 from a hypothetical rupture of a loading arm. Please refer to the attachment to the response to NEB IR No. 1.62d for the detailed quantitative Ecological Risk Assessment. The updated Human Health Risk Assessment will be filed with the NEB on June 16, 2014.

j) The information requested will be provided in the updated Human Health Risk Assessment to be provided to the NEB in on June 16, 2014.

k) Consultation with federal, provincial and regional regulatory authorities responsible for the protection of public health took place in the preparation of the ecological risk

assessment and human health risk assessment (HHRA). Consultation included information provided to the authorities such as an introduction to the Project and the nature and scope of work to be completed to assess the potential Project-related human health effects. Feedback received from the authorities helped inform the assessment. The regulatory authorities consulted with respect to the HHRA for the Westridge Marine Terminal expansion are listed below:

- Health Canada;
- Fraser Health Authority; and
- Vancouver Coastal Health Authority.

Details regarding the consultation activities are shown in Table 2–1 of Technical Report 7-3 in Volume 7, Screening Level Human Health Risk Assessment of Pipeline and Facilities (Intrinsik Environmental Sciences Inc. December 2013).

1.02.04 Economic Assessments

Reference:

i. Volume 2, Appendix B *The Trans Mountain Expansion Project: Understanding the Economic Benefits for Canada and its Regions, The Conference Board of Canada, Section 2.2 Indirect Effects* (A55987, A3S0R1, p.79)

Preamble:

Reference 'i' states the economic benefits for Canada and the pipeline region. It includes the direct and indirect effects across a wide range of industries that are part of the supply chain that would be linked to the Trans Mountain Expansion Project.

Request:

a) Has Trans Mountain completed an economic impact assessment for Canada and its regions, (including the direct and indirect effects on industries) which contemplates a marine spill scenario, affecting port activities and possible port closure?

b) If it has undertaken this analysis, please provide.

Response:

a) Trans Mountain has not completed the requested economic impact assessment, nor is it appropriate to do so for this type of analysis. The objective of the Conference Board report was to assess the potential economic benefits for Canada and its regions associated with the Project. Under no circumstances would a potential spill be considered an economic benefit. Please also refer to the response to Allan R IR No. 1.01cc.

b) Please refer to the response to City of Vancouver IR No. 1.02.04a.

1.02.05 Socio-Economic Impacts

Reference:

i. Volume 7, Section 6.2 *Environmental Effects* (A56025, A3S4V6, p.17-35)
ii. Volume 8A, Section 5.6 *Environmental and Socio-Economic Effects of an Oil Spill from a Tanker* (A56025, A3S5Q3, p.4)

Preamble:

Reference 'i' refers to ecological and human health effects, the potential effects associated with short-term and long-term exposure to hydrocarbons as to acute and chronic effects, respectively. The reference also states that oil spills can contribute to changes in human health, and can affect the sense of individual and community well-being as well as:

- have the potential to adversely affect air and water quality;
- cause the death of upland vegetation (annual plants, foliage of perennials, shrubs and trees);
- have the potential to chronically affect soil invertebrates through soil contamination;
- cause the death of terrestrial wildlife and/or result in decreased survival and reproductive success of terrestrial and wildlife;
- may have lethal and non-lethal effects on aquatic biota (i.e. fish or shellfish);
- result in lethal and sub-lethal effects to birds;
- result in lethal and sub-lethal effects to terrestrial and semi-aquatic mammals.

Reference 'ii' describes Socio-Economic effects, such as:

- Hydrocarbon exposure to soil could result in soil contamination, affect vegetation and soil productivity;
- A spill could affect the tourism/recreation industry both by directly disrupting the activities of tourists and recreationalists and by causing economic effects to recreation or tourism-based businesses;
- Spills can potentially damage homes, business/commercial establishments and infrastructure, resulting in costs for individuals and lost income for affected neighbourhood businesses. Municipalities may also incur infrastructure repair and replacement costs;
- Spills could have a great impact on human health effects in urban areas because of their high population density and likely presence of sensitive individuals (i.e., infants and young children, the elderly, pregnant women, and individuals with compromised health);
- Spills may adversely affect community well-being by affecting cultural and heritage resources, traditional lands, culture, and practices, and psychological well-being. In the event of an oil spill, affected communities and individuals many effects include: declines in traditional social relations with family members, friends, neighbours and coworkers; a decline in subsistence production and distribution activities; perceived increases in the amount of and problems associated with drinking, drug abuse, and domestic violence; and a decline in perceived health status and an increase in the number of medical conditions, including depression, anxiety and post-traumatic stress disorder experience a number of psycho-social effects.

Also, reference 'ii' states that "pipeline spills can have both positive and negative effects on local and regional economies, both in the short and long term. Spill response and clean-up creates business and employment opportunities for affected communities, regions, and clean-up service providers".

Reference 'ii' states that "marine spills can have both positive and negative effects on local and regional economies over the short-and long-term. Spill response and clean-up creates business and employment opportunities for affected communities, regions, and clean-up service providers, particularly in those communities where spill response equipment is, or would be, staged".

Request:

a) What specific short and long term positive effects of an oil spill on local and regional economies has Trans Mountain identified?

b) Has Trans Mountain quantified these effects? If so, please provide the background data, reports, or other information evidence surrounding the positive effects and the results of any analysis that concludes there will be positive effects.

c) What specific short and long term negative effects of an oil spill on local and regional economies has Trans Mountain identified?

d) Has Trans Mountain quantified these effects? If so, please provide the background data, reports, or other information evidence surrounding the positive effects and the results of any analysis that concludes there will be negative effects.

e) Has Trans Mountain conducted a comparative analysis between the positive and negative effects on local economies that pipeline and marine spills can have in the short and long term? If so, what were the results of that analysis?

f) In assessing the economic impact of a spill, did you consider the effect on the Super Natural BC brand? If so, what impact did you assess? If not, why not?

g) In assessing the economic impact of a spill, did you consider the effect on Vancouver's Greenest City brand? If so, what impact did you assess? If not, why not?

h) In assessing the economic impact of a spill, did you consider the effect on the region's global reputation for liveability especially as it relates to attracting investment and globally mobile talent? Is so, what impact did you asses? If not, why not?

i) Please provide details of the expected economic impact of construction, operations of the pipeline and marine terminal and in the event of a spill. This analysis should be broken down by industry (using Canadian Industries as defined by the 2012 North American Industry Classification System (NAICS) Canada) and by Economic Region (using Statistic Canada Variant of SGC 2011).

j) Please provide details of the expected infrastructure repair and replacement costs for municipalities that would not be covered by the compensation regime and financial liability.

Response:

a) Regrettably, recent media coverage has caused the reference in the preamble to be taken out of context and some have interpreted it in a way that is not consistent with its original intent. First and foremost, no spill is acceptable to Trans Mountain, nor is it part of the economic justification for the Project.

Please refer to the response to Province BC IR No. 1.1.30a for a description of the types of specific effects and net overall effects that could result from small to credible worst case spills. This response provides clarification to respond to this request and other similar Information Requests.

b) Regrettably, recent media coverage has caused the reference in the preamble to be taken out of context and some have interpreted it in a way that is not consistent with its original intent. First and foremost, no spill is acceptable to Trans Mountain, nor is it part of the economic justification for the Project.

Section 6 of Volume 7 and Section 5.6 of Volume 8A provide a qualitative evaluation of potential environmental and socio-economic effects of small to credible worst case pipeline and marine transportation spills. Quantitative analysis was restricted to the ecological risk assessments and human health risk assessments using widely accepted methodologies and a quantitative comparative analysis of socio-economic effects was not completed.

Please refer to the response to Province BC IR No. 1.1.30a for a description of the types of specific effects and net overall effects that could result from small to credible worst case spills.

c) Please refer to the response to Province BC IR No. 1.1.30a for a description of the types of specific effects and net overall effects that could result from small to credible worst case spills.

d) Please refer to the response to City of Vancouver IR No. 1.02.05b.

e) Please refer to the response to City of Vancouver IR No. 1.02.05b.

f) A monetization of an economic impact on the brands or reputation was not conducted. An analysis of spill costs (including damages) arising from hypothetical spills is provided in Application Volume 7, Appendix G. The approach undertaken in the spill cost analysis is to estimate total costs; conditions vary from spill to spill and it is not possible to provide damage estimates on individual specific items that may be of value, such as branding campaigns or reputation. That said, Trans Mountain considers the risks of a large spill are small and it has sufficient financial capacity to contain, remediate, and compensate for damages that might occur.

g) Please refer to the response to City of Vancouver IR No. 1.02.05f.

h) Please refer to the response to City of Vancouver IR No. 1.02.05f.

i) Volume 2 of the Application provides detailed analysis of the economic impact of the Trans Mountain Expansion Project (the Project) during construction and operations, including the pipeline and all facilities. Refer to Appendix B of Volume 2 of the Application, The Trans Mountain Expansion Project: Understanding the Economic Benefits for Canada and its Regions (The Conference Board of Canada December 2013). A summary of estimated economic effects of Project development and operations in Canada, including gross output, Gross Domestic Product (GDP), provincial and federal tax revenue, and employment effects, are presented in Tables 7.2.7-4, 7.2.7-5 and 7.2.7-6 of Volume 5B, respectively. The Input-Output model used by the Conference Board of Canada to estimate macroeconomic benefits does not contain regional detail beyond the provincial level, and therefore effects cannot be broken down to the Statistics Canada Economic Region level.

Project-related effects on regional employment and municipal economies are discussed in Section 7.2.7 of Volume 5B.

In terms of economic opportunities associated with direct workforce requirements during construction, it is estimated that the Project will create over 60,100 full-time equivalent worker months of during the 2016 to 2017 period. Refer to Table 7.2.7-7 in Volume 5B for a summary of direct construction workforce opportunities including a breakdown by Socio-Economic Region and by potential construction hub communities identified within each Socio-Economic Region. These direct construction workforce estimates are further analyzed in Table 10.2-3 in Section 10.2 of Technical Report 5D-2 in Volume 5D, Socio-Economic Technical Report (Vista Strategy Corp. and TERA Environmental Consultants December 2013), which provides a preliminary labour force capacity analysis (based on census sub-divisions identified in the Socio-Economic Regional Study Area) and estimates of the extent to which direct construction employment opportunities are anticipated to be filled by regional (i.e., current residents) versus non-regional workers.

The Socio-Economic Regional Study Area (RSA), and Socio-economic Regions within the Socio-Economic RSA, defined for the purposes of the socio-economic effects assessment in Volume 5B, were not defined by Statistics Canada Economic Regions. Rather, they were defined by political and administrative boundaries that are relevant to service delivery and governance for the communities and residents who may have direct or indirect interactions with the Project, and are based on an assessment-specific amalgamation of census sub-divisions, not larger Economic Regions (which were considered too broad geographically to serve as a basis as assessment regions). For further information on the defined Socio-Economic RSA and its six Socio-Economic Regions, please refer to Section 3.3.1 of Technical Report 5D-2 in Volume 5D; in particular, Table 3.3-3 of Technical Report 5D-2 lists all communities and regions (based on Statistics Canada census subdivisions) in the Socio-Economic study area and the rationale for the inclusion.

Regrettably, recent media coverage has caused the reference in the preamble to be taken out of context and some have interpreted it in a way that is not consistent with its original intent. First and foremost, no spill is acceptable to Trans Mountain, nor is it part of the economic justification for the Project. Please refer to the response to Province BC IR No. 1.1.30a for a description of the types of specific effects and net overall effects that could result from small to credible worst case spills.

j) Please refer to Annex A, Appendix G, Volume 7, for a summary of key aspects of liability in the regulatory regime for pipeline spill prevention and remediation federally, as well as in Alberta and British Columbia.

Also refer to the response to Allan R IR No. 1.21j.

1.03 Environmental Assessment

1.03.01 Assessment Team Qualifications

Reference:

i. Volumes 5A(A56004)
ii. Volume 5C(Part 1: A56006) (Part 2: A56007) (Part 3: A56010) (Part 4: A56012)
iii. Volume 8A, Section 4.0 *Environmental and Socio-Economic Assessment* (A56025, A3S4X4, p.39)

Preamble:

Throughout the Environmental and Socio-Economic Assessment and technical reports, there is reference to decisions made based on the "professional experience of the assessment team" or because the team was "highly qualified".

Request:

a) Please provide the names, education, training, and relevant experience of all environmental assessment team members listed, including TERA Environmental Consultants, Stantec Consulting Ltd., EBA Tetra-Tech, Triton Environmental Consultants, Rowan Williams Davies and Irwin Inc., Intrinsik Environmental Services Inc., and Vista Strategy Corp.

Response:

a) Resumes for the requested authors for the Environmental and Socio-economic Assessments (Volumes 5A, 5B and 8A) and supporting technical reports (Volumes 5C, 5C and 8B) are attached to this response as follows.

Company	Discipline	Authors	Name of Attachment
TERA Environmental Consultants	General Assessment Advisors	Jason Smith	City of Vancouver IR No. 1.03.01a-Smith-Resume
		Tamara Petter	City of Vancouver IR No. 1.03.01a-Petter-Resume
		Terry Antoniuk	City of Vancouver IR No. 1.03.01a-Antoniuk-Resume
	Fish	Greg Eisler	Refer to response to Raincoast IR No. 1.01a
	Wetlands	Joanne Mauthner	
	Vegetation	Amy Griffiths	
	Wildlife	Lois Pittaway	
		Jody Bremner	
	Heritage Resources	Aaron Osicki	City of Vancouver IR No. 1.03.01a-Osicki-Resume
	Traditional Land and Marine Resource Use	Wanda Lewis	Refer to response to Raincoast IR No. 1.01a
BGC Engineering Inc.	Acid Rock Drainage	Alex Baumgard	City of Vancouver IR No. 1.03.01a-Baumgard-Resume
Mentiga Pedology Consultants Ltd.	Soils	Al Twardy	Refer to response to Raincoast IR No. 1.01b

Company	Discipline	Authors	Name of Attachment
Waterline Resources Inc.	Groundwater	David van Everdingen	Refer to response to Raincoast IR No. 1.01a
Rowan Williams Davies and Irwin Inc. (RWDI)	Air Emissions Greenhouse Gas Emissions	David Chadder	Refer to response to Raincoast IR No. 1.01a
	Acoustic Environment	Teresa Drew	
GeoMarine Environmental Consultants Ltd.	Fish	Calum Bonnington	Refer to response to Raincoast IR No. 1.01a
Triton Environmental Consultants Ltd.	Fish	Ian Emerson	Refer to response to Raincoast IR No. 1.01a
Stantec Consulting Ltd.	Marine	Karen Munro	Refer to response to Raincoast IR No. 1.01a
		Stefan Dick	
		Marcel Gabhauer	
		Andrea Ahrens	
	Ecological Risk Assessment	John Henderson	
EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company	Marine spill modeling	Robert E Draho	Refer to response to Raincoast IR No. 1.01b
		James Stronach	
		Justin Rogers	
		Albert Leung	
		Travis Miguez	
		Aurelien Hospital	
Vista Strategy Corp.	Socio-economic	Susan Dowse	Refer to response to Raincoast IR No. 1.01a
Habitat Health Impact Consulting Corp.	Community Health	Marla Orenstein	City of Vancouver IR No. 1.03.01a-Orenstein-Resume
Intrinsik Environmental Sciences Inc.	Human Health	Christine McFarland	Refer to response to Raincoast IR No. 1.01a
B.A. Blackwell & Associates Ltd.	Forestry	Bruce Blackwell	City of Vancouver IR No. 1.03.01a-Blackwell-Resume
McTavish Resource & Management Consultants	Agriculture	Bruce McTavish	City of Vancouver IR No. 1.03.01a-McTavish-Resume
Decision Economics Consulting Group	Worker Expenditures	John Sedley	City of Vancouver IR No. 1.03.01a-Sedley-Resume

1.03.02 Assessment Team Qualifications

Reference:

i. Volume 1, Section 4.2 *World Leading Marine Oil Spill Preparedness and Response* (A55987, A3S0Q7, p.105)

Preamble:

The application states there are "anticipated changes to future Canadian Federal regulations and standards" and that "Trans Mountain is proposing significant improvements to the oil response regime for the area".

Request:

b) Please provide detail on the anticipated changes to Federal regulations and standards.

c) Please explain what significant improvements to the oil spill regime Trans Mountain is proposing, when they'll be proposed, and through what forum.

d) Please provide details on which industry associations either Trans Mountain or Kinder Morgan belongs.

Response:

b) Please refer to Volume 8A (Marine Transportation), Section 1.4.5.

The speaking notes for a recent announcement by Canada, "New measures to strengthen a world-class tanker safety system" provides a summary and additional insight. The document may be accessed at http://news.gc.ca/web/article-en.do?nid=847529

Reference:

Transport Canada. 2014. "Speaking notes for The Honourable Lisa Raitt, Minister of Transport at an event to announce new measures to strengthen a world-class tanker safety system." Website: http://news.gc.ca/web/article-en.do?nid=847529. Accessed: June 2014.

c) Based on information from the risk assessment, enhanced planning standards for spill response describe a regime that will be able to deliver 20,000 tonnes of capacity within 36 hours from dedicated resources staged within the study area. This represents a response capacity that is double and a delivery time that is half the existing planning standards. These enhancements will reduce times for initiating a response to two hours for the harbour and six hours for the remainder of the study area and parts of the West Coast of Vancouver Island. Please see details in Volume 8A (Marine Transportation), Table 5.5.3.

d) Typically industry association memberships are held individually by Kinder Morgan Canada (KMC) staff, representing KMC's interests with the association. Trans Mountain assumes that based on the preamble to the question, the request is for information about technical committee memberships. KMC employees are members of the following technical industry associations and organizations:

- AB Common Ground Alliance (ABCGA)
- American Petroleum Institute (API)
- Association of Oil Pipe Lines (AOPL)
- BC Common Ground Alliance (BCCGA)
- BC Environment Industry Association (BC EIA)
- BC One Call, founding Board member
- Canadian Association of Petroleum Producers (CAPP)
- Canadian Energy Pipeline Association (CEPA)
  - Damage and Prevention Committee
  - Climate Change Work Group
  - Emergency Response & Security Work Group
  - Environment Work Group
  - Health and Safety Work Group
- Canadian Standards Association (CSA)
  - Z662 Strategic Steering Committee
  - Z662 Technical Committee
- Chamber of Shipping BC
- Edmonton Area Pipeline and Utility Operators Committee (EAPUOC)
- Green Marine
- International Association of Emergency Managers
- Pipeline Research Council International (PRCI)
- Strathcona Industrial Association
- Western Canada Marine Response Corporation Board of Directors
- Western Canada Spill Services Board of Directors

1.03.03 Protection of Drinking Water as a Resource in BC

Reference:

i. Volume 5A, Section 5.3 *Water Quality and Quantity* (A56004, A3S1L5, p.34)
ii. Volume 5A,Section 7.2.3 *Water Quality and Quantity* (A56004, A3S1Q9, p.47)
iii. Volume 5C, Section 5.3 *Westridge Marine Terminal* (A56006, A3S1U8, p.71)
iv. Volume 5C, Groundwater Technical Report-REP-NEB-TERA-00004 (A56006, A3S1U8)
v. British Columbia Ministry of Environment. (2014) *Contaminated Sites Regulation*. Found online at http://www.env.gov.bc.ca/epd/remediation/leg_regs/csr.htm

Preamble:

The BC *Contaminated Sites Regulation* (reference 'v') contains requirements to protect the current and future use of groundwater as a drinking water resource. The application did not reference these requirements and nor did it consider the regulations during groundwater quality tests, sensitive aquifer and well mapping, or when identifying potentially impacted areas.

Request:

a) Please apply Drinking Water standards to all groundwater quality assessments, and revise aquifer and well mapping and identification of potentially impacted areas, using the protection of groundwater as a future drinking water resource as a screening tool.

Response:

a) Trans Mountain acknowledges that the Contaminated Sites Regulation has regulatory bearing on groundwater quality under the *Environmental Management Act* in British Columbia. It is also recognized that in both Alberta and British Columbia, the applicable legislation or regulation is intended to protect the future use of groundwater resources. All groundwater resources and aquifers assessed as part of the Application were considered from the perspective of the future use of groundwater resources. In the groundwater assessments completed and presented in the Groundwater Technical Report 5C-3, Volume 5C, the potential use of groundwater for drinking water purposes was applied, there is no revision required to the existing mapping of aquifers and wells.

1.03.04 Lack of Access for Surveys

Reference:

i. Volume 5A, section 5.9.2.5 *Burnaby to Westridge Segment* (A56004, A3S1L9, p.10)
ii. Volume 5C, Technical Report TR5C-7, Section 6.1 *General Recommendations* (A56040, A3S2C2, p.34)
iii. Volume 5C, Technical Report TR5C-8 (A56012)

Preamble:

The application references a "lack of access for vegetation surveys in 2013", states that 60 potential watercourse crossings were not accessible during the 2012-2013 field programs, and that only 116 of 229 wetlands in BC were assessed in 2012-2013.

Request:

a) Please provide reason for lack of access to complete vegetation surveys, watercourse crossing assessments, and wetlands assessments.

b) Please advise when the vegetation surveys, watercourse crossing assessments, and outstanding wetlands assessments will be completed, and when associated reports will be provided to the NEB and subsequently made available to the public.

Response:

a) Trans Mountain's landowner engagement program has included contacts with landowners and occupants to provide information on the proposed project, answer questions, gather any concerns they may have. At the same time, Trans Mountain land agents requested voluntary permission from landowners and occupants to allow field crews to conduct environmental and routing field studies. The lack of access was a result of several factors: some landowners refused access, and some parcels were outside of the original 150 metre wide survey corridor and additional information was required to contact the landowners. Under Section 73 of the NEB Act, Trans Mountain had the right to access all lands, to maintain good relations with landowners, Trans Mountain directed crews to only access those properties where owners and occupants had previously provided survey permission.

b) Trans Mountain is continuing with field studies for lands where access was not available in 2013 and along route refinement areas where new lands are being crossed in order to confirm literature results and mitigation measures, including those found in the Environmental Protection Plans (Volumes 6B, 6C and 6D). Any additional site-specific mitigation measures resulting from these studies will be provided in the updated Environmental Protection Plans to be filed with the NEB 90 days prior to construction as per NEB Draft Conditions No. 29 to 31 of the NEB's *Letter – Draft Conditions and Regulatory Oversight* (NEB 2014). Trans Mountain does not intend to file copies of these additional studies.

References:

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014.

1.03.05 Community Health Technical Report

Reference:

i. Volume 5D *Community Health Technical Report for the Trans Mountain ULC Trans Mountain Expansion Project* (A56011, A3S2L9)
ii. BC Statistics. (n.d.). Local Health Area Reference Map. Found online at: http://www.bcstats.gov.bc.ca/statisticsbysubject/geography/referencemaps/health.aspx

Preamble:

In reference 'i' most of the background community social economic and health data are presented at the Health Service Delivery Area (HSDA) level of aggregation for British Columbia. This level of aggregation is not sufficiently granular to be informative.

The geographic area covered by one HSDA can include several communities. HSDA level information is not very useful for describing the socio-economic and health characteristics of the population living in close proximity to the proposed pipeline and marine route and for assessing the impact(s) from both the construction and operating phases of the project -especially in urban areas where significant variations can exist between neighborhoods even a short distance apart.

There are finer aggregates available from the Ministry of Health, for example at the Local Health Area level (LHA) (reference 'ii'), although even the LHA level is often not sufficiently granular.

Request:

a) Please provide background community and social health data at the local health area level (LHA).

b) Please provide any data and analysis surrounding your community health technical report.

Response:

a) Trans Mountain does not believe that the provision of community and social health data at the level of the Local Health Area (LHA) in the Metro Vancouver area is either useful or informative beyond the information that has already been provided in Technical Report 5D-8 in Volume 5D, Community Health Technical Report (Habitat Health Impact Consulting Corp. December 2013) at the level of the Health Service Delivery Area (HSDA). For the Metro Vancouver Region, community and social health data was reported for four HSDAs: the Fraser South HSDA; the Fraser North HSDA; the Richmond HSDA; and the Vancouver HSDA.

There are several reasons why the use of data at the level of the HSDA may be more informative than at the level of the LHA for this Project in this geographical area for community health effects.

1) Some community and social health data is only publicly available at the level of the HSDA and not at the LHA level.

2) Regional health data provides more stable estimates than finer community aggregates, due to issues around smaller sample sizes.

3) The health effects examined in Section 5.0 of Technical Report 5D-8 in Volume 5D tend to operate on a regional level, and not based on a neighbourhood's physical distance from the proposed pipeline corridor. This is because many of the community heath effects examined are influenced primarily by the presence of a temporary mobile workforce, and not by the physical presence of the pipeline. As an example, the potential for an increase in infectious diseases is related to the interaction of the mobile workforce with local residents and the subsequent spread of disease in the local population. This increase in infectious disease rates is unlikely to be linked to the physical construction of the pipeline and associated facilities in a specific neighbourhood; rather, routes of disease transmission will vary depending on where workers are housed, what parts of the city they visit for entertainment, where local workers are drawn from, etc. A similar explanation holds for socio-economic health effects; the potential for an increase or decrease in overall health as a result of socio-economic changes results from the provision of jobs and revenue across Metro Vancouver. This is not tied to neighbourhoods in closest proximity to the proposed pipeline corridor, but is likely to be dispersed across the HSDAs.

Finally, it should be remembered that for the purposes of understanding baseline health conditions and informing analysis and the formulation of recommendations, regional statistical data was only one source of information that was accessed. In all affected regions, key informants such as local Medical Officers of Health and hospital administrators were interviewed (see Table 2.3-1 in Technical Report 5D-8 in Volume 5D). These key informants were able to speak about special health concerns and vulnerable populations in areas crossed by the proposed pipeline corridor.

b) All data and analysis surrounding Technical Report 5D-8 in Volume 5D, Community Health Technical Report (Habitat Health Impact Consulting Corp. December 2013) are included in the Reference (i).

1.03.06 Water Quality and Quantity

Reference:

i. Volume 5A, Section 6.2 *Westridge Marine Terminal* (A56004, A3S1Q8, p.24)

Preamble:

The application did not include detailed information for surface water or groundwater quality and quantity, stating: “no work will occur within 30m of any waterbodies, and therefore, detailed information on surface water and groundwater quality and quantity is not warranted”. The application indicates construction at Westridge Terminal will include one dock with three operational berths and a utility dock, all in or adjacent to the inlet.

Distance to surface water bodies has no bearing on the potential impact to groundwater during construction of pipelines, facilities, or at Westridge Marine Terminal.

Request:

a) Please provide details of any investigation Trans Mountain performed to determine whether work could occur within 30 meters of a waterbody.

b) Please revise the summary of environmental elements and considerations to include surface water and groundwater quality and quantity.

Response:

a) Construction and operation activities at the Westridge Marine Terminal will be located within the existing fenced area. Fish habitat assessments (refer to Technical Report 5C-7 provided in Volume 5C, Fisheries [British Columbia] Technical Report [Triton Environmental Consultants Ltd. December 2013]) and wetland evaluations (refer to Technical Report 5C-8 provided in Volume 5C, Wetland Evaluation Technical Report [TERA Environmental Consultants December 2013]) confirmed that no works will occur within 30 m of a freshwater waterbody at Westridge Marine Terminal. Activities at the terminal will, however, be conducted along foreshore lands and the existing water lease will need to be expanded to accommodate the new docks within Burrard Inlet. Please refer to the marine elements provided in Section 6.2 of Volume 5A for environmental setting information applicable to the marine environment.

b) As stated in Section 7.6.3 of Volume 5A of the Application, there are no watercourses or freshwater waterbodies located within 30 m of construction or operations activities at the Westridge Marine Terminal. Consequently, detailed information on surface water (freshwater) quality and quantity was not provided as per Table A-1 of the National Energy Board (NEB) *Filing Manual* (NEB 2014). Further clarification regarding the consideration of surface water and the marine environment is provided in the response to City of Vancouver IR No. 1.03.06a.

As described in Section 7.6.3 of Volume 5A, there are no water supply wells, nor mapped aquifers located within the Footprint of the Westridge Marine Terminal.

However, it is expected that with the close proximity to Burrard Inlet, the groundwater will be shallow. No water level data are available. It is likely, however, that groundwater flow is to the north toward Burrard Inlet. For additional information refer to Technical Report 5C-5 provided in Volume 5C, Groundwater Technical Report (Waterline Resources Inc. December 2013).

Reference:

National Energy Board. 2014. Filing Manual. Inclusive of Release 2014-01 (January 2014). Calgary, Alberta.

1.03.07 Inventory for Contaminated Sites

Reference:

i. Volume 5A, section 5.2.4 *Soil Contamination* (A56004, A3S1L5, p.34)

Preamble:

The application states there is an inventory of known locations of contaminated soils in the Local Study Area (LSA) and potentially contaminated sites related to other land users.

Request:

a) Please provide information on how the inventory of potentially contaminated sites related to other land users was prepared and what information sources were utilized.

b) Please advise if the BC Ministry of Environment's Site Registry was utilized to assess for contaminated sites in the project LSA and if not, please provide explanation.

c) Please provide the known locations of contaminated soils and related data, and the inventory of potentially contaminated sites related to other land users.

Response:

a) A Cursory Inventory of Potentially Contaminated Sites (CIPCS) was conducted for the Project as an initial review to identify any potential sites which could be sources of contamination that have the potential to impact the proposed pipeline corridor. The CIPCS addressed a 450 m wide study area covering lands located within the 150 m wide proposed pipeline corridor and 150 m wide area surrounding the proposed pipeline corridor on both sides. Current and historical aerial photography of the study area was reviewed to identify potentially contaminated sites which fall within the study area and could be sources of contamination. Publicly accessible business listings were also reviewed for urban areas within the study area. The CIPCS did not include records reviews, database searches, site visits or sampling or analysis of soil, water or air. Areas of interest included, but were not limited to, railway lands, railway-pipeline intersections, mines, pulp-paper mills, industrial areas, gas stations, dry cleaners and manufacturing facilities.

b) The BC Ministry of Environment's Site Registry was not utilized in the preparation of the Cursory Inventory of Potentially Contaminated Sites. However, BC Site Registry searches were conducted for known locations of contaminated soils within BC.

c) Trans Mountain will be assessing areas potential contamination based on the final route. Preliminary inventories will be updated prior to construction. As noted in Section 7.2.2.4, Table 7.2.2-2 of Volume 5A of the Application, any sites contaminated by a spill during construction will be assessed, remediation will be designed, and disposal sites will be identified in accordance with the National Energy Board Remediation Process Guide. For locations where previously unknown contamination is identified during construction, the Contamination Discovery Contingency Plan (Volume 6B) will be implemented.

In any event, Trans Mountain does not intend to make the locations of the Cursory Inventory of Potentially Contaminated Sites report publicly available as the resulting list is preliminary and speculative and needs to align with the final route.

1.03.08 Roles and Responsibilities for Environmental Compliance

Reference:

i. Volume 6A, Section 3.4.1, *Roles and Responsibilities for Environmental Compliance* (A56013, A3S2S1, p.10)
ii. Volume 6A, Table 3.3.1 (A56013, A3S2S1, p.11)
iii. Phimister, J.R., Bier, V.M., Howard, C. (2004). *Accident Precursor Analysis and Management Reducing Technological Risk through Diligence*, US National Academy of Engineering. Found online at: http://www.nap.edu/catalog/11061.html

Preamble:

The environmental compliance organization chart and associated roles and responsibilities indicate that Environmental Inspectors report to Construction Managers, not to the Environmental Manager or Environmental Compliance Manager.

Reference 'iii' contains best current best practice on reducing the risk of industrial accidents.

Request:

a) Please explain what processes will be put in place to ensure environmental issues or incidences will be elevated through the chain of command to ensure regulatory compliance and required reporting is completed, and what accountability Construction Managers have if this does not occur.

b) Please revise the Construction Managers' roles and responsibilities to include ensuring compliance with environmental regulations and the environmental compliance plan. Please provide revised document.

c) Has Trans Mountain considered risk reduction methodologies as referred to in reference 'iii'. If so, please provide evidence of how these methodologies modified your strategy. If not considered, please explain what risk reduction methodologies Trans Mountain uses.

Response:

a) The Environmental Protection Plan (Volume 6B) includes sections in which the roles, responsibilities and communication channels for Project Management, including those for the Construction Manager and the Environmental Inspector. The EPP provides a system of Management Oversight and Quality Assurance where the Construction Manager, as part of the Management Team, is accountable to the TMEP Project Management, which includes the Environmental Compliance Manager. A similar structure of reporting was used effectively during the TMX Anchor Loop project in Jasper National Park and Mount Robson Provincial Park as it encouraged effective dialogue, and problem solving. Having environmental management, compliance and environmental inspection work as a separate unit tends to create silos which result in reduced and less effective communication.

b) Volume 6B Environmental Protection Plan provides details of Trans Mountain's compliance and environmental management plans. Section 3.0 to 3.7 Environmental Compliance Program describes the systems to be followed to achieve environmental compliance. Section 4.0 to 4.7 Approach to Environmental Management, describes Trans Mountain's Project management team approach to achieve a shared responsibility for environmental compliance. Section 4.2 describes the review process of Environmental Inspector's reports which includes review by the Environmental Compliance Manager, Environmental Manager and the Construction Manager. Section 4.4 describes Trans Mountain's Commitment to Team Work and Joint Problem Solving. The Environmental Compliance Plan will be prepared prior to construction. In the Environmental Compliance Plan the roles and responsibilities of the Construction Managers will include compliance with environmental regulations and the environmental compliance plan.

c) Trans Mountain is taking measures well beyond meeting minimum code requirement to manage and mitigate risk and prevent oil spills from happening. Trans Mountain's commitment to a risk-based design, as described in the response to City Burnaby IR No. 1.07.14r involves a rigorous design process that seeks to enable designers to be informed of principal risks along the pipeline route, and to pre-emptively employ risk mitigation measures to prevent spills and the consequences associated with such spills.

In the context of this risk-based design, risk is defined as a compound measure of both failure likelihood (spill frequency) and consequences of a spill. High Consequence Areas as defined in Section 3 of Volume 7 of the Application, and which include populated areas, are all highlighted in the risk assessment as being of particular environmental sensitivity, and spills in these areas are afforded accordingly higher levels of consequence rating.

With risk being defined as a compound measure of both failure likelihood and consequences, any evaluation of risk must consider both these aspects, as must any risk mitigation measure being considered, and risk mitigation measures must be selected so that they appropriately address the factor(s) driving risk.

The risk assessment and associated risk-based design process is ongoing; Trans Mountain does not have, at this time, a list of specific spill risks that have been controlled through the implementation of this process, however examples of typical risk mitigation strategies include the mitigation of 3rd Party damage through increased depth of cover, the mitigation of environmental consequences through the installation of mainline valves, and the mitigation of geotechnical threats through threat avoidance.

While emergency spill preparedness and response are not elements of the risk assessment (all spills are modelled and assessed as unmitigated, with no credit applied to the consequences associated with spill mitigation), the risk assessment, overland spill modelling, and HCA mapping will be used to inform the enhancements to the existing Emergency Management Program as described in Volume 7, Section 4.8.2.

1.03.09 Environmental Compliance Plan

Reference:

a. Volume 6A, Section 3.7 *Environmental Compliance Plan* (A56013, A3S2S1, p.18)
b. Volume 6A, Section 5.0 *Pre-Construction Activities* (A56013, A3S2S1, p.24)

Preamble:

The application states an Environmental Compliance Plan will be developed prior to the start of construction, when the teams have been determined, authorizations are in hand, and the Environmental Protection Plans have been updated. These components are not required to develop an Environmental Compliance Plan.

Request:

a) Please explain why the Environmental Compliance Plan was not included in the application.

b) Please advise when the Environmental Compliance Plan will be submitted to the NEB and available to the public.

Response:

a) The Environmental Compliance Plan will be finalized prior to construction. The format and content of the plan will include key permits and contact information for the compliance team which will not be available until closer to construction.

b) Trans Mountain does not currently plan to file the Environmental Compliance plan with the NEB. As per Draft Condition 6 the commitments tracking table will be filed with the NEB within 90 days after the certificate date and at least 30 days prior to commencing construction it will be posted on the project website for public review.

1.03.10 Environmental Inspection

Reference:

i. Volume 6A, Section 7.0 *Environmental Inspection During Construction* (A56013, A3S2S1, p.28)
ii. Volume 6A, Section 7.3 *Communication and Reporting* (A56013, A3S2S1, p.29)

Preamble:

The application states Environmental Inspectors will monitor construction and prepare daily reports of activities and conditions.

Section 7.3 (Communication and Reporting) states that "serious non-compliances will be immediately reported".

Request:

a) Please provide a copy of the daily report template, detailing inspection requirements and assessment criteria.

b) Please provide any guidance that the Environmental Inspectors will use in monitoring construction.

c) Please define "serious non-compliance".

Response:

a) Environmental Inspectors (EIs) will fulfill commitments of the Environmental Protection Plan (EPP) (reference EPP Section 1.2 Roles and Responsibilities) by using the EPP as their criteria and summarizing, maintaining a photographic record and documenting typical activities in their daily reports, which will include:

- Activities Inspector's Daily Morning Meeting, chaired by the Chief Inspector where Activity Inspectors discuss progress and concerns relating to each construction activity, including Environment and Safety.
- Environmental Implementation Meeting: Chaired by Lead EI: Meeting held following the Activity Inspectors meeting where all EIs, Aboriginal Monitors (AM), Contractor Environmental Representative and any on-site Resource Specialists (RS) meet to discuss the day's work logistics, assignments, issues and concerns.
- Daily Construction Meeting 7:30: Chaired by Resident Construction Manager, is held following the completion of the Contractor's daily foremen's meeting, attendees might include: Visiting Project Management, Lead EI, Chief Activity Inspector, Safety Lead, Cost Controller and the Contractor's counterparts. Items discussed include: Construction progress, logistics issues, and resolutions.

- Daily Tailgates: As required, EIs will attend activity crew tailgates with Activity Inspectors and contractor foremen to raise environmental awareness and discuss current issues.

- Pre-Job Meetings: When a new crew or activity is about to start work, a pre-job meeting will be held to review plans and procedures and might include: Emergency Response Plans, communication protocols, contingency plans, conditions of approvals, restricted practices, specific environmental considerations

- Daily Activities: Individual EIs will tour the Right-of-way and visit site activities to monitor construction compliance to the EPP. EIs will go ahead of construction phases to ensure environmentally sensitive features are sufficiently signed and the mitigation requirements for features are understood by each upcoming phase of construction. EIs will support and advise Activity Inspectors and Construction Foremen in applying the EPP by reviewing the Environmental Alignment Sheets (EAS) to ensure environmental features and mitigation measures are incorporated into daily construction plans. EIs will communicate with Activity Inspectors and Construction Foremen to correct work practices that could lead to non-compliance. Where necessary, EIs will halt work where non-compliant conditions exist and discuss how corrective solutions are to be applied.

- EIs will photograph construction activities and site conditions to capture and illustrate progress.

- All EIs meetings, regarding the Project, with Regulators, Stakeholders, Landowners and the public will be summarized in daily reports.

Refer to the requested Environmental Inspector's Daily Report format below:

TRANSMOUNTAIN Trans Mountain Expansion Project Daily Environmental Report				EI Name:			
				Date:			
				Location:			
				Report #:			
(*EI's Company name and address)*				*Contract #*			
Spread:	*# and Location*	Contractor:	Name of mainline contractor.				
Reporting to:				**Work Day**	Half Day ☐	Full Day ☐	
Weather /Temp:				**Vehicle**	Personal ☐	Rental☐	Other ☐
RoW Conditions				**Equipment**	ATV ☐	Other ☐	
Photos Taken #				**Driven Kms**			
Contractor Daily AM Status:							

Activity Inspectors Meeting: (6:15 AM): Chaired by Chief Inspector:
(A summary of construction activities and issues from inspectors, including Environment and Safety)**:**

Environmental Implementation Meeting: **Chaired by Lead EI:**

Daily Construction Meeting 7:30: Chaired by Resident Construction Manager:

Daily Inspection Activities:
Location: (i.e. KP 19.480) **Activity:** (i.e. Clearing) **Site name/No:** (where applicable, i.e. Bear Creek or Wetland #25)**:** (Description of Activities, personnel meetings, observations, issues and resolutions). (Reference photos taken, see below). (Repeat for each site visited.)

Environmental Current Events and Concerns: (Summary)

Environmental Admin: (Summary of administration activities):

Photographs: (Example):
BJ_#9_OS2.900a_SF2.5LeanerDougfir_viewNW: *Three Doug fir to be removed MoF approved.*

Name of EI:
Signature:

Trans Mountain Authorization signature:

_____
Chief Environmental Inspector.

b) Environmental Inspectors (EIs) will use the Environmental Protection Plans (EPPs) (Volume 6B, 6C and 6D) as the main guidance for monitoring to ensure environmental compliance during construction. The EPP is also cross referenced to the Environmental Alignment Sheets (EAS) (Volume 6E), which present scaled aerial photomosaic maps of the construction corridor with environmental protection and socio-economic details plotted along the corridor. The EAS guides users to detailed environmental resource information in the EPPs Appendices and to tables providing details on biophysical features such as soils, wildlife, vegetation, wetlands, etc. The EIs will also reference all the information collected and presented in the application to the National Energy Board (NEB) including the Biophysical Technical Reports.

Prior to and during construction the EIs will review all construction technical information. This will include the Construction Alignment Sheets, which are similar in presentation to the EAS and provide detailed construction information. EIs will have input and access to construction plans developed by the Contractor, such as grade plans and individual wetland and watercourse crossing plans.

At each construction spread office a binder of Permits and Approvals will be maintained by Construction Management and Environmental Inspection. The Permits and Approval binder will contain all permits and approvals for the project. The binder will be kept current as new permits and approvals are applied for and received.

The Environmental Compliance Manager will develop and maintain the environmental commitment tracking table. The EIs will reference and contribute to the commitment tracking table by providing compliance status information in their daily reports.

The EIs will be a prominent part of the field construction management team and will participate in the communication and exchange of construction and environmental information. The EIs will use their knowledge of construction issues to apply and monitor the commitments of the EPPs.

c) Non-compliance is described as “serious” when the incident cannot be mitigated within the designated construction footprint in a timely and effective manner using standard pipeline construction procedures, and where there is a requirement for the Project to report the incident to a regulatory agency or third party.

1.03.11 Post-construction Environmental Monitoring

Reference:

i. Volume 6A, Section 9.0 *Post-Construction Environmental Monitoring* (A56013, A3S2S1, p.32)

Preamble:

The application states post-construction environmental monitoring will be provided "up to five complete growing seasons (or during years one, three and five)" following

Request:

a) Please explain what will determine the reporting schedule.

b) Please provide details of the success criteria to be used in the post –construction environmental monitoring program.

c) Please advise what will occur if success is not achieved within five years.

Response:

a) Please refer to the response to ALIB IR No. 1.6.8a.

b) The criteria for success for post-construction environmental monitoring can be found in Section 9.3 of Volume 6A.

In general, in agricultural areas, right-of-way conditions will be compared to adjacent off right-of-way conditions. In forested, urban and industrial areas where the adjacent off right-of-way conditions may not resemble the post-construction right-of-way conditions (due to land use or management differences), a representative area close to the right-of-way will be selected or pre-construction conditions will be used for comparison.

c) Please refer to the response to ALIB IR No. 1.6.08a. In the event that construction-related issues persist past five years of monitoring, PCEM will continue until measures are considered to be effective and the issue resolved.

1.03.12 Environmental Protection Plans

Reference:

i. Volume 6B (A56013)
ii. Volume 6C (A56013)
iii. Volume 6D (A56013)

Preamble:

Throughout Volumes6B, 6C, and 6D there are references to environmental procedures and mitigation measures to be implemented during construction of the pipeline, facilities, and Westridge Terminal, but there is no reference to or discussion of environmental protection plans for operations.

Request:

a) Please explain why environmental protection plans were not included in the application.

b) Please provide environmental protection plans for operations of the pipeline, facilities, and Westridge Terminal.

Response:

a) Environmental Protection Plans (EPPs) are prepared for the construction phase of a Project. Some of the mitigation measures provided in the Trans Mountain EPPs would extend into the operations phase of a Project, but these measures deal with the reclamation and monitoring of the construction right-of-way and not specifically with the operations of the pipeline and associated facilities. Trans Mountain will integrate commitments and expectations from the Project into existing standards and procedures currently used by operations.

b) Kinder Morgan Canada Inc. has environmental protection plans in the form of an Environment Manual with standards and operating procedures in place for current operations which are regulated by the NEB. The Environmental Manual will be updated prior to completion of construction to comply any new requirements that are introduced as a result of the Project.

The plans are subject to regular audit through the National Energy Board and are compliant with the requirements included in the Onshore Pipeline Regulations.

1.03.13 Contamination Discovery Contingency Plans

Reference:

i. Volume 6B, Appendix B *Contingency Plans* (A56013, A3S2S3, p.163)
ii. Volume 6C, Appendix B *Contingency Plans* (A56013, A3S2S6, p.108)
iii. Volume 6D, Appendix B *Contingency Plans* (A56013, A3S2S9, p.76)

Preamble:

Contamination Discovery Contingency Plans provided in the application contain no detail, procedures, roles and responsibilities, or regulatory framework for contamination assessment, management, or remediation.

The plan does not include sediment as a potentially-contaminated media.

Request:

a) Please provide an appropriate, detailed plan for how contamination can be identified, procedures and roles and responsibilities for contamination assessment, management, and remediation (including transportation and disposal), as well as the regulatory framework to ensure such work is conducted in accordance with the applicable environmental legislation.

Response:

a) The requested plan is not available at this time. However, further details regarding the safe handling, storage, transportation and disposal of contaminated materials discovered during construction are provided in the Contamination Discovery Contingency Plan (Section 1.0 of Appendix B of Volume 6B), the Spill Contingency Plan (Section 11.0 of Appendix B of Volume 6B) and the Waste Management Standard (Section 11.0 of Appendix C of Volume 6B).

1.03.14 Mitigation Measures

Reference:

i. Volume 6B, section 7.0 *General Pipeline Construction Mitigation Measures* (A56013, A3S2S3, p.49)
ii. Volume 6C, Section 7.0 *General Facility Construction Mitigation Measures* (A56013, A2S2S6, p.44)
iii. Volume 6D, Section 7.0 *General Westridge Marine Terminal Construction Mitigation Measures* (A56013, A3S2S9, p.37)

Preamble:

The application provides lists of "potential" mitigation measures for pre-construction and construction activities. The lists are quite broad and the measures quite general. The application states detailed specifications will "follow".

Request:

a) Please advise when the detailed specifications for mitigation will be developed for pipeline, facilities, and Westridge Marine Terminal.

b) Please provide details on what the process is to review/approve these measures to ensure completion and consistency with the issues identified in the ESA.

c) Please advise who will review or approve these measures

Response:

a) Trans Mountain will submit final versions of the Environmental Protection Plans to the NEB a minimum of 90 days prior to the commencement of construction. Refer to NEB Draft Conditions No. 29, 30 and 31 as outlined in the NEB's *Letter – Draft Conditions and Regulatory Oversight* (April 16, 2014; NEB 2014) for conditions that are specific to the preparation and submission of the three Environmental Protection Plans prior to construction.

b) The Project team members that are responsible for preparing the Environmental Protection Plans (EPP) review the issues and recommended construction mitigation measures identified in the Environmental and Socio-economic Assessment (ESA), including the discipline-specific technical reports. The mitigation measures in the EPPs are the result of a collaborative effort amongst discipline-specific technical experts, ESA team and EPP team members. The EPP team met frequently with the ESA team and discipline-specific technical experts to discuss the recommended mitigation measures to ensure the recommendations were fully understood and captured in the EPPs. The discipline-specific technical experts then reviewed the EPPs to make sure their recommendations have been captured correctly by the EPP team. Recommended mitigation measures from discipline-specific technical experts were provided in Section 7.0 of Volumes 5A and 5B of the ESA which were then cross referenced to the appropriate section of the applicable EPPs. Representatives from Trans Mountain then

reviewed the EPPs to accept all of the recommended mitigation measures and procedures.

c) Representatives of Trans Mountain (*e.g.*, Project Director, Environment Lead) will review and approve the measures that will be provided in the final versions of the Environmental Protection Plans.

1.03.15 Blank Sections

Reference:

i. Volume 6D, Appendix C *Management Plans* (A56013, A3S2S9, p.96)
ii. Volume 6D, Appendix G *Details* (A56013, A3S2S9, p.164)

Preamble:

The Noise Management Plan section in Appendix C says: "to be developed prior to construction".

The Environmental Facility Drawing (Appendix F) was not included; the application says: "information to be added prior to construction".

Request:

a) Pease advise when the Noise Management Plan will be submitted to the NEB and subsequently provided to the public.

b) Please advise the process for developing the Noise Management Plan.

c) Please provide details of the methodology for developing the Noise Management Plan.

d) Please advise when the Environmental Facility Drawing will be submitted to the NEB and subsequently provided to the public.

Response:

a) The construction plan for the Westridge Marine Terminal continues to be refined during the Application review process as detailed engineering design progresses through the detailed construction planning stage. The Noise Management Plan referred to in the Westridge Marine Terminal Environmental Protection Plan (Volume 6D) is expected to be filed with the NEB 90 days prior to commencing construction as per NEB Draft Conditions No. 33 (Noise Management Plan for pump stations, tank terminals and the Westridge Marine Terminal) of the NEB's Letter – *Draft Conditions and Regulatory Oversight* (NEB 2014). The draft condition outlines the elements that would be considered in the Noise Management Plan. Please also refer to the response to City Burnaby IR No. 1.09.04c.

Reference:

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014.

b) Development of the Noise Management Plan requires that construction planning be sufficiently advanced so that the types and sizes of equipment for each construction stage plus preliminary activity schedules be known. The plan will then be developed to

identify specific receptor locations or areas along the pipeline route, or specific activities, which require additional controls and include a list of requirements for specific affected locations.

Once the plan is developed, it will be submitted to the NEB for review. The NEB's *Letter – Draft Conditions and Regulatory Oversight* (NEB 2014) requires that the completed plans be provided to the NEB at least 90 days prior to construction.

Reference:

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014.

c) Please refer to the responses to City of Vancouver IR No 1.03.15a, 1.03.15b and 1.09.04c.

d) The Environmental Facility Drawing will be submitted to the NEB a minimum of 90 days prior to the commencement of construction. The Environmental Facility Drawing will be available to the public at this same time.

1.03.16 Operations Control Measures

Reference:

i. Volume 7, Section 2.2.1 *Westridge Marine Terminal* (A56025, A3S4V5, p.33)

Preamble:

The application states that environmental impacts associated with the construction and operations of the Westridge expansion will be prevented or mitigated through design and operations control measures. The application includes control measures related to tanker berthing and de-berthing activities in Volume 8A but none of the other measures listed in Section 2.2.1. While unclear, the application suggests none of these control measures have been developed.

Request:

a) Please provide details of the control measures listed in section 2.2.1.

b) Please advise why all control measures were not included in the application.

c) Please advise when the outstanding control measures will be submitted to the NEB and subsequently available to the public.

Response:

a) Design control measures for Westridge Marine Terminal (WMT) are included in Section 2.0 and Section 3.4.4, Volume 4A of the Facilities Application. Construction control measures for WMT are included in Section 4.2.1.4, Section 4.2.2.4, Section 4.4, and Section 5.0, Volume 4B. The preliminary Environmental Protection Plan (EPP) for WMT is included Volume 6D. Operations control measures for the expanded pipeline system are included in Section 3.0 through Section 11.0, Volume 4C. Specific information on the operational control of WMT is included in Section 7.1.10, Volume 4C. Additional control measures are included in the response to NEB IR No. 1.98a (NEB IR No. 1.98a – Attachment 9). Further details related to all of the design, construction, and operations control measures will be developed during upcoming engineering, construction planning, and operations planning phases. Many of the control measures will build upon Trans Mountain's long and successful operational experience at WMT.

b) Please refer to the response to City of Vancouver IR No. 1.03.16a.

c) If the National Energy Board requests design, construction, and operations information for Westridge Marine Terminal, other than what has already been provided in the Facilities Application or Information Request responses, to be submitted for public review, Trans Mountain will comply, when the requested information is available.

1.03.17 Detailed Ecological Risk Assessment

Reference:

i. Volume 7, Section 6.0 *Potential Effects of Pipeline Releases* (A56025, A3S4V6, p.16)
ii. Volume 8A, Section 5.6.2 *Environmental Effects* (A56025, A3S52, p.11)

Preamble:

In assessing the potential environmental and socio-economic effects of pipeline or Terminal releases, the application acknowledges that detailed ecological risk assessment is outstanding and will be submitted in "early 2014".

It is impossible to adequately assess the potential impacts to ecological receptors in the absence of a detailed, qualitative risk assessment.

Request:

a) Please explain why the application was submitted without inclusion of a qualitative ecological risk assessment.

b) Please advise how the "quantitative evaluations will verify conclusions provided" in the application.

c) We are now well past early 2014 and the Ecological Risk Assessment is still not submitted. Please advise why it has not been submitted? When will it be submitted?

Response:

a) Technical Report 7-1 entitled A Qualitative Ecological Risk Assessment of Pipeline Spills (Stantec Consulting Ltd. December 2013) was submitted as part of Volume 7. The report discusses credible worst case spill scenarios at four representative river locations to describe the potential environmental effects to a variety of aquatic and terrestrial ecological receptors that might be observed as a result of large hypothetical spills along the pipeline route. The results of the QERA are summarized in Section 7, Volume 7 of the Application.

Preliminary Quantitative Ecological Risk Assessment (PQERA) Technical Reports were also prepared and submitted to describe the potential effects of credible worst case and smaller spills resulting from hypothetical loading accidents at the Westridge Marine Terminal (WMT) (Technical Report 7-2 in Volume 7), and for credible worst case and smaller spills resulting from marine transportation accidents occurring at three locations along the marine shipping route (Technical Report 8B-7 in Volume 8B).

Results of the PQERA for spills at the WMT are summarized in Volume 7, Section 8. Results of the PQERA for marine transportation accidents are summarized in Section 5.6.2 of Volume 8A.

A Detailed Quantitative Ecological Risk Assessment (DQERA) has been completed and was submitted to the NEB on May 14, 2014; refer to NEB IR No. 1.62d – Attachment 1.

b) The Detailed Quantitative Ecological Risk Assessment (DQERA) builds on the results of the referenced Preliminary Quantitative Ecological Risk Assessments (PQERA) which were completed to evaluate the potential effects of loading accidents at the Westridge Marine Terminal (WMT), and for accidental releases at various locations along the marine transportation route.

The PQERA reports discuss the range of potential effects to various ecological resources by considering the probability of exposure to predicted surface oil slicks and affected aquatic and shoreline habitats within the study area. These assessments were based on stochastic two-dimensional (2D) oil spill modelling completed for each of four seasons including winter (January to March), spring (April to June), summer (July to September) and fall (October to December). Each set of stochastic modelling results considered season specific behaviour (wind direction and speed, temperature, etc.), trajectories, and oil fate. Potential effects were evaluated by overlaying GIS data layers containing information on biological resources, sensitive habitats and other areas of ecological importance. The strength of the stochastic approach is that it shows where spilled oil could go in the event of an accident, but the resulting probability contours are not a reliable guide as to where crude oil would go in the event of a single unique incident.

The DQERA focuses on the quantification of toxicological induced changes in the health of marine ecological receptors from exposure chemicals of potential concern associated with hypothetical spills of a representative crude oil (Cold Lake Winter Blend) resulting from loading accidents at the WMT, and from a tanker accident at Arachne Reef during marine transportation. The DQERA is based on more detailed 3-dimensional (3D) modelling of specific spill scenarios. These spill scenarios and the resulting ecological risk assessment evaluations are more detailed and provide greater insight into the behaviour and effects of crude oil in the water column than do the stochastic analyses. They also provide a more realistic picture of the spatial extent of oil spill effects than the probability contours in the stochastic analysis, which tend to overestimate spatial extent relative to a single unique incident.

c) The Detailed Quantitative Ecological Risk Assessment (DQERA) for Loading Accidents and Marine Spills was submitted to the NEB on May 14, 2014; refer to NEB IR No. 1.62d – Attachment 1.

1.03.18 Marine Fish and Fish Habitat

Reference:

i. Volume 8A, section 4.3.6.4.1 *Effects Consideration* (A56025, A3S4Y3, p.54)
ii. Species at Risk Act S.C. 2002, c.29. Found online at: http://laws-lois.justice.gc.ca/eng/acts/s-15.3/page-1.html

Preamble:

In discussing the behavioural disturbance to marine fish and invertebrates due to underwater noise, the application acknowledges there is a lack of empirical data and knowledge about the effects of underwater noise on fish and invertebrates, but excludes the potential effects from further assessment based on the statement that existing information indicates that noise levels from vessel traffic aren't likely to cause physical injury or mortality to marine fish. These statements are conflicting, and the lack of data identifies a need for further research. They also do not consider the potential impact from increased vessel traffic.

The application states the scientific literature is sparse regarding the behavioural response of marine fish and invertebrate species to noise from vessel traffic, but states "there is no evidence in the literature that vessel traffic will result in large-scale displacement of fish or invertebrate populations". These statements are conflicting and identify the need for further research. They also do not consider the potential impact from increased vessel traffic.

Request:

a) Please provide scientific rationale for excluding the potential effects of underwater noise on marine fish and invertebrates from the assessment.

b) Please provide scientific rationale for excluding the potential effects of underwater noise marine mammals, specifically whales from the assessment.

c) Please provide scientific rationale for excluding the potential effects of underwater noise on marine species listed for protection under the *Species at Risk Act*.

Response:

a) The potential effect of behavioural disturbance to marine fish and invertebrates due to underwater noise from Project-related vessels was considered for inclusion in the assessment of marine fish and fish habitat. However, for the reasons presented in Section 4.3.6.4.1 of Volume 8A of the Application, it was determined that a detailed assessment of this potential effect was not required.

b) Potential effects of underwater noise on marine mammals (including whales) are assessed in subsection 4.3.7 of Volume 8A of the Application.

c) Potential effects of underwater noise on marine mammals (including species listed for protection under the *Species at Risk Act*) are assessed in subsection 4.3.7 of Volume 8A of the Application. With respect to marine fish (including species listed for protection under the *Species at Risk Act*), please refer to the response to City of Vancouver IR No. 1.3.18a.

1.04 Emissions

1.04.01 Marine Emission Reductions

Reference:

i. Volume 8A, Section 4.3.4.6 *Significance Evaluation of Potential Residual Effects* (A56025, A3S4Y3, p.36)
ii. Volume 8A, Section 4.3.4.1, *Assessment Indicators and Measurement Endpoints* (A56025, A3S4Y3, p.34)
iii. Volume 8A, Section 4.3.4.1, Table 4.3.4.1, *Assessment Indicators and Measurement Endpoints For GHG Emissions* (A56025, A3S4Y3, p.34)
iv. Volume 8A, Section 4.3.4.5, *Potential Residual Effects* (A56025, A3S4Y3, p.35)
v. Volume 8B, TR-8B-3, "Marine Air Quality and Greenhouse Gas Marine Transportation Technical Report for the Trans Mountain Pipeline ULC Trans Mountain Expansion Project", Section 3.2, Assessment Indicators and Measurement Endpoints (A56022, A3S4J7, p.28)
vi. Volume 8B, TR-8B-3, "Marine Air Quality and Greenhouse Gas Marine Transportation Technical Report for the Trans Mountain Pipeline ULC Trans Mountain Expansion Project", Section4.2.2, Greenhouse Gases, (A56022, A3S4J7, p.80)
vii. Bhatia, P., & Ranganathan, J., (2004). *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition*, World Resources Institute. Chapter 1, p.8
viii. Bhatia, P., & Ranganathan, J., (2004). *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition*, World Resources Institute. Chapter 4, p. 25

Preamble:

1. The Proponent lists an "increase in CO2e emissions" as a residual effect (reference 'iv'). Reference 'v' notes a comparison to local, provincial and national totals.

2. The protocol cited in reference 'vii' and 'viii' provides the basis for many GHG accounting programs, including but not limited to, the Western Climate Initiative, International Standards Organization, and the Climate Registry.

3. Reference 'vii' notes that relevance, among other things, is a key component of developing an appropriate GHG emissions inventory–"an important aspect of relevance is the selection of an appropriate inventory boundary that reflects the substance and economic reality of the company's business relationships". Further, "the choice of the inventory boundary is dependent on the characteristics of the company, the intended purpose of information, and the needs of the users".

4. Reference 'viii' states, that "operational boundaries that are comprehensive with respect to direct and indirect emissions will help a company better manage the full spectrum of GHG risks and opportunities that exist along its value chain emissions. For consistent tracking of emissions over time, the base year emissions may need to be recalculated as companies undergo significant structural changes".

5. The Project is an expansion project. Based on Canadian and International Standards, such as that listed in 'vii' and 'viii', and as described above, the appropriate baseline is the operating emissions of the current Trans Mountain pipeline and associated components. A simple comparison to local, provincial and national inventories is not the appropriate benchmark for solely determining significance of the Project with respect to GHG emissions.

Request:

a) On what basis did you conclude that the measurement endpoint selection addressed concerns raised during Aboriginal and stakeholder engagement? On what basis did you conclude the measurement endpoint selection was support by government agencies?

b) Explain why Trans Mountain did not follow international standards by using the current operating emission of the pipeline as the appropriate baseline?

c) Please provide an analysis that compares the Project emissions to those of the current Trans Mountain pipeline and associated components.

d) Please provide the rationale for omitting current greenhouse gas emissions from the Westridge Marine Terminal, as listed in 'vi'.

e) Please provide analysis of current greenhouse gas emissions from the Marine Terminal.

Response:

a) Project-related marine transportation was an important issue to many stakeholders. Trans Mountain initiated an Environmental Socio-Economic Assessment, which included public consultation and Aboriginal engagement activities to assist in identifying potential adverse environmental and socio-economic effects and mitigation measures resulting from the increased Project-related marine transportation.

The assessment indicators and measurement endpoints selected for use in the assessment of marine greenhouse gas (GHG) emissions considered: filing requirements in the NEB *Filing Manual* (NEB 2014); experience gained during previous projects with similar conditions/potential issues; feedback from Aboriginal engagement, regulatory authorities, and stakeholders; available research literature; and the professional judgment of the assessment team. The proposed GHG indicators were discussed during the Edmonton, Kamloops and Surrey ESA Workshops and a summary of the proposed approach to the Environmental Socio-Economic Assessment for the Project was provided for public review and comment (TERA Environmental Consultants 2013). The GHG indicators were also discussed and agreed to in Marine ESA Workshops which included Aboriginal communities and stakeholders held in North Vancouver and Victoria in May 2013.

There was general consensus among workshop participants, which included the City of Vancouver at the Marine Workshop in North Vancouver on May 22, 2013, that the proposed GHG emissions indicators were appropriate for evaluating effects of

Project-related activities on GHG emissions and the effect of these emissions on the environment. Input on scoping and indicator selection was also sought from Environment Canada, BC Ministry of Environment, Fraser Valley Regional District and Metro Vancouver in meetings held in November 2012.

References:

National Energy Board. 2014. Filing Manual. Inclusive of Release 2014-01 (January 2014). Calgary, AB.

TERA Environmental Consultants. 2013. Summary of the Proposed Approach to the Environmental and Socio-Economic Assessment for the Trans Mountain Pipeline Project. Issued For Public Review and Comment. March 1, 2013.

b) The current operating pipeline related emissions were used as the baseline for the land-based operations. Trans Mountain is required to prepare an Environmental and Socio-economic Assessment (ESA) as the Project is regulated by the National Energy Board (NEB) and is also considered a designated project under the *Canadian Environmental Assessment Act, 2012*. The ESA for Project has been prepared following guidance in the NEB *Filing Manual* (NEB 2014) and direction provided in guidance documents issued by the Canadian Environmental Assessment Agency.

Greenhouse gas (GHG) emissions from the current operation of the pipeline, pump stations and terminals are shown in Section 4.2.2 of Technical Report 5C-4 in Volume 5C, Air Quality and Greenhouse Gas Technical Report (RWDI December 2013). GHG emissions associated with the construction and operation of the Project are presented in Section 6.0 of Technical Report 5C-4 in Volume 5C. The cumulative GHG emissions (Project + baseline/existing) are presented in Section 8.0 of Technical Report 5C-4 in Volume 5C.

Consistent with the World Resources Institute's Greenhouse Gas Protocol (References vii and viii), scope 1 direct and scope 2 indirect GHG emissions from equipment owned and operated by Trans Mountain have been included in this assessment. Trans Mountain does not own or operate the vessels calling at Westridge Marine Terminal and these emissions would be excluded from a corporate account of direct emissions. In recognition of the potential effects of increased marine transportation, and with guidance from the NEB and stakeholders, the Application has included an assessment of GHG emissions from marine transportation in Technical Report 8B-3 in Volume 8B, Marine Air Quality and Greenhouse Gas - Marine Transportation Technical Report (RWDI December 2013). Although Volume 8A compares the results of the assessment to the measurement endpoints and indicators as discussed in the response to City of Vancouver IR No. 1.04.01b, the GHG emissions baseline for marine traffic is presented in Section 4.2 of Technical Report 8B-3 in Volume 8B.

Reference:

National Energy Board. 2014. Filing Manual. Inclusive of Release 2014-01 (January 2014). Calgary, AB.

c) Please refer to the response to City of Vancouver IR No. 1.04.01b.

d) Current greenhouse gas (GHG) emissions from the Westridge Marine Terminal were not omitted. Existing annual marine GHG emissions associated with the Westridge Marine Terminal are shown in Table 4.8 of Technical Report 8B-3 in Volume 8B, Marine Air Quality and Greenhouse Gas - Marine Transportation Technical Report (RWDI December 2013).

e) Existing annual marine greenhouse gas (GHG) emissions associated with the Westridge Marine Terminal are shown in Table 4.8 of Technical Report 8B-3 of Volume 8B, Marine Air Quality and Greenhouse Gas - Marine Transportation Technical Report (RWDI December 2013).

1.04.02 Project Emission Reductions

Reference:

i. Volume 5A, Section 7.2.5.3, *GHG Emissions Associated with Individual Project Components* (A56004, A3S1Q9, p.95)
ii. Volume 5A, Section 7.2.5.5, *Potential Residual Effects* (A56004, A3S1Q9, 0.99)
iii. Volume 5A, Section 7.1, *Methodology* (A56004, A3S1Q9, p.1)
iv. Environment Canada. (n.d.). *Reducing Canada's Greenhouse Gas Emissions*, Found online at: https://ec.gc.ca/dd-sd/default.asp?lang=En&n=AD1B22FD-1, Target 1.1

Preamble:

1. Under Reference 'iii', the Proponent lists the CEA Agency's "Incorporating Climate Change Considerations in Environmental Assessment (CEA Agency 2003)" as a reference in developing its assessment methodology. This guide lists, among other things, consideration of jurisdictional plans and policies in assessing GHG Considerations.

2. Canada's emission reduction targets (Reference 'iv') require a reduction in greenhouse gas emissions of 17 per cent below 2005 levels by 2020.

3. Reference 'ii', above, indicates an increase in GHG emissions as a residual effect of the Project.

Request:

a) Please explain how increases in emissions from the Project are consistent with Canada's goals of reducing greenhouse gas emissions.

b) If the proponent considers the Project's emission increases to be inconsistent with Canada's goals, please advise whether there is a mitigation plan such that the Project would align with Canada's targets and international obligations with respect to emission reduction. If so, please provide a copy of any mitigation plan, or explain any mitigating strategies.

Response:

a) The Project is expected to result in a small net increase of greenhouse gas (GHG) emissions in Canada. Environment Canada's National Inventory Report estimates total GHG emissions from Canada to be 702 Mt in year 2011 (Environment Canada 2013). Operational emissions from the Project will increase total (indirect and direct) GHG emissions in Canada by 0.15% as noted in Table 7.2.5-9 of Volume 5A.

It should be noted that the annual Project-related GHG emissions were based on a very conservative assumption of operating at design capacity from day one of operations and continuing for the duration of the Project life. Actual indirect GHG emissions, that account for most of the Project-related emission totals, are expected to be much less than the estimated totals.

Canada's proposed emission target was presented as part of the COP15 meetings. The Government of Canada is continuing to implement its plan to regulate GHG emissions on a sector-by-sector basis (as stated in Reference iv). Sector-specific regulatory approaches to address GHG emissions from upstream oil and gas have not yet been implemented. Trans Mountain has committed to complying with all regulatory requirements regarding GHG emissions.

Environment Canada's Greenhouse Gas Emissions Reporting Program requires industrial facilities that emit more than 50,000 tonnes of CO_{2e} annually to report direct facility annual emissions (Queen's Printer for Canada 2013). The reporting program does not set absolute or facility specific GHG emission limits. Construction emissions are exempt because they are not direct emissions from the operation of the facility. No facilities associated with this Project will meet the reporting threshold.

References:

Environment Canada. 2013. National Inventory Report – Greenhouse Gas Sources and Sinks in Canada: 1990 2011. Gatineau, QC. 539 pp.

Queen's Printer for Canada. 2013. Canada Gazette Part I Volume 147, No. 44.Ottawa, ON.

b) No inconsistency with Canada's goals was identified as sector-specific regulatory approaches to address GHG emissions from upstream oil and gas have not yet been implemented. Trans Mountain has committed to complying with all regulatory requirements regarding GHG emissions. Please refer to the response to City of Port Moody IR No. 1.4.3d for additional information with respect to mitigation measures.

1.04.03 Emission Reductions

Reference:

i. Volume 8A, Section 4.3.4.5 *Potential Residual Effects* (A56025, A3S4Y3, p.35)
ii. Volume 8A, Section 4.3.1 *Methodology* (A56025, A3S4Y3, p.6)
iii. Environment Canada. (n.d.). *Reducing Canada's Greenhouse Gas Emissions*, Found online at: https://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=AD1 B22FD-1, Target 1.1

Preamble:

1. Under reference 'ii', Trans Mountain lists the CEA Agency's "Incorporating Climate Change Considerations in Environmental Assessment (CEA Agency 2003)" as a reference in developing its assessment methodology. This guide lists, among other things, consideration of jurisdictional plans and policies in assessing GHG Considerations.

2. Canada's emission reduction targets (Reference 'iv') require a reduction in greenhouse gas emissions of 17 per cent below 2005 levels by 2020.

3. Reference 'ii', above, indicates an increase in GHG emissions as a residual effect of marine transportation.

Request:

a) Please provide a report indicating how increases in emissions from the marine transport resulting from the Project are consistent with Canada's goals of reducing greenhouse gas emissions.

b) If Trans Mountain considers the Project's emission increases to be inconsistent with Canada's goals, please provide a mitigation plan such that the Project would align with Canada's targets and international obligations with respect to emission reduction.

c) Alternately, please provide an analysis of what segments of the Canadian economy should take responsibility for the additional emission reductions required due to the Project's increases, in order to meet Canada's obligations.

Response:

a) As shown in Table 4.3.4.4 of Volume 8A, Marine Transportation, Project-related marine emissions will increase total annual Canadian greenhouse gas emissions by less than one percent (0.01%) and Canadian marine emissions by just over one percent (1.4%).

Canada’s greenhouse gas inventory and target include emissions from domestic marine sources, consistent with the Intergovernmental Panel on Climate Change (IPCC) guidance. IPCC guidance documentation defines domestic marine as including marine journeys which originate and terminate in the same country or as the domestic portion of a trip which originates in one country and includes a stop in the same country including drop off and pickup of freight (or passengers) in the same country before terminating in a

second country (IPCC 2011). By this definition, the tankers filling with product at the Westridge Marine Terminal are considered international marine transport, and are not included in the national inventory or target. Greenhouse gas emissions for the domestic portion of these trips have been included in the Application for completeness.

Reference:

Intergovernmental Panel on Climate Change. 2011. IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories – Chapter 2 – Energy. June 2011. Kanagawa, Japan.

b) Please refer to the responses to City of Vancouver IR No. 1.04.02a and City of Port Moody IR No. 1.04.03d.

c) This information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

1.04.04 Project Emission Reductions

Reference:

i. Volume 5A, Section 7.2.5.3 *GHG Emissions Associated with Individual Project Components* (A56004, A3S1 09, p.95)
ii. Volume SA, Section 7.2.S.1, A*ssessment Indicators and Measurement Endpoints* (AS6001, A3S1Q9, p.93)
iii. Volume SA, Section 7.2.S.1 ,Table 7.2.S-1, *Assessment Indicators and Measurement Endpoints For GHG Emissions* (AS6001, A3S1Q9, p.94)
iv. Volume SA, Section 7.2.S.S, *Potential Residual Effects* (AS6001, A3S1 09, p.99)
v. Volume SC, "Air Quality and Greenhouse Gas Technical Report for the Trans Mountain Pipeline ULC Trans Mountain Expansion Project", report section 3.2, Table 3.1.(AS6006, A3S1 UO, p.43)

Preamble:

1. The Proponent lists an "increase in C02 emissions" as a residual effect (Reference 'iv'). Reference 'v' notes a comparison to local, provincial and national totals.

2. The Project is an expansion project. Based on Canadian and International Standards the appropriate baseline is the operating emissions of the current Trans Mountain pipeline and associated components. A simple comparison to local, provincial and national inventories is not the appropriate benchmark for determining significance of the Project with respect to GHG emissions.

3. Reference 'v' states that measurement endpoint selection addressed concerns raised during Aboriginal and stakeholder engagement and are supported by government agencies (i.e., Environment Canada, BC MOE, Metro Vancouver, FVRD, PMV).

Request:

a) Please provide a report that compares the Project emissions to those of the current Trans Mountain pipeline and associated components.

b) Please provide the details of the specific policies or agreements with each of the government agencies listed in preamble section 3 that support the measurement endpoint selection, and provide specific rationale from these policies or agreements that allowed the Proponent to omit a comparison to the existing Trans Mountain pipeline and associated components.

Response:

a) A comparison of the Project greenhouse gas (GHG) emissions to those of the current Trans Mountain operations for the terrestrial and marine components are provided in Tables 1.04.04A-1 and 1.04.04A-2, respectively.

TABLE 1.04.04A-1

A COMPARISON OF TRANS MOUNTAIN'S CURRENT (EXISTING CASE) AND PROJECT'S LAND-BASED GHG EMISSIONS (IN TONNES CO_{2E}/Y)

Existing Emissions	Project Emissions	Emissions (Application Case)
169,100[1]	1,083,000[2]	1,252,000[3]

Notes:
1. Table 4.38 of Technical Report 5C-4 in Volume 5C, Air Quality and Greenhouse Gas Technical Report (RWDI December 2013).
2. Table 6.8 of Technical Report 5C-4 in Volume 5C.
3. Table 8.1 of Technical Report 5C-4 in Volume 5C.

TABLE 1.04.04A-2

A COMPARISON OF TRANS MOUNTAIN'S CURRENT (EXISTING CASE) AND PROJECT'S MARINE GHG EMISSIONS (IN TONNES CO_{2E}/Y)

Existing Emissions	Project Emissions	Emissions (Application Case)
13,410[1]	72,081[2]	85,491

Notes:
1. Table 4.8 of Technical Report 8B-3 in Volume 8B, Marine Air Quality and Greenhouse Gas – Marine Transportation Technical Report (RWDI December 2013).
2. Table 6.1 of Technical Report 8B-3 in Volume 8B.

b) A comparison to the existing Trans Mountain pipeline and associated components has not been omitted thus details of specific policies or agreements with government agencies is not required. Please refer to the response to City of Vancouver IR No. 1.04.04a.

1.05 Greenhouse Gas Emissions

1.05.01 Significance of Greenhouse Gas Emissions

Reference:

i. Volume 8A, Section 4.3.4.6, *Significance Evaluation of Potential Residual Effects*, Table 4.3.4.4, Comparison Of Project-Related Marine Vessel Traffic GHG Emissions (Expressed As Net Change From Existing Conditions) With Available Inventories (A56025, A3S4Y3, p.36)
ii. Government of British Columbia. (2012). *Making Progress on B. C.'s Climate Action Plan*, Found online at: http:l/vvvvw.env.gov.bc.ca/cas/pdfs/2012-Progressto-Targets.pdf, p.8 of 58
iii. Volume 8A, Section 4.3.4.6, *Significance Evaluation of Potential Residual Effects* (A56025, A3S4Y3, p.36)

Preamble:

The proponent references British Columbia's 2010 emissions inventory for comparison to Project emissions. However, BC's legislated emission reduction target of 33 per cent below 2007 levels by 2020 are not cited for comparison, despite their overlap with the Project's commencement.

Reference 'ii' illustrates GHG emissions targets for 2016 and 2020. As the Project would become operational in 2017 if approved, a comparison of emissions at the commencement of operations to targeted provincial emissions would be an appropriate measure of significance.

Reference 'iii' states that "Compared to the last available inventory for total annual GHG emissions in the marine RSA, the expected Project-related emissions are twice as large ... Given that this is a substantial contribution but that there is currently no regulatory limit for GHG emissions in the RSA, the magnitude is rated as medium".

Request:

a) Please provide a comparison of projected emissions cited in reference 'i' to BC's emissions targets for 2020.

b) Please explain how the absence of a regulatory limit has the effect of lowering the magnitude rating.

c) Is it Trans Mountain's opinion that only emissions covered under a regulatory limit have atmospheric impacts?

d) Please explain why a 235 per cent increase in GHG emissions in a relevant RSA is not a 'high' magnitude.

Response:

a) Please refer to the response to NEB IR No. 1.33b, which provides an explanation of the relevance of existing and planned federal, provincial, and local reduction targets, policies, and requirements related to greenhouse gas (GHG) emissions, including how Project GHG emissions compare to each relevant jurisdiction's reduction targets.

b) The magnitude of residual environmental effects is categorized into four groupings. In the absence of a regulatory limit, no established reference point exists for assessing a "high' magnitude. Residual environmental effects are deemed to have "medium" magnitude if they are detectable and may approach, but are still within the environmental and/or regulatory standards. The "medium" magnitude rating of the increase in CO_{2e} emissions from Project-related marine vessel traffic on marine greenhouse gas (GHG) emissions is conservatively high; since the last available inventory from year 2005 is likely a substantial underestimation of total annual GHG emissions in the Marine Regional Study Area (RSA) because of growth in marine traffic between the years of 2005 and 2013.

The assessment criteria of potential environmental effects are discussed in the Evaluation of the Significance of residual effects in Table 7.1-2 of Volume 5A. The assessment criteria were selected on the basis of the Canadian Environmental Assessment Agency's (CEAA) Cumulative Effects Assessment Practitioners Guide (Hegmann et al. 1999) and other references provided in Volume 5A, Section 7.1. The assessment criteria were selected to be relevant and are common to all environmental concerns. The rationale used to reach conclusions on magnitude rating is provided in the Application for each indicator and effect pathway.

Reference:

Hegmann, G., C. Cocklin, R. Creasey, S. Dupuis, A. Kennedy, L. Kingsley, W. Ross, H. Spaling and D. Stalker. 1999. Cumulative Effects Assessment Practitioners Guide. Prepared by AXYS Environmental Consulting Ltd. and the CEA Working Group for the Canadian Environmental Assessment Agency. Hull, Quebec.

c) No. Trans Mountain has provided some examples below from the completed studies where atmospheric impacts were evaluated with no regulatory limits. Project emissions of criteria air contaminants were assessed against established regulatory criteria in Technical Report 5C-4 in Volume 5C, Air Quality and Greenhouse Gas Technical Report (RWDI December 2013). Many of these ambient air quality criteria or objectives are desirable targets not regulatory limits. They were developed by environmental and health authorities, based on scientific studies that consider the influence of various air contaminants on such receptors as humans, wildlife, vegetation as well as aesthetic qualities such as visibility.

There are no ambient or emission criteria for greenhouse gases (GHGs); however, there are federal and provincial reporting requirements. The federal and provincial reporting requirements and a comparison to the Project-related emissions are further discussed in

the response to NEB IR No.1.32. No facilities associated with the Project are expected to meet or exceed the federal or provincial GHG reporting thresholds.

As noted in Section 3.4.3.1 of Technical Report 5C-4 in Volume 5C, global temperature increases and other changes in the climate system and physical environment (e.g., precipitation changes and decreases in crop yields) are directly related to cumulative emissions of GHG. The low and high estimated changes in some of the environmental parameters per 1°C of global temperature increase are presented in Table 3.22 of Technical Report 5C-4 in Volume 5C. The effect of the Project on overall climate, assuming that the operation-related emissions will not change dramatically over the lifetime of the Project, is estimated to result in 3.0×10^{-5} °C increase in Earth's global temperature. The effects of this temperature increase on other environmental parameters are summarized in Table 8.2 of Technical Report 5C-4 in Volume 5C.

d) Please refer to the response to City of Vancouver IR No. 1.05.01b.

1.05.02 Greenhouse Gas Measurement Endpoints

Reference:

i. Volume 8A, Section 4.3.4.1, *Assessment Indicators and Measurement Endpoints* (A56025, A3S4Y3, p.34)
ii. Volume 8A, Section 4.3.4.1, Table 4.3.4.1, *Assessment Indicators and Measurement Endpoints For GHG Emissions* (A56025, A3S4Y3, p.34)
iii. Volume 3A, Section 1.5.3.1, *Environmental and Socio-economic Assessment Workshops* (A55987, A3SOR3, p.29)

Preamble:

1. The proponent indicates that in selecting GHG indicators, there was general consensus among workshop participants that the proposed GHG emissions indicators were appropriate for evaluating effects of Project related activities on GHG emissions and the effect of these emissions on the environment, and that no additional indicators were suggested for consideration in assessment of Project related activities.

2. The proponent makes no mention of consultation regarding measurement endpoints during the sessions mentioned in preamble section 1, above.

3. City of Vancouver staff were present at the Marine Studies workshop in North Vancouver in May 2013. City staff supported repeated concerns voiced by representatives of other local municipalities with respect to the selected measurement endpoints, both at the in-person workshop and in the written feedback forms provided by and submitted to Trans Mountain. Specifically, concerns were raised repeatedly that the embodied emissions of shipped product should be included in the emissions estimates. These measurement endpoints are not included in reference 'i" or 'ii', above

Request:

a) Please explain the discrepancy between the assertions relating to 'general consensus' and 'no major concerns' in ii. and iii., respectively, and the repeated written and verbal concerns actually voiced at the workshop cited.

b) Please explain why this inconsistency was not published in the Project application.

c) Please provide copies of all written feedback forms relating to this issue.

d) Please provide a report that quantifies the embodied emissions of product shipped in tankers from Westridge Marine Terminal, as requested during the consultation process.

Response:

a) There is no discrepancy between the concerns voiced at the marine workshops and the assertions. As noted in Section 1.7 of Volume 3A, climate change was recognized as a common topic of concern. Tables 1.7.3 and 1.7.4 of Volume 3A list summaries of Interests or Concerns generated from consultation in the Lower Mainland/Fraser Valley

and Marine Coastal region, respectively. These tables include, "What is the impact of the Project on climate change?" as an interest/concern. As noted in these tables, Trans Mountain assessed the effect of GHG emissions from constructing and operating the proposed TMEP on climate change. The greenhouse gas (GHG) emission impacts are outlined in the Environmental and Socio-economic Assessment (see Section 7.0 of Volume 5A and Section 4.3 of Volume 8A) submitted with the National Energy Board (NEB) Facilities Application including actions to mitigate (reduce) direct emissions as much as possible.

Key topics and issues from the marine workshops were relayed to the appropriate Project team representative to be considered, incorporated and addressed in the Application, where applicable. The concerns related to an assessment of the GHG emissions associated with upstream activities and the downstream use of the oil transported by the pipeline (i.e., embodied emissions from shipped product) is not relevant to one or more of the issues identified in the National Energy Board's (NEB) List of Issues for the Trans Mountain Expansion Project which was first released in July 2013. Subsequently, in April 2014, the NEB excluded the assessment of the GHG emissions associated with upstream activities and the downstream use of the oil transported by the pipeline in the List of Issues, deeming it to be outside of the scope of the NEB Hearing Order (NEB 2014).

Reference:

National Energy Board. 2014. Trans Mountain Pipeline ULC Trans Mountain Expansion Project. File Number OF-Fac-Oil-T260-2013-03-02, Hearing Order OH-001-2014. 2 April 2014.

b) Please refer to the response to City of Vancouver IR No. 1.05.02a.

c) As mentioned in the response to City of Vancouver IR No. 1.5.2a, the issue related to an assessment of the greenhouse gas (GHG) emissions associated with upstream activities and the downstream use of the oil transported by the pipeline is not relevant to one or more of the issues identified in the National Energy Board's (NEB) List of Issues for the Trans Mountain Expansion Project which was first released in July 2013 and subsequently, determined by the NEB to be outside of the scope of the NEB Hearing Order for the Project. Therefore, Trans Mountain is not providing copies of written feedback forms relating to this issue.

d) The information request is not relevant to one or more of the issues identified in the National Energy Board's (NEB) List of Issues for the Trans Mountain Expansion Project. Appendix I of Hearing Order OH-001-2014 (NEB 2014) indicates that "The National Energy Board does not intend to consider the environmental and socio-economic effects associated with upstream activities, the development of oil sands, or the downstream use of the oil transported by the pipeline."

Reference:

National Energy Board. 2014. Trans Mountain Pipeline ULC Trans Mountain Expansion Project. File Number OF-Fac-Oil-T260-2013-03-02, Hearing Order OH-001-2014. 2 April 2014.

1.06 Natural Hazards

1.06.01 Landslide Risk

Reference:

i. Volume 5A, Section 7.1 0.2, *Potential Effects and Mitigation Measures* (A56004, A3S1 RO, p.28)
ii. Volume 7, Section 3.1 .4 *Failure Frequency Estimating- Geohazards* (A56025, A3S4V5, p.41)
iii. Auditor General of British Columbia. (2014). *Catastrophic Earthquake Preparedness*, Found online at http://WININ.bcauditor.com/pubs/2014/report15/catastrophic-earthquakepreparedness. Page 35.

Preamble:

Table 7.10-1 (A56004, A3S1 RO, p.129) indicates hazards for geotechnical risk. Climate change will likely result in increases in rainfall intensity and frequency of landslides and debris flows.

In Reference 'ii' the document states: "through data gathered from the Natural Hazard Management Program along the existing line over the last 20 years, on average one to two moderate sized debris flow events occur each year over the entire pipeline length and similarly an average of less than one landslide per year has been recorded. Over the 60 year history only a handful of these hazards have been of significant size to require intervention such as mitigation".

Reference 'iii' includes the BC Auditor General's report on the risk of catastrophic earthquakes in BC, including a number of different types of earthquakes that the region will inevitably experience. Any of these earthquakes could result in multiple debris flows or landslides along the pipeline.

Request:

a) Please advise whether projected increases in rainfall intensity and frequency were considered when qualifying or quantifying landslide risk.

b) If so, please provide the rainfall intensity and frequency data used in quantifying or qualifying landslide risk. Please provide this analysis.

c) If not, please explain why this information was not considered. Please also provide a revised analysis including the projected increases in rainfall intensity and frequency.

d) Please indicate how Trans Mountain has assessed the potential impacts of different types of earthquakes on the pipeline, including the risk of debris flows and landslides.

e) Please provide contingency plans for responding to pipeline ruptures or incidents as a result of seismically triggered landslides or debris flows.

f) Please describe for each of the "handful" of hazards identified the nature, size, and scope of the intervention.

g) Please provide details of the incidents including any resultant spills.

Response:

a) The Environmental and Socio-economic Assessment describes the potential effects of the environment acting on the Project in Section 7.10 of Volume 5A including environmental conditions such as hydrotechnical hazards, geotechnical hazards, seismic hazards, wildfires, changing climate and sea level rise.

The exact impacts of climate change via changes in temperature, rainfall intensities, frequencies and volumes, and the associated changes in runoff and sediment transport with respect to pipeline integrity remain uncertain. This is especially true considering the spatial distribution of the pipeline and multiple climatic or physiographic regions that the proposed pipeline crosses. Some regions may experience increased precipitation amounts and increases in rainfall intensity, while others decreasing precipitation volume but still with increases in intensities. Moreover, the distribution of precipitation as snow or rain is also likely to change in space (elevation) and time. The scale of such changes can presently only be approximated. Third order effects to geohazards such as in how changes in precipitation pattern affect stream scour or landslide activity are extremely complex. Therefore applying a single value adjustment to individual geohazards to represent unknown conditions in the future is overly simplistic.

Trans Mountain realizes that changes to climate during operations of the Project may manifest in several ways, including occurrence of a higher frequency of extreme hydro-climatic events. Trans Mountain will adaptively manage potential residual effects associated with changing climate through the Natural Hazards Management Program. As part of this, climate and stream flow data will be re-assessed at various intervals, and if necessary, pipeline protection will be adjusted in response to changing boundary conditions.

b) Rainfall intensity changes for 14 rain gauges in Metro Vancouver with 5 minute measurement intervals has been studied in detail for Metro Vancouver in 2002 and 2007 by Kerr Wood Leidal and by the Pacific Climate Impacts Consortium (PCIC), Victoria, respectively. The results (summarized for the 2003 work in Jakob et al. 2003), demonstrate that there are few increases in high intensity precipitation yet except for very short durations at some stations. Following these studies, Metro Vancouver commissioned a study from BGC to determine how their Intensity-Duration-Frequency (IDF) curves could be adjusted given the anticipated changes in rainfall intensities. This was considered important as it may require a faster replacement cycle for urban drainage infrastructure. BGC applied an empirical relationship between rainfall monthly totals and rainfall intensities up to 24 hrs and adjusted the IDF curves to the year 2050. The principal results of this study were that rainfall return periods for given intensities may half by mid century. The results of these studies can be accessed through the website of Metro Vancouver (http://www.metrovancouver.org/Pages/default.aspx).

A follow up study was conducted by Jakob and Lambert (2009) in which the authors looked at how changes in rainfall intensity and volumes could affect shallow landslides. This study demonstrated (a) that predicted changes in rainfall volumes particularly during the fall and winter months will likely be associated with increases in precipitation intensities, and (b) that this will result in more shallow landslides in coastal areas. To the knowledge of the authors, such study has not been repeated in the same systematic fashion for interior sections of the pipeline route. Part of the problem is the paucity of automatic rain gauges with high measurement frequencies (hourly or higher frequency).

In 2013, BGC conducted a regional flood hazard study for the Kootenay Region (BGC, 2013) that included a cursory analysis of the effects of climate change. This analysis demonstrated that climatic warming and the associated link to moisture availability in the air column will influence flood hazards through factors such as changes to precipitation intensity and frequency, glacial shrinkage, changes to watershed water balance, slope stability, insect infestations and forest fire frequency. Implications of climate change on flood hazards include: the potential for shifting flood hazard seasons as a result of earlier spring freshets, and where applicable, a longer autumn peak flow window with delays in the start of winter where precipitation shifts from rain to snow; increases in the number of high flow events; and, “flashier” responses to precipitation events.

Changes in landslide risk due to changes in rainfall intensities and rainfall volumes are inherently complex. Every landslide type has a different “hydrological memory” and reacts to different moisture inputs. For example, deep seated soil slumps or earthflows may require many months of above average precipitation to approach a critical factor of safety. In contrast shallow landslides may only require weeks of high precipitation coupled with significant rainfall intensities during the landslide-triggering storm.

References:

BGC 2013. Regional Flood Hazard Study – Phase 1. Final. Report submitted to Regional District of East Kootenay. April 16, 2013.

Jakob M., McKendry, I., and Lee, R., 2003. Long-term changes in rainfall intensities in Vancouver, British Columbia. Canadian Water Resources Journal, Vol. 28, No. 4.

Jakob, M. and Lambert, S. 2009. Climate change effects on landslides along the south-west coast of British Columbia. Geomorphology. 107. 275-284.

KWL Wood Leidal Associates Ltd. 2002. Development of GVRD precipitation scenarios. Report prepared for GVRD.

Pacific Climate Impacts Consortium. 2007. GVRD historical and future rainfall analysis update. Report prepared for Metro Vancouver. August 2007.

c) Please refer to the response to City of Vancouver IR No. 1.06.01b.

d) The seismic desktop study (Volume 4A, Appendix J) described the different types of earthquakes and presented a preliminary assessment of earthquake-triggered

liquefaction and landslide hazards. The purpose of the preliminary assessment was to identify areas with elevated hazard potential for site-specific investigation and design.

Geohazard assessment will be iterative and ongoing throughout detailed design as additional site specific information on individual geohazard sites are investigated. A preliminary geohazard assessment is currently being completed and will be provided as part of the risk assessment on Line 2 referred to in NEB IR No. 1.81a.

Reference:

National Energy Board. 2014. NEB Hearing Order OH-001-2014, Information Request 1.81a.

e) Please refer to the response to Province BC IR No. 1.1.09a.

f) Please refer to the response to Nations IR No. 1.2.9b.

g) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

1.06.02 Precipitation & Flooding

Reference:

i. Volume SA, Section 7.10 *Changes to the Project Caused by the Environment* (AS6004, A3S 1 RO, p.127)
ii. Volume SA, Section 7.1 0.1 *Environmental Conditions Not Considered* (AS6004, A3S 1 RO, p.127)
iii. Volume SA, Table 7.10-1 *Potential Effects, Mitigation Measures and Residual Effects of Changes to the Project Cause by the Environment* (AS6004, A3S1 RO, p.129)
iv. *Pinna Sustainability.* (2014). *Multi-Agency Qualitative Risk Assessment Report Understanding the Future Impact of Atmospheric Rivers and Identifying Actions to Reduce Risks* (Draft Report). p.5.

Preamble:

One of the environmental conditions not considered is heavy and persistent precipitation, yet Trans Mountain identifies flooding as an impact on the pipeline. By 20SO, the average number of atmospheric river days is projected to roughly double at most locations on the coast and in the interior. By the end of this century, we can expect 6-8 day events, carrying on average 30% more precipitation each day of the storm. An increase in precipitation could lead to more overland flooding, sewer surcharges and riverine flooding.

Trans Mountain's assessment considers riverine flooding, but does not consider overland flooding impacts or a combination of these events.

Request:

a) Please explain why Trans Mountain has considered riverine flooding but not overland flooding.

b) Please explain why Trans Mountain has considered riverine flooding but not a combination of events related to heavy or persistent precipitation.

c) Please explain why Trans Mountain has not included the environmental condition of heavy and persistent precipitation and the increase in annual precipitation that is projected to be caused by climate change.

Response:

a) Events of heavy or persistent precipitation are generally considered to not have the potential to adversely affect the Project during construction and/or operations. Delays in construction due to severe weather conditions are expected to be short in duration, and heavy precipitation will not adversely affect the buried pipeline or above ground facilities.

Trans Mountain provided an assessment of hydrotechnical hazards along the proposed pipeline corridor in Appendix H of Volume 4A, Terrain Mapping and Geohazard Inventory Report (BGC Engineering Inc. December 2013). Hydrotechnical hazards are present throughout the proposed pipeline corridor. In addition, concerns regarding

flooding were raised by stakeholders in BC. Although the discussion of the residual effect of loss of cover over the pipeline or pipe buoyancy as a result of an extreme flood event in Section 7.10.4 of Volume 5A is focused on riverine flooding, the assessment of this effect and significance evaluation is relevant to overland flooding as well. Trans Mountain will monitor the condition of the right-of-way in a timely manner after any heavy rainfall events to look for erosion or washout areas and remediate any damage to protect the integrity of the pipeline. As stated in Section 7.10.2, Table 7.10-1 of Volume 5A, Trans Mountain will also implement the Natural Hazards Management Program in Kinder Morgan Canada's Canadian Integrity Management Program in the event of a hydrotechnical hazard.

The effect of changing climate has also been considered. Depending on the type and severity of the change in climate trends, the scheduling of maintenance activities may be affected. Changes to climate during operations of the pipeline may manifest in several ways (*e.g.,* in the increased occurrence of extreme events). Trans Mountain will adaptively manage potential residual effects associated with changing climate through the Natural Hazards Management Program. During operations of the Project, it is expected that Trans Mountain will be adaptive in their management of the pipeline and schedule maintenance activities to accommodate local environmental conditions and implement the appropriate protection measures to suit local environmental conditions thereby reducing the potential environmental effects.

b) Please refer to the response to City of Vancouver IR No. 1.06.02a.

c) Please refer to the response to City of Vancouver IR No. 1.06.02a.

1.06.03 Flood Events

Reference:

i. Volume 5A, Section 7.1 0.4, (AS6004, A3S1 RO, p.131)
ii. BC Ministry of Environment. (2011). *Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use Draft Policy Discussion Paper,* p.39
iii. BC Ministry of Environment. (2011). *Climate Change Adapt/on Guidelines for Sea Dikes and Coastal Flood Hazard Land Use Guidelines for Management of Coastal Flood Hazard Land Use,* p.7-8.

Preamble:

The pipeline will be designed to withstand a 200 year flood event. The design event used for Fraser River modelling is a 1:500 event as noted in reference 'ii'.

Request:

a) Please explain why Trans Mountain chose to design the pipeline to withstand only a 200 year flood event.

b) Please cite any references considered in deviating from the standard 1:500 flood event.

c) Please provide revised designs for pipeline crossings to withstand a 1:500 flood.

Response:

a) The 1:500 year return period event referred to in reference ‘ii’ is specific to storm surge and high tides for the Lower Fraser River. It does not refer to freshet flooding against the dikes. It is the latter high water level scenario, not the former, which can result in local scour and bank erosion, two common hydrotechnical hazards that can impact buried pipelines.

The design flood for Lower Fraser River dikes remains the 1894 flood of record, which does not have a return period assigned to it. Throughout British Columbia, the flood protection standard for dikes advocated by the BC Ministry of Forest, Lands and Natural Resource Operations (MFLRNO) remains a 200-year return period, the Fraser River withstanding. Furthermore, there are no provincial or federal guidelines that provide guidance or specify to what return period pipelines should be protected against scour or other hydrotechnical hazards. As such, a 200-year flood event has been adopted for hydrotechnical hazards that could potentially impact the proposed pipeline.

Given that horizontal directional drilling (HDD) is being proposed as the primary method for the pipeline crossing of the Fraser River, the discussion of the design flood event for this crossing is not relevant, as the pipeline will be buried several tens of meters lower than potential scour depths.

b) As stated in the response to City of Vancouver IR No. 1.06.03a, there is no standard 1:500 return period flood for the Fraser River so there is no deviation.

c) As noted in the response to City of Vancouver IR No. 1.06.03a, the 500-year design event referred to in reference 'ii' is specific to storm surge and high tides for the Lower Fraser River, not peak flow events and so Trans Mountain will continue to use the 1:200 year design event for watercourses.

1.06.04 Earthquakes and Seismic Risk

Reference:

i. Volume 7, Section 3.1.4 *Failure Frequency Estimating- Geohazards* (A56025, A3S4V5, p.41)
ii. Volume 4A, Appendix J, *Seismic Assessment Desktop Study Report* created by BGC Engineering, INC. (A56002, A3S1 F6, p.1)
iii. Volume 7, Appendix A *Kinder Morgan Threat Assessment Report* (A56025, A3S4V7, p.1)
iv. Volume 8A, Section 4.3.14.1 (A56025,A3S4Y3, p.211)
v. Volume 8C, TERMPOL 3.18- Contingency Planning (A56030, A3S5J9, p.1)

Preamble:

Reference 'i' states that: "through data gathered from the Natural Hazard Management Program along the existing line over the last 20 years, on average one to two moderate sized debris flow events occur each year over the entire pipeline length and similarly an average of less than one landslide per year has been recorded. Over the 60 year history only a handful of these hazards have been of significant size to require intervention such as mitigation." (pdf 41-42). It is unclear how Kinder Morgan Canada has determined that the 60 year history of the existing pipeline is an appropriate measure of risk of geotechnical hazards, given that major earthquakes are known to occur in BC, and that catastrophic earthquakes are projected in the future which could result in any number of cascading geotechnical or hydrological events.

Reference 'ii' discusses risk from outside forces but states that geotechnical risk assessments have not been completed.

Reference 'iv' states that: "seismic activity was not considered to have the potential to adversely affect the increased Project-related marine vessel traffic during operations. An earthquake, either on land or under the ocean, would not produce a mechanism by which Project-related marine traffic could become affected".

Reference 'v' describes the contingency plan for Westridge marine terminal and includes a number of hazards. It does not include earthquakes despite the fact that is the number one identified hazard in the lower mainland.

Request:

a) Please explain the justification for considering only the 60 year history of the existing pipeline when discussing geotechnical risks including debris flow.

b) Please confirm when geotechnical threat assessments will be completed and how the results of these will be integrated into emergency response and contingency plans.

c) Please provide all emergency plans for earthquake response at Westridge Marine Terminal and along the pipeline.

d) Please explain how vessels would not be impacted by a seismic event that impacted berths at Westridge terminal.

e) Please explain how vessel traffic operations would be maintained should an earthquake occur impacting the Port of Metro Vancouver, given that Trans Mountain does not anticipate any impact to vessel operations as a result of an earthquake.

Response:

a) A geohazard assessment will be included in the Semi Quantitative Risk Assessment (SQRA) (please refer to the response to NEB IR No. 1.79). This assessment will consider the full period of historical evidence that can be observed along the route through the interpretation of airphotos and LiDAR, and for seismic hazards, the historical seismic record. Information from third party maps and studies will also be incorporated and will be supplemented by the 60 year operating history of the existing TMPL pipeline along areas of the route where the proposed pipeline will follow the existing pipeline.

b) Geohazard assessment will be iterative and ongoing throughout detailed design as additional site specific information on individual geohazard sites are investigated. A preliminary geohazard assessment is currently being completed and will be provided as part of the risk assessment on Line 2 referred to in NEB IR No. 1.81a.

Application Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of Trans Mountain Expansion Project. The final programs will be developed in a manner consistent with the National Energy Board's draft conditions 42, 52, 53 and 54.

c) Please refer to the response to Province BC IR No. 1.1.09a.

d) Please refer to the response to GoC NRCan IR No. 1.01.01a.

As the threat of an event such as a tsunami due to a seismic event is of low likelihood, vessels at Westridge terminal would not be impacted.

e) Should an earthquake occur impacting the Port of Vancouver, then depending on the situation as assessed by the port, vessels may be prevented from entering or leaving the harbour.

1.06.05 Extreme Flood Events

Reference:

i. Volume 5A, Section 7.1 0.4, *Loss of Cover Over the Pipeline or Pipe Buoyancy as a Result of an Extreme Flood Event* (A56004, A3S 1 RO, p.131)
ii. City of Vancouver (2012). *Climate Adaptation Strategy*, Found online at: http://vancouver.ca/files/cov!Vancouver-Ciimate-Change-Adaptation-Strategy-2012-11-07.pdf, p. 12
iii. University of Victoria. (2013). *Pacific Climate Impacts Consortium Regional Analysis Tool,* Found online at: http://www.pacificclimate.org/analysis-tools/regional-analysis-tool

Preamble:

Under reference 'i', the frequency of an extreme flood event is rated as rare. References 'ii' and 'iii' discuss return periods for extreme flood events that are expected to alter as the climate changes.

Request:

a) Please advise whether this assessment of extreme flood frequency considers the changing return periods that are anticipated as a result of climate change.

b) If not, please explain why these projected changes in return periods were not considered.

Response:

a) The assessment of an extreme flood event in Section 7.10.4 of Volume 5A considers that the pipeline will be designed on the basis of a 1 in 200 year flood event. This design is supported by the Route Physiography and Hydrology report in Appendix I of Volume 4A (BGC Engineering Inc. November 2013), which provides estimated peak flows for various return periods at major rivers. The notable watercourse crossings will be designed for scour and bank stability to meet the conditions of a 1 in 200 year flood event and, as such, the proposed pipeline will be sufficiently buried, or otherwise protected, to ensure its long-term integrity.

The effects of changing climate are also discussed in Section 7.10.4 of Volume 5A. Trans Mountain realizes that changes to climate during operations of the pipeline may manifest in several ways, including the increased occurrence of extreme events. Trans Mountain will adaptively manage potential residual effects associated with changing climate through the Natural Hazards Management Program.

Please also refer to the response to City of Vancouver IR No. 1.06.03a for additional rationale on design for a 1 in 200 year flood event.

b) Please refer to the response to City of Vancouver IR No. 1.06.05a.

1.06.06 Waves Over-Topping the Terminal

Reference:

i. Volume SA, Section 7.1 0.4, *Waves Over-Topping the Dock Leading to Safety Hazards, Terminal Downtime and Damage to Infrastructure* (A56004, A3S1 RO, p.131)
ii. *Climate Change Adaption Guidelines for Sea Dikes and Coastal Flood Hazard Land Use Draft Policy Discussion Paper,* BC Ministry of Environment, 2011, p.2
iii. Mannerstrom et al., (2013). *A Continuous Simulation Approach for Estimating Future Flood Hazards Due to Joint Occurrence of High Ocean Levels and High Runoff*.

Preamble:

Trans Mountain is using 0.5m increase in sea level to 2100 yet the Province of BC guidelines on Flood Hazard Management 'ii' state a 1m sea level rise by 2100 as the appropriate planning projection.

This section states that model parameters looking at waves with sea level rise would be highly speculative and so modelling was not conducted, yet the City of Vancouver has just completed similar modelling using a well-accepted scenario modelling approach (reference 'iii').

The frequency in this section is described as occasional. This is very dependent on the timeline chosen and the amount of sea level rise experienced in the future. The frequency could be far higher.

Magnitude is rated as low, but it may have a much larger impact if nuisance flooding occurs, which often requires more shut downs and possible rebuilds of the facility to higher levels.

Request:

a) Please explain why Provincial Flood Hazard Management guidelines were not followed by Trans Mountain.

b) Please explain why Trans Mountain did not use the scenario modelling approach in its analysis of safety hazards and infrastructure damage resulting from wave overtopping.

c) Please advise what timeline was selected, and on what basis, for determining future sea level rise.

d) Please indicate how frequent nuisance flooding would impact the assessed magnitude of such events, per reference 'i'.

e) What mitigation measures have been considered, if any?

f) If higher frequency nuisance flooding has not been considered, please provide the rationale for this decision.

Response:

a) The stated purpose of the document cited in Reference ii) is to provide "guidelines for the design of sea dikes to protect low lying lands that are exposed to coastal flood hazards arising from their exposure to the sea and to expected sea level rise due to climate change". The Westridge Marine Terminal is not located on low-lying lands or protected by a dike, so the document is not necessarily directly applicable as a planning standard.

There are a range of credible estimates for sea level rise in the scientific literature, and the value of 0.5 m was selected based on Thomson *et al.* (2008) as a reasonable basis for planning the marine facilities at Westridge. While the engineering design of the Westridge Marine Terminal is not yet complete and some of the key parameters such as wharf deck elevations have yet to be finalized, in general, the effects of sea level rise on the Westridge marine structures are not expected to be significant.

For preliminary planning purposes, the present top of deck elevation of the proposed Westridge loading platforms is set at +9.1 m above chart datum. This is more than 4 m higher than the present high tide level of +5.0 m. This deck elevation is well above the maximum water level expected even after accounting for the maximum 100-year storm waves occurring simultaneously with extreme high tide, regardless of whether 0.5 m or 1.0 m is assumed as a value for sea level rise. In either case, wave overtopping is not expected to be an issue. Even if the actual amount of sea level rise exceeds projections, there are a number of adaptive strategies that can be applied, if necessary in the future to mitigate these effects without compromising the safety of operations of the Westridge Marine Terminal.

Reference:

Thomson, R.E., B.D. Bornhold and S. Mazzottii. 2008. An examination of the factors affecting relative and absolute sea level in British Columbia. Canadian Technical Report of Hydrography and Ocean Sciences 260. Fisheries and Oceans Canada. Ottawa, ON.

b) Please refer to response to City of Vancouver IR No. 1.06.06a. The preliminary deck elevations at the Westridge Marine Terminal are already well above the maximum expected 100-year wave crest elevations regardless of whether 0.5 m or 1.0 m is assumed as a value for sea level rise.

c) The temporal boundaries of the assessment of the Project are discussed in Section 7.1.3 of Volume 5A. The potential residual effect of waves over-topping the dock may occur over the operational life of the Westridge Marine Terminal. The first berth at the Westridge Marine Terminal is expected to be in-service by Q3 2017 and the second and third new berths are expected to be in-service by late 2017. The operations phase of the Project is anticipated to extend for 50 years or more.

d) Given the design of the Westridge Marine Terminal to allow for a 0.5 m rise in sea level by 2100 (within the operational life of the Terminal), Trans Mountain does not believe waves will over-top the dock more frequently than assessed in Section 7.10.4 of Volume 5A (*i.e.*, occasional, sporadic and depending on weather events). The engineering considerations related to sea level rise leads to a low probability of waves over-topping the dock. Therefore, Trans Mountain does not believe the magnitude of this potential residual effect would be elevated beyond the rating of low magnitude.

Please refer to the response to City of Vancouver IR No. 1.06.06a.

e) Mitigation measures recommended for the potential effect of sea level rise are provided in Section 7.10.2, Table 7.10-1 of Volume 5A of the Application. Design of the Westridge Marine Terminal dock elevation to withstand a 0.5 m increase in sea level is part of this mitigation. Section 3.4 of Volume 4A includes a description of dock elevation and Figure 3.4.17 of Volume 4A displays the Typical Dolphin and Pile Foundation including elevation above the high water level. In addition, shoreline dredging will be employed as required to ensure geotechnical stability at the Westridge Marine Terminal. If needed, Trans Mountain will implement Kinder Morgan Canada's Natural Hazards Management Program.

f) Please refer to response to City of Vancouver IR No. 1.06.06d.

1.06.07 Sea Level Rise & Temporal Context

Reference:

i. Volume 5A, Table 7.10-1 #5 *Environmental Effects Assessment, Changes to the Project Caused by the Environment, Potential Effects and Mitigation Measures*, (AS6004, A3S 1 RO, p.130)
ii. Volume 5A, Table 7.10-1 #6 *Environmental Effects Assessment, Changes to the Project Caused by the Environment, Potential Effects and Mitigation Measures* (AS6004, A3S1 RO, p.130)
iii. Volume 5A, Table 7.10-2 *Environmental Effects Assessment, Changes to the Project Caused by the Environment, Significance Evaluation of Potential Residual Effects*, (AS6004, A3S1 RO, p.131)
iv. BC Ministry of Environment. (2011). *Climate Change Adapt/on Guidelines for Sea Dikes and Coastal Flood Hazard Land Use Guidelines for Management of Coastal Flood Hazard Land Use*, p.5.

Preamble:

Sea level rise is predicted to continue at an increasing rate over the next century or more ('iv'). The proponent acknowledges that sea level rise will impact the project, and indicates that Engineering has considered sea level rise in project design.

The proponent does not provide the temporal context for which sea level rise is considered. Table 7.10-2 (AS6004, A3S1 RO, p.131) appears to indicate that it is only considered in the short-term.

Table 7.10-1 #6 (AS6004, A3S1 RO, p.130) lists 'KMC's Natural Hazards Management Program' and shoreline dredging (in addition to Engineering design) as the mitigation measures for sea level rise.

Request:

a) Please provide the time period over which sea level rise and its impacts were considered for the purposes of:
   1) Engineering design;
   2) Other effects mitigation; and,
   3) Residual impacts.

b) Please provide the time period over which each impact of 'Changing Climate' (Table 7.10-1 #5) (AS6004, A3S1 RO, p.130) was considered, and the rationale for choosing these time periods.

c) Please provide the details of what specific actions KMC's Natural Hazards Management Program undertakes to mitigate sea level rise over the time period described in Request 1.4.a, above.

d) Please provide details of the expected environmental impacts of KMC's Natural Hazards Management Program.

e) Please provide estimates of the expected costs of KMC's Natural Hazards Management Program.

f) Please indicate what Engineering design changes occurred to accommodate sea level rise over the time period described in 1.4.a, above.

g) Please provide the long-term plan for managing sea level rise over the life of the Project. If no long-term plan exists, please explain why not.

Response:

a) Please refer to the response to City of Vancouver IR No. 1.06.06c.

For clarification, the use of “short-term” in Table 7.10-2 of Volume 5A of the Application refers to the period of time over which the residual effect extends. The potential residual effect of waves over-topping the dock at the Westridge Marine Terminal leading to safety hazards, terminal downtime or damage to infrastructure is considered to be reversible in the short-term. Short-term reversibility is defined in Table 7.1-2 of Volume 5A as greater than two days and less than or equal to 1 year to reverse the residual effect. The criteria of short-term reversibility was selected for this residual effect since it is likely that any dock downtime could be rescheduled within a year.

b) The temporal boundaries of the assessment of the Project are discussed in Section 7.1.3 of Volume 5A of the Application. The potential residual effects associated with changing climate listed in Table 7.10-1 of Volume 5A may occur during construction, maintenance or operations activities. Pending regulatory approval of the Project, construction of the pipeline and facilities is scheduled over an approximately 24 month period to achieve the planned in-service date of late 2017. The operations phase commences following completion of construction in Q4 2017 and is anticipated to extend for 50 years or more.

The potential residual effect of alteration of scheduling of maintenance activities could occur during the operations phase. The potential residual effect of loss of cover over the pipeline as a result of an extreme flood event could occur during construction activities (*i.e.,* instream construction) or during operations. The potential residual effect of pipe buoyancy as a result of an extreme flood event, and the potential residual effect of loss of pipeline cover from fire or drought could occur during operations.

c) The Trans Mountain Natural Hazard Program does not address the potential for rising sea levels.

d) The Trans Mountain Natural Hazard Program focuses on the prevention of pipeline damage resulting from geo-hazards. Mitigation aspects of the program include projects to restore cover and river bed armoring in water courses where erosion has reduced the depth of cover. The environmental impacts of such projects are addressed during the planning stage for these projects and are not covered by the Natural Hazard Program.

e) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

f) Section 3.4.4.3.2, Volume 4A of the Facilities Application indicates that a 50 cm sea level rise allowance has been included in the design criteria for the proposed expansion of Westridge Marine Terminal (WMT). Otherwise, the design basis for WMT will include the climatic design data provided in the British Columbia Building Code, as applicable, and other available and applicable meteorological and oceanographic information (i.e. winds, water levels and tides, waves, and currents) also discussed in Section 3.4.4.3.2.

g) Section 3.4.4.3.2, Volume 4A of the Facilities Application describes the rationale for the proposed 50 cm sea level rise consideration for Westridge Marine Terminal (WMT), discussed in the response to City of Vancouver IR No. 1.06.07f. As such, Trans Mountain believes the proposed allowance will be adequate for the very long term. If and when an actual sea level rise trend can reliably be used to predict a rise of greater than 50 cm, prior to the anticipated end of life of WMT, future adaptive measures will be considered, at that time, to address the issue. As the 50 cm allowance will be initially included in the design of WMT, an ongoing plan, other than to monitor the sea level trend, will not be necessary.

1.06.08 Material Durability

Reference:

i. Volume 5A, Table 7.10-1 #5 Climate Change (A56004, A3S1 RO, p.130)

Preamble:

Recommendations and mitigation measures appear to focus on the construction of the project and not on the ongoing operation of the pipeline (beyond maintenance schedule impacts).

Request:

a) Please provide an analysis of the impacts that pipeline materials and material durability will have on changes in precipitation intensity, heat intensity, or other climatic changes.

b) Please indicate what plans are in place to mitigate unforeseen impacts to project materials over the life of the project.

c) Please provide details of what plans are in place to mitigate degradation of the existing pipeline from environmental effects associated with climate changes.

Response:

a) The Trans Mountain Line 2 buried pipeline is not exposed to the effects of significant climatic changes over the operating year since the burial depth ground temperature typically varies only between plus to minus 5 degrees Celsius (±5ºC) in Lower Mainland. This ground temperature range is a very small fraction of the pipeline material design temperature of minus 5 degree to plus 65 degrees Celsius (+65ºC). Above ground piping components will experience the ambient temperature range variation and are designed for lower and higher temperatures than normally experienced. The steel pipe, pipe coatings, components and support structures are all designed for conditions exceeding the ambient temperature normally experienced. Higher precipitation will lead to wetter ground conditions that may require the current on the cathodic protection (CP) impressed current system to be adjusted over time. The CP system is normally monitored and adjusted so there is no additional operational requirement imposed on the pipeline due to climate change.

b) The proposed pipeline will be monitored throughout its operational life using a comprehensive integrity management program. The integrity management program includes the running of a variety of in-line inspection tools to monitor the condition of the pipeline on a regular basis.

   This program also includes a process to identify new hazards that pose a potential threat to the integrity of the pipeline such as an unforeseen impact to the project materials. This process requires the incorporation of newly identified hazards into the monitoring program and requires the development of preventive measures to control the risk due to new hazards.

Further details of the integrity management program for the proposed pipeline are outlined in section 8 of Volume 4C of the application.

c) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

1.07 Liability

1.07.01 Financial Capacity and Insurance

Reference:

i. Volume 1, Summary, Section 1.0 *Application and General Information* (A55987, A3SOQ7, p.27)
ii. Volume 7, Section Appendix G *Potential Cleanup and Damage Costs of a Hypothetical Oil Spill: Assessment of Trans Mountain Expansion Project* (A56025, A3S4W8, p.1)
iii. Volume 7, Section 9.0 *Financial Capacity to Respond to a Spill* (A56025, A3S4V6, p.129)

Preamble:

Reference 'i' and 'ii' refer to the potential clean up and damages costs of an oil spill and states that Trans Mountain currently has $750 million of spill liability insurance. It is stated that Trans Mountain would maintain this level of spill liability insurance throughout the life of the project.

Reference 'iii' identifies corporate entities such as Trans Mountain Pipeline ULC, Trans Mountain Pipeline L.P., Kinder Morgan Canada Inc., and Kinder Morgan Energy Partners, L.P. that are associated with this Project. It also states that Trans Mountain Pipeline ULC currently maintains a General Liability insurance program with an annual limit totalling US$750 million, and that coverage for pollution legal liability is included within this program.

Request:

Trans Mountain Construction Phase

a) Please describe the types of insurance coverage (including exclusions, conditions and limits) that Trans Mountain would carry during construction phase.

b) Please explain how the limits on insurance coverage are defined, including details of the risk analysis, risk exposures, types of perils and hazards as well as assumptions made.

c) Please describe the insurance requirements including types of coverage, conditions and limits that Trans Mountain would require for contractors and subcontractors during the construction phase.

Trans Mountain Operational Phase

d) Please describe the types of insurance coverage (including exclusions, conditions and limits) that Trans Mountain currently carries.

e) Please explain how limits on current insurance coverage were defined, including details of the risk analysis, risk exposures, types of perils and hazards as well as assumptions made.

f) Please describe the types of insurance coverage (including exclusions, conditions and limits) that Trans Mountain would carry once the project expansion is completed and operating.

g) Please explain how limits are defined, including details of the risk analysis, risk exposures, types of perils and hazards as well as assumptions made.

Westridge Marine Terminal

h) Please describe the types of insurance coverage (including exclusions, conditions and limits) that Westridge Terminal currently carries.

i) Please explain how the limits on insurance coverage are defined, including details of the risk analysis, risk exposures, types of perils and hazards as well as assumptions made.

j) Please describe the types of insurance coverage (including exclusions, conditions and limits) that Westridge Terminal would carry when project expansion is completed.

k) Please explain how the limits on insurance coverage will be defined, including details of the risk analysis, risk exposures, types of perils and hazards as well as assumptions made.

WCMRC

l) Please describe the types of insurance coverage (including exclusions, conditions and limits) that WCMRC currently carries.

m) Please explain how the limits on insurance coverage are defined, including details of the risk analysis, risk exposures, types of perils and hazards as well as assumptions made.

Spill Liability Insurance

n) Regarding the $750 spill liability insurance described in the application:
   1) Please confirm that the spill liability insurance is solely applied to Trans Mountain Pipeline U LC. Please describe how this policy is triggered.
   2) Please inform whether the policy is claims-made or per occurrence form.
   3) Please provide details of any annual aggregate limits of coverage.
   4) Please provide spill liability insurance program structure, provider and provider's rating.

Joint Responsibility

o) In reference to a hypothetical spill at vessel loading point of the Westridge Marine Terminal falling under joint responsibility between vessel operator and marine facility operator:
   1) Please describe how joint responsibility is determined.
   2) Please describe the liability and compensation regime for an oil spill caused by a vessel operator versus the liability and compensation regime for a spill caused by a marine facility operator.
   3) Please confirm who would determine the appropriate level of response when joint responsibility is determined.
   4) Please advise which regulatory regime(s) and responsible governing authority(ies) would be engaged when joint responsibility is determined.

5) Please advise who would manage the claim and investigate the accident when joint responsibility is determined.

Claims Management

p) Please describe how Trans Mountain or its insurer manages and adjusts first party claims.

q) Please describe how Trans Mountain or its insurers legitimizes third party claims.

r) Please describe how Trans Mountain or its insurer manages third parties claims and the compensation regime for property damage for residents, businesses, commercial establishments and municipalities directly impacted by a spill.

s) Please describe how Trans Mountain or its insurer manages third parties claims and the compensation regime for economic damage to businesses, commercial establishments and municipalities indirectly affected by a spill.

t) Please describe how Trans Mountain or its insurer manages third parties claims and the compensation regime for non-economic damage for residents, businesses, commercial establishments and municipalities directly impacted by a spill.

u) Please confirm whether corporate entities (i.e. Trans Mountain Pipeline ULC, Trans Mountain Pipeline L.P., Kinder Morgan Canada Inc. and Kinder Morgan Energy Partners LP) would provide any form of financial security to compensate for economic and property damage arising from a spill. If so, what form of financial security would be provided and on what terms and conditions.

v) Please provide details of all financial instruments that are in place within the Kinder Morgan group to meet liabilities arising from Trans Mountain Pipeline ULC.

w) Please explain how Trans Mountain would cover any third party losses and claims arising out of a spill and other potential liabilities that are in excess of its insurance coverage or are excluded from its insurance coverage.

x) Please advise whether Trans Mountain is currently using insurance-linked securities (e.g. catastrophe bonds) as an alternative way to transfer risk. If not, please advise whether Trans Mountain intends to use insurance-linked securities in connection with the proposed project expansion. If these are used or will be used, please provide details of the instruments.

Natural Hazards and Climate-Related Risks

y) Please describe the liability insurance program and compensation regime that Trans Mountain, Westridge Marine Terminal and WCMRC hold for natural hazards catastrophic events such as an earthquake (including post-earthquake fires and explosions) windstorms and landslides.

z) To what extent has Trans Mountain considered and addressed climate-related risks in its risk management and risk transfer/insurance activities? Please provide specific examples of risk management activities, such as risk identification, risk assessment, loss prevention measures, and loss reduction measures pertaining to climate-related risks.

aa) How is Trans Mountain responding to climate-related risks?
1) If Trans Mountain is not responding to climate related risks, please indicate why not.
2) If Trans Mountain is responding to climate change risks please provide details of the types of risk transfer/insurance Trans Mountain carries for climate-related risks.

Response:

a) Please refer to the response to NEB IR No. 1.08a.

b) Please refer to the responses to NEB IR No. 1.08b to 1.08h.

c) Please refer to the response to NEB IR No. 1.08a.

d) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

e) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

f) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

g) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

h) Westridge Terminal is covered under the same policy and conditions as pipeline Please refer to the responses to NEB IR No. 1.08a to 1.08h.

i) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

j) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

k) Please refer to the responses to NEB IR No. 1.08a to 1.08e.

l) Please seek this information from the Western Canada Marine Response Corporation.

m) Please refer to the response to City of Vancouver IR No. 1.07.01l.

n) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

o) Sub-parts 1-5): Please refer to the response to City of Port Moody IR No. 1.3.28c.

Depending on the specifics of the spill, either the Canadian Coast Guard (originating on water) or the National Energy Board (originating from the pipeline on land) would be the lead federal agency. The response would be managed under an Incident Command System (ICS) structure with both the vessel owner, Trans Mountain and the appropriate authorities participating in a Unified Command. Decisions as to the appropriate level of response would be determined by Unified Command.

p) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

q) Each third party claim is evaluated based on the specific facts and circumstances surrounding the claim to determine whether the claim is legitimate. The evaluation process would typically be carried out by a combination of Kinder Morgan insurance personnel, Kinder Morgan legal personnel, external legal counsel and to the extent required a third party insurance claims professional. The number of steps and the length of time required to carry out the claims process varies depending on the complexity of the claim as well as the complexity of the incident giving rise to the claim.

r) Please refer to the response to City of Vancouver IR No. 1.07.01q.

s) Please refer to the response to City of Vancouver IR No. 1.07.01q.

t) Please refer to the response to City of Vancouver IR No. 1.07.01q.

u) Please refer to the responses to NEB IR No. 1.08a to 1.08h.

v) Please refer to the response to NEB IR No. 1.08e.

w) Please refer to the response to NEB IR No. 1.08e.

x) Trans Mountain does not currently use or propose the use of insurance-linked securities in connection with the Trans Mountain Expansion Project.

y) Please refer to the response to NEB IR No. 1.08e.

z) Trans Mountain has estimated a credible worst case pipeline spill of $300 million, irrespective of cause, and Trans Mountain has indicated large financial capacity relative to this risk in the response to NEB IR No. 1.08e. Trans Mountain does not expect that climate related risk would affect this conclusion.

Changes to climate during operations of the pipeline may manifest in several ways (*e.g.*, in a long-term increase of annual average temperatures or in the increased occurrence of extreme events). Trans Mountain has been operating for 60 years, over which they have encountered a variety of environmental conditions. It is understood that past environmental conditions may not be representative of conditions under future climate change. For example, extreme events that have occurred only every few decades over the last 60 years might occur more frequently or with greater magnitude during future Project operation. Therefore, Trans Mountain will adaptively manage potential residual effects associated with changing climate through the Natural Hazards Management Program. During operations of the Project, it is expected that Trans Mountain will be adaptive in their management of the pipeline. Climate change would therefore be accommodated by increased monitoring intensity as effects are observed. Through this form of ongoing monitoring and mitigation, Trans Mountain has upgraded stream crossings for the existing pipeline at numerous locations. The geotechnical and hydrological hazards are included in the Semi Quantitative Risk Assessment (SQRA) and include inputs for stream crossing based on known meteorological data with basis for engineering and detailed design based on 200 year flood events for stream crossings.

aa) 1) Please refer to the response to City of Vancouver IR No. 1.07.01z.

2) Please refer to the response to NEB IR No. 1.08e.

1.07.02 Marine Liability Act

Reference:

i. Volume 8a, Section 1.4.1.6 *Marine Liability Act* (A56025, A3S4X3, p.43)
ii. Volume 8a, Section 5.2.2 *Probability of a Spill in the Marine Environment Related to the Project*
iii. Volume 8C, Tempol Reports, *Trans Mountain Expansion Project Oil Spill Response Simulation Study, Arachne Reef and Westridge Marine Terminal*, 4.3.2

Preamble:

This section discusses the framework for handling marine liability and compensation in Canada. The section does not include any reference to marine emergencies or incidents involving fires, explosions, or multiple types of chemicals. In reference 'ii' fires and explosions are listed as one potential cause of oil spills. As per reference 'iii', "as in all cases associated with a release of hydrocarbons, the risk of fire increases ... " It is unclear how damage or impacts from marine oil spills or incidents caused by or associated with fires or explosions will be compensated.

Request:

a) Please describe the compensation regime for damage and impacts of marine incidents involving fires, explosions, burning spills of oil or diluted bitumen.

b) Please describe the compensation regime for damage and impacts of marine incidents involving both oil and other hazardous material

Response:

a) All claims relating to the consequence of an oil spill may be filed as per information available on the website of Canada's SOPF (Ship-source Oil Pollution Fund). http://ssopfund.gc.ca/en/how-to-file-a-claim/claims-eligibility.

Reference:

Government of Canada. 2013. Ship-source Oil Pollution Fund—Claim Eligibility. Website: http://ssopfund.gc.ca/en/how-to-file-a-claim/claims-eligibility. Accessed: June 2014.

b) For information on the financial liability and compensation regime in the event of an oil spill stemming from crude oil exported by tanker from Westridge, please reference Volume 8A (Marine Transportation), Section 5.5.3.

Please also refer to the response to Allan R IR No. 1.21j.

1.07.03 Marine Liability and Compensation Regime

Reference:

i. Volume 8A, Section 1.4.1.6 *Marine Liability Act (*A56025, A3S4X3, p.43)
ii. Volume 8A, Section 1.4.1.7 *Marine Transportation Security Act* (A56025, A3S4X3 p.43)

Preamble:

Reference 'i' states: "both Canada's and the international frameworks are based on the principle of "polluter pays", which makes the polluter liable for all response costs and damages associated with an oil spill (Transport Canada 2013c). In the event of an oil spill from a tanker in Canadian waters, the owner of a tanker (i.e., the Responsible Party) would be liable for the cost of clean-up and compensation to affected parties subject to the limits of their liability".

Reference 'ii' states: "in total, there is approximately $1.3 billion in funding available to address the costs of emergency response, clean-up and compensation in the event of an oil spill from a tanker".

Request:

a) Please provide a list of claims arising from a marine spill that would fall under the definition of compensable claims or legitimate claims as those terms are used in the Marine Liability and Compensation regime referred to 'i' and 'ii', above.

b) Please advise whether the polluter is responsible for all the quantifiable and legitimate costs related to an oil spill, such as (a) claims arising from third-party property damage and commercial loss and (b) claims arising from indirect third-party property and commercial loss.

c) Please identify any exclusions under the international ship-source oil pollution regime which could expose the City of Vancouver to uncompensated losses.

d) Please explain how and to what extent the marine liability and compensation regime referred to in 'i' and 'ii', above would reimburse the City of Vancouver for the costs of emergency response, clean-up, property damage and other potential losses once the $1.3 billion in funding is exhausted.

e) Based on a hypothetical oil spill from a tanker in Canadian waters where evacuation of an urban area is deemed necessary to protect the health and safety of the public, please advise who would cover the costs of such evacuation.

Response:

a) This information is available on the website of Canada’s SOPF (Ship-source Oil Pollution Fund). http://ssopfund.gc.ca/en/how-to-file-a-claim/claims-eligibility

Reference:

Government of Canada. 2013. Ship-source Oil Pollution Fund — Claim Eligibility. Website: http://ssopfund.gc.ca/en/how-to-file-a-claim/claims-eligibility. Accessed: June 2014.

b) Please refer to the response to City of Vancouver IR No. 1.07.03a. Please also refer to the response to Allan R IR No. 1.21j.

c) Please refer to the response to City of Vancouver IR No. 1.07.03b.

d) Please refer to the response to City of Vancouver IR No. 1.07.03b.

e) Please refer to the response to City of Vancouver IR No. 1.07.03b.

1.08 Risk Assessment and Management of Pipeline and Facility Spills

1.08.01 Infrastructure and Services - Emergency Management

Reference:

i. Volume 58, Section 7.2.5.3 Context (A56004, A3S1S7, p.119)
ii. Volume 58, Section 7.2.5.4 *Potential Effects and Mitigation* (A56004, A3S1S7, p.120)
iii. Volume 8A, Section 1.4.2.4 *Port Metro Vancouver* (A56025, A3S4X3, p.50)

Preamble:

As per reference 'i', the application refers to established emergency response protocols, programs, and protocols at the community and regional level. The application states that "the objectives of the program are to familiarize first responders with the pipeline location, explain the properties of the pipeline's contents, and promote information exchange and coordination of response efforts in the event of an incident... Trans Mountain has adopted the ICS as the basic response structure for its emergency response teams".

As per reference 'ii', the application states that "effects of the Project on emergency, protective and social services during the operations phase were considered for inclusion but were scoped out due to the understanding that Trans Mountain's current emergency response regime will not change or need to change to accommodate the expanded operating system." The potential effects considered do not include the impact on emergency response services due to the heightened risks to public and environmental safety caused by the increased transportation by pipeline of diluted bitumen over conventional crude, or any other potential product that may be shipped through the pipeline in the future.

Reference 'iii' states that Port Metro Vancouver works in partnership with a broad range of stakeholders including local municipalities, police forces and federal agencies.

Request:

a) Please elaborate on the "coordination of response efforts" with local first responders and clarify the anticipated role of first responders in the event of an incident.

b) Please explain what contingency plans Trans Mountain has developed for responding to an incident in the event that local municipalities are unable to assist Trans Mountain with its response efforts.

c) Please provide detailed information on first response protocols for responding to all types of products that will be shipped through the pipeline, including first response protocols for diluted bitumen spilled into the freshwater environment.

d) Please describe the specific protocols in place to exchange information with the City of Vancouver in the event of a pipeline spill impacting the Fraser River watershed.

e) Please explain the expected role of municipalities and first responders in the ICS structure.

f) Please describe the resource commitment required by local authorities to participate in the Trans Mountain Community Awareness and Emergency Response program.

g) Will Trans Mountain cover the costs of municipal first responders to participate in training or exercise programs? What does Trans Mountain estimate these costs to be?

h) Will Trans Mountain cover the costs for personal protection equipment for municipal first responders? What does Trans Mountain estimate these costs to be?

i) Will Trans Mountain provide funding for specialist equipment as part of Trans Mountain Community Awareness and Emergency Response program and, if so, how much funding will be provided?

j) Please provide after action reports from all pipeline and terminal exercises in the past 10 years including the role of local authorities in those exercises.

k) Has Trans Mountain considered the emergency planning requirements imposed on local communities by the Project due to the increased transportation of diluted bitumen and the potential for pipeline ruptures to impact local waterways, including:
1) Contingency planning for spills and burning spills of diluted bitumen;
2) Long term recovery planning;
3) First responder health and safety;
4) Monitoring of first responder health impacts;
5) Monitoring of public health impacts
6) Evacuation zone identification
7) Evacuation zone and shelter-in-place orders;
8) Issuance of public notification.

l) If so, what specific recommendations does Trans Mountain have for how local communities should plan and prepare for pipeline ruptures that result in the release of diluted bitumen into local waterways in urban environments?

m) If not, please explain how the current emergency response regime adequately addresses the impacts of a spill of diluted bitumen on public health and safety, the environment, and local first responders, and how information related to the risks posed by diluted bitumen are communicated to local authorities.

n) Please describe how mitigation measures and residual effects will be systematically monitored, evaluated, and publically reported.

Response:

a) In the unlikely event of a pipeline release, Kinder Morgan Canada Inc. (KMC) immediately shuts down the pipeline and allows the pressure to dissipate, thus stopping further release of petroleum. When this shut down occurs there are a number of things happening at the same time by different individuals to ensure a timely response to the incident. These simultaneous actions include:

- Local emergency services are contacted immediately and trained KMC technicians would be dispatched to the location to help secure the area and commence air monitoring to ensure air quality for those in the immediate vicinity.
- KMC consults with the local authority to determine the best course of action to protect the public.

Affected municipalities will be invited to join Unified Command and in the process participate in the Incident Command System (ICS), to assist with the decision making process for the response to the incident.

Additionally, if the affected municipality opens an Emergency Operations Centre (EOC) KMC will provide a liaison officer to work in the municipal EOC to ensure coordinated response and timely access to information from the Incident Command Post.

KMC expects to work co-operatively with the municipal emergency responders in the unlikely event of an emergency occurring. The needs for fire, police and health services greatly depend on the type of emergency. KMC does not have the authority to order evacuation, and/or conduct the evacuation of public/private places, nor does it have the authority to close roads, redirect traffic, public transit and other transportation related infrastructure. KMC anticipates working collaboratively with the local first responders through an ICS structure to coordinate these and other activities in the unlikely event the need arises.

b) Please refer to the response to City Burnaby IR No. 1.03.08c.

c) The Application, Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

Please also refer to the responses to Province BC IR No. 1.1.09a and Katzie FN IR No. 1.11b.

d) In the unlikely event of a pipeline release, Kinder Morgan Canada Inc. (KMC) immediately shuts down the pipeline and allows the pressure to dissipate, thus stopping further release of petroleum. When this shut down occurs there are a number of things happening at the same time by different individuals to ensure a timely response to the incident. These simultaneous actions are:

- Local emergency services are contacted immediately and trained KMC technicians would be dispatched to the location to help secure the area and commence air monitoring to ensure air quality for those in the immediate vicinity.
- KMC consults with the local authority to determine the best course of action to protect the public.

- Control Centre issues an Emergency Response Line (ERL) notification to the Incident Management Team (IMT). Upon notification the IMT calls the conferencing line to get information about the incident and begin pre-assigned response duties.

- Immediately following the ERL conference call KMC notifies the Transportation Safety Board of Canada (TSB) and the National Energy Board (NEB) though the single TSB emergency telephone number when required. Depending on severity and incident location, various other regulatory agencies (BC Provincial Emergency Program, Federal and Provincial Fisheries agencies, etc.) will also be contacted.

- Information Officer – begins preparing an initial media statement and communication plan

- Liaison Officer – begins notifications to other groups not included in the above notifications. Notifications may include, but are not limited to:

    - Additional Liaison Team Members
    - Local Emergency Services/Program (if not already notified)
    - Affected First Nations communities
    - Elected Officials
    - Provincial or National Parks (if impacted)
    - Health Authorities (if not already notified)
    - Provincial Environment Ministry (if not notified by Provincial Emergency Program)

- Logistics Section Chief – begins identification of resources required for the response and ordering supplies and equipment

- Operations Section Chief – begins field operations, containment and clean-up

- Planning Section Chief – begins planning recovery operations and contacting team members required including the Environmental Unit Leader.

The Application, Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

e) Kinder Morgan Canada Inc. (KMC) uses the Incident Command System (ICS) for incident planning which is adaptable to different emergency scenarios and allows for quick identification of resources, and a method of procurement. The affected municipality will be given the opportunity to join Unified Command, or participate within the Planning Section in order to assist with the decision making process for the response to the incident. It is KMC's preference to enter into a Unified Command with the municipal, provincial and federal agencies to ensure a safe, coordinated, and thorough response to any emergency.

f) Kinder Morgan Canada's (KMC) goal is to protect people and the environment. Safety is KMC's priority. KMC has always been committed to working collaboratively with organizations, both public and private, to ensure there is a mutual understanding how the pipeline and/or operations at facilities could impact those organizations.

The resource commitment of local authorities needed to participate in the Trans Mountain/KMC Community Awareness and Emergency Response (CAER) program is solely the time commitment of its attendees. Each CAER presentation delivered to personnel from local authorities is typically 1 to 3 hours in duration depending on the needs and schedule requirements of the attendee group. KMC covers the costs associated with instruction of the program, but does not currently cover the costs, such as responder wages, benefits and employment costs, associated with attendance.

g) Trans Mountain pays taxes to municipal/regional, provincial and federal governments. Despite not being along the pipeline corridor or near the marine terminal, the City of Vancouver would benefit from government tax revenue from the Project. Additional pipeline capacity will result in more tax revenue to governments which could be used to fund additional community capacity in areas such as emergency response training and resources.

Trans Mountain has not estimated the costs of coordination effort with first responders for the Application. Trans Mountain considers that coordination and training of first responders related to emergencies is a normal activity of the local municipalities, police forces and federal agencies.

Trans Mountain has indicated through emergency management consultation activities in 2013 (see Consultation Update No. 1 & Errata, March 2014), that emergency managers and first responders in BC's lower mainland will be invited to participate in more multi-agency exercises and table top scenarios. For example, KMC hosted a large river training exercise on Cheam First Nation land near Harrison, BC in April 2014. Emergency managers and first responders from Metro Vancouver and the Fraser Valley were invited to attend.

Trans Mountain will pay for the cost of hosting the training exercises but not the staff costs of those that participate. It is likely the costs to stage training events far out-weigh staff costs of municipalities to attend; however, the benefits and coordination learned by all participating agencies will contribute to local overall community emergency planning and response capacity.

h) Trans Mountain has not calculated these costs. Please refer to the response to City of Vancouver IR No. 1.08.01.g.

i) Trans Mountain has not calculated such costs. Please refer to the response to City of Vancouver IR No. 1.08.01g.

j) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

k) The types of products to be transported in the expanded Trans Mountain Pipeline system are anticipated to be similar to those transported at present. Kinder Morgan Canada (KMC) is willing to work with local first responders and emergency planners to ensure that they have all necessary information on the pipeline system and products transported. KMC is willing and able to review emergency response plans, share information on our operations, and provide advice on proper response techniques. External agencies are invited to participate in emergency response exercises, continuing education programs, and consultation meetings. KMC covers the costs associated with instruction, but does not currently cover the costs, such as responder wages, benefits and employment costs, associated with attendance.

The Application, Volume 7, Section 4.8 outlines the process to enhance KMC's existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

l) Kinder Morgan Canada's (KMC) goal is to protect people and the environment. Safety is KMC's priority. KMC has always been committed to working collaboratively with organizations, both public and private, to ensure there is a mutual understanding how the pipeline and/or operations at facilities could impact those organizations. KMC is willing and able to review emergency response plans, share information on our operations, and provide advice on proper response techniques. External agencies are invited to participate in emergency response exercises, continuing education programs, and consultation meetings. KMC covers the costs associated with instruction, but does not currently cover costs associated with attendance, such as responder wages, benefits and employment costs.

KMC's Emergency Management Program (ERP) is under review. The Application, Volume 7, Section 4.8 outlines the process to enhance KMC's existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the National Energy Board draft conditions related to emergency response.

m) Please refer to the response to City of Vancouver IR No. 1.10.08a.

n) Trans Mountain has reviewed the references cited by the City of Vancouver and cannot understand the precise context of the question. As such, Trans Mountain does not understand the information request and cannot provide a response.

1.08.02 Emergency Response Plans

Reference:

i. Volume 6B, section 1.2.3 *Emergency Response Plans* (A56013, A3S2S3, p.24)
ii. Volume 6C, section 1.2.3 *Emergency Response Plans* (A56013, A3S2S6, p.23)
iii. Volume 6D, section 1.2.3 *Emergency Response Plans* (A56013, A3S2S9, p.19)

Preamble:

Volumes 68, 6C, and 60 state emergency response plans will be developed and implemented for TMEP construction.

The application references but does not include emergency response plans for operations of the pipeline, facilities, and Westridge Terminal.

Request:

a) Please explain why emergency response plans for construction of the pipeline, facilities, and Westridge Terminal were not developed and included in the application.

b) Please explain why emergency response plans for operation of the pipeline, facilities, and Westridge Terminal were not included in the application.

c) Please provide emergency response plans for construction and operation of the pipeline, facilities, and Westridge Marine Terminal.

Response:

a) Trans Mountain will develop Emergency Response Plans (ERPs) for construction as indicated in Volume 4B, 5.4 of the Application. Aspects of construction-related Emergency Response Plans to be developed can be found in the Environmental Protection Plan (EPP) Volume 6B, Appendix B, and include the Fire Contingency Plan and the Spill Response Plan. In addition, the EPP in Volume 6B, Appendix C references the Wildlife Conflict Management Plan, aspects of which will also be integrated into the Emergency Response Plan. Components of the Security Management Plan, referenced in Section 5.3.1 of Volume 4B, will also be integrated into the ERP. As noted in Section 5.4.2 of Volume 4B, site-specific ERPs will be developed by contractors, not yet selected, and will take into account contractor equipment once detailed engineering and construction planning have been developed.

An Emergency Response Plan for Construction will be filed with the National Energy Board (NEB) as per NEB Draft Condition No. 41 of the NEB's *Letter—Draft Conditions and Regulatory Oversight* (NEB 2014).

Please refer to Volume 4B — Project Design and Execution — Construction and Volume 6B — Pipeline Environmental Protection Plan.

Reference:

National Energy Board. 2014. Draft Conditions and Regulatory Oversight. Hearing Order OH-001-2014. Trans Mountain Pipeline ULC (Trans Mountain) Application for the Trans Mountain Expansion Project (Project). April 16, 2014.

b) The Application, Volume 7, Section 4.8.2 outlines the process and consultation for updating the Emergency Response Plans (ERP), which is consistent with National Energy Board draft conditions 42, 52 and 53. The Emergency Management Program (EMP) documents contain information which is proprietary and of a sensitive nature. Due to security concerns the EMP documents are not publically available. The Application is a public document and for this reason the Emergency Management Program documents referred to in the Request for the pipeline, facilities, and Westridge Terminal are not included.

The response to Province BC IR No. 1.1.09a describes how local, provincial and federal authorities may obtain Emergency Management Program documents.

c) Please refer to the response to Province BC IR No. 1.1.09a, which includes information on how local, provincial and federal authorities may obtain Emergency Management Program documents.

1.08.03 Measures to Prevent and Mitigate Oil Spills

Reference:

i. Volume 7, Section 2.2.1 *Westridge Marine Terminal* (A56025, A3S4V5, p.33)

Preamble:

Reference 'i' describes design and operational controls that will be used to "minimize environmental impacts" during construction and operations at the Westridge Marine Terminal (Page 7-6; pdf page 33). Of the items listed in the bulleted list (pages 7-6;pdf page 33 and 7-7; pdf page 34), it is unclear whether these measures are current practices or are proposed enhancements that would be implemented if the TMX application is approved.

It is also unclear whether these measures would be implemented through TMX policies or whether some or all are also requirements under Federal, Provincial, City, or Port regulations or guidelines. For example, the 4th bullet on page 7-7 (pdf page 34) states that loading arms will be disconnected if wind speeds exceed "acceptable limits".

Request:

a) Clarify for each item listed on page 7-6 and 7-7 whether the practice described is already in place at the Westridge Marine Terminal, or whether it would be implemented as an additional mitigation measure to address the increased oil spill risk from the TMX.

b) Clarify whether the controls listed would be implemented during construction, operations, or both.

c) Provide specific parameters and supporting analysis for wind speed limits during loading.

d) Please provide details of the monitoring and enforcement of the wind speed limits.

e) Specify the number of fire and foam monitors required to achieve "adequate" fire suppression.

f) Please provide details of how "adequate" fire suppression is to be determined.

Response:

a) The practices associated with each item listed on Volume 7, Section 2.2.1 are already in place at the Westridge Marine Terminal with one exception, which is noted below. Subject to the requirements of the final design, all the practices mentioned in Volume 7, Section 2.2.1 will be in place for the expanded terminal facilities associated with the Project.

The single exception to practices cited in Volume 7, Section 2.2.1: for the present single dock operation, only one full containment boom is stored at Westridge Marine Terminal. A second ship containment boom is not kept there. Additional general purpose containment boom can readily be obtained, if needed, at any time from Western Canada

Marine Response Corporation (WCMRC), approximately 2 kilometers to the west of the Terminal.

b) The controls listed in Volume 7, Section 2.2.1 are intended to be applied to active berths during vessel loading or unloading operations. Separate, specific and comprehensive controls and safeguards will be in place to address the hazards and potential environmental impacts related to marine terminal construction activities.

c) Information on specific parameters and supporting analysis for wind speed limits can be found in Volume 8C, TR 8C-11, Section 3.1. Further work and analysis will be completed as part of the detailed engineering and design to be completed between Q3 2014 and Q4 2015.

d) The wind speed limits for the expanded marine terminal operation are discussed in Application Volume 8C, please see TR 8C-11, Section 3.1, Westridge Marine Terminal Risk Controls, and details are listed in TR 8C-12, Section 13.2. The current limitations are to shut down loading operations if 30 second wind gusts exceed 30 knots; if 30 second wind gusts exceed 35 knots then loading arms are to be drained and disconnected. These parameters are within the limits set for other marine oil handling terminals internationally. The wind speed limits for use in future will be determined as part of the engineering design work for the terminal expansion.

The monitoring of wind speeds during vessel cargo loading at Westridge Marine Terminal is the joint responsibility of the Kinder Morgan Canada Inc. (KMC) loading master, and the vessel's master or chief officer. The vessel's anemometer readout in the cargo control room is monitored and the KMC loading master is informed if wind speed approaches limits that have previously been communicated to the vessel's master or chief officer as part of mandatory completion of the ship/shore safety checklist in a meeting prior to commencing loading operations.

The KMC loading master works with the vessel master to ensure ongoing safety of loading operations and readiness to take action should it be required in the event of changing environmental operating conditions.

e) The number of fire monitors required to achieve adequate fire suppression at the expanded Westridge Marine Terminal will be determined during detailed engineering and design of the facility which is estimated to occur between Q3 2014 and Q4 2015.

f) Adequate fire suppression coverage will be determined as guided by final terminal layout and the application of relevant regulations, codes and standards to be used during detailed engineering and design. Please also refer to the response to City of Vancouver IR No. 1.08.03e.

1.08.04 Oil Spill Risk Assessments

Reference:

i. Volume 7, Section 3.1.6 *Spill Outflow Modelling* (A56025, A3S4V5, p.43)
ii. Transportation Safety Board Pipeline Investigation Report (P07H0040) Crude Oil Pipeline -Third Party Damage, Trans Mountain Pipeline LP 61 0-Millimetre Diameter Crude Oil Pipeline Kilometre Post 3.1 0, Westridge Dock Transfer Line Burnaby, BC 24 July 2007
iii. National Transportation Safety Board (NTSB) Accident Report on Enbridge Incorporated Hazardous Liquid Pipeline Rupture and Release (NTSB/PAR-12/01 PB 2012-916501)

Preamble:

Reference 'i' discusses spill outflow modeling to assess the risk from a full-bore pipeline rupture. The volume outflow calculation is based on the assumption that pump shutdown would be achieved within ten minutes of the release, based on the SCADA alarm system and the "trained Control Center Operator (CCO) [who] will recognize the event immediately." Reference 'ii' on the Trans Mountain Westridge Dock Transfer Line spill that occurred in July 2007 notes that the initial SCADA report "was not recognized as the start of a crude oil release" by the CCO in Edmonton, Alberta. In fact, initial shut down targeted the delivery valve at the terminal, because the operator assumed "that the emergency was related to the tanker loading that was underway." Fifteen minutes elapsed between the initial rupture and the observation by the CCO that the release may be ongoing, and it was at this point that the valves were closed and the spill isolated. The oil spill contingency plan for Enbridge's Line 6B, which ruptured and spilled into the Kalamazoo River in 2010, assumed that a pipeline release would be detected and the pipeline shut in within 8 hours. In fact, 12 hours elapsed before the spill was confirmed and the pipeline shut in because of human error on the part of the control center operators (Reference 'iii'). Both of these examples illustrate that real-world factors and human error can contribute to delays in leak detection and corresponding delays in pipeline shut-in.

The assumption that a full-bore rupture from the TMX would be controlled within 10 minutes, based on CCO expertise, is not consistent with the practical experience during the 2007 transfer line spill or the Enbridge Kalamazoo River spill. Because of the uncertainties involved in leak detection, pipeline rupture scenarios should contemplate a range of potential detection times.

It is unclear whether Trans Mountain has taken corrective actions to improve CCO competency to ensure a 10-minute isolation. The basis for the 10-minute assumption, which drives the outcome of pipeline spill outflow modeling and risk assessment, should be justified.

Request:

a) Describe changes to CCO training and operational guidance that have been implemented since the 2007 transfer line spill to ensure that pipeline ruptures can be isolated within 10 minutes.

b) Provide documentation of actual incidents or near misses where CCOs have demonstrated the capability to achieve isolation of the appropriate valve(s) within ten minutes of a SCADA alarm.

c) Develop additional pipeline rupture scenarios to demonstrate the potential impact of extended time-to-detection.

Response:

a) Please refer to the response to Tsleil-Waututh Nation IR No. 1.2.1.5.06a.

b) The information request is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

c) A full-bore pipeline rupture is a low likelihood, worst-case event used in the modelling scenario discussed in Volume 7, Section 3.1.6. Kinder Morgan Canada has conducted detailed technical reviews of the July 2007 incident, it has also reviewed the findings and recommendations of the Transportation Safety Board of Canada concerning the incident. Kinder Morgan Canada has implemented improvements on the Trans Mountain Westridge Dock Transfer Line and elsewhere on its pipeline system which in aggregate provide assurance that the 10 minute response time by Control Centre Operators used for modelling this spill scenario in the Application is conservative, and will be consistently achieved. Additional pipeline rupture scenario development suggested in the request would not provide additional clarity or realism to the evaluation of spill scenarios.

1.08.05 Fate and Behaviour of a Hydrocarbon Release

Reference:

i. Volume 7, Section 5.0 *Fate and Behaviour of a Hydrocarbon Release* (A56025, A3S4V5, p. 75)
ii. Volume 8C, TERM POL TR 8C-12 S7-A Study of Fate and Behaviour of Diluted Bitumen Oils on Marine Waters, Dilbit Experiments- Gainford, Alberta (A56029, A3S5G2 & A3S5G4 & A3S5G5)

Preamble:

The discussion on diluted bitumen releases to water in Reference 'i' contains a number of speculative statements that are not supported by reference or fact. For example, Section 5.3.2 states that, during the Kalamazoo River diluted bitumen spill, most of the oil transported downriver remained "on the water surface." This statement is not referenced to any quantifiable measurement, and contradicts most incident reports (EPA, 2013).

Reference 'i' relies heavily on data from a single weathering experiment conducted by Trans Mountain (Reference 'ii'). Information request '2' specifically addresses the Gainford Study and points out some significant flaws to the methodology and assumptions. Because of these flaws, the study and its conclusions do not provide a valid foundation for oil spill risk assessment and spill response planning. Specific examples of these flaws include:

- The questions used to frame the study were presumptive and leading, and none were answered in full. For example:
    - "Will diluted bitumens sink or float in marine waters?" presumes that there is a single, exclusive answer to this question. Published literature and past experience suggests that the answer to this question is nuanced and dependent upon a number of inter-related factors. This oversimplification adds little to the scientific basis for understanding and evaluating diluted bitumen fate and behavior and related oil spill risks.
    - "Will diluted bitumens behave any differently than other heavy crude oils as they weather" suggests that some comparative analysis will be performed to measure diluted bitumen fate and behavior against a reference heavy crude oil, but the experiments did not include a reference to oil. Therefore, comparisons that are made between the observed results of the diluted bitumen studies and "conventional heavy crude oil" are qualitative assumptions on the part of the study authors.
    - "Is the performance of the equipment currently stockpiled by North American oil spill recovery organizations adequate to mechanically remove diluted bitumens off the surface of the water?" suggests that extensive equipment trials were conducted. The Gainford Study involves small-scale skimmer tests in a controlled environment. Factors such as encounter rate and variations in slick thickness were not incorporated into the tests. Skimmer recovery rates for diluted bitumen were not directly compared to manufacturer specifications for "conventional" oils.

- The literature review was incomplete.
- The studies were conducted at water temperatures much warmer than typical Burrard Inlet surface temperatures for most of the year, using winter blend oils that would not typically be transported under those conditions.
- Weathering parameters were not consistent with field conditions in Burrard Inlet.
- The study conclusions emphasize the fact that diluted bitumen was not observed to sink, without acknowledging potential biases in study design and conduct that would favor floating (oil type, weather, duration of tests, water salinity, absence of sediments).

Request:

a) Provide a reference to support statements about the quantity of oil that remained floating on the water surface during the Kalamazoo River spill.

b) Clarify how the Gainford Study does or does not answer the question "will diluted bitumens sink or float in marine waters"?

c) Clarify which "conventional heavy crude oils" are considered as the basis for comparison statement made in the Gainford Study.

d) Provide information about the comparative recovery rates for the skimmers tested in the Gainford Study for diluted bitumen compared to oils used in manufacturer tests.

e) Review the Gainford Study and provide additional references to and discussion of work done since the fall of 2012.

f) Explain how the use of winter oils under summer conditions impacts the study results.

g) Clarify how the weathering parameters used in the Gainford Study do and do not approximate Burrard Inlet conditions.

h) Clarify the relevance of the observation that "in no instance was any oil observed to have sunk." Is this meant to imply that oil spill response plans and risk assessment for the TMX project should assume that diluted bitumen will not sink if spilled to Burrard Inlet?

Response:

a) Volume 7, Section 5.3.2 noted that for the Marshall spill, “most oil remaining on the water surface. A portion of oil, mixed with river bank and/or suspended sediment, and did submerge and in places sank.” This does not contradict the findings of the EPA. See additional discussion in Section 6.2.2.1 of the Pipeline ERA which is included as part of Volume 7 TR7-1.

b) Studies conducted by the Government of Canada (2013), Gainford Study (2013), and by SLRoss (2010 and 2011) all show that fresh and weathered representative samples of diluted bitumen (CLB and AWB) are expected to float on marine waters.

Please refer to the response to NEB IR No. 1.61b.

References:

Application Volume 8C, TERMPOL Reports, TR 8C-12 S8 – A Comparison of the Properties of Diluted Bitumen Crudes with other Oils

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

SL Ross, 2010. Properties and Fate of Hydrocarbons Associated with Hypothetical Spill at the Marine Terminal and in the Confined Channel Assessment Area. Technical Data Report prepared for Enbridge Northern Gateway.

SL Ross. 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway

c) Please see discussions in Volume 8C (Oil Comparison), Government of Canada Report (2013), and SL Ross (2011). Fresh dilbit oil has density and viscosities comparable to a range of medium crude oils. Shortly after most of the evaporative loss through weathering, the remaining dilbit behaves similarly in many physical respects with other heavy crude oil and common heavy fuel oils, such as Bunker C.

Please refer to the reply to Province BC IR No. 1.1.73d

References:

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

SL Ross. 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway

d) Please refer to the response to City of Vancouver IR No. 1.12.06a.

e) The only references available of work comparable to that conducted at Gainford is the Government of Canada (2013) study. A pre-publication announcement of additional Government of Canada work was issued late May 2014.

For a listing of references consulted for the reports in the application and subsequent relevant studies, please refer to the response to Province BC IR No. 1.1.73c.

For a discussion on comparisons of results between the Government of Canada work and the Gainford report, please refer to the response to NEB IR No. 1.61a.

Reference:

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

f) Winter formulations have a higher fraction of volatiles relative to summer blends; however, the rate of loss of volatiles from summer blend is lower than from winter blend because of the smaller mole fraction. Relative to the ambient conditions that prevailed at Gainford, diluted bitumen crude oil may be expected to have a slightly slower rate of evaporation and slightly greater viscosity once exposed to weathering under colder winter ambient conditions. There is no impact to the study results as it is clearly stated what the conditions were during the tests. The overall study results are corroborated by results from the Government of Canada (2013) study and from SL Ross (2011).

Please also refer to the responses to NEB IR No. 1.60b and 1.61a.

References:

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

SL Ross. 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway

g) The water temperatures in the test tanks at Gainford were subject to local conditions, with average water temperatures between 12° and 16°C. These water temperatures are more characteristic of summer conditions for Burrard Inlet. Winds applied across the tanks represented a range, from no wind to sustained wind of approximately 4.5 m/s, which encompass winter and summer averages for Burrard Inlet.

Also refer to the response to NEB IR No. 1.60a.

h) No oil was observed to sink for the conditions used during the Gainford tests. As pointed out in the same report, and echoed in the Government of Canada (2013) report, factors can contribute to oil submergence and/or sinking, as with other heavy oils. As such, oil spill response plans and Response Organizations include strategies, tactics, and equipment to respond promptly, minimize the potential for oil submergence or sinking and to address submerged or sunken oil.

Please also refer to the response to Katzie FN IR No. 1.11b.

Reference:

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

1.08.06 Potential Effect of Pipeline Releases

Reference:

i. Volume 7, Section 6.2.4 Burrard Inlet (A56025, A3S4V6, p.27)

Preamble:

Reference 'i' discusses potential impacts to Burrard Inlet marine resources from a hydrocarbon spill at the Westridge Marine Terminal and nearby Project facilities that drain into the estuary. This section describes the 2007 third-party spill that resulted in a 100m^3 spill that reached Burrard Inlet. The discussion notes that biophysical assessments to measure the spill impacts were complicated by background levels of PAHs in mussels. The discussion does not indicate whether additional baseline studies will be conducted to inform future assessments for potential spills from the TMX.

Request:

a) Describe the type and extent of baseline analyses that will be performed in conjunction with the TMX project to improve the knowledge base about background contaminants in Burrard Inlet.

b) Identify lessons learned from the 2007 spill that will be incorporated into the TMX project planning and scientific analysis (i.e. identify knowledge or data gaps that were identified during the 2007 spill and describe how project-related scientific studies may be used to fill these gaps).

Response:

a) No further baseline work to characterize background contaminant levels in Burrard Inlet is planned. Baseline information on marine sediment and water quality is provided in Volume 5C, Biophysical Technical Report 5C-12, Marine Sediment and Water Quality – Westridge Marine Terminal Technical Report (Stantec Consulting Ltd. December 2013). As noted in Section 6.2.4 of Volume 7, long-term monitoring conducted after the 2007 accidental hydrocarbon release upland of the Westridge Marine Terminal indicated that all the recovery endpoints had been met by 2012 (the exception was polycyclic aromatic hydrocarbons [PAH] in mussel tissue, which was related to sources other than the released oil).

b) Given that it is not possible to predict the precise location or timing of a spill, the priority focus is on spill prevention planning, as described in Section 2.0 of Volume 7. Below is a summary of the key lessons learned from the 2007 release:

- Identification of resources required to respond to a release was further refined to ensure contractors capacity and capability is appropriate for all locations across the system.

- Active participation of Stakeholders, First Nations and contractors in training and Emergency Response drills is encouraged to allow all parties to contribute their skills and knowledge.
- Enhancements were made to response trailers and their contents.
- Development of an expanded environmental GIS application, with identification of sensitive environmental resources, that is accessible from remote locations.
- Confirmation that rapid response to contain and remove the oil is essential (as occurred following the 2007 accidental release to Burrard Inlet, which recovered all but 5.6 m^3 of the 100 m^3 released to the inlet) to ensure minimum impacts to the marine environment.
- Stakeholder and First Nation engagement is critical for the acceptance and timely application of proposed remediation techniques, which allow for effective clean-up of the release.

The Application provides sufficient baseline and planning information to form the framework of an assessment of effects of a spill to the marine environment, should one occur.

1.08.07 Hypothetical Pipeline Spill Scenarios

Reference:

i. Volume 7, Section 7.1.4 *Scenario 3: Fraser River near Hope, British Columbia RK 1,072.8* (A56025, A2S4V6, p.68)
ii. Technical Report TR 7-1, Qualitative Ecological Risk Assessment of Pipeline Spills (A56025, A3S4WO & A3S4XO)

Preamble:

The Fraser River scenarios presented in the application are scattered across two documents: reference 'i', supported by reference 'ii', present Scenario 3: Fraser River (RK 1072.8).

Three spills are modeled for the Fraser River scenario, using the same spill size and location with different seasons, air temperatures, and river flow conditions. No modeling is presented or discussed in Reference 'i', and although there are model outputs provided as an appendix to Reference 'ii', it appears that the fate and effects descriptions in Reference 'i' were developed based on a qualitative review of other spill cases. The connection between References 'i' and 'ii' is not well explained, and the methodology used to estimate fate and effect and trajectory for Fraser River spill scenarios is not adequately described.

Quantitative estimates are provided in some places in Reference 'i'- e.g. the statement that for a winter scenario "Recovery of the terrestrial environment would take approximately 18 months to 5 years ... "-yet, no calculations or justification are provided to explain how these numbers were derived. Similarly, numeric estimates are provided for how far the oil may travel downriver (6.1 km for winter, 100km for summer, 60km for spring/fall) but it is not clear whether these estimates were derived from the stochastic simulations that append Reference 'ii', or were calculated using another method.

Reference 'ii' provides some modeling outputs as appendices to the report, but these are not well explained or referenced in the body of that report, and are not tied into the discussion in the submission. Stochastic modeling outputs show the aggregated results of 368 independent spills, but the modeling technique is not described. The simulations are all cut off at 3 days, which may underestimate the long-term impacts and miss the potential for unrecovered oil to submerge or sink. By comparison, the modeling performed in reference 'ii' for a Westridge Terminal Facility spill extends to 15 days.

Request:

a) Provide scenario maps showing the spill location and area of impact for each of the three scenarios (these are presented as appendices to reference 'ii' but not integrated into the application contents).

b) Describe the methodology used to determine fate and effect for the three Fraser River hypothetical spill scenarios presented.

c) Extend the pipeline modeling simulations beyond 3 days, to a minimum of 15 days.

d) Provide calculations to justify the quantitative estimates for recovery times for all scenarios and receptors.

e) Provide calculations to justify the downriver transport distance estimates under the range of flow conditions present.

Response:

a) Seasonal stochastic oil spill modelling for pipeline spills was completed for the spill scenario originating at the Lower Fraser River (Port Mann Bridge location) only. Oil spill mapping is provided in the Technical Report 7-1, Volume 7, Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report (Stantec Consulting Ltd. December 2013). Additional details of the spill modelling at this location are provided in Section 8.6 of Technical Report 8C-12, Volume 8C, Modelling the Fate and Behaviour of Marine Oil Spills for the Trans Mountain Expansion Plan Technical Report (EBA, A Tetra Tech Company December 2013).

b) Seasonal stochastic oil spill modelling (Winter, Spring/Fall and Summer), was completed by EBA Engineering Consultants Limited for the spill scenario originating at the Lower Fraser River, Port Mann Bridge location (RK 1167.5) only. Details of the spill modelling methods are described in Technical Report 8C-12, Volume 8C, Modelling the Fate and Behaviour of Marine Oil Spills for the Trans Mountain Expansion Plan Technical Report (EBA, A Tetra Tech Company December 2013).

Seasonal fate assessments for other spill locations (RK 309, RK 766 and RK 1072.8) were evaluated qualitatively through consideration of the physical and chemical properties of a representative diluted bitumen product (Cold Lake Winter Blend), and the environmental conditions expected at each hypothetical spill location. The assessment of effects considers the receptors which could potentially be exposed, operable exposure pathways, and the documented effects from previous oil spills into similar environments. Each of these factors are discussed for each spill location in Section 6 of Technical Report 7-1, Volume 7, Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report (Stantec Consulting Ltd. 2013).

Statements related to recovery are based on the Recovery Assessment provided in Appendix C of Technical Report 7-1. The estimates for recovery times for each receptor group and release scenario were based on the results of previous studies on recovery of the freshwater environment after an oil spill. A literature review was conducted to identify and acquire information on the recovery for simulated and actual oil spills and the scientific literature in peer reviewed journals, government reports and technical documents, provided several case studies of oil releases which met the following criteria:

- occurred in a freshwater environment;
- were located in a cold temperate zone or subarctic location; and
- where the spilled oil had similar physical and chemical properties as the product assessed in the ERA.

The following information from each case study was considered in the assessment:

- Which ecological receptors were affected?
- What was the reported effect?
- Was recovery reported?
- If the ecological receptor recovered, what processes were involved?
- Were there obstacles or complicating factors that impeded recovery?
- Were there attempts to intervene to accelerate recovery?
- How long did the recovery take?

While it was not possible to match all three of the desired criteria for each case study, each case study was considered to have relevance to the Project (Table C.1, Appendix C in Technical Report 7-1, Volume 7).

c) The simulation shows that most of the oil has been removed from the water after three days, either through shore retention (73.8% yearly average) or evaporation (10%). The yearly average shows that about 14% of the oil is left on water after three days. In addition, the mitigation will occur within hours when the oil is still confined in the river. For these two reasons, a simulation time of three days is credible and representative of the fate and behaviour of the oil for a release in the Fraser River. A simulation duration of 15 days is not required in order to understand the overall fate and behaviour of a spill in the river.

d) Please refer to the response to City of Vancouver IR No. 1.08.07b.

e) Please refer to the responses to City of Vancouver IR No. 1.08.07b and ALIB IR No. 1.2.5a.

1.08.08 Hypothetical Scenario: Westridge Marine Terminal Release Reaching Inlet

Reference:

i. Volume 7, Section 8.0 *Hypothetical Scenario: Westridge Marine Terminal Release Reaching Burrard Inlet* (A56025, A3S4V6, p.1 00)
ii. Volume 7, Technical Report TR 7-2, Ecological Risk Assessment of Westridge Marine Terminal Spills (A56025, A3S4X1)

Preamble:

References 'i' and 'ii' describe hypothetical"credible worst case" scenario spills at the terminal. The spill that was selected is a small release from the tanker loading arm into a pre-boomed area (160m^3 total release, 32m^3 escapes containment boom). While this is a credible scenario, it is difficult to understand how it represents a "worst case" discharge given the total storage volume at the facility and onboard the Aframax tankers. The selection of a loading arm spill significantly limits the spill volume, and limits the planning and preparedness value. The purpose of worst case discharge scenarios is to provide a hypothetical example of the most catastrophic release that could occur. The scenario provides an opportunity to test planning assumptions, to anticipate and thus mitigate adverse impacts, and to verify that adequate resources are in place to respond to a worst case release. By selecting such a modest spill size, the application does not demonstrate the potential consequences of a catastrophic release from the terminal, nor does it provide a test case to determine whether adequate spill response resources are in place.

The probability of a catastrophic release at the Westridge Terminal is low, but it is not zero. 160m^3 is less than 0.5% of the capacity of an Aframax tanker, and 160m^3 spilled into containment boom is not the worst possible spill that could occur. Burrard Inlet is a constriction point, and tankers will be undertaking complex maneuvers when calling at Westridge. A credible worst case discharge should involve at least a partial loss of vessel cargo. A true worst case discharge scenario might consider full cargo loss, for the purpose of adequately preparing for and mitigating adverse effects.

The modeling outputs provided in reference 'ii' differ from the pipeline spills. The pipeline spill simulations include more detail about mass balance, including dispersed, biodegraded, OMAs, sunken, and dissolved oil. This level of detail is not provided for the Westridge simulations.

Request:

a) Provide a worst case discharge volume that is reflective of a true worst case spill from the Westridge Marine Terminal - loss of cargo from a laden tanker operating at the terminal. Use this scenario as the basis for oil spill response capacity development and analysis at Westridge.

Response:

a) Trans Mountain believes appropriate and credible information on credible worst-case spill from a tanker operating at Westridge terminal has been included with the

Application to enable the appropriate level of risk assessment and risk-informed decision-making to have been conducted in accordance with the National Energy Board's Letter, "Filing Requirements Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities, Trans Mountain Expansion Project" dated September 10, 2013. Please see Section 9.2 in Technical Report 8C-12 in Volume 8C, TERMPOL 3.15, "General Risk Analysis and Intended Methods of Reducing Risks—Trans Mountain Expansion Project" (Det Norske Veritas, November 2013).

1.09 Marine Transportation and Risk Assessments

1.09.01 Spill Scenarios and Risk Assessment

Reference:

i. Volume 8C, Technical Report TR 8C-12 S9, section 2.0 *Spill Scenarios* (A56029, A3S5G9, p.16)
ii. Volume 8A, Table 5.2.2 *Possible Locations for an Accident Involving a Project Related Tanker* (A56025, A3S4Y3, p.294)

Preamble:

The application states that eight locations along the tanker transit route were selected as possible locations for spills. Of the eight, four were selected for modelling spill behaviour.

The table in reference 'ii' states that the hypothetical incident considered for English Bay was a "possible collision with ships at anchor in English Bay and traffic from Fraser River is considered low probability." Given that the Fraser River is not located near English Bay, it makes sense that there would not be a collision in English Bay due to traffic from the Fraser River. However, traffic from other locations that are likely to interact with ships at anchor in English Bay has not been considered, including traffic to or from Indian Arm, False Creek, or the Burrard Inlet.

Request:

a) Please advise the basis for selection of the four locations modelled.

b) Please explain why the representative hypothetical scenario for English Bay included traffic from the Fraser River which is not in the vicinity of English Bay.

c) Please explain why Trans Mountain did not include a probability analysis of the possibility of a collision in English Bay with commercial and recreational traffic from:
   1) Howe Sound
   2) Georgia Strait
   3) False Creek
   4) Indian Arm
   5) Burrard Inlet

Response:

a) Please refer to the response to NEB IR No. 1.68.

b) The representative hypothetical scenario for English Bay did primarily include consideration of traffic through English Bay from nearby locations such as Burrard Inlet, False Creek and Indian Arm as mentioned in Volume 8C, Termpol 3.5 & 3.12, Section 6.3. It also considered the possible interaction of traffic entering and exiting English Bay with traffic to and from the North Arm of the Fraser River. That is the reason for mentioning Fraser traffic in Reference (ii). Please refer to Volume 8C Termpol 3.15, Figure 16 for an overview of the marine network that was assessed for this purpose.

c) All traffic in the marine Regional Study Area (RSA) was analyzed for probability of collision with a Project tanker. This includes Howe Sound, Georgia Strait, False Creek, Indian Arm, and Burrard Inlet traffic. Please refer to Figure 16 in Technical Report 8C-12 in Volume 8C, TERMPOL 3.15, "General Risk Analysis and Intended Methods of Reducing Risks—Trans Mountain Expansion Project" (Det Norske Veritas, November 2013) which clearly shows the traffic routes modelled by Det Norske Veritas (DNV) in MARCS for the risk assessment. English Bay is part of Route Segment 3 where DNV determined the risk of collision leading to an oil spill is an event that might occur once in over 86,000 years. Only collisions with large commercial vessels could cause sufficient damage to the tanker that could potentially lead to an oil spill. However, all commercial vessels of such size are under pilotage; further, due to the traffic separation scheme, inbound and outbound vessels are kept separated from one another. These measures mean the potential for any collision with such large commercial vessels is reduced to head-to-head situations where any damage would be limited to glancing impact that would potentially not pose danger to the tanker's double-hull protected cargo tanks.

1.09.02 Federal and Provincial Initiatives

Reference:

i. Volume 8A, Section 1.4.5 *Federal and Provincial Initiatives* (A56025, A3S4X4, p.9)
ii. A Review of Canada's Ship-Source Oil Spill Preparedness and Response Regime: Setting a Course for the Future (Tanker Safety Panel Expert Report, 2013)

Preamble:

Section 1.4.5 of reference 'i' discusses government initiatives to improve tanker safety and oil spill prevention/response, including the Federal Tanker Safety Expert Panel. Page 8A-60 indicates that TMX is working with Western Canada Marine Response Corporation (WCMRC) to identify improvements to WCMRC's existing capacity for emergency response from an oil tanker. Reference 'ii' states that Tanker Safety Panel's position that "potential polluters should be prepared, through their contracted Response Organizations, to respond to a worst-case discharge, whether it be the full cargo of a tanker or a complete release of bunker fuel on board a vessel" (page 9 of reference 'ii').

However, the Marine Terminal spill volume used to plan for oil spills from the TMX facility does not approximate a worst-case discharge of the full cargo, and instead reflects a small loading arm discharge into pre-deployed containment boom during a transfer. This extremely small spill forms the basis of the spill preparedness planning and risk assessment for terminal spills, and does not align with the Tanker Safety Panel position or recommendations.

Request:

a) Explain how the selection of a 160m3 loading arm spill into pre-deployed containment boom as the Westridge Terminal worst case discharge will help TMX to achieve "world class" spill preparedness for marine spills from TMX tankers.

b) Provide a worst case discharge volume that represents the "full cargo of a tanker" in alignment with the Federal Tanker Safety Expert Panel recommendation.

Response:

a) Det Norske Veritas (DNV) identified the credible worst-case scenario for an oil spill during tanker loading as a representative credible worst-case (CWC) oil spill within Burrard Inlet. The credible worst-case scenario during tanker loading was calculated as a spillage of 100 m^3 oil occurring once every 234 years within the pre-boomed area surrounding the tanker at berth. Spill modelling was carried out using 160 m^3 (a more conservative size oil spill than the CWC) spilled into the waters of Burrard Inlet and having 32 m^3 escape the containment boom. This information is valuable information in planning for oil spill preparedness in Burrard Inlet. Trans Mountain has proposed enhanced spill response, please refer to Volume 8A, Section 5.5.2 for details.

b) The Federal Tanker Safety Expert Panel's explanation of this recommendation can be found on page 15 in, "A Review of Canada's Ship-source Oil Spill Preparedness and Response Regime," which states:

> *"The probability that a worst-case discharge will occur in Canadian waters is remote. While it is prudent to have some level of preparedness for a spill of that magnitude, the primary focus of Response Organizations should be preparing for the types of spills that are likely to occur within their Area of Response."*

A worst-case discharge is not credible and Trans Mountain believes appropriate and credible information on worst-case oil spill scenarios have been included with the Application to enable the appropriate level of risk assessment and risk-informed decision-making to have been conducted in accordance with the National Energy Board's Letter, "Filing Requirements Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities, Trans Mountain Expansion Project" dated September 10, 2013. No additional modelling or assessment is contemplated.

Reference:

Tanker Safety Panel Secretariat. 2013. A Review of Canada's Ship-source Oil Spill Preparedness and Response Regime—Setting the Course for the Future. Ottawa, ON. 66 pp.

1.09.03 Oil Spill Risk from Vessel Collisions or Groundings in Burrard Inlet

Reference:

i. Volume 8A, Section 5.0 *Risk Assessment and Spill Management* (A56025,A3S4Y3, p.286)
ii. Volume 8C, TERMPOL 3.15- General Risk Analysis and Intended Methods of Reducing Risks (A56029, A3S5F4 & A3S5F6 & A3S5F8)

Preamble:

In reference 'i', page 8A-516 states that the probabilities and consequences of oil spills in reference 'ii' were used to define credible worst case and mean case risks based on spill volume. Section 9.15 of reference 'ii' recommends "credible worst case" spills have a low likelihood of occurrence but the potential for significant adverse impacts.

Collision and grounding accidents are identified as potential oil spill events for multiple locations along the vessel routes: the main ferry route crossing (collision, Segment 4, location D), the Turn Point SOA at Arachne Reef (powered grounding, Segment 5, location E), South of Race Rocks (collision, Segment 6, location G), and Buoy Juliet (collision, Segment 7, location H). There are no collision or grounding scenarios presented for any location along Segment 1 (Westridge Terminal to Berry Point), Segment 2 (Vancouver Harbor), or Segment 3 (English Bay into the Strait of Georgia). Yet, the Executive Summary to reference 'ii' clearly states:

> The sailing route from Westridge terminal to high seas outside the mouth of Juan de Fuca Strait is a relatively uncomplicated route. The most challenging part is the start of the route from the terminal through the Second and First Narrows in the Vancouver harbor area, which is a Movement Restricted Area (MRA).

Reference 'ii' goes on to note that there is a high level of risk control in place for this MRA. However, it does not suggest that the residual risk of a tanker operating in this MRA is zero. In Section 5.2.2 of reference 'ii', Table 6 shows that the traffic growth factor for tankers operating in Segments 1 to 5 (excluding TMX tankers) is 4% per year from 2012 to 2018, higher than any other vessel type and twice the growth factor for Segments 6 to 12. Table 12 in Section 7.1 shows that the incident return period increase is nearly equal for the segments shown (i.e. the return rate increase in Segments 1-2 for all incidents if with the addition of TMX tankers is roughly the same as the increase for all Segments). The incident return periods by incident type and segment shown in Table 13 show a fairly consistent increase across all segments for collisions -there is approximately a 7-fold increase in return period for all segments.

Given the significant increase in tanker traffic in the MRA, a constricted waterway with well-recognized navigation hazards, the potential for a collision or grounding along this route exists. Reference 'ii' does not show any substantive difference in return rates for incidents in Segments 1-3 compared to the rest of the route with the addition of TMX tankers. There is no logical reason for not planning for a potential collision or grounding from a tanker operating within the Inner Harbor/MRA.

Request:

a) Clarify why the potential for a vessel grounding or collision in Burrard Inlet was not analyzed, and provide supporting analysis.

Response:

a) Potential for vessel grounding and collision in Burrard Inlet has been analyzed and these results are available in Technical Report 8C-12 in Volume 8C, TERMPOL 3.15, "General Risk Analysis and Intended Methods of Reducing Risks — Trans Mountain Expansion Project" (Det Norske Veritas, November 2013). Please refer to TERMPOL 3.15, Section 7.1 for Total Incident Frequency.

1.09.04 Alternatives Considered

Reference:

i. Volume 8A, Section 2.2.2 *Alternatives Considered* (A56025, A3S4X4, p.20)

Preamble:

Reference 'i' discusses alternatives considered by TM for the Project, and indicates that the only alternatives considered were class of tanker. Aframax tankers were identified as the preferred alternative. Alternative shipping lanes and traffic patterns were not considered because of established shipping lanes in the region.

The discussion of alternatives does not address alternative sites for the Marine Terminal. Consideration of an alternative site would provide an opportunity to consider ecological impacts, spill risks, and navigational hazards against a different base case.

Request:

a) Analyze one or more alternative marine facility locations for the TMX.

Response:

a) Please refer to the response to City Burnaby IR No. 1.01.01a.

1.09.05 Traffic Controls, Movement Restrictions, and Transit Windows in the MRA

Reference:

i. Volume 8A: Marine Transportation Assessment (A56025)
ii. Volume 8C, TERMPOL 3.7: Transit Time & Delay Survey
iii. Volume 8C, TERM POL 3.15: General Risk Analysis and Intended Methods of Reducing Risk (A56029, A3S5F4 & A3S5F6 & A3S5F8)
iv. Volume 8C, TR 8C-5 S4: Analysis of Second Narrows Transits (AS56023, A3S4TO)
v. Port Metro Vancouver (PMV) Second Narrows Movement Restricted Area (MRA) Procedures, April 14, 201 0

Preamble:

In Section 6 of reference 'iii' and various locations reference 'i', the risk controls currently in place for the MRA are presumed to have an equivalent risk reduction value into the future as the volume of laden tankers transiting to and from Westridge Terminal increases. These controls include the use of tethered and non-tethered tug escorts and additional pilots along parts of the route, as well as operational restrictions tied to visibility, navigational channel clearances, speed restrictions, and communications procedures. These risk controls were implemented by the Vancouver Fraser Port Authority in cooperation with the Pacific Pilotage Authority to manage risks based on traffic patterns at the time (most recently updated in 2010, see Reference 'v').

Reference 'iii' presents two potential additional risk controls that could be implemented: extension of the tug escort area and use of moving exclusion (safety) zones around the tankers. These two options are shown to have additional risk reduction benefits, particularly the use of the moving safety zone.

Reference 'iii' and reference 'i' presume that the existing MRA risk controls will continue to be applied to new tankers, and propose additional measures to manage the increased risk caused by additional tanker transits. However, the feasibility of increasing the volume of tankers transiting the MRA while simultaneously increasing the controls and restrictions on their movements is unclear. For example, assuming all existing controls plus the proposed new controls are in place, laden tanker traffic will need to be spaced out to maintain the safety zone, and other commercial traffic would be limited during tanker transits. The window of opportunity for tanker transits is narrowed by the operating limits in the existing MRA (tide, daylight, speed restrictions).

References 'ii' and 'iv' provide some analysis of the timing and duration of transit opportunities for the increased volume of TMX vessels operating under the existing MRA risk controls, but do not factor in the implications of the safety zone. The overlapping reports at references 'ii' and 'iv' rely on methodologies and assumptions that are not clearly explained.

Reference 'iv' provides an analysis of Second Narrows Transits that considers historical averages for each factor required to accommodate transits of a variety of vessels, including laden and ballasted Aframax tankers of varying drafts. While not referenced in reference 'iv', reference 'ii' provides a slightly more detailed discussion of the same information. However, both references have significant gaps in their methodology and assumptions. For example:

- References 'ii' and 'iv' estimate "transit windows" that could accommodate various classes of vessels based on the movement restrictions currently in place with the MRA. Reference 'iv' does not define a transit window, but Reference 'ii' indicates that the duration of windows varies from 30 minutes to more than 3 hours, and that the number of transits assumed to be possible for each window equates to the duration of the window divided by 25 minutes. Reference 'ii' states that "the duration of each window varies according to the combination of tides, currents, and daylight conditions," but the graph in Figure 1 of Reference 'iv' shows each condition individually, suggesting that each factor was measured individually. The method for estimating windows is unclear and is presented differently in each report.

- Figure 1 in Reference 'iv' (Figure 3-1 in Reference 'ii') shows a graph of average conditions over 60 years, and shows the number of "transit windows" based on aggregate conditions, but the methodology used to calculate and compile these averages is unclear. For example:

    - When converting actual windows to 25-minute windows, how were time periods that were not multiples of 25-minutes addressed? (For example, was a 40-minute window considered to be 1.6 windows or 1 window?)
    - Does the number of windows shown for each parameter on the x-axis represent the number of times per year a window of 25 minutes duration occurred? How were these windows aggregated moving from one column to the next?
    - Visibility estimates appear to include daylight only, not the 1 .5 nm requirement specified in the MRA and shown in Table 1 of reference 'iv'. Did the study consider visibility other than daylight?
    - The reliance on average conditions influences the accuracy of the estimates, but this fact is not discussed. For example, averaging daylight will underestimate transit windows during summer months and overestimate windows during winter.
    - There are no confidence bounds provided for numeric estimates.

- References 'ii' and 'iv' do not consider the implication of Safety Zones to the transit windows.

- Page 11 of reference 'ii' concludes that since there are approximately 700 available "transit opportunities" for the 408 laden Aframax tankers available each year, "this leaves more than enough transit windows available to accommodate all other waterway users, both at existing traffic levels and projected future volumes." There are no data presented to support this statement, and no discussion of how margins of error in these estimates might influence the conclusions. This statement does not address the potential impact of proposed safety zones to vessel transit timing or opportunity.

Given the complexities of vessel traffic movements and the importance of ensuring that existing and proposed additional safety measures are feasible, a more rigorous and integrated analysis of transit windows is warranted.

Request:

a) Provide additional information to explain or clarify the following assumptions and methods from references 'ii' and 'iv'.
   1) Clarify methods used to calculate transit windows based on tide, current, and daylight conditions and provide an example calculation.
   2) Clarify the relationship between windows moving from left to right on the graph in Figure 1/Figure 3-1 of References 'ii' and 'iv'. Specify how conditions were aggregated to estimate number of windows.
   3) Explain whether visibility limits other than daylight were considered (i.e. fog). Discuss how incorporation of other visibility limits would influence overall conclusions. Under what conditions would transit of the first or second narrows be considered unsafe?
   4) Explain how the use of averages may influence or bias the results compared to other statistical methods.
   5) Provide confidence intervals for numeric estimates.
   6) Provide scenarios to demonstrate that the 700 transit opportunities are sufficient to support the increased vessel traffic through the MRA, and consider the tolerance for disruptions if transit opportunities are missed.

b) Provide an analysis of vessel traffic feasibility for projected traffic increases in the MRA that addresses the impact of Tanker Safety Zones to transit windows and opportunities.

c) What is the maximum number of transits of the second narrows possible or contemplated by all types of commercial and recreational vessels?

d) What is the cumulative impact of the proposed increase in tanker traffic through the first and second narrows on the capacity for commercial expansion of other products at the Port of Metro Vancouver?

Response:

a) With reference to all parts of this information request (IR) please refer to the response to PMV IR No. 1.2.1.

b) The introduction of a moving exclusion zone for transiting loaded tankers is not expected to impact MRA transit windows and opportunities.

c) Please refer to the response to City of Vancouver IR No. 1.09.05a.

d) Trans Mountain's assessment has considered potential increase in Port Metro Vancouver (PMV) traffic, information that is available in Volume 8A (Marine Transportation), Section 2. Please seek information on the impact of the Project on the capacity for commercial expansion of other products at the Port of Metro Vancouver from PMV.

1.09.06 Escort Tug and Pilot Availability

Reference:

i. Volume 8A: Marine Transportation Assessment (A56025)
ii. Volume 8C, TERM POL 3.15: General Risk Analysis and Intended Methods of Reducing Risk (A56029, A3S5F4 & A3S5F6 & A3S5F8)
iii. An Evaluation of Local Escort and Rescue Tug Capabilities in Juan de Fuca Strait
iv. Port Metro Vancouver (PMV) Second Narrows Movement Restricted Area (MRA) Procedures, April 14, 2010

Preamble:

In section 6 of reference 'ii' and various locations reference 'i', the risk controls currently in place for the MRA are presumed to have an equivalent risk reduction value into the future as the volume of laden tankers transiting to and from Westridge Terminal increases. These controls include the use of tethered and non-tethered tug escorts and additional pilots along parts of the route, as well as operational restrictions tied to visibility, navigational channel clearances, speed restrictions, and communications procedures. These risk controls were implemented by the Vancouver Fraser Port Authority in cooperation with the Pacific Pilotage Authority to manage risks based on traffic patterns at the time (most recently updated in 2010, see reference 'iv').

Reference 'ii' presents two potential additional risk controls that could be implemented: extension of the tug escort area and use of moving exclusion (safety) zones around the tankers. Both options are shown to have additional risk reduction benefits.

The expanded tanker traffic and potential extension of the tug escort zone will increase the need for suitable tugs to support the system. Reference 'iii' concludes that there are only 6 tugs in BC that "could be considered as serious tanker escort tugs" for tankers operating in the Juan de Fuca Strait. The TMX application does not discuss tug availability as a limiting factor and does not identify how or from where additional, adequately equipped tugs would come from to support the increased need for escorts. No analysis is provided for escort tug capabilities or availability for vessels operating in Burrard Inlet.

References 'i' and 'ii' do not specify the minimum number of tugs that would be required to support the TMX tanker transits. The tanker escort system in place in Prince William Sound Alaska, which is similar in configuration to the proposed TMX system, has 11 escort and rescue tugs in dedicated service to the tanker escort system.

Reference 'iii' identifies several areas where the analysis and conclusions in Reference 'ii' are predicated on assumptions about tug availability, and it points out several important points about tug availability:

- Escort tug capability to control a tanker depends upon the escort tug capabilities, which are not defined in reference 'ii'.
- Reference 'ii' does not specify the tug capabilities required to support the system.

- Reference 'ii' assumes that escort tugs will have a bollard pull of 40 tons and length of 40m; Reference 'iii' points out that there are only 5 tugs in BC that meet those specifications, and all are coastal towing tugs.

- Reference 'iii' study provides, on page 39, minimum specifications for escort tugs capable of operating in Juan de Fuca Strait. The TMX application does not specify whether these minimum specifications will form the basis for escort tug assignments.

Reference 'iii' concludes about reference 'ii', "the assessment of the present tug fleet against [tug force generating] requirements is a critical missing link in defining safe procedures for tanker escort in BC waters".

Reference 'i' does not analyze the availability of marine pilots in BC to handle the additional demand with the increase in traffic. Given the highly specialized nature of marine pilots and extensive training required for licensure, the availability should beanalyzed.

Request:

a) Specify the minimum tug capabilities for various escort functions within the TMX marine transportation routes, including Burrard Inlet.

b) Identify the minimum number of escort tugs (and their capabilities) that would be required to support TMX tanker operations, and indicate potential sources for these tugs and intended configuration of the escort system.

c) Analyze the increased need for marine pilots to support TMX tankers through the MRA and demonstrate that adequate personnel will be available to fill these roles.

d) What are the response times for tugs of sufficient bollard pulls in the event that a vessel had to be removed from the berth at Westridge Terminal?

Response:

a) Tug requirements for tankers in Burrard Inlet can be found in Port Metro Vancouver's Harbour Operation's Manual. Current tug escort requirements in Boundary Pass and Haro Straits can be found in the Pacific Pilotage Authority's "Notice to Industry, Notice Number: 07/2013," which can be found at http://www.ppa.gc.ca/text/notice_to_industry-e.html.

Please refer to the response to NEB IR No. 1.59a.

References:

Port Metro Vancouver. 2014. Harbour Operations Manual. Updated May 2014.

Pacific Pilotage Authority. 2013. Notice to Industry, Notice Number: 07/2013. Issued 11 October 2013. Website: http://www.ppa.gc.ca/text/notice_to_industry-e.html. Accessed: June 2014.

b) Please refer to the response to NEB IR No. 1.59.

c) Please seek this information from the Pacific Pilotage Authority (PPA), the federal agency mandated by the Minister to ensure pilotage service is available for all vessels within the pilotage zone covering the coastline of British Columbia (BC). The PPA can be reached by electronic mail at info@ppa.gc.ca.

d) Response time for tugs to reach Westridge would depend on the nature and urgency of the request. To date, Trans Mountain has not had any delays due to tugs. As part of the enhanced dock system, a utility dock will provide moorage for tugs at Westridge.

1.10 Emergency Management and Oil Spill Response

1.10.01 TERMPOL Review

Reference:

i. Volume 8A, Section 1.4.1 .8 *TERMPOL* (A56025, A3S4X4, p.44)
ii. Volume 8C TERMPOL 3.1 Reports, Section 1.2 *TERMPOL Review Process* (A56023, A3S4R6, p.6)

Preamble:

As per reference 'ii' the TERMPOL report is not a binding document, and the review process is voluntary. The TERMPOL report will be made public.

The application does not confirm when the report of the TERMPOL committee will be made public. It is unclear how or if the NEB and TERMPOL Review Committee will work together in developing recommendations related to marine transportation.

Request:

a) Please describe the authority of the NEB to rule on marine related issues.

b) Please provide a list of stakeholders that participated on the TERMPOL review process.

c) In relation to the above list please describe the selection process for the TERMPOL review, the role of the stakeholders involved, how selected stakeholders represent individuals and organizations that are directly affected by the project.

d) Please describe the role of any coastal municipal governments or First Nations on the TERMPOL Review Committee, including whether any are members of, or have participated or contributed to the review. If not, please explain why these groups have not been involved and how the TERMPOL Review Committee will receive or integrate feedback from them.

Response:

a) Please refer to the response to Allan R IR No. 1.21i.

b) The TERMPOL Review Committee includes the following agencies:

Transport Canada
Environment Canada
Fisheries and Oceans Canada
Canadian Coast Guard (CCG)
Pacific Pilotage Authority Canada (PPA)
Port Metro Vancouver (PMV)
BC Coast Pilots Association

c) The TERMPOL process is managed by Transport Canada. Kindly seek this information directly from Transport Canada.

d) The TERMPOL process is managed by Transport Canada. Please seek this information directly from Transport Canada.

1.10.02 Response and Preparedness for Navigational Safety Emergency

Reference:

i. Volume 8A, Section 1.4.2, *Roles and Responsibilities for Navigational Safety, Emergency Response and Preparedness* (A56025, A3S4X3, p.47)
ii. British Columbia, *Emergency Program Act* [RS BC 1996] Chapter 111, found online at: http://www.bclaws.ca/EPLibraries/bclaws_new/document/1D/freeside/00_96111_01#section6

Preamble:

Reference 'i' identifies parties with roles and responsibilities in Navigational Safety, Emergency Response, and Preparedness. The section does not specifically include local government or First Nations. Further, the section does not describe how these agencies interact during response, or specific standards or benchmarks that must be achieved to confirm their capacity to fulfill their identified roles.

Reference 'ii' the Emergency Program Act refers to the legislated roles and responsibilities of local authorities in emergency management, including in Section 6 (2) the responsibility to maintain an emergency plan and, in Section 13 (1), the powers of local authority in declared state of local emergency.

Request:

a) Please explain why local governments and First Nations are not explicitly included in oil spill emergency response and preparedness.

b) Please describe which parties are responsible for coordinating land based operations (ie: evacuations, shelter-in-place orders, securing of perimeters, public notification) and define the organizational structure for emergency response for a marine based spill or incident impacting populated urban areas.

c) Does Trans Mountain assume the availability of any local authority resources to respond to or recover from marine based oil spills or incidents? Please provide details on expected response and recovery actions from local authorities.

d) Please confirm if Trans Mountain has included in its review of the Roles and Responsibilities for Emergency Response and Preparedness consideration of the Emergency Program Act
   1) If so, how does the Emergency Program Act impact emergency response for oil spills in the marine environment.
   2) If not, please conduct a full assessment of the Emergency Program Act and describe in detail how the Emergency Program Act relates to Emergency Response and Preparedness for oil spills.

e) Please provide examples of the role of local governments and First Nations in marine oil spills in the US and in Canada.

f) Please identify all potential impacts on local authorities from the direct or cumulative effects of an oil spill, and describe the role that local authorities would take, if any, in mitigating these impacts.
   1) If no role is identified, please explain why local authorities have no role.

g) Has Trans Mountain given consideration to the management or impact of emergent volunteers?

h) Please identify exercises and responses that all of the listed parties have participated in, and provide after action reports and improvement plans.

i) What level of training has been provided to parties in emergency response, including Incident Command System?

j) Please provide a sample organizational structure including specific roles and responsibilities in a 10,000 mt spill.

Response:

a) Trans Mountain expects that in the event of a marine spill effected Aboriginal communities would be invited to participate in the ICS organization as part of the Unified command or in other capacities based on the communities capabilities, interests, and the particular requirements of the response.

Both WCMRC and Trans Mountain employ the Incident Command System in emergency response (as described in Section 4.3.1 of Volume 7). ICS is an internationally recognised, standardized, on-scene, all-hazard command and control structure that allows its users to adopt an integrated organizational structure to match the complexities and demands of single incident or multiple incidents without being hindered by jurisdictional boundaries. One of the 14 Principles and Features of ICS is Unified Command, which is the command and control structure used by KMC. Unified Command is responsible for overall management of the incident directing incident activities, including development and implementation of overall objectives and strategies. Communities such as City of Vancouver, or First Nations, who are impacted by the incident, would be invited to participate in Unified Command. This allows the communities to put forth their objectives and priorities along with other members of Unified Command. The city would also likely be invited to participate in other Sections and Units in the ICS structure such as the Environmental Unit and Resourcing Teams. For those local authorities that do not wish to participate in Unified Command, or are indirectly impacted by the incident, opportunities exist for participation in the ICS organization in many areas depending on training and expertise. Examples of potential areas of participation include: field response labour, security, site control, environment unit, wildlife unit, logistics, catering, supply businesses, etc. Specifically, refer to Figure 4.3.1 of Section 4.3.1 in Volume 7 which provides the organizational structure employed within the ICS framework.

Local governments and First Nations are not responsible for the clean up of oil spills; however, it is appropriate for local community authorities to be directly involved in

emergency response decision making through Unified Command and to receive real time updates throughout the course of the emergency.

b) The organizational structure used for emergency response for a marine based spill is the Incident Command System (ICS) as outlined in the Application, Volume 7, Section 4.3.1, and as discussed in part a).

ICS allows local, provincial and federal Authorities in the jurisdiction of the emergency to jointly manage the event using Unified Command to determine the best course of action to protect the public and the environment including the coordination of land based operations.

c) As discussed in part a), local authorities such as governments and First Nations do not clean up oil spills; however, it is appropriate for local community authorities to be directly involved in emergency response through Unified Command / Incident Command System, as outlined in the Application, Volume 7, Section 4.3.1, to determine the best course of action to secure the area and protect the public.

KMC takes full responsibility for any emergency that results from the Trans Mountain Pipeline system and its facilities to clean up the spill and recover the products with its internal and external response network as identified in Section 4.5 of Volume 7. As identified in part b), KMC does not have the authority to order evacuation, and/or conduct the evacuation of residents, schools, daycares, hospitals, businesses, parks, recreation facilities, and other public/private places, nor does it have the authority to close roads, redirect traffic, public transit and other transportation related infrastructure.

Kinder Morgan Canada Inc. (KMC) expects to work co-operatively with the municipal first / emergency responders in the unlikely event of an emergency occurring. The needs for fire, police and health services greatly depend on the type of emergency. KMC anticipates working collaboratively with the local first responders through an Incident Command System (ICS) structure to coordinate these and other activities in the unlikely event the need arises.

d) Trans Mountain assumes all parts of this request for part d) are with respect to marine oil spills.

Kinder Morgan Canada (KMC) has always been committed to working with organizations, both public and private, to ensure there is a mutual understanding how the pipeline and/or operations at facilities could impact those organizations for incorporation in their own emergency response plans, when those organizations request assistance. However, KMC is not responsible for the emergency planning of other organizations.

Oil spills in the marine environment are under federal jurisdiction. Canada Coast Guard (CCG) is the lead oversight agency for oil spills in marine waters on behalf of the federal government. Western Canada Marine Response Corporation (WCMRC) is the Transport Canada Certified spill response organization for BC's Coast who will respond to the incident on behalf of the Responsible Party under the supervision of CCG.

The BC Emergency Program Act is not applicable to the spill responders or federal oversight of the marine spill response. It is however relevant to local authorities and Province of BC agencies who may participate in Unified Command as defines the powers of a local and/or provincial state of emergency and the scope of their abilities to protect people and property affected by an emergency.

KMC, and WCMRC are committed to utilising Incident Command Structure (ICS) and Unified Command. The Application, Volume 7, Section 4.3.1 outlines the response organization and the three-tiered response structure (Table 4.3.1) used by KMC. ICS is an internationally recognised, standardized, on-scene, all-hazard command and control structure that allows its users to adopt an integrated organizational structure to match the complexities and demands of single incident or multiple incidents without being hindered by jurisdictional boundaries

As discussed in response to City of Vancouver IR No. 1.10.02a, communities such as the City of Vancouver, or First Nations, who are impacted by the incident, would be invited to participate in Unified Command. This allows the communities to put forth their objectives and priorities along with other members of Unified Command. The City would also likely be invited to participate in other Sections and Units in the ICS structure such as the Environmental Unit and Resourcing Teams.

e) If an oil spill occurs in the marine environment, multiple organizations take coordinated action to mitigate public and environmental impacts.

As described in the West Coast Marine Response Corp. (*WCMRC) Information Handbook* (2012), the overall response to a marine oil spill could include, as appropriate, the participation of the Canada Coast Guard (CCG), Regional Environmental Emergency Team (REET), the Province, harbour authorities such as Port Metro Vancouver, local emergency response teams, the Responsible Party (Incident Commander), and the certified oil spill Response Organization (WCMRC).

ICS is an internationally recognised, standardized, on-scene, all-hazard command and control structure that allows its users to adopt an integrated organizational structure to match the complexities and demands of single incident or multiple incidents without being hindered by jurisdictional boundaries. One of the 14 Principles and Features of ICS is Unified Command, which is the command and control structure used by KMC and WCMRC. Unified Command is responsible for overall management of the incident directing incident activities, including development and implementation of overall objectives and strategies. All stakeholders involved in, and impacted by, an incident, such as First Nations, would be invited to participate in Unified Command. This allows them to put forth their objectives and priorities along with other members of Unified Command.

Representatives from the federal government, the Province of BC, the U.S. Coast Guard, and Responsible Party integrate their plans and strategies through Unified Command coordinated command system, a diagram of which can be found in Figure 4.3.1, Section 4.3.1 of Volume 7. Unified Command also often includes local

municipal and First Nations representatives (please refer to the responses to City of Vancouver IR No. 1.10.02a to 1.10.02c). Incident Command System is adaptable to different emergency scenarios and allows for quick identification of resources, and a method of procurement.

The needs for fire, police and health services greatly depend on the type of emergency. For Canada and the US, it is only certified Marine responders such as WCMRC, Southeast Alaska Petroleum Response Organization (SEAPRO) in Alaska or Marine Spill Response Corporation (MSRC) in Washington State who manage the recovery of spilled oil. Local governments and First Nations are often asked to join Unified Command in situations where there could be a safety threat to the public or a draw on local resources to support the efforts of the spill response team.

Additionally, local governments and First Nations are often included to provide guidance on environmental priorities to Environment Canada and the BC Ministry of Environment aspect as part of Unified Command.. As described in Section 1.4.2.7 of Volume 8A, the REET is a multi-agency, multi-disciplinary group specializing in environmental emergencies. A REET is designed to provide consolidated, locally relevant environmental advice in the event of an environmental emergency such as an oil spill (WCMRC 2012). REET members include federal, provincial, and municipal departments, Aboriginal communities, private sector agencies, and local individuals. In the event of an oil spill in a marine environment on the West Coast of BC, the REET would provide advice to WCMRC and the incident commander.

- Providing consolidated and coordinated environmental advice
- Prioritizing for the Responsible Party and/or Lead Agency the environmental, cultural, economic, property and human issues
- Eliminating agency overlap and duplication
- Providing a forum for local stakeholders to have their concerns met
- Providing assistance with mapping, permits, trajectory modeling, and shoreline assessments.

Reference:

Western Canada Marine Response Corporation (WCMRC). 2012. Information Handbook. Burnaby, BC. http://www.wcmrc.com/wp-content/uploads/2011/08/WCMRC-Information-Handbook-2012.pdf Accessed June 6, 2014.

f) The impacts on local authorities greatly depend upon the type and scale of emergency and other factors which cannot be determined in advance. Kinder Morgan Canada (KMC) is committed to a timely and safe response to any incident and has a proven history of procuring any additional resources required at the time of the event.

KMC uses the Incident Command System for incident planning which is adaptable to different emergency scenarios and allows for quick identification of resources, and a method of procurement. The current planning method calls for the replacement of

municipal services with private firms as early as possible, with the approval of Unified Command. It is KMC's preference to enter into a Unified Command with the municipal, provincial and federal agencies to ensure a safe and thorough response to any emergency.

g) As discussed in the response to Del Ponte IR No. 1.4d.2, Trans Mountain does not rely on volunteers for emergency response. As described in Section 4.5 and Section 4.6 of Volume 7, KMC maintains a network of response resources which includes internal and external equipment and personnel. A rigorous training and response exercise program is in place for all operations and head office staff that ranges from detailed equipment deployment drills to full ICS management and organization training and deployment. Please refer to the response to City of Vancouver IR No. 1.08.01e for a discussion surrounding ICS, municipality inclusion and roles / responsibilities.

KMC belongs to a number of response organizations and participates in mutual aid exercises to supplement the company's self-reliant response capability. KMC has contracts and master services agreements with a number of response contractors to supply equipment and/or personnel during an emergency, some of whom are identified in Section 4.5.2 of Volume 7.

Kinder Morgan Canada (KMC), as operator of the Trans Mountain pipeline, would be responsible for the response and clean up associated with its pipeline facilities. In the event of a tanker spill, the ship owner would be responsible for the response and clean up of the spill.

If a spill occurred as a result of Trans Mountain's pipeline or facility operations, Trans Mountain would be in charge of Incident Command for the response. Trans Mountain's response network is identified in Section 4.5 of Volume 7. Please refer to Table 4.3.1, Section 4.3.1 of Volume 7 for the three-tiered response structure which explains who would be invited to the response based on the definitions provided.

For marine response, as stated in the response to City Burnaby IR No. 1.25.01g, WCRMC does not use volunteers when additional labour is required to respond to a spill.

h) Please refer to the response to NDP IR No. 1.17 for a detailed account of consultation with communities along the pipeline corridor to date regarding emergency preparedness and response. After action reports and improvement plans are not available to provide to external agencies because such report/plans are confidential between Trans Mountain and other entities in order to encourage open and rapid exchange of feedback. However, findings / improvements will be incorporated into emergency management plans as applicable.

Please refer to the response to Province BC IR No. 1.1.72f for a discussion of Marine based exercises.

As described in Section 4.2 of Volume 7, Kinder Morgan Canada's EHS management system structure emphasizes the importance of EHS impact prevention and continuous performance improvement, rather than reaction and management of loss occurrences.

Application Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of TMEP. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

Also refer to NEB's draft conditions 42, 52, 53 and 54.

i) Please refer to the response to District of North Vancouver IR No. 1.5.07a for more information about training opportunities provided.

Kinder Morgan Canada (KMC) has always been committed to working with organizations, both public and private, to ensure there is a mutual understanding how the pipeline and/or operations at facilities could impact those organizations for incorporation in their own emergency response plans, when those organizations request planning assistance. However, KMC is not responsible for the emergency planning of other organizations.

KMC is committed to engaging with external stakeholders where our pipelines and facilities operate. We offer to review emergency response plans, educate on our operations, and provide advice on proper response techniques. KMC conducts regular emergency response exercises and equipment deployments that include participation from local emergency responders.

j) Oil spills will be managed by a Unified Command acting within the framework of the Incident Command System (ICS). ICS is a flexible system with four Sections operating in assigned roles under the Command staff. There can be many variations of an ICS structure to suit the needs of the response; however a typical organization will be composed of the following elements:

- **Unified Command** (Federal, Provincial and Local Government; Responsible Party; Local Emergency Services, First Nations, others as required)
- **Operations Section**
- **Planning Section**
- **Logistics Section**
- **Finance Section**

Volume 7, Section 4.3.1 provides a more detailed explanation of ICS.

The British Columbia Ministry of Environment offers a detailed discussion of ICS on their website at: http://www.env.gov.bc.ca/eemp/resources/icsintro.htm.

1.10.03 Tanker Owners and Operators

Reference:

Volume, 8A 1.4.2.9 *Tanker Owners and Operators* (A56025, A3S4X4, p.1)

Preamble:

Reference i discusses the role of Tanker Owners and Operators in marine spill response, including the limit of liability, and the expectation that the responsible party would initiate appropriate response activities.

Request:

a) How many times in WCMRC history has a vessel operator activated the response organization?

b) How long would it take for the Coast Guard to determine if the tanker owners/operator's response is inadequate?

c) Please provide details on all incidents and exercises that have involved a transfer of command between a Responsible Party and the Canadian Coast Guard, including gaps, issues, and lessons learned.

d) How do Tanker owners/operators track their costs to determine limits of liability?

e) What percentage of tanker captains are trained in the Incident Command System and to what level?

f) Please provide Shipboard Marine Emergency Pollution Emergency Plans for vessels calling on Westridge terminal over the past 10 years.

g) What is the record of tanker owners/operators accurately reporting spill rates for oil or bunker fuel?

h) What are the means of communication available for vessel operators to activate WCMRC?

i) Please provide details of all incidents or exercises in which foreign vessel operators have activated WCMRC, and include the method of communication and the time it took for the Responsible Party to notify WCMRC.

Response:

a) WCMRC has individual agreements in place with their members and subscribers; these agreements will identify the personnel authorized to activate a response. It is the choice of the member company to identify the vessel master with signing authority. Trans Mountain does not keep these records nor can it be supplied by Trans Mountain. Accordingly, Trans Mountain encourages the City of Vancouver to contact WCMRC directly to obtain that information.

b) It would be speculation on the part of Trans Mountain to try to forecast how long it would take for the Canadian Coast Guard (CCG) to determine if the tanker owner/operator response is inadequate. In the event of an oil spill in a marine environment in Canadian waters, CCG would assume the role of the Federal Monitoring Officer, monitoring the overall response effort of the response organization to ensure it is timely, effective and appropriate to the incident. At any time, in the event the responsible party (i.e., the polluter) is unable or unwilling to assume the lead role (i.e., incident commander) to respond to an oil spill from a vessel, CCG would step in to assume the lead role in managing the response (Volume 8A [Marine Transportation], Section 1.4.4).

c) Trans Mountain does not have this information. Please contact the Canadian Coast Guard (CCG).

d) The International Safety Management (ISM) Code requires that the tanker owner establish, in the safety management system onboard, the master has overriding authority and responsibility for making decisions with respect to safety and pollution prevention, and to request Company assistance as may be necessary. Under international regulations, a ship's master is required to take all steps necessary without recourse to costs. Once Incident Command System (ICS) has been set up, the Logistics and Finance and Administration units will begin tracking costs as far as possible and report to Unified Command — which includes the tanker owner as the responsible party (RP).

Limits of Liability are established under the International Convention on Civil Liability for Oil Pollution Damage based on vessel size.

e) Ship's captains receive training on emergency management in accordance with the International Maritime Organization's syllabus, part of the certification that provides a vessel's senior management with the knowledge and skills necessary to coordinate the vessel's response to an emergency on their own vessel or other vessels in distress.

Under The International Safety Management (ISM) Code, companies are required to provide for measures ensuring the "Company's organization can respond at any time to hazards, accidents and emergency situations involving its ships," which necessarily includes additional training for senior operations staff and masters to receive instructions on managing incidents within emergency response management structures such as Incident Command System (ICS). The level of instructions would differ by company, but it is often the case that senior operations staff receive instructions as incident commander while the ship's master receives training as operations lead. Trans Mountain is unable to predict the number of masters who would have ICS training when their ships call at Westridge.

f) A SOPEP (Shipboard Marine Emergency Pollution Emergency Plan) is a ship-specific document approved by Class, and Trans Mountain does not have copies for vessels calling at Westridge terminal. The information in the SOPEP relates to procedures that prevent spills during operations, emergency response in case of an oil spill, notification, crew safety and first response — including immediate means to reduce ship outflow. A

sample SOPEP has been attached that is representative of the ship-specific plans carried on vessels calling at Westridge (City of Vancouver IR No. 1.10.03f – Attachment 1 [SOPEP]).

g) Trans Mountain believes the tanker owners/operators of tankers calling at Westridge would accurately report spills of oil or bunker fuel.

h) Under the Canadian Shipping Act, 2001 (CSA) domestic and foreign vessels over 150 Gross Tonnes (GT) carrying oil cargo and all vessels over 400 GT are required to have a membership with WCMRC. These vessels are also required to have a Ship Oil Pollution Emergency Plan (SOPEP). Contact information for local emergency response, including WCMRC contact information must be available in the SOPEP.

WCMRC maintains a 24/7 on-call emergency telephone line that dispatches to the WCMRC officer on duty. Ships can use satellite or cellular phones to direct dial that telephone number or they can access WCMRC through radio contact with the Canadian Coast Guard's Vancouver Vessel Traffic System (VTS).

Please also refer to the response to City of Vancouver IR No. 1.10.4a.

i) Please refer to the response to City of Vancouver IR No. 1.10.03h for background information. This is an activation question that relates equally to domestic and foreign vessels. WCMRC does not publish records of notification times associated with incidents or exercises. Transport Canada and/or the Canadian Coast Guard would note such information in their incident investigations or exercise notes. Accordingly, Trans Mountain cannot supply further detail and encourages the City of Vancouver to contact those entities directly to obtain that information.

1.10.04 Impact of an Oil Spill on Local Populations and First Responders

Reference:

i. Volume 8A, Section 5.6.1 .2 *Human Health* (A56025, A3S5Q3, p. 8)
ii. Volume 8A, Section 5.6.1.3.3 *Local Infrastructure and Services* (A56025, A3S5Q3, p.10)
iii. Volume 8A, Section 5.6.1 .1 .3 *Property Damage* (A56025, A3S5Q3, p. 8)

Preamble:

Reference 'i' states that "in the event of a marine spill, the tanker owner, CCG, WCMRC, and Transport Canada will initiate spill response and notify municipal, provincial, and federal authorities responsible for the protection of public health". There is no identification of the specific plans or protocols in place to notify local authorities, or which organization of the 4 listed above is responsible for notifying local authorities.

The Section on Human Health also states that "evacuation of affected areas will occur if health and safety of the public is threatened". However, Trans Mountain does not include any assessment of the impact of an evacuation on: first responders, the public, vulnerable populations, or local businesses. Further, Trans Mountain has not assessed the viability of conducting an evacuation in a busy urban environment like the City of Vancouver.

Reference 'ii' states that "in the event of a spill, demands are likely to be placed on local, municipal, regional, and independent emergency responders". But that "'actual effects would depend on the size and nature of a spill, the number of people potentially affected, and the availability of proper equipment and trained personnel".

Local governments have a responsibility to prepare and plan for risks and hazards. Trans Mountain has not provided information on the potential costs for local municipalities and taxpayers to plan for oil spills, to mitigate impacts, or to recover from potential oil spills.

As per reference 'iii', Trans Mountain states that "the vessel responsible for the spill would be responsible for compensating those who suffered damage". There is no explanation of how claims would be filed, the length of time it would take for compensation to be granted, or how compensation would be provided if the cost of the spill exceeded the available funds.

Request:

a) Please describe the specific protocols in place to notify local authorities of an incident that could impact public health and safety in the lower mainland.

b) Please provide time limits in which notification would occur.

c) Please describe the information that would be provided to local authorities responsible for planning an evacuation.

d) Please describe any assessment that has been conducted regarding the ability to evacuate dense urban areas.

e) Please describe alternate options to protect public health and safety if evacuation is not possible.

f) Please provide an assessment of the socio-economic effect of evacuating areas of the City of Vancouver, including the downtown core and the Port as a result of a marine based oil spill, fire, or other incident.

g) Please describe the personal protective equipment that would be required for local first responders to initiate an evacuation of an area impacted by a spill of diluted bitumen and an assessment of the availability of adequate PPE in the lower mainland.

h) Please provide an assessment of the cost for local municipalities to prepare for the risk of oil spills or fires or explosions involving diluted bitumen, including the cost of participating in exercises and training, acquiring equipment, and developing plans.

i) Please identify all potential costs of an evacuation and describe how costs of an evacuation due to a marine based oil spill, fire, or incident would be compensated for local governments, business, and residents.

Response:

a) All vessels coming to port are required to develop a list of local contacts to notify in case of emergency.

In the case of an oil spill from a vessel, the master is obligated to notify authorities immediately using the information provided in the Shipboard Marine Emergency Pollution Emergency Plan (SOPEP). The Canadian Coast Guard (CCG) requires all pollution or threats of pollution in the Marine Environment to be reported by calling 1-800-889-8852 or contacting any Coast Guard Marine Communications and Traffic Service (MCTS) station by Marine Channel 16 VHF

When calling in a spill report, the vessel will provide the following information:

- Vessel name
- Contact information
- Spill location
- Spill quantity
- Type of product spilled
- On-scene weather

In addition, as proscribed in the Tanker Acceptance Standard, while within Canadian EEZ, the vessel is required to inform Trans Mountain of any incident affecting the safety or environment as well as loss of propulsion. The vessel will also immediately inform WCMRC in case of oil spill, however minor.

Immediately upon receiving notification of an incident, depending on the nature of the event, Trans Mountain will notify the requisite authorities in federal, provincial and municipal government.

For more about notification related to pipeline facilities please refer to the response to City Surrey IR No. 1.4f.

b) In the case of an oil spill from a vessel, the master is obligated to notify authorities immediately. Please refer to the response to City of Vancouver IR No. 1.10.04a.

c) As described in the response to PMV IR No. 1 8 1, the probability of a spill in Burrard inlet is very low (1/19,286 years) and only potential smaller oil spills than the estimated credible worst case spill size will occur in the event of a collision, because of mitigating measures.

Trans Mountain does not have the legislative authority to order an evacuation. The local communities / first responders have the legislative authority to evacuate the public, schools, hospitals etc. in the event of an emergency. Decisions to evacuate are made by authorities and cooperatively managed through Unified Command. Information would be received as real time updates throughout the course of the emergency and decision making would be in consultation with other agencies represented in Unified Command.

In the event that a local authority wants to plan for a smaller very low probability event, Trans Mountain will work collaboratively with local communities, such as the City of Vancouver, and will work collaboratively to identify appropriate information, related to evacuation.

Trans Mountain has not conducted an assessment of the ability to evacuate dense urban areas because of the low probability and likely smaller size of potential spills.

Trans Mountain considers it has addressed alternatives to evacuation in PMV IR No. 1.8.1, through special reducing measures.

With respect to socio economic effect of evacuation, given that evacuation is very unlikely, Trans Mountain has not developed a socioeconomic impact analysis.

With respect to personal protective equipment protective equipment that would be required for local first responders for evacuation, the likelihood of need is very low, however Trans Mountain notes that in addition to organizations such as Western Marine Response Corporation (WCMRC), KMC has contracts and master services agreement with a number of response contractors to supply equipment and/or personnel during an emergency.

Please refer to the response to City of Vancouver IR No. 1.10.02b

d) Please refer to the response to City of Vancouver IR No. 1.10.04c.

e) Please refer to the response to City of Vancouver IR No. 1.10.04c.

f) Please refer to the response to City of Vancouver IR No. 1.10.04c.

g) Please refer to the response to City of Vancouver IR No. 1.10.04c. Please also refer to the responses to Cowichan Tribes IR No. 1.08m and 1.08n.

Also refer to Table 4.5.1, Section 4.5.1 of Volume 7 and Section 4.5.2 of Volume 7

h) Please refer to the response to City of Vancouver IR No. 1.08.01g.

Kinder Morgan Canada (KMC) has always been committed to working with organizations, both public and private, to ensure there is a mutual understanding how the pipeline and/or operations at facilities could impact those organizations for incorporation in their own emergency response plans, when those organizations request assistance. However, KMC is not responsible for the emergency planning of other organizations.

KMC is committed to engaging with external stakeholders where our pipelines and facilities operate. We offer to review emergency response plans, educate on our operations, and provide advice on proper response techniques. KMC conducts regular emergency response exercises and equipment deployments that include participation of local emergency responders. External agencies are also invited to participate in continuing education programs and consultation meetings. KMC covers the costs associated with instruction, but does not currently cover costs associated with attendance, such as responder wages, benefits and employment costs.

Please refer to the response to City of Vancouver IR No. 1.08.01g

i) Should the potential evacuation be a result of a ship source oil spill, the costs can be claimed from the Ship-Source Oil Pollution Fund (SOPF). Please also refer to the response to City of Vancouver IR No. 1.07.03b.

1.10.05 WCMRC

Reference:

i. Volume 8A, Section 1.4.2.5 *Western Canada Marine Response Corporation* (A56025, A3S4X3, p.52)
ii. Volume 8A, Section 5.5.1 .1 *Planning Standards for Response Times and Capacity* (A56025, A3S4Y6, p.28)
iii. Volume 8A, Section 1.4.4 *Canada's Marine Oil Spill Preparedness and Response Regime* (A56025, A3S4X4, p.8)

Preamble:

Reference 'i' states that Trans Mountain is a shareholder of WCMRC; and that WCMRC's mandate is to serve all shipping and oil handling facilities on the West Coast of Canada.

Reference 'ii' states the current WCMRC certification level and capacity of response to an oil spill and non-mechanical methods of oil spill clean-up that WCMRC personnel are trained.

Reference 'ii' also states that "while the credible worst case spill volume based on partially laden Aframax tankers is 16,500 m^3 or an approximate 15,500 tonne release of heavy crude, this volume was increased for the WCMRC report to reflect the fact that larger cargos, not related to the Project, transit the WCM RC's Geographic Area of Response. DNV calculated that under the same conditions the credible worst case for a fully laden Aframax (not related to the Project) would equate to approximately 21,000 m or a 20,000 tonne release of heavy crude oil".

Reference 'iii' states that "under ICS a Unified Command would be established to allow affected municipalities, Aboriginal groups, and other agencies to participate in leadership of the response".

Request:

a) Please confirm that Trans Mountain is a WCMRC shareholder.

b) Please describe the ownership relationship between WCMRC and Trans Mountain Pipeline ULC, Trans Mountain Pipeline L.P., Kinder Morgan Canada Inc., and Kinder Morgan Energy Partners, L. P.

c) Please confirm whether WCMRC is for-profit or non-profit entity. If WCMRC is a for profit entity, please advise whether WCMRC could profit from an oil spill.

d) Is the current regulated response capacity of 10,000 tonnes a world-class standard? If not, please advise what the world-class standard is and how are these standards determined.

e) Please describe how WCMRC would respond to a spill larger than 15,000 tonnes (i.e. credible worst case oil spill used on the application).

f) Please clarify when the use of cleanup methods not pre-approved by Transport Canada (i.e. oil spill dispersants and in-situ burning of oil) would be necessary.

g) Please provide WCMRC contingency plans for earthquake, fire and explosion, emergency response vessels malfunctions.

h) Please advise what standards Trans Mountain used to determine the worst case spill scenario.

i) Please provide examples of the leadership roles that Trans Mountain is proposing for affected municipalities and how municipalities would be compensated for the costs associated with these roles.

j) Please provide details of the expected loading of tankers leaving Westridge Marine Terminal, including maximum loading at spring/king tide conditions.

Response:

a) Trans Mountain Pipeline L.P. is a shareholder of WCMRC.

b) The relationship between Trans Mountain Pipeline L.P. and other entities mentioned in this information request (IR) can be found in Volume 1 (Summary), Section 1.

c) Please refer to the responses to Allan R IR No.1.25e and 1.25h.

d) To be certified as a Tier IV Response Organization (RO), every RO must demonstrate its capacity to respond effectively to an oil spill of 10,000 metric tonnes. WCMRC has capacity in excess of the minimum required to meet the Tier IV certification level. Please refer to Volume 8A (Marine Transportation), Section 5.5.1.4. Trans Mountain believes WCMRC's existing response capacity is commensurate with current risk.

With reference to the second part of this information request (IR), please refer to the response to Province BC IR No. 1.63j.

e) WCMRC would respond to a spill of any size under the guidance of the Incident Command System (ICS). Although they have the highest available government certification, a 10,000 tonne response capacity, WCMRC's current equipment capacity is actually rated at 27,000 tonnes. Additional support for a large spill would be cascaded through contractors and mutual aid partners. Should the Trans Mountain Expansion Project be approved, WCMRC's response capacity will increase further. Please see:

A3S5I9, Application Volume 8C, TERMPOL Reports, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendations on Bases and Equipment for information regarding WCMRC's proposed response capacity increase.

f) In the event of a spill, response strategies would be developed under an Incident Command Structure and approved by Unified Command. This structure is expected to include Environment Canada and the BC Ministry of Environment who would provide

advice on environmental priorities. Any decision to use dispersants or in-situ burning would be based on net environmental benefit analysis and would need approval of the appropriate regulatory authorities.

g) The WCMRC contingency plans for earthquake, fire, explosion, and emergency response vessel malfunctions cannot be supplied by Trans Mountain. Accordingly, Trans Mountain encourages the City of Vancouver to contact WCMRC directly to obtain that information.

h) The process to determine the credible worst-case spill scenario is described in Section 9 in Technical Report 8C-12 in Volume 8C, TERMPOL 3.15, "General Risk Analysis and Intended Methods of Reducing Risks — Trans Mountain Expansion Project" (Det Norske Veritas, November 2013).

i) Kinder Morgan Canada Inc. (KMC) expects to work co-operatively with the municipal first / emergency responders in the unlikely event of an emergency occurring. The needs for fire, police and health services greatly depend on the type of emergency. KMC does not have the authority to order evacuation and/or conduct the evacuation of public/private places, nor does it have the authority to close roads, redirect traffic, public transit and other transportation-related infrastructure. KMC anticipates working collaboratively with local first responders through an Incident Command System (ICS) structure to coordinate these and other activities in the unlikely event the need arises.

KMC uses the Incident Command System for incident planning which is adaptable to different emergency scenarios and allows for quick identification of resources, and a method of procurement. The current planning method calls for the replacement of municipal services with private firms as early as possible, with the approval of Unified Command. It is KMC's preference to enter into a Unified Command with the municipal, provincial and federal agencies to ensure a safe and thorough response to any emergency.

KMC has always been committed to working collaboratively with organizations, both public and private, to ensure there is a mutual understanding about how the pipeline and/or operations at facilities could impact those organizations. KMC is willing and able to review emergency response plans, share information on operations, and provide advice on proper response techniques. External agencies are invited to participate in emergency response exercises, continuing education programs and consultation meetings. KMC covers the costs associated with instruction, but does not currently cover costs associated with attendance, such as responder wages, benefits and employment costs.

Please also refer to the response to Allan R IR No. 1.21j.

j) Trans Mountain has assumed that based on a height of tide of 3.2 metres, project Aframax tankers will be able to partially load to about 550,000 barrels of heavy crude or 580,000 barrels of light crude. The actual amount of loaded cargo could vary depending on the prevailing tide and vessel configuration.

1.10.06 Regional Environmental Emergency Team (REET)

Reference:

i. Volume 8a, Marine Transportation, Section 1.4.2.7 Regional Environmental Emergency Team
ii. Environment Canada. (n.d.), *Environmental Emergencies Program: Preparedness.* Found online at: http://www.ec.gc.ca/eeue/default.asp?lang= En&n=9 F5562 89-1
iii. Environment Canada. (n.d.). *Environmental Emergency Program: Response* Found online at: http://www.ec.gc.ca/ee-ue/default.asp?lang=En&n=001 CCC?B-1

Preamble:

Reference 'i' states that: "the REET is a multi-agency, multi-disciplinary group specializing in environmental emergencies. A REET is designed to provide consolidated, locally relevant environmental advice in the event of an environmental emergency such as an oil spill. REET members include federal, provincial, and municipal departments, Aboriginal communities, private sector agencies, and local individuals. Environment Canada and the BC Ministry of Environment Co-Chair the REET in BC".

Reference iii states that "when the need arises ... a REET can be activated".

Reference 'i' also states that "in the event of an oil spill in a marine environment on the West Coast of BC, the REET would provide advice to WCMRC and the incident commander". However, it is unclear how the REET fits into the Incident Command System.

Reference 'ii' refers to the importance of training at the regional level, and the importance of regular, well-planned exercises.

Request:

a) Please provide specific details about the membership of the REET that would respond to spills in the Burrard Inlet, English Bay, and Salish Sea, including the names of all municipal representatives, length of membership, terms and conditions of membership, and details of funding and compensation.

b) Please explain any recent changes to the REET program over the last 5 years and assess how these changes impact response capacity.

c) Please explain the process for activating the REET.

d) Please provide specific details on the length of time it would take to activate the REET.

e) Please describe in detail the role of municipalities within REET.

f) Please provide records of training, exercises, and response activities undertaken by REET since its inception.

g) Please provide records and after action reports from joint exercising involving the REET and WCMRC in the last 10 years, including gap analysis and improvement plans.

h) Please describe in detail how the REET fits into the Incident Command structure when activated.

Response:

a) Trans Mountain understands Environment Canada is the resource agency designated to advise the Canadian Coast Guard (CCG) on environmental matters and that the Regional Environmental Emergencies Team (REET) has been replaced by the Environmental Emergencies Science Table (EEST or the "Science Table"). The EEST would consist of agencies or organizations with an interest in the incident (whether by legislation, agreements or tradition), or expertise, that can assist in dealing with the emergency event. These organizations convene in the EEST to monitor the response to the environmental issues, coordinate environmental advice and assistance and convey the consolidated advice to the polluter through the Incident Command System (ICS) organization.

The specific composition of the EEST would depend upon incident-specific factors. Questions about EEST composition should be directed to Environment Canada.

b) Please refer to the response to City of Vancouver IR No. 1.10.06a.

c) Please refer to the response to City of Vancouver IR No. 1.10.06a.

d) Please refer to the response to City of Vancouver IR No. 1.10.06a.

e) Please refer to the response to City of Vancouver IR No. 1.10.06a.

f) This information should be sought from Transport Canada.

g) The REET and following their reorganisation, the NEET (National Environmental Emergency Team), has participated in WCMRC's major certification exercises. This group has also been involved (along with WCMRC) during the Burrard Inlet spill response in 2007 and the October 2013 bunker oil recovery in Grenville Channel from the **USAT *Brigadier General M. G. Zalinski.*** Kindly approach WCMRC for details of their interaction with the REET/NEET.

h) As explained in the response to City of Vancouver IR No. 1.10.06a, the EEST will act as an advisor to Unified Command in ICS.

1.10.07 Canada-US Response

Reference:

i. Volume 8a, Section 1.4.2.8 *Canada-US* (A56025, A3S4X4, p.1)

Preamble:

Reference 'i' claims that the Canadian Coast Guard and the US Coast Guard work together to "ensure adequate emergency preparedness and response capability in the event of an oil spill in trans-boundary waters", and that the USCG could be called on for support.

Recent reports highlight significant gaps in emergency preparedness and response from the US and Canadian Coast Guards. These include but are not limited to:

- The 2013 *Tanker Safety Expert Panel Review of Oil Spill Preparedness and Response*, the
- The 2013 *West Coast Spill Response Study* commissioned by the BC Ministry of Environment
- The 2010 *Report of the Commissioner of the Environment and Sustainable Development* to the House of Commons
- The 2013 report commissioned by NOAA *Transporting Alberta's Oil Sands Products: Defining the Issues and Assessing the Risks*

Request:

a) Please advise whether Trans Mountain has considered the findings from the above listed reports or other relevant assessments of Canadian and US response and preparedness regimes and capacity in assessing the risks of the project.

b) Please explain how the project would or would not be impacted by the capacity gaps identified in the above listed reports.

c) Please provide details, including copies of letters, emails or other documented communication of any communications that Trans Mountain has had with the US Coast Guard regarding the availability of spill response resources in the event in an oil spill in trans-boundary waters.

d) Please provide specific details about ability of the US Coast Guard to respond to spills of all types of products that are currently and could in the future be shipped via tanker from the Westridge Terminal.

e) Please provide specific details about the availability of US Coast Guard spill response equipment to respond to spills in Canadian waters, including the process for activation and the amount of time it would take to activate and deploy spill response equipment from the US.

f) Please describe the types of scenarios that would be likely to result in the CCG requesting support from the USCG.

g) Please provide detailed reports on joint exercises occurring over the past 10 years, including after action reports and gap analyses.

h) Please explain Trans Mountain's on the definition of 'adequate emergency preparedness and response capability in the event of a trans-boundary spill'.

i) Please provide a detailed list of the Canadian Coast Guards spill response equipment, including any equipment that may be used to recover submerged oil.

j) In the event of a trans-boundary oil spill, where would USCG vessels be deployed from?

k) Please describe the capacity of both the US and Canadian Coast Guards to manage more than one spill at a time.

l) Please provide details of the spill response capacity that is available in Washington State.

m) Please provide analysis on the relative effectiveness of the spill response capacity that is available in Washington State as compared to British Columbia.

Response:

a) Trans Mountain has considered the findings of the listed reports.

b) Please refer to the responses to Allan R IR No. 1.21c, 1.21e, 1.21j, 1.21s and 1.21t.

Please refer to the response to Makah TC IR No. 1.10a.

Trans Mountain has proposed an enhanced spill response system it believes will be adequate to the needs of the Project and submitted it along with its Application to the NEB, and as part of a TERMPOL submission and is awaiting a response from both organizations. Please refer to the responses to NEB IR No. 1.64a and 1.64b. Trans Mountain does not believe any information found in these reports require any change to the Application.

c) Trans Mountain has regular communications with the US Coast Guard (USCG) to keep the USCG informed of Project progress, providing any sought-after information and sharing Application details — including the proposed enhanced spill-response system.

d) Please seek this information from the US Coast Guard (USCG).

e) Canada participates in joint activities with the United States (US) in an effort to establish an appropriate measure of preparedness and response. A formal Canada-US Joint Marine Pollution Contingency Plan has been established. Trans Mountain believes any issues or areas of improvement identified through joint exercise are considered and acted upon as necessary by the responsible authorities in both nations.

f) An oil spill in the jointly managed waterway that threatens the waters and coasts of both nations will necessarily lead to a joint response under the Canada-US Joint Marine Pollution Contingency Plan.

g) Please seek this information from the Canadian Coast Guard (CCG) or the US Coast Guard (USCG).

h) Trans Mountain believes adequate emergency preparedness and oil spill response capability should be commensurate with geographic risk and be capable of timely and effective response should an event occur.

i) Please seek this information from the Canadian Coast Guard (CCG). Trans Mountain has proposed an enhanced spill response system it believes will be adequate to the needs of the Project and submitted it along with its application to the NEB and as part of a TERMPOL submission, and is awaiting a response from both organizations. Please see the responses to NEB IR No. 1.64a and 1.64b.

j) Please seek this information from the US Coast Guard (USCG).

k) Please seek this information from the Canadian Coast Guard (CCG) or the US Coast Guard (USCG).

l) Please seek this information from the US Coast Guard (USCG) or Washington State.

m) Trans Mountain believes the spill response regime in the region is effective and the capacity of response, whether in Canada or the US, is commensurate with the prevailing marine oil spill risks in the waters of each nation. In this respect, the US receives a large volume of crude oil as feedstock for refineries in the Puget Sound area. Please refer to the report of the Tanker Safety Expert Panel, “A Review of Canada’s Ship-source Oil Spill Preparedness and Response Regime—Setting the Course for the Future” (November 2013, Figure 4).

Reference:

Tanker Safety Panel Secretariat. 2013. A Review of Canada’s Ship-source Oil Spill Preparedness and Response Regime—Setting the Course for the Future. Ottawa, ON. 66 pp.

1.10.08 KMC Training and Exercise Programs

Reference:

i. Volume 7, Section 4.6.2 (A56025, A3S4V5, p.62)
ii. Volume 7, Section 4.8.2.4 (A56025, A3S4V5, p.72)

Preamble:

Reference 'i' indicates that "KMC conducts, on average, 20 to 25 training, table-top, and deployment exercises at locations along the pipeline each year". No documentation or details are provided regarding the substance or outcome of those exercises.

Reference 'ii' describes plans to expand the training and exercise program to incorporate new plans and equipment associated with TMX, and states that "an Emergency Response Training Plan will be developed, which outlines the training program, participants, content, and exercise locations with the intent of providing field deployment exercises that will cover the geographical extent of the pipeline". There is no timeline provided for this process.

Request:

a) Provide records for the past 10 years documenting training and exercise events for the Trans Mountain to support the 20 to 25 training average cited in the application. Provide information about the type of exercise, its objectives, key outcomes, and corrective actions.

b) Provide a draft Emergency Response Training Plan that demonstrates how KMC intends to expand its training and exercise regime to incorporate the TMX.

c) Please provide details of all worst case scenarios developed for use in exercises by Trans Mountain and Kinder Morgan for facilities, pipeline, and marine incidents, and clearly explain the process and factors used for establishing worst case scenarios.

Response:

a) Please refer to the responses to NEB IR No. 1.69a and 1.69b for the list of exercises (table top, worst case, and deployment). The additional events that make up the remainder of the average include classroom training on various topics which includes but is not limited to: Incident Command Training, Incident Safe Approach, Fire Systems Trainings, external training, specialized equipment training, jet boat operation, security systems training, Hazardous Waste Operations and Emergency Response, and course refresher training. The request for the associated records for the training is not relevant to one or more of the issues identified in the National Energy Board's List of Issues for the Trans Mountain Expansion Project.

b) The training plan requested will be developed as part of Kinder Morgan Canada's update of its Emergency Management Program as described in Section 4.8.2.1 of Volume 7. The Application, Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans

Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

c) The various emergency response scenarios, exercise types conducted and factors considered by KMC are described in the responses to NEB IR No. 1.69a and 1.72a.

In the Application, Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of TMEP. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

1.10.09 Emergency Preparedness and Response

Reference:

i. Volume 7, Section 4.1 *General* (A56025, A3S4V5, p.48)
ii. Volume 8C, TERMPOL 3.18: Contingency Planning (A56030, A3S5J9)

Preamble:

Reference 'i' describes a "mature Emergency Management Program" in place at Kinder Morgan Canada. Figure 4.2.1 in reference 'i' shows a hierarchical diagram of emergency management systems and programs, and lists several types of plans in place that relate to oil spill emergency response, including Emergency Response Plans, Field Guide Manuals, and Control Point Manuals. Section 4.4 of reference 'i' describes Emergency Response Manuals for the Westridge Terminals and Trans Mountain Pipeline (TMPL) as it presently exists. Reference 'ii' describes the Westridge Terminal contingency plan but does not provide it for review.

In order to evaluate and understand Kinder Morgan's emergency management program, it would be helpful to review these types of plans to inform our assessment of Kinder Morgan's emergency management program.

Section 4.2.2.4 of reference 'i' describes Kinder Morgan Canada procedures to monitor and measure performance within the EHS Management System, but does not indicate whether the checking and corrective active procedures described on pages 7-26 and 7-27 are reviewed as a component of the NEB Emergency Management Program audit. Regulatory oversight of the corrective action process would provide an additional level of assurance that Trans Mountain is proactively managing and mitigating oil spill risks based on past experience.

Request:

a) Provide copies of Emergency Response Plans, Field Guide Manuals, and Control Point Manuals for existing Kinder Morgan Canada operations for review as representations of the corporate emergency management program.

b) Clarify whether there is regulatory oversight of checking and corrective actions in response to potential or actual oil spills as part of NEB auditing of Kinder Morgan.

c) Include checking and corrective actions for EHS Management issues as a commitment to be tracked according to the NEB Hearing Order OH-001-2014.

Response:

a) The Emergency Management Program (EMP) documents contain information which is proprietary and of a sensitive nature, due to security concerns it is not publically available. KMC is willing to provide copies of the EMP documents to local, provincial and federal authorities who satisfy the following conditions:

- The authority has/is willing to participate in consultations with KMC;

- The authority could be called upon to respond to an event associated with the Trans Mountain Pipeline system within their jurisdiction;
- The authority has requested a copy and/or requires a copy by legislation, and
- The authority has signed a confidentiality agreement and/or has a method by which the document can be filed confidentially.

b) The National Energy Board (NEB) is responsible for auditing the Emergency Management Program (EMP) as part of the Integrated Safety and Loss Management System. Trans Mountain cannot speculate as to what the NEB will audit or choose to check on as oversight for the corrective actions. Kinder Morgan Canada (KMC) does complete all corrective actions identified in any audit of its systems.

c) The Application, Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency management.

1.10.10 Marine Oil Spill Training and Response Exercises

Reference:

i. Volume 7, Section 4.8.2.4 *Training and Exercises* (A56025, A3S4V5, p.72);
ii. Volume 7, Section 4.8.2.5 *Spill Response Tactics* (A56025, A3S4V5, p.73)
iii. Volume 8A. Section 1.4.2.5 *Western Canada Marine Response Corporation* (A56025, A3S4X3, p.52)

Preamble:

In this section, and on page 7-40 (in pdf page 27-84), reference is made to training of responders and of exercises, both tactical and tabletop.

The application states that Western Canada Marine Response Corporation maintains its certification by "undertaking a number of equipment deployment exercises, tabletop exercises, and oil spill response training course and scenarios".

Request:

a) What training in Marine Spill Response was given in the last ten years
   1) for WCMRC contractors
   2) for WCMRC staff
   3) for local authorities and first responders for First Nations

b) How many trained staff are available for response within 2 hours?

c) Of the staff identified in b, please provide details of availability of response at any given time of day or night.

d) Of the staff identified in b, please provide details of availability of response during weekdays, weekends and statutory holidays.

e) Please provide details of all exercises conducted involving local emergency services, including the scale of exercise, outcomes, and role of local emergency services?

f) What personal protective equipment are staff trained to use?

g) Under what circumstances are staff trained to use personal protective equipment.

h) Please provide details of all worst case scenarios developed for use in exercises by WCMRC for marine incidents, and clearly explain the process and factors used for establishing worst case scenarios.

i) Please provide details on the number of trained personnel required to respond to the above listed worst case scenarios, including those required to respond for all roles at the site and at all emergency or incident command or coordination centres.

j) Please provide details on the locations of where the above listed staff would deploy from in the event of an emergency in the Burrard Inlet or at any point along the pipeline.

k) Please provide details on all complicating factors impacting responder timelines that have been tested through exercises, and any improvement plans to mitigate these potential impacts currently in place.

l) Please provide details of all cross-border deployment exercises and include the time it took to deploy cross border resources by sea, air, or land.

m) Please provide detailed information on attendees, frequency, and training content for each type of exercise, course, and scenario undertaken by WCMRC.

Response:

a) The WCMRC training program for the last ten years cannot be supplied by Trans Mountain. Accordingly, Trans Mountain encourages the City of Vancouver to contact WCMRC directly to obtain that information.

b) The 2-hour planning standard does not currently apply to WCMRC as per current CSA 2001 regulations; it is part of proposed enhancements to support the Trans Mountain Expansion Project. In all cases WCMRC operates on a tiered response basis linked to the spill location. A WCMRC duty officer manages 24/7 response dispatch. Please refer to the responses to City Burnaby IR No. 1.25.01b and 1.25.01c for specific personnel numbers.

c) Please refer to the response to City of Vancouver IR No. 1.10.10b.

WCMRC, both currently and in the enhanced proposal to support the Trans Mountain Expansion Project, is capable of responding on a 24/7 basis. For detailed information on their operation, please see *A3S5I9, Application Volume 8C, TERMPOL Reports, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendations on Bases and Equipment.*

d) For background information, please refer to the responses to City of Vancouver IR No. 1.10.10b and 1.10.10c. WCMRC has an internal roll call process for staff and contractors during holiday and weekends. Trans Mountain encourages the City of Vancouver to contact WCMRC directly to obtain further information on their internal call-out procedures.

e) WCMRC conducts certification exercises on Geographic Area of Response basis. Local municipalities are invited to participate as stakeholders, observers or within an ICS section. For example, WCMRC has invited Local Royal Canadian Mounted Police officers, health services, including ambulance services, fire services, local emergency planners and customs/border services to these exercises. These exercises follow a rotation of:

- 150 Tonne on-water deployment (annual),
- 1000 Tonne Tabletop (annual),
- 2500 Tonne on-water deployment (every 2 years),
- 10,000 Tonne Tabletop (every 3 years)

WCMRC has a workshop with the Emergency Planners in Burrard Inlet scheduled to introduce and discuss the work completed within the WCMRC Geographic Response Strategies Development Program. The City of Vancouver is encouraged to contact WCMRC if additional information is required.

f) WCMRC trains staff to employ atmospheric monitoring equipment to determine the required level of personal protective equipment (PPE). Responders with WCMRC are qualified to respond up to Level C, which consists of:

- Full or half-mask air purifying respirators with NIOSH approved cartridges
- Chemical-resistant suit
- Double layer of chemical-resistant gloves
- Chemical–resistant boots with steel toes and shank
- Eye protection if a half-mask respirator is worn

Trans Mountain encourages the City of Vancouver to contact WCMRC directly to obtain further information on their health and safety training program. General information on PPE can also be found in the response to Cowichan Tribes IR No. 1.08m.

g) The use of personal protective equipment (PPE) is standard operating procedure in spill response; for detailed information on PPE training please refer to the response to City of Vancouver IR No. 1.10.10f.

h) Trans Mountain cannot supply the detailed information on the WCMRC exercise program requested; accordingly the City of Vancouver is encouraged to contact WCMRC directly to obtain that information.

i) In general, WCMRC uses staff personnel (please refer to the responses to City Burnaby IR No. 1.25.01b and 1.25.01c for specific personnel numbers) as well as third party contractors, Fishermen's Oil Spill Emergency Team (FOSET) members, consultants and advisors. For specific information staffing response roles, the City of Vancouver is encouraged to contact WCMRC directly to obtain that information.

j) WCMRC primarily responds to spills in the navigable waters of British Columbia; as such they would respond to incidents associated with the Westridge Marine Terminal and a ship-sourced spill along the shipping route. Currently, WCMRC's main response facility is located in Burnaby with additional personnel and equipment available by cascade from Port Metro-Vancouver, Duncan and Prince Rupert, in addition to equipment caches located along the mainland coastline and Vancouver Island. Third-party contractors and mutual aid partners can also provide supplemental resources to WCMRC's assets.

In support of the Trans Mountain Expansion Project, additional response resources have been proposed. Detailed information on these proposed enhancements can be found in: *A3S5I9, Application Volume 8C, TERMPOL Reports, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendations on Bases and Equipment.*

k) To reduce the time it takes for a response to be initiated, WCMRC currently has strategically located equipment caches and trained contractors at different locations within their Geographic Area of Response. Enhancements to these resources, including new response base locations, have been proposed to support the Trans Mountain Expansion Project. Please see *A3S5I9, Application Volume 8C, TERMPOL Reports, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendations on Bases and Equipment* for more information on this proposal.

l) In conjunction with the Canadian Coast Guard and the US Coast Guard, WCMRC has participated in the CANUSPAC and CANUSDIX exercises. Cross-border communications and deployment exercises and training sessions have been conducted with the Marine Spill Response Corporation (MSRC) in Washington State. WCMRC personnel have also attended classroom and on-water training programs as part of the Northwest Oil Spill Control Course (NWOSCC) instructed by Texas A&M University. Although WCMRC has developed internal procedures to expedite border crossings to ensure a quick response, border-crossing times will ultimately depend on the urgency of the situation and the active participation of various trans-border agencies.

m) Please refer to the response to City of Vancouver IR No. 1.10.10e for information regarding exercise frequency.

The WCMRC exercise program is detailed in their Oil Spill Response Plan (OSRP), which is approved by Transport Canada. These exercises utilize a defined scenario that includes notification, spill assignments, and the activation of spill management personnel. WCMRC uses the Incident Command System (ICS) so that all parties are able to cohesively work together under a common management system. In addition to WCMRC personnel and contractors, exercise participants have included representatives from the Canadian Coast Guard, Environment Canada, British Columbia Ministry of Environment, Transport Canada, and First Nations. Local RCMP officers, ambulance services, fire services, local emergency planners, port representatives and other non-governmental organizations such as Islands Trust and university students have also attended WCMRC exercises.

1.10.11 Hazardous and Noxious Substances

Reference:

i. Volume 8A, Section 1.4.1.9 *International Conventions* (A5602, A3S4X3, p.45)
ii. Volume 8C, TERM POL 3.1, Section 1.2, *TERMPOL Review Process* (A56023, A3S4R6, p.6)
iii. Transport Canada. (2010). *Ship-Source Hazardous & Noxious Substances (HNS) Incident Preparedness and Response Regime*. Found online at: http://www.tc.gc.ca/media/documents/marinesafety/HazardousNoxiousSubstancesPaper.pdf
iv. Transport Canada. (2001). *TERMPOL Review Process.* Section 3.20 Hazardous and Noxious Liquid Substances (part 3-21). Found online at: http://www.tc.gc.ca/publications/EN/TP? 43/PDF/H R/TP? 43E.pdf
v. IMO 2010 HNS Convention. (2010). *An overview of the international convention on the liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea.* Found online at: http://www.imo.org/OurWork/Legal/HNS/Documents/HNS%200verview.pdf
vi. Volume 8A, Section 5.4.4 *Fate and Behaviour of Accidental Project-Related Diluted Bitumen Spills: Fate and Behaviours of Accidental Project-Related Diluted Bitumen Spills* (8A- 554) (A56025, A3S4Y5, p.23)

Preamble:

As per reference 'i', the Application states that Canada has ratified all IMO Conventions, however, Canada is not a signatory to the OPRC-HNS Protocol (reference iii).

Reference 'ii' states that the TERMPOL 3.20 study on Hazardous and Noxious Liquid Substances is not relevant to this project. However, the TERM POL review process laid out by Transport Canada (reference iv) states that "the Proponent should follow the developments related to the HNS Convention and implementation of national/regional Chemical Response Regimes if applicable." Section 15 of the IMO HNS Convention Overview document (reference v) states that "non-pollution damage caused by persistent oil, e.g. damage caused by fire or explosion, is covered by the Convention".

As per reference 'vi', the application describes the diluent in the Cold Lake Winter Blend as condensate that "is rich in lighter hydrocarbons that are both volatile and relatively water soluble" with a "relatively high potential to cause acute toxicity to aquatic life, or to cause irritation or injury to human receptors".

Given the above information, and the fate, behaviour, and volatility of the diluent in diluted bitumen when spilled, along with the risk of fires or explosions, it is unclear why TERMPOL 3.20 was not deemed relevant. It also appears unlikely that a response to a spill or fire or explosion involving diluted bitumen could be managed under the current oil spill response regime.

Request:

a) Please identify all circumstances in which the OPRC-HNS Protocol would, if signed, be applied to incidents involving tankers carrying diluted bitumen.

b) Please explain why Trans Mountain has not completed TERMPOL Report 3.20, given the highly volatile nature of diluted bitumen, and the fact that the HNS Convention includes damage caused by fire or explosions of persistent oil.

c) Please confirm whether Trans Mountain has considered the capacity of the current response and preparedness regime to respond to H NS incidents, including fires, explosions or burning spills on board or from any vessel carrying any product that may be shipped from Westridge terminal, and collisions with vessels carrying other HNS.
   1) If Trans Mountain has considered this, please provide relevant documentation including methodology and outcomes of the risk analysis, and a capacity and gap analysis with recommendations to reduce risk.
   2) If not, please explain why Trans Mountain does not believe that this is relevant to this project.

d) Please provide an analysis of preparedness and response capacity to address HNS incidents including fires and explosions on board tankers carrying diluted bitumen and other types of oil products, and for incidents involving collisions between tankers and other vessels carrying hazardous and noxious substances.

Response:

a) As discussed below, Trans Mountain has not identified any credible circumstances in which the HNS Protocol would apply to Project tankers loaded with crude oil (including diluted bitumen).

The circumstances in which the HNS Protocol applies to tanker incidents are provided in detail in Reference (v). The following response clarifies some of these circumstances as they may be relevant to the Application and this information request (IR).

Canada is taking steps to implement the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea 2010, commonly termed the “HNS Convention.” Should Bill C-3, *Safeguarding Canada's Seas and Skies Act* pass into law, Part 4 of Bill C-3 (sects. 28 to 56) would amend Part 6 of the *Marine Liability Act* to bring the bulk of the HNS Convention into force in Canada in due course for most vessels. The Convention is not yet in force internationally. That will happen 18 months after 12 States (including at least four States with not less than two million units of gross tonnage) have expressed their desire to be bound, and when those persons in such States who would be liable to contribute to the HNS Fund shall have received at least 40 million tonnes of contributing cargo to the General Account of the Fund during the preceding calendar year. If Bill C-3 is duly enacted in its present form, it may well be brought into force on the date when the Convention comes into effect internationally — a date unknown as yet.

For the purposes of the HNS Protocol, a Hazardous and Noxious Substance is defined as any substance other than oil which if introduced into the marine environment is likely to create hazards to human health, harm living resources and marine life, damage amenities or interfere with other legitimate uses of the sea.

The OPRC-HNS Protocol ensures that ships carrying hazardous and noxious substances are covered by preparedness and response regimes similar to those already in existence for oil incidents. Furthermore, the HNS Convention provides a regime of liability and compensation for pollution damage from ships, quite similar to the liability and compensation regime that already exists for oil tankers — especially tankers carrying persistent oils. In fact, Bill C-3 is structured to involve the Ship-Source Oil Pollution Fund (SOPF) in managing the HNS compensation regime and interacting with the HNS Fund, which will be set up in a manner that is similar to the International Oil Pollution Compensation (IOPC) Funds. Trans Mountain notes that Canada's SOPF already includes damages from both persistent and non-persistent spills, providing coverage that is more comprehensive than IOPC Funds and not dependent upon the HNS Protocol. If oil [or any designated Hazardous and Noxious Substance (HNS)] was released from a vessel, the vessel owner would be the Responsible Party (RP). Trans Mountain is not responsible for such releases.

Given that a robust oil spill liability and compensation regime already exists, the effect of Bill C-3 on tankers carrying persistent oils would be very minimal. It would only expand liability and compensation coverage to cover damage from risks of fire and explosion as well as for loss of life or personal injury, if beyond the capacity of the ship's insurance. As the risk of a fire and explosion on a project tanker is an extremely low-likelihood event, in effect no credible circumstances have been identified in which the OPRC-HNS Protocol would apply to Project tankers loaded with crude oil.

b) The classification of cargo is divided in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL), of which Canada is a signatory.

- Annex I, Regulations for the Prevention of Pollution by Oil — Covers prevention of pollution by oil from operational measures as well as from accidental discharges; amendments made to Annex I in 1992 made it mandatory for new oil tankers to have double hulls
- Annex II, Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk — Details the discharge criteria and measures for the control of pollution by noxious liquid substances carried in bulk
- Annex III, Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form — For the purpose of this Annex, "harmful substances" are those identified as marine pollutants according to the International Maritime Dangerous Goods Code (IMDG Code) or which meet the criteria in Appendix of Annex III.

As is clearly noted above, oil tankers are regulated under MARPOL Annex I. Thus, in the scope of TERMPOL studies, it was in agreement with Transport Canada that the

decision was made not to include TERMPOL 3.20, which would be applicable for a tanker regulated under MARPOL Annex II.

Please also refer to the response to City of Vancouver IR No. 1.10.11a.

c) Given that Trans Mountain Project tankers carry crude oil exclusively and do not carry items classified as hazardous and noxious substances as cargo, this information request (IR) is not relevant to the Project.

d) Trans Mountain believes appropriate and credible information on marine risk has been included with the Application [see Technical Report 8C-12 in Volume 8C, TERMPOL 3.15, "General Risk Analysis and Intended Methods of Reducing Risks—Trans Mountain Expansion Project" (Det Norske Veritas, November 2013)] to enable the appropriate level of risk assessment and risk-informed decision-making to have been conducted in accordance with the National Energy Board's Letter, "Filing Requirements Related to the Potential Environmental and Socio-Economic Effects of Increased Marine Shipping Activities, Trans Mountain Expansion Project" dated September 10, 2013. No additional analysis is contemplated.

1.10.12 Marine Fire Fighting Capacity

Reference:

i. Volume 8C, TERMPOL 3.18 -Contingency Planning, Section 2 *Westride Marine Terminal* (A56030, A3S5J9, p.S)*;* Section 3 *Shipboard Contingencies* (A56030, A3S5J9, p.7);
ii. Volume 8A, Section 5.2.2 *Probability of a Spill in the Marine Environment Related to the Project* (A56025, A3S4Y3, p.291)

Preamble:

Reference 'ii' lists fires/explosions as a potential accident that could result in an oil spill.

Reference 'i' identifies contingencies that should be planned for including fire and explosion at Westridge Marine Terminal, and on board vessels at berth. However, there are not detailed contingency plans included to respond to fires on vessels or at berth beyond reference to the shipboard emergency plans. It is unclear whether the current requirements for shipboard emergency plans, or the contingency plans at Westridge Marine Terminal are sufficient for responding to fires or explosions, or what capacity exists regionally to respond to shipboard or terminal fires or explosions.

Request:

a) Please describe in detail what consideration has been given to fires aboard vessels at the terminal?

b) Please provide detailed procedures and contingencies for response to a vessel fire that could not be adequately responded to via the shipboard contingency plan.

c) Please explain why or why not Trans Mountain feels that shipboard emergency plans are sufficient to respond to shipboard fires on a vessels carrying diluted bitumen or any other product that could be shipped from Westridge Marine Terminal.

d) What response capability is present locally for response to: accommodation or engine room fire on board a tanker, or to a cargo fire on board a tanker?

e) How much fire-fighting foam is available for response at Westridge Marine Terminal, where, of what type?

f) What communications are available to vessels for emergency contact and with whom? Please provide specific protocols for notifying local authorities, WCMRC, Trans Mountain, vessels in the area, other impacted or at risk stakeholders.

g) Please provide information on all exercises or drills conducted with vessels in the last 10 years to test communication protocols for shipboard vessels, including after action reports.

h) What is the response time for local emergency responders to Westridge Marine Terminal?

i) What is the response time for WCMRC responders to Westridge Marine Terminal?

j) Please provide details of all exercises and training that have included fires and explosions at the Westridge Marine Terminal and on board vessels at sea and at the terminal.

k) Please describe the potential impact to the public from a fire or explosion at Westridge Marine Terminal and the procedures to notify local authorities of the risk.

l) Please describe the compensation regime for damage related to fires or explosions occurring at the Westridge Marine Terminal.

Response:

a) Fire onboard a tanker of the type that will be used by the Project (modern Aframax and Panamax tankers) is prevented by adhering to a strict systems approach that includes global regulation on tanker design, construction methods, preventative equipment and processes such as: maintaining cargo tanks in inert condition at all times; only fitting or using intrinsically safe equipment; crew training; inspections; surveys; audits; and certification. Since the implementation of mandatory use of inert gas on all crude oil tankers, the threat of cargo-related fire and explosion onboard a tanker has been almost eliminated. The advent of double-hull tankers has further reduced such threats as a result of collisions or other high-energy impacts. Tanker crews are trained to maintain an onboard environment that is free of ignition threats, and various prevention and detection elements are designed in tanker construction. Thus, a cargo-related fire on a Project tanker is not considered a credible incident.

The ship's machinery spaces are protected with fixed firefighting equipment, such as CO_2, high expansion foam and water mist systems. Using such systems, a fire in any of these spaces can be extinguished effectively.

Fire in a vessel's galley or accommodation can be managed effectively with use of the ship's firefighting equipment by the crew such as fire hoses and extinguishers or, depending on the space, fixed equipment such as sprinklers. Please see Section 3.8 in Technical Report 8C-9 in Volume 8C, TERMPOL 3.11, "Cargo Transfer and Transshipment Systems — Trans Mountain Expansion Project" (Det Norske Veritas, November 2013) for information on firefighting equipment a tanker would carry as a result of international regulations. The probability of a fire in the galley or accommodation escalating into a fire and explosion involving the cargo is also a remote event and thus not considered credible.

The possibility of a fire involving cargo during cargo operations is of extremely low likelihood. Tanker cargo tanks are kept in inert condition (oxygen content less than 8 per cent) at all times, even while loading the tank, obviating the possibility of fire or explosion involving the tankers cargo tanks. At Westridge, vapour generated in a tanker's cargo tanks during loading is collected and piped to shore for processing. The combined effect of a "closed loading system" further reduces the likelihood of a fire during cargo loading.

For more information, please refer to Volume 8C, TERMPOL 3.10, 3.11 and 3.15.

b) Please see Volume 8C, TERMPOL 3.11, "Cargo Transfer and Transshipment Systems—Trans Mountain Expansion Project" and the attached Marine Emergency Duties Training Courses (Transport Canada, TP 4957E) and Tanker Safety, Crude Oil Washing and Inert Gas, and Supervisor of Transfer Operations Training Courses (Transport Canada, TP 8129E) documents. TP 4957E is based on the International Maritime Organization's model course covering emergency training items the staff of a ship must undertake. TP 8129 E is also based on an International Maritime Organization model course and shows the special training a tanker crew must have before serving on a tanker. The IMO model courses are common to all countries that train seafarers. These are examples of the many additional training courses seafarers serving on Project tankers must take in qualifying to serve, in addition to other studies required for crew to be certified as competent if serving in a supervisory position. Such training will prevent fire onboard; should a fire occur, it will ensure the crew has the ability to deal with it effectively while mitigating its impact.

See City of Vancouver IR No. 1.10.12b – Attachment 1 and Attachment 2.

c) Please refer to the responses to City of Vancouver IR No. 1.10.12a and 1.10.12b.

d) Aside from mandatory response capability on the vessel, Westridge Marine Terminal has the capacity to apply water and foam to the deck of a tanker at Westridge (please refer to the response to City of Vancouver IR No. 1.10.12e). If necessary, water can be supplied to the vessel's fire mains using the international shore connection. Several tugs have the capability to apply their water cannons on a vessel and carry out boundary cooling or firefighting. There are ongoing discussions between Port Metro Vancouver (PMV) and cities and municipalities in Metro Vancouver to develop additional capacity for trained firefighters who can assist in case of any ship fire in the harbour. Trans Mountain understands that discussions with cities and municipalities in Metro Vancouver could also extend to the procurement of additional fire boats. Please refer to the response to Province of BC IR No. 1.1.78a.

e) Current available fire fighting foam for response at Westridge Marine Terminal includes:

- Stored at Westridge Marine Terminal:
    - 5,600 liters of low temperature Aqueous Film-Forming Foam (AFFF) concentrate as charge in portable foam trailer.
- Stored at Burnaby Terminal (approximately 4 kilometers away):
    - 37,850 liters of low temperature AFFF concentrate,
    - 3,000 liters of FP-70 foam concentrate

If needed, additional quantities can readily be obtained from other Kinder Morgan Canada terminals and also through mutual aid partners.

Reviews, updates and enhancements to the Kinder Morgan Canada Emergency Management Program are currently being undertaken which could result in changes to emergency response materials inventory levels, including fire suppression equipment and consumables. The Application, Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

f) Notification of an emergency by the vessel would follow that outlined in the response to City of Vancouver IR No. 1.10.04a. The vessel has the option to use onboard radios (VHF and MF/HF), satellite communications, or cellphone if available onboard and within range.

g) International Safety Management (ISM) Code requires that all vessels, as part of the ship's safety management system, exercise emergency communications protocols with their shore management. Prior to starting cargo at Westridge dock Ship–shore communication protocols are set and tested on every vessel in accordance with the Ship/Shore Safety Checklist. This is done between the tanker, the Loading Master and Westridge shore operations. Communication between these parties is also checked periodically during the entire loading process.

h) A report of a release related to the Trans Mountain terminals or pipelines received by the Kinder Morgan Canada Inc. control centre would result in the immediate shut down of pumps, closure of valves, and dispatch of field operations personnel to investigate the report. The maximum response time for field operations personnel to arrive on site is not defined. While there are loading operations at Westridge Marine Terminal there is enough response capacity at the terminal to ensure back up booms and initial response efforts are underway and complete within one hour, as per Transport Canada regulations.

Trans Mountain cannot comment on the response time for municipal services. This question would be better asked of the City of Burnaby.

Table 5.5.3 of the Application, Volume 8A provides a summary of existing and proposed enhanced planning standards for the Western Canada Marine Response Corporation including responses times.

i) Please refer to the response to the City Burnaby IR No. 1.25.01h.

j) Please refer to the response to NEB IR No. 1.69a for a list of exercises for the past 5 years. Kinder Morgan Canada (KMC) is responsible for the safe operation of the Westridge Marine Terminal and is not responsible for the operation of the vessels that call there.

The Application, Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of Project. The final programs will be

developed in a manner consistent with the NEB's draft conditions related to emergency management.

k) Please see the Application, Volume 7 for information in regards to the risk assessments and impact. Please refer to the response to NEB IR No. 1.75a for information on the continuing education programs for local authorities, and see the Application, Volume 7, Section 4.8 for information on the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency management.

l) Damages caused by Trans Mountain at the Westridge Marine Terminal are the liability of Trans Mountain. Please refer to the responses to NEB IR No. 1.08a to 1.08h.

1.10.13 Trans Mountain Spill Response Resources

Reference:

i. Volume 7, Section 4.5.1 *Internal Response Equipment* (A56025, A3S4V5, p.60)

Preamble:

Reference 'i' describes Oil Spill Containment and Response (OSCAR) units that are placed along the Trans Mountain, and provides a general description of their contents as containing "a minimum of 750ft. of containment boom, skimmers, sorbents, pumps, temporary storage, tools, and personal protective gear;" and, in some cases "extra specialized equipment to meet the specific needs of the local area." Table 4.5.1 in Reference 'i' lists specific OSCAR units, but provides no additional information (with the exception of linear feet of boom). Without a detailed inventory of the OSCAR unit contents, it is impossible to assess their capability and limitations.

The application does not indicate whether Trans Mountain intends to increase the number of OSCAR units along the Trans Mountain route if the expansion project is approved.

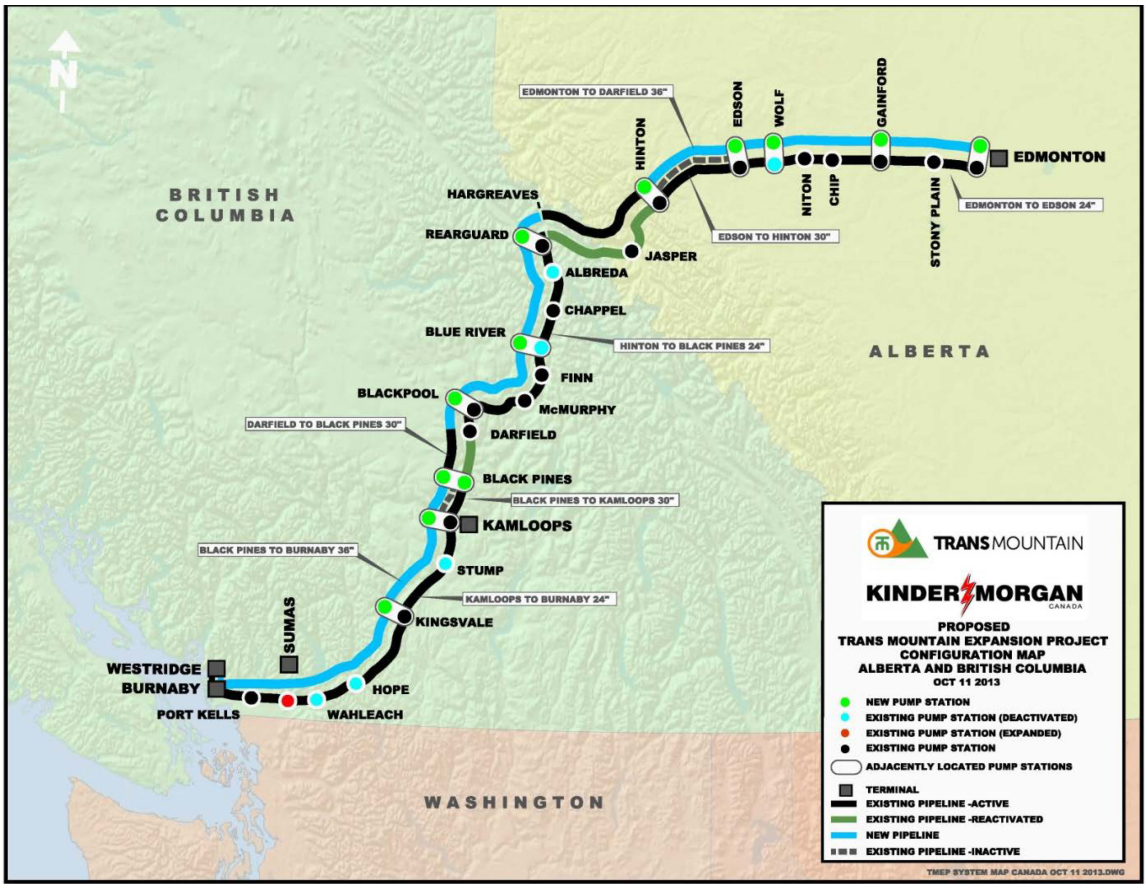
Request:

a) Provide inventory lists and a location map for the seven OSCAR units that are currently along the Trans Mountain route. Equipment specifications should include:
   1) response boat specifications (type and size of vessel, including engine),
   2) boom type and size,
   3) number and type of skimmers (including nameplate capacity),
   4) quantity and type of sorbents (boom, pads, absorbent or adsorbent, etc.),
   5) configuration (tanks, bladders, etc.)and capacity (storage volume) of temporary storage devices,
   6) types of tools,
   7) amount and types of PPE, and
   8) specifications for "specialized equipment.

b) Clarify whether additional OSCAR units will be acquired and where they will be located to enhance spill response capability along the pipeline route if the TMX is approved.

Response:

a) Location map and inventory lists of OSCAR unit equipment at locations along the existing Trans Mountain Pipeline are shown below:



Project Location Map

Westridge Terminal OSCAR Trailer	Burnaby OSCAR Trailer	Hope OSCAR Trailer
2 Marker Buoys 1 Boom Bridles/Paravanes 300 ft Containment Boom (additional 550 ft stored at Terminal location) 2 Valves/Fittings 16 Hand tools 3 lengths Hose 14 lengths Rope 7 bales Sorbents 1 Oil Skimmer 100 Miscellaneous 12 sets PPE 25 Miscellaneous Safety Equipment 1 Jon Boat and Ancillaries (Boat is not stored in the Trailer) 1 boom deployment boat (moored in water at Dock 59)	22 Anchors 4 Boom Vanes 35 Cable Assemblies 20 lengths Chain 43 Drive-In Pins 20 Marker Buoys 34 Shackles 1200 ft Containment Boom 5 Boom Bridles/Paravanes 10 lengths Rope 60 Boom Ancillaries 63 Valves/Fittings 18 Hand tools 53 lengths Hose 100 Miscellaneous 15 Bales Sorbents 4 Storage Tanks 7 Transfer Pumps 20 Sets PPE 140 Miscellaneous Safety Equipment 3 Oil Skimmers 1 Jon Boat and Ancillaries (Boat is not stored in the Trailer)	8 Anchors 1 Cable Assemblies 20 lengths Chain 12 Drive-In Pins 13 Marker Buoys 23 Shackles 750 ft Containment Boom 6 Boom Bridles/Paravanes 3 Boom Ancillaries 18 Valves/Fittings 5 Rope 26 Hand tools 18 lengths Hose 100 Miscellaneous 12 Sorbents 4 Storage Tanks 5 Transfer Pumps 12 PPE 63 Miscellaneous Safety Equipment 3 Oil Skimmers 1 Jon Boat and Ancillaries (Boat is not stored in the Trailer) 2 Winter Response Equipment

Kamloops OSCAR Trailer	Blue River OSCAR Trailer	Jasper OSCAR Trailer
24 Anchors 4 Cable Assemblies 23 lengths Chain 36 Drive-In Pins 13 Marker Buoys 18 Shackles 1100 ft Containment Boom (additional 4,150 ft of boom stored at the station site) 5 Boom Bridles/Paravanes 79 Boom Ancillaries 6 Valves/Fittings 10 lengths Rope 34 Hand tools 37 lengths Hose 100 Miscellaneous 14 bales Sorbents 6 Storage Tanks 7 Transfer Pumps 10 sets PPE 106 Miscellaneous Safety Equipment 3 Oil Skimmers 1 Jon Boat and Ancillaries (Boat is not stored in the Trailer) 10 Winter Response Equipment	24 Anchors 3 Cable Assemblies 20 lengths Chain 49 Drive-In Pins 12 Marker Buoys 16 Shackles 1200 ft Containment Boom 6 Boom Bridles/Paravanes 50 Boom Ancillaries 33 Valves/Fittings 10 lengths Rope 27 Hand tools 30 lengths Hose 100 Miscellaneous 17 Sorbents 3 Storage Tanks 7 Transfer Pumps 12 sets PPE 114 Miscellaneous Safety Equipment 3 Oil Skimmers 1 Jon Boat and Ancillaries (Boat is not stored in the Trailer) 1 Jet Boat and Ancillaries (Boat is not stored in the Trailer) 68 Winter Response Equipment	23 Anchors 30 Cable Assemblies 48 lengths Chain 16 Marker Buoys 16 Shackles 900 ft Containment Boom 6 Boom Bridles/Paravanes 43 Boom Ancillaries 10 lengths Rope 32 Valves/Fittings 32 Hand tools 38 lengths Hose 50 Miscellaneous 10 bales Sorbents 3 Storage Tanks 9 Transfer Pumps 10 sets PPE 120 Miscellaneous Safety Equipment 3 Oil Skimmers 1 Jon Boat and Ancillaries (Boat is not stored in the Trailer) 63 Winter Response Equipment
Stony Plain OSCAR Trailer		
23 Anchors 6 Cable Assemblies 16 lengths Chain 36 Drive-In Pins 13 Marker Buoys 1200 ft Containment Boom 6 Boom Bridles/Paravanes 42 Boom Ancillaries 75 Valves/Fittings 10 lengths Rope 37 Hand tools 30 lengths Hose 80 Miscellaneous 12 bales Sorbents 2 Storage Tanks 5 Transfer Pumps 10 sets PPE 110 Miscellaneous Safety Equipment 3 Oil Skimmers 1 Jet Boat and Ancillaries (Boat is not stored in the Trailer) 62 Winter Response Equipment		

Edmonton Terminal

Due to the proximity of Stony Plain Station and its unit, no OSCAR unit is used at Edmonton terminal. The stockpile of emergency response supplies and equipment located here includes sorbents, pumps, temporary storage, tools personal protective gear, cold weather response equipment, 15,000 gal of foam concentrate, portable foam trailer and foam cannon.

b) Decisions regarding acquisition of additional OSCAR units and their location to enhance spill response capability will occur as part of Kinder Morgan Canada's update of its Emergency Management Program as described in Section 4.8.2.1 of Volume 7. Section 4.8 of Volume 7 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency response.

1.10.14 Emergency Management Improvements

Reference:

i. Volume 7, Section 4.8.1 *External Emergency Management Plans and Improvements* (A56025, A3S4V5, p.65)

Preamble:

Reference 'i' describes the 2013 Land Based Spill Preparedness and Response Symposium sponsored by the BC Ministry of Environment, and describes KMC's participation in the symposium and follow-on work groups as a representative of the Canadian Energy Pipeline Association (CEPA). It is not clear how KMC's participation in this process relates to improvements to their company emergency management and oil spill response programs, particularly since KMC participated on behalf of an industry trade group.

Reference 'i' identifies several "key considerations" discussed through this effort, including response organization, oversight and advisory committees, geographic response plans, responder training, response time, sampling requirements, spill reporting, and natural resource recovery. However, this section does not identify any specific measures or actions taken or contemplated by KMC to improve oil spill preparedness or emergency response for the TMX by implementing these types of initiatives.

Request:

a) Clarify whether the KMC representative(s) that participated in the Land Based Spills Symposium and follow-on work groups did so on behalf of KMC or the CEPA.

b) Identify specific measures or actions that KMC has taken or intends to adopt based on the key considerations discussed during the symposium and work group processes.

c) Discuss how KMC plans to address the key considerations listed on pages 7-40 and 7-41 of Reference 'i':
   1) response organization,
   2) oversight and advisory committees,
   3) geographic response plans,
   4) responder training,
   5) response time,
   6) sampling requirements,
   7) spill reporting, and
   8) natural resource recovery.

Response:

a) The Kinder Morgan Canada (KMC) personnel who participated in the Land Based Spills Symposium and follow-up work groups did so on behalf of the Canadian Energy Pipeline Association (CEPA).

b) As a leader in emergency response in British Columbia Kinder Morgan Canada Inc. (KMC) presented at the symposium and one of the key presentations with regard to petroleum release human health air monitoring was based on work completed for KMC. This work led to the development of a program KMC has implemented.

The key considerations discussed at the symposium were with regard to the development of a world leading emergency response regime in British Columbia. KMC will continue to participate in the multi-stakeholder advisory committee as a member of the Canadian Energy Pipeline Association and provide emergency response expertise to further this important objective.

c) As described in Section 4.8.1.1, KMC has taken a leadership role and engaged early in the land based spill initiative consultation process by submitting comments in response to the Province of BC intentions paper. KMC understands from this process that a number of items that were identified as being important elements and that the details specific to each of the elements would be developed during the implementation phase.

The Province of British Columbia has not yet introduced or enacted legislation referred to in Section 4.8.1.1 of Volume 7 that will formalize the discussions and requirements for land based spill preparedness and response. Because the detailed legislation is not yet available for review, KMC has not developed specific plans to address the considerations mentioned at this time.

KMC's Emergency Management Program is under review. Application Volume 7, Section 4.8 outlines the process to enhance KMC's existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of TMEP. The final programs will be developed in a manner consistent with the National Energy Board's (NEB's) draft conditions related to emergency management.

1.10.15 Emergency Response Plans and Improvements

Reference:

i. Volume 7, Section 4.8.2.2 *Equipment Review and Availability* (A56025, A3S4V5, p.71)

Preamble:

Reference 'i' describes a planned process to review KMC and Trans Mountain spill response capacity. Page 7-44 of reference 'i' describes the elements to be evaluated, but does not explain the methodology that will be used to determine "if the existing Trans Mountain OSCAR units have sufficient equipment and capacity for the expanded system" and the other factors listed. The type of review described is important and it is surprising that this level of review has not already been undertaken. The final bullet in this list indicates that a component of the review will involve "cataloging all existing resources and defining future needs." Given the breadth of studies and reviews that KMC has conducted to prepare this application, it is unclear why they have not undertaken a basic inventory of their existing spill response capability.

The bullet list at the top of page 7-45 in reference 'i' specifies that additional equipment needs for the Westridge Terminal may include "an approximate 250 tonne oil spill response capacity including boom and skimmer to deal with dock-side spills." Since KMC has not yet undertaken a spill response capacity analysis, what is the basis for the 250 tonne oil spill response capacity need assessment? The response capacity is described in tonnes here, while other components of the application use cubic meters.

Request:

a) Conduct all of the analyses specified in Section 4.8.2.2 of reference 'i' and provide reports for review that include methodology and results for studies that assess:
   1) Sufficiency of present capacity of OSCAR Units to manage additional spill risks from TMX;
   2) Current locations of all equipment caches in the context of strategic deployment;
   3) Review of inventory of available response equipment, including trained personnel and logistical support components, available through formal and informal mutual aid programs to support a KMC/TMX spill response; and
   4) Inventory of all existing resources and define future needs.

b) Provide a comprehensive description of the spill response capacity that will be in place should the TMX application be approved, including additional resources along the pipeline route and at the Westridge Marine Terminal. Calculate spill capacity to demonstrate containment, recovery, transfer, and storage capabilities in terms of volume of oil recovered over time.

Response:

a) The information requested for item 2 can be found in Section 4.5.1, Table 4.5.1 of Volume 7.

The remainder of other information, analysis and reports requested is currently being developed as part of Kinder Morgan Canada's update of its Emergency Management Program as described in Section 4.8.2.1 of Volume 7. Section 4.8 of Volume 7 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of the Project. The final programs will be developed in a manner consistent with the NEB's draft conditions related to emergency management.

b) The Application Volume 7, Section 4.8 outlines the process to enhance Kinder Morgan Canada's (KMC) existing emergency management programs as they relate to the Trans Mountain Pipeline system to address the needs of TMEP. The final programs will be developed in a manner consistent with the National Energy Boards (NEB) draft conditions.

1.10.16 Spill Response Tactics

Reference:

i. Volume 7, Section 4.8.2.5 *Spill Response Tactics* (A56025, A3S4V5, p.73)
ii. Volume 7, Section 4.8.2.5.2 *In-Situ Burning* (A56025, A3S4V5, p.74)
iii. Volume 7, Appendix F *Special Tactics for Spill Response* (A56025, A3S4W7, p.17)

Preamble:

In-situ burning is listed a possible tactic for removal of spilled oil. In-situ burning emits a large column of black smoke. This could involve evacuation of citizens for days or longer.

Reference 'i' discusses spill response tactics and indicates that standard spill control tactics used by KMC are described in Control Point Manuals, but examples of these manuals were not provided for review. The control point manuals show how KMC would approach containment and recovery of a spill from the TMX to a river or watercourse based on tactics presently used for the KMPL. These manuals should be provided for review as part of the application as they are representative of the type of response tactics that would be used to mitigate a spill from the TMX.

This section discusses the use of dispersants and in situ burning to mitigate spills from the pipeline or marine terminal. The discussion indicates that KMC intends to seek preapproval for the use of these techniques in order to "expedite the decision making process, reduce the recovery time substantially and allow remediation work to begin earlier than if a purely mechanical recovery was utilized." This statement makes fairly broad assumptions about the potential efficacy of in situ burning or dispersants, both of which have operating limits related to water salinity and oil type, and also have significant human and ecological health and safety considerations. Given that spills from pipeline and facility operations would impact inland or nearshore waters, it is unclear how in situ burning or dispersants would fit into a response. Use of both response options is typically restricted near sensitive coastlines or in proximity to population centers.

Reference 'i' describes in situ burning as "one of the techniques that has been explored to scientific depth". This statement is confusing and implies that other response methods, such as mechanical containment and recovery, have not been studied.

Request:

a) Provide copies of existing Control Point Manuals to demonstrate the tactics and techniques that KMC typically uses to contain and control spills to rivers and watercourses.

b) Clarify KMC's intentions regarding the use of dispersants and in situ burning as spill response countermeasures for spills to inland rivers or watercourses and coastal inlets and estuaries.

c) Explain the relevance of "scientific depth" of exploration associated with in situ burning to the selection of response methods for a TMX pipeline or facility oil spill.

d) Is in-situ burning considered as a spill response method for a spill in the Burrard Inlet, Indian Arm, English Bay or the Fraser River Delta?

e) If in-situ burning was used as a response tactic, what provisions for evacuation of citizens is contemplated should wind and weather cause the smoke to impact residential areas?

f) Please provide details on the expected effects of in-situ burning on all types of products being shipped.

g) Please provide details on the specific health and safety risks of in situ burning of diluted bitumen, including conditions when it would and would not be safe for the public or responders to conduct in-situ burning of diluted bitumen.

h) Please provide air dispersion modeling for the different scenarios where in-situ burning may be used.

i) Please provide details of how in situ burning would be managed, including the training required and the location and response time of trained personnel

j) Please provide details of contingency plans that would be used if in situ burning was used as a tactic.

k) Please provide details of the availability of emergency responders to manage in situ burning.

Response:

a) The Emergency Management Program (EMP) documents contain information which is proprietary and of a sensitive nature, and due to security concerns it is not publically available. KMC is willing to provide copies of the EMP documents to local, provincial and federal authorities who satisfy the following conditions:

- The authority has/is willing to participate in consultations with KMC;
- The authority could be called upon to respond to an event associated with the Trans Mountain Pipeline system within their jurisdiction;
- The authority has requested a copy and/or requires a copy by legislation; and
- The authority has signed a confidentiality agreement and/or has a method by which the document can be filed confidentially.

b) Dispersants and in-situ burning are not approved for use. In the event of a spill response, strategies would be developed under an Incident Command Structure and approved by Unified Command. This structure is expected to include Environment Canada and the BC Ministry of Environment who would provide advice on environmental priorities. Any decision to use dispersants or in-situ burning would be based on net environmental benefit analysis and would need approval of the appropriate regulatory authorities.

c) The term 'scientific depth' is intended to indicate that although the technique of in situ burning has been known and used for many years, it has not been scientifically evaluated until recently (Fingas 2011). The relevance is that in situ burning has now been scientifically evaluated in the same way as other spill countermeasures in respect to short and long term environmental costs and benefits. This allows Unified Command, regulators and other federal and local officials to make informed decisions as to which technique or techniques are most appropriate.

Reference:

Fingas, M. 2011. Oil Spill Science and Technology, Prevention, Response, and Cleanup. Chapter 23. Gulf Professional Publishing. ISBN: 978-1-85617-943-0. Pp. 737-903.

d) Please refer to the response to City of Vancouver IR No. 1.10.16b.

The use of in situ burning is unlikely near populated areas.

e) Please refer to the response to City of Vancouver IR No. 1.10.16d.

f) In general terms, the effects of in situ burning on the suite of petroleum types to be transported in Lines 1 and 2, in the event the Project receives approval, would be:

1) Combustion of a moderate to high percentage of the product, expressed as combustion efficiency, in the immediate burn location depending on product type, levels of emulsification and weathering, while confined within fire resistant booming on water, or on the ground surface and near surface for land-based spills) (Fingas 2011);

2) Generation of products of combustion including particulates (smoke), unburned product, various gases and water vapour;

3) Emission of heat into the air around the burn and into the upper layer of the substrate;

4) Creation of a residual product from incomplete combustion, ranging from unburned product to a tar-like substance which is easily recovered from the water surface (Fingas 2011).

The table below shows general combustion efficiency and flame sootiness of in situ burning of various generic product types (after Fingas 2011):

Product	Sootiness of Flame	Burning Efficiency Range
Gasoline	medium	95-99%
Diesel	very high	90-98%
Light Crude	high	85-98%
Medium Crude	medium	80-95%
Heavy Crude	medium	75-90%
Emulsified Crude Oil	low	30-60%

Reference:

Fingas, M. 2011. Oil Spill Science and Technology, Prevention, Response, and Cleanup. Chapter 23. Gulf Professional Publishing. ISBN: 978-1-85617-943-0. Pp. 737-903.

g) As described in Section 5.5.1.4 of Volume 8A, in situ burning is not one of the methods pre-approved for oil spill response. It would only be considered on a case-by-case basis through consultation with federal and local authorities and experts.

Details on the specific health risks of in situ burning of diluted bitumen are not available at this time. The general safety risks in the immediate response area include reduced visibility in areas impacted by the smoke plume, the heat generated by the in situ burning, exposure to volatiles evaporating from spilled product and inhalation of products of combustion in high concentrations. The safety risks can be mitigated through PPE use by responders and maintaining the immediate area downwind of the burn free of vessel traffic including response vessels.

In the event of a spill response, strategies would be developed under an Incident Command Structure and approved by Unified Command. This structure is expected to include Environment Canada and the BC Ministry of Environment who would provide advice on environmental priorities. Any decision to use in-situ burning would be based on net environmental benefit analysis and would need approval of the appropriate regulatory authorities.

h) Air dispersion modeling for the different scenarios where in situ burning may be used depends upon incident specific criteria not currently available.

i) In-situ burning (ISB) would be managed through the Unified Command. In-situ burning is not pre-approved as a response strategy. In the event of a spill response, strategies would be developed under an Incident Command Structure and approved by Unified Command. This structure is expected to include Environment Canada and the BC Ministry of Environment who would provide advice on environmental priorities. Any decision to use in-situ burning would be based on net environmental benefit analysis and would need approval of the appropriate regulatory authorities. The decision to approve ISB will largely be governed by the protection of human health and the efficacy of ISB in the specific incident under consideration. Because ISB creates a dense smoke plume, burning in or near population centers is unlikely to be approved.

Should ISB approval be granted for a marine spill trained WCMRC personnel would execute the countermeasure. Training to execute ISB focuses on the safe use of a gelled accelerant and maintaining the thickness of the slick to sustain ignition. WCMRC maintains a limited stock of fireboom, the specialized containment boom required to concentrate the slick to a sufficient thickness to sustain ignition, and purpose-built ignition equipment. Response time to deploy the equipment to the in-situ burn site will depend upon the area approved for burning.

j) Because there is no pre-approval for in-situ burning (ISB) and conditions surrounding the countermeasure are situationally dependent, a unique burning plan will be developed by the Unified Command as part of the ISB application.

k) Please refer to the response to City of Vancouver IR 1.10.16i.

1.10.17 Marine Spill Response Capacity

Reference:

i. Volume 8C, TERMPOL report TR 8C-12 S12: Future Oil Spill Response Approach (A56030, A3S513 & A3S514 & A3S515 & A3S516 & A3S517)
ii. EDRC Project Final Report. Prepared for Bureau of Safety and Environmental Enforcement by Genwest, Inc. December 2012. BSEE contract## E12-PD-00012
iii. ASTM F2683-11. Standard Guide for Selection of Booms for Oil Spill Response

Preamble:

Reference 'i' indicates that WCMRC intends to develop a Tier 5 spill response capacity, to respond to a marine oil spill up to 20,000 m^3. The report identifies a number of initiatives related to spill planning and preparedness, and as an intentions document shows a strong approach to building spill response capacity. Page 14 of the report references three initiatives currently underway that will inform WCMRC's approach. These reports should be made available upon completion to provide a clearer picture of WCMRC's future capacity.

Figure 4-1 in reference 'i' shows an example of a GRP that was developed for Rocky Point Mudflats near the Westridge Terminal. This GRP lacks critical detail, and contains some information that does not conform with best practices for GRP development. For example:

- "General purpose boom" is not a term of art. Boom is typically classified by operating environment based on several international classification schemes (e.g. Reference 'iii').
- The use of 4 anchors to hold a 3,500-foot boom array is not likely to be sufficient.
- Typical rules-of-thumb for anchoring protective booming arrays call for 1 anchor every 500 feet at minimum. In high current areas, anchor sets may be deployed every 100-200 feet.
- A 3,500-foot boom array would only be feasible under very calm and low-current conditions. The GRP does not indicate what the prevailing currents would be at that location. Table 8-2 indicates that currents may be as high as 3 m/s. Conventional boom cannot hold against a current in excess of 0.5 m/s.
- The GRP does not clarify whether the booming strategy is tide-specific (e.g. flood or ebb).
- The level of specificity in anchor points (lat/lon) may be too detailed. Sometimes coordinates are provided for fixed anchor points, but in the case of marine anchors, it is often best to leave field responders some discretion in setting anchors. Additional directions or verbiage on the GRP could address this.

The initial analysis of response base location (Section 5) is useful, but specific bases should be identified and more detailed logistical analyses performed to ensure that the bases can support the desired response capacity.

Reference 'i' (Section 8) acknowledges the limits of operating conditions on spill response tactics. A detailed response gap analysis should be performed to evaluate the frequency that on-water response conditions exceed response equipment operating limits.

The report repeatedly discusses response capacity and quantifies the intended response capacity for various spill response bases. The method suggested for calculating response

capacity (Section 2) relies on a very simple formula used by Transport Canada. There has been a great deal of recent research into more accurate methods for calculating response capacity based on the complexities associated with encountering, skimming, pumping, and storing oil and oily water (reference 'ii'). Once WCMRC has developed their response inventories, a more sophisticated analysis of response capacity should be performed to estimate the capacity. Field exercises should be conducted to demonstrate response timing and logistics.

Request:

a) Provide copies of WCMRC studies (as referenced on page 14 of reference 'i') for review when completed:
   1) Benchmarking study
   2) Gap analysis
   3) Roadmap

b) Provide examples of full GRPs as part of TMX application.
   1) Ensure that strategies represent best industry practices.
   2) Where possible, use standardized classification systems for spill response equipment.
   3) Conduct field exercises to verify feasibility of deployment, and adjust strategies to incorporate lessons learned.
   4) Provide full equipment inventories and response capacity analysis to demonstrate capability to meet Tier 5 (20,000 m^3) response as well as specified capacity for each response base.

c) Has Trans Mountain considered factors that could impact response personnel response time? If so, please provide a detailed list of factors that could impact response time and any contingencies that have been considered to ensure adequate and timely response.

d) What is the expected response time of local Emergency Services?

e) What is the expected response time of WCMRC contractors?

f) What is the expected response time of WCMRC Spill Responders?

g) Please provide details of the availability of staff to respond with details of minimum and maximum numbers by time of day and day of year.

h) Please provide a detailed assessment of the size of the workforce including trained response personnel and others that would be required to respond to a worst case scenario spill.
   1) Where would the workforce for a worst case scenario spill in Canadian waters be drawn from?
   2) Does WCRMC or Kinder Morgan Canada have sufficient staff for an extended response to a worst case scenario spill? If not, please describe where the workforce would be drawn from and the anticipated response time.

Response:

a) Copies of the three WCMRC studies requested in this Information Request cannot be supplied by Trans Mountain. Accordingly, Trans Mountain encourages the City of Vancouver to contact WCMRC directly to obtain that information.

b) Please note that a Tier 5 response does not currently exist; it has been proposed to support the Trans Mountain Expansion Project, under review by the NEB. An equipment inventory and response capacity analysis associated with Tier 5 is detailed in: *A3S5I9, Application Volume 8C, TERMPOL Reports, TR 8C-12 S12 – Review of Trans Mountain Expansion Project Future Oil Spill Response Approach Plan Recommendations on Bases and Equipment*.

Trans Mountain does not keep information regarding the development of WCMRC's project to update area coastal maps, GRPs and GRSs. Accordingly, Trans Mountain encourages the City of Vancouver to contact WCMRC directly to obtain that information.

Please refer to the response to Province BC IR No. 1.1.65a.

c) Please refer to the responses to City of Vancouver IR No. 1.10.10k and NEB IR No. 1.65c.

d) Trans Mountain cannot provide specific information on the expected response time of local Emergency Services. Accordingly, the City of Vancouver is encouraged to contact those agencies directly.

e) Please refer to Section A3S519, Application Volume 8C, TERMPOL Reports, Future Oil Spill Response Approach Plan - Recommendations on Bases and Equipment, Section 3.3 for a general discussion of WCMRC's proposed tiered response times. Trans Mountain cannot provide specific information on the expected response time of WCMRC contractors. Accordingly, the City of Vancouver is encouraged to contact WCMRC directly to obtain that information.

f) Please refer to Section A3S519, Application Volume 8C, TERMPOL Reports, Future Oil Spill Response Approach Plan - Recommendations on Bases and Equipment, Section 3.3 for a general discussion of WCMRC's proposed tiered response times. Also. Please refer to the response to City of Vancouver IR No. 1.10.10b.

g) Please refer to the response to City of Vancouver IR No. 1.10.10c.

h) Please refer to the response to Tsawout FN IR No. 1.36aa.

1.10.18 Pre-SCAT Project

Reference:

i. Volume 8C, TERMPOL TR 8C-15 S15: Pre-SCAT Briefing (A56030, A3S5KO)
ii. Volume 8C, TERM POL TR 8C-12 S11: Method for Estimating Shoreline Oil Retention (A56030, A3S518)

Preamble:

Reference 'i' provides an October 2013 project brief for a Pre-Spill SCAT project to be conducted in Central Burrard Inlet. The brief notes that the project will be completed in January 2014. The completed data and report was not provided for review.

The briefing does not indicate how the Pre-SCAT assessment data will be correlated with the Method for Estimating Shoreline Oil Retention described in reference 'ii'.

Request:

a) Provide a copy of the Pre-SCAT project data and final report for review.

b) Explain how the methodology in reference 'ii' relates to the Pre-SCAT shoreline characterization described in reference 'i'.

Response:

a) The report, entitled: “Central Burrard Inlet Pre-spill SCAT” (Reimer et al. March 17, 2014) is undergoing internal review and is not yet final.

Reference:

Reimer, Doug, Gary Sergy and Karaline Reimer. March 17, 2014 draft in review. “Central Burrard Inlet Pre-Spill SCAT”. Contract project report prepared for Trans Mountain Pipeline ULC and Kinder Morgan Canada.

b) There is no direct relationship or correlation of the Central Burrard Inlet Pre-spill SCAT study (reference i) with the reference ii report “Methods for Estimating Shoreline Oil Retention” prepared by John Harper (hereafter referred to as the Harper report). These are two different studies done for different objectives. That being said, the following provides an explanation of how they relate or do not relate to each other in methodology or concept.

The Harper report was done for the purpose of supporting spill modeling associated with the assessment of accidental diluted bitumen spills. It assessed the existing (historic) ShoreZone dataset for a very large area (northern Vancouver Island to Washington), extracting and summarizing from a large dataset, those selected attributes most relevant to spill modelling and specifically (for modelling) to estimate initial oil retention, should a diluted bitumen spill reach the shoreline.

The Central Burrard Inlet Pre-spill SCAT project, collecting very detailed information on the area surrounding the Westridge Marine Terminal, was a task specific spill preparedness study aiming to provide a more effective and decisive shoreline response to a marine spill event. Although some of the information, such as oiling conditions, must be collected real time during a spill, a large amount of directly relevant shoreline information can be assembled pre-spill and a dataset of knowledge critical to advance the SCAT process and best practice shoreline response decision-making can be prepared in advance in the form and quality that would be needed in the event of a spill. The dataset is housed in a specialized pre-spill SCAT database. Where possible it is desirable to collect/assess certain data during the pre-spill period when there is more time available to address issues, rather than in the initial stressed emergency stage.

Despite differences in basic objectives, there are a number of areas of methodological or conceptual commonality between Harper's study and the pre-spill SCAT study.

In the pre-spill SCAT study, the description of marine shorelines followed the Environment Canada national standards, including definitions of shoreline type, backshore type, substrate type, primary and secondary shoreline. These standards were supplemented with additional terms and definitions as needed to properly characterize the complex manmade environment of Burrard Inlet and some unique aspects of BC environment shorelines, namely sediment veneer covered bedrock platforms. The determination of overall shoreline type for a particular segment is typically based on the primary shoreline type. As is common standard for SCAT in Canada, this typically refers to the clearly predominant shoreline character located in the upper intertidal zone. This is the zone in which oil usually becomes stranded and where treatment or cleanup activities take place. That being said, the physical characterization of the shoreline extends across the entire intertidal zone and the across-shore zone data is a primary building block for mapping.

Likewise, the ShoreZone mapping also includes considerable detail across shore, however for the explicit purpose of the Harper study and derivations, the upper intertidal zone was of greatest interest and importance, and the upper intertidal substrate description of each shore unit was included and used as the most accurate representation for use in spill retention. In this the two studies have focused on the same intertidal zone priority. For purposes of the Harper study, thirteen "Spill Shore Types" were extracted from the dataset and selected to assess shore oil retention. These same shore types - substrate types - used in the Harper study are also represented within the larger suite of substrates types defined, used and mapped in the pre-spill SCAT study, i.e. the latter has more subdivisions of the same substrate. In this again the two studies use the same basic terms or concepts. Finally, Harper selected use of the ORI (oil residence index) as one of the attributes, this also being one of the attributes mapped in the pre-spill SCAT study.

As a part of the pre-spill SCAT study, selections are made for each segment on what would be the most appropriate cleanup techniques. This is based on the substrate type, and what techniques work best on this substrate under anticipated oil conditions. As

there is limited data on dilbit behaviour on the shoreline, predictions of dilbit behaviour were made by extrapolation on the fate and behaviour of other conventional oils and this included using the Harper report information and estimates of oil retention.

1.11 Spill Impacts

1.11.01 Socio-Economic Effects of an Oil Spill

Reference:

i. Volume 8A, Section 5.6.1 *Socio Economic Effects* (A56025, A3S5Q3, p.5)

Preamble:

Reference 'i' claims that there is complexity in predicting socio-economic effects, due to issues including:

- constant change occurring in the socio-economic conditions of any community or region, influenced by an array of economic, political and cultural factors;
- a lack of precise information about goods, services and employment demands for hypothetical spill scenarios.

There is no explanation of the methods that Trans Mountain employed to access the above information in order to apply it to a hypothetical spill model. Socio-economic impacts are regularly modelled for hypothetical scenarios including disasters of all kinds, and substantial data and methodologies exist to be able to do this.

Reference 'i' also refers to the Exxon Valdez Oil Spill (EVOS) as a "the largest and best studied example of the effects of a large oil spill on many aspects of the cold water marine environment, and of communities and residents who live near, or depend on marine resources".

None of the hypothetical spills that Trans Mountain has considered include scenarios similar to those surrounding the EVOS. In particular the socio-economic landscape of the Burrard Inlet and surrounding geography are substantially different. There are a number of well documented oil spills and oil related incidents that have occurred in densely populated, high traffic areas that would provide a better proxy for assessing the potential socio-economic effects of a spill.

Request:

a) Please identify any oil spills or incidents occurring in densely populated areas that Trans Mountain considered in its socio-economic impact assessment.

b) If others have been identified, please explain why they have not been used to evaluate the potential socio-economic effects of a spill.

c) Please provide an assessment of the socio-economic effects of these spills, and in particular the impacts on local governments.

d) Please describe mitigation measures that should be implemented based on lessons from other spills to limit the negative effect of oil spills in urban areas.

e) Please describe which methodologies were considered for assessing the socioeconomic impacts of spills and why Trans Mountain decided not to conduct a comprehensive assessment despite the availability of multiple methodological approaches.

Response:

a) Trans Mountain searched for reports or references documenting the socio-economic effects of oil spills and found no references for densely populated areas other than the 2007 spill resulting from third-party damage to the existing Trans Mountain Pipeline Westridge delivery line in Burnaby.

b) Socio-economic effects of the 2007 Westridge delivery line spill were incorporated into the socio-economic effects discussion in Section 6.3, Volume 7 of the Application.

c) Effects on local infrastructure and services are described in the Application, Section 5.6.1.3.3, Volume 8A and specific effects of the 2007 Westridge delivery line spill on property, human health, local infrastructure and services, and community well-being are described in Sections 6.3.1, 6.3.2, and 6.3.3 of Volume 7.

d) Socio-economic effects of the 2007 Westridge delivery line spill were incorporated into the socio-economic effects discussion in Section 6.3, Volume 7 of the Application.

e) Trans Mountain discussed a number of options to fulfill the National Energy Board requirements to assess the potential environmental and socio-economic effects of credible worst case and smaller spills. These include economic valuation approaches (contingent valuation and passive use value methods) as well as development and assessment of one detailed spill and response scenario. Trans Mountain concluded that a risk-based approach that applied accepted models and methods and considered a number of scenarios appropriate to a linear system would provide more defensible information on credible events and the range of outcomes that could result depending on location, season, and volume of crude oil released.

The selected approach was patterned on the structured risk assessment approach developed to support the Aleutian Islands Risk Assessment (Transportation Research Board 2008). The first step involved a quantitative risk assessment to define the risk of spills from pipelines and project-related marine vessels, the size of spills that could credibly occur, and credible locations for those incidents. The second step involved a qualitative assessment of potential environmental and socio-economic consequences based on evidence from past oil spills and studies. Representative onshore and marine spill scenario locations were then selected for more detailed analysis of environmental and human health outcomes (please refer to technical reports TR 7-1, TR 7-2, and TR 7-3 in Volume 7 and TR 8B-7 and TR 8B-9 in Volume 8B). These more detailed analyses relied on widely accepted and commonly applied ecological risk assessment and human health risk assessment methods. Trans Mountain concluded that no such widely accepted method exists for predicting oil spill socio-economic effects and determined that the best approach to describe the range of socio-economic effects from credible worst case and smaller oil spills was to rely on evidence from past oil spills and studies and the 2007 Westridge delivery line spill.

The assessment provided in the Application confirms that, although the probability of a credible worst case crude oil spill is low, substantial negative effects can occur if prompt

and effective measures are not taken to mitigate the immediate impacts by containment and recovery. This confirms that spill prevention, preparedness, and effective response activities must always be a primary focus to reduce the probability of an oil spill, and to have adequate oil spill response plans and procedures in place that have proven capability to reduce the magnitude and extent of actual effects on people and the environment.

Reference:

Transportation Research Board. 2008. Risk of vessel accidents and spills in the Aleutian Islands, Designing a comprehensive risk assessment. Prepared for the Transportation Research Board of the National Academies by the Committee on the Risk of Vessel Accidents and Spills in the Aleutian Islands: A study to design a comprehensive risk assessment Risk Assessment. Transportation Research Board Special Report 293.

Summary of New Commitments:

- Consult with City of Vancouver and other municipalities about enhancements and improvements to the Emergency Management Program, including requirements for properly equipped and trained personnel and services along the proposed pipeline corridor.

1.11.02 Spill Clean-up Costs

Reference:

i. Volume 7- Risk Assessment and Management of Pipeline and Facility Spills (A56025, A3S4V5, p.35-84) & (A56025, A3S4V6, p.1-128
ii. Enbridge Energy, Limited Partnership. (2013). Before the Minnesota Public Utilities Commission (Docket No. PL-9/CN-13-153) *Application for a Certificate of Need for a Crude Oil Pipeline*, Found online at: https://VWJIN.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7bF1B13575-3071-4CAA-A86A-05CE1EBBCA38%7d&documentTitle=20138-90363-03, p.61.

Preamble:

In reference (i) Trans Mountain commissioned HJ Ruitenbeek Resource Consulting to provide an estimate of the potential cost of hypothetical spills and whether the financial assurance mechanisms set out in the application are adequate to cover those potential costs. HJ Ruitenbeek Resource Consulting concluded that the maximum financial exposure to a hypothetical "small" spill is estimated to be a maximum of $20 million. They also concluded that the largest hypothetical spill (4,000 m3) evaluated had a financial exposure of $160 million or, in a credible worst case, up to $300 million.

Reference (ii) refers to the current costs of responding to 20,082 barrels (approximately 3,200 m^3) of diluted bitumen into the Kalamazoo River, Michigan (i.e. Line 6B Enbridge). The costs for clean-up and remediation costs were reported to currently stand at $1,039,000,000.

Request:

a) Please explain in detail the methodology used by HJ Ruitenbeek Resource Consulting to arrive at the conclusion that a large hypothetical spill of 4,000 m3 (~25,000 barrels) would have a financial exposure of only $160-$300 million and provide the underlying data, reports or other information relied on in reaching this conclusion.

b) Please explain why the actual cost of cleaning up the spill in the Kalamazoo River(a spill smaller than the hypothetical spill) is more than triple the estimate in reference 'i'.

c) If the difference in cost is attributable to difference in jurisdictions between Canada and the USA, please provide information on these differences and explain why this influences Trans Mountain ULC's expected exposure.

d) Based on the actual clean-up costs at the Kalamazoo River information, please explain why Trans Mountain believes that the spill liability coverage of $750 million is sufficient to meet pollution, clean-up, restoration and third party compensation costs.

Response:

a) Please see the Application, Volume 7, Appendix G, and the responses within NEB IR No. 1.10 to describe and clarify the relevant assumptions relating to the analyses. Additional clarification on data sources is provided in the response to Allan R IR No. 1.18c.

b) Please refer to the response to City Burnaby IR No. 1.26.04a.

c) Please refer to the response to City Burnaby IR No. 1.26.04a. Additional treatment of jurisdictional influences is provided in the response to Allan R IR No. 1.18b.

d) Please refer to the response to City Burnaby IR No. 1.26.04a.

1.11.03 Marine Oil Spill Consequences

Reference:

i. Volume 8A, Section 5.2.3 *Volume of a Spill in the Marine Environment Related to the Project* (A56025, A3S4Y3, p.293)
ii. Volume 8C, TERM POL 3.15: General Risk Analysis and Intended Methods of Reducing Risk (A56029, A3S5F4 & A3S5F6 & A3S5F8)

Preamble:

Reference 'i' notes that Reference 'ii' does not make any attempt to quantify oil spill consequences based on any factor other than spill volume. This approach essentially ignores half of the risk equation. While spill volume typically contributes to spill severity and consequences, there are many other factors that influence the damages caused by an oil spill. Without considering these factors, it is impossible to estimate consequences and therefore impossible to accurately estimate overall risks.

A full consequence analysis should be performed to assess the potential impacts of the worst case oil spill scenarios presented, along with an additional scenario for vessels operating in the MRA. The consequence analysis should take into consideration sensitive receptors, seasonality, time to recovery, and other factors.

Request:

a) Perform a consequence analysis for all oil spill scenarios and use the consequence analysis, in combination with the probability estimates in the DNV report to provide a complete picture of potential oil spill risks from vessel, pipeline, and terminal spills to the marine environment.

Response:

a) A comprehensive marine risk assessment and environmental and socio-economic assessment has been completed and provided with the Application. Please see Volumes 8A, 8B and 8C.

1.12 Fate and Behavior of Diluted Bitumen

1.12.01 Gainford Literature Review

Reference:

i. Volume 7 (A56025)
ii. Volume 8C, TERM POL TR 8C-12 S7: A Study of Fate and Behavior of Diluted Bitumen Oils in Marine Waters (Gainford Study) (A56029, A2S5G2 & A3S5G4 & A3S5G5)
iii. Environment Canada, Fisheries & Oceans Canada, Natural Resources Canada, and CanmetEN ERGY.(November 30, 2013). *Federal Government Technical Report: Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands*.
iv. "Fate, Behaviour & Modeling of Spilled Oil Sands Products (Freshwater & Marine Environments)", Bruce Hollebone, Environment Canada. Presentation to Oil Sands Products Training, Seattle, WA 16 April, 2013.

Preamble:

Many of the assumptions throughout reference 'i' about the fate and behaviour of diluted bitumen spilled to Burrard Inlet are derived from reference 'ii'.

The report in reference 'ii' included a literature review which, according to the Executive Summary, "was conducted in the fall of 2012." The literature reviewed and cited in the report overlooks significant recent work. While some were published after the fall of 2012, the literature review should have been updated prior to report publication. The Gainford Study results are presented with little consideration for or reference to other ongoing work in this area, such as reference 'iii' and reference 'iv'.

Request:

a) Update literature review to include, at a minimum, a discussion of references 'iii' and 'iv' and how the Gainford Study methodology and results relate to these studies.

Response:

a) The Gainford Report was prepared and issued with the application. The reference list in that report reflects some of the references used and consulted as part of that work at that time. The full body of literature reviewed is more extensive (see for example the reference listing in Application 8C, “A Comparison of the Properties of Diluted Bitumen Crudes with other Oils” report.

Reference (iii), Government of Canada (2013) report was issued at nearly the same time the application was being filed. Reference (iv) is a slide presentation, which is not usually incorporated as part of a literature review. Literature reviews and updates are part of ongoing activities being undertaken by multiple organizations with interest in this and related applications.

For a listing of references consulted for the reports in the application and subsequent relevant studies, please refer to the response to Province of BC IR No. 1.1.73c.

For a discussion on comparisons of results between the Government of Canada work and the Gainford report, please refer to the response to NEB IR No. 1.61a.

References:

Application Volume 8C, TERMPOL Reports, TR 8C-12 S8 – A Comparison of the Properties of Diluted Bitumen Crudes with other Oils

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

1.12.02 Gainford Study Parameters

Reference:

i. Volume 7 (A56025)
ii. Volume 8C,TERMPOL TR 8C-12 S7: A Study of Fate and Behavior of Diluted Bitumen Oils in Marine Waters (Gainford Study) (A56029, A2S5G2 & A3S5G4 & A3S5G5)

Preamble:

Many of the assumptions throughout Reference 'i' about the fate and behaviour of diluted bitumen spilled to Burrard Inlet are derived from Reference 'ii'.

Reference 'ii' used tank tests to evaluate certain characteristics of diluted bitumen under simulated conditions to inform the overall understanding of how this product might behave when spilled to marine or estuarine waters. All laboratory and meso-scale studies are limited, to some extent, by the artificialities of test parameters. However, Reference 'ii' does not contemplate how the artificialities incorporated into the study may impact the findings. In many cases, results are presented as representative of real-world conditions without adequate discussion of how the study parameters may have influenced the results. Examples include:

- Water temperatures. The studies in Reference 'ii' were conducted at water temperatures much warmer than typical Burrard Inlet surface temperatures for most of the year. Test tank temperatures ranged from go to 23°C, with temperature variations of as much as 18°C in an individual tank over the course of the experiments. Such temperature extremes, which are not typical of Burrard Inlet surface waters over a 1 0-day period, can have a number of impacts on oil properties and characteristics that could have influenced the results. The average temperatures for all tanks ranged from 14.3 to 16.1 °C, which approximate summer conditions in Burrard Inlet but are much warmer than other seasons.

- Salinity. Water salinity ranged from 20-24 ppt, with averages between 20.6-22.5 ppt. Burrard Inlet salinities range from 20-25 ppt to 15 ppt. The higher salinity conditions used in the study are appropriate for part of the inlet, but do not approximate the lower salinities in the Indian Arm region or during freshet, nor do they address the potential for a freshwater lens at certain times of the year. Water salinity has a direct relationship to buoyancy, so the higher overall salinity values may underestimate the potential for weathered oil to approach neutral or negative buoyancy.

- Test oils. Reference 'ii' used winter blend oils (Cold Lake Winter Blend, CLWB, and winter specification Access Western Blend, AWB) tested under extremely warm summer conditions. Winter blend oils have lower density and viscosity than summer blends, because they are typically transported during colder conditions. The combination of a lower density test oil and warmer water temperatures may have influenced the oil fate and effect in a way that is not consistent with or representative of a potential spill. (In other words, it is highly unlikely that a winter blend oil will be spilled into Burrard Inlet under summer conditions.) This combination of unlikely conditions is not acknowledged in the report.

- Weathering conditions. Reference 'ii' characterizes the meso-scale tests as expanding the knowledge base by allowing for "simulated wave and current conditions that may be more typical of the marine setting of Burrard Inlet." However, methods used in Reference 'ii' to weather the diluted bitumen did not attempt to replicate currents, and fans and paddles were used to simulate wave conditions. The water depth in the tanks ranged from 1m to 1 .9m. The small tank sizes used for the weathering experiments did not provide an opportunity for slicks to spread as they would in an open environment, therefore components of weathering related to spreading were not accurately reflected.

- Duration of experiments. The experiments ended after 10 days, with no clear explanation as to the significance of this timeframe. The density curves for the subject oils showed that some were approaching neutral or negative buoyancy at the time the studies concluded. In Table 8-1, the study states that "only after extensive weathering may some portion become submerged or sink." Extending the duration of the experiments may have yielded additional information regarding the potential for submergence or sinking of oils over time, or the weathering thresholds that may lead to submergence or sinking. The experiments missed the opportunity to explore these behaviors.

The fact that there were artificialities in the study parameters is not unusual for this type of study, and does not invalidate the results. However, Reference 'ii' presents many of the observations from this one series of tests as authoritative reference points for how diluted bitumen oil spills would weather and behave in Burrard Inlet. Additional research is needed to understand the complex dynamics behind diluted bitumen fate and behavior.

Request:

a) Explain the influence of the following assumptions on the findings in Reference 'ii':
   1) The use of very warm water temperatures;
   2) Temperature extremes as large as 18°C on test results;
   3) Higher range salinities;
   4) The combination of winter blend test oils and summer water temperatures;
   5) The effect of shallow water depths and limited spreading to overall weathering; and
   6) Cutting off experiments at 10 days.

b) Conduct replicate experiments under winter conditions and compare results.

Response:

a) The information gained from the Gainford tests, as well as that available from SLRoss (2010, 2011) and Government of Canada (2013) are generally quite complementary and allow for modeling of diluted bitumen under assumed conditions distinct from those used for testing (please refer to the response to NEB IR No. 1.61a).

a) 1) The temperatures used for the tests were ambient conditions as thermal controls were not built into the tanks. Warmer water temperatures may lead to decreased viscosity, greater spreading, and faster rate of evaporation relative to the same oil on cold water (please refer to the response to City of Vancouver IR No. 1.08.05f).

2) The water temperature did not range by 18°C in any given tank. The largest range of temperature occurred over the duration of the tests given the warmer temperatures initially and a cooling trend over the course of the 10-days.

3) Higher salinities exist along the Strait of Juan de Fuca and lower salinities exist in freshwater systems. The rational for the salinities used for the tests are explained and potential differences in weathered oil behaviour in waters with lower salinities is noted in the same report.

4) please refer to the response to City of Vancouver IR No. 1.08.05f

5) The greatest effect of performing tests in tanks is confinement, which limits spreading; however, results serve to understand what may be a partially confined spill and can be extrapolated for modeling purposes. The depth of the tanks mostly affects the dilution potential for hydrocarbons into the underlying water, with tanks showing larger concentrations than what would be measured in an unconfined setting.

6) The 10-day test period was selected as that corresponds to the number of days for oil spill response and cleanup in current oil spill Response Organization (RO) planning standards.

References:

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

SL Ross, 2010. Properties and Fate of Hydrocarbons Associated with Hypothetical Spill at the Marine Terminal and in the Confined Channel Assessment Area. Technical Data Report prepared for Enbridge Northern Gateway.

SL Ross. 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway

b) Additional oil testing and related scientific and technical programs are subject of a Scientific Advisory Committee. It is Trans Mountain's intention to be a member of that Committee and support any research both financially and technically.

Please refer to the response to NEB IR No. 1.63a.

1.12.03 Sinking and Submerged Oil

Reference:

i. Volume 7 (A56025)
ii. Marshall, Michigan. (2013). *Dredging Begins on Kalamazoo River, US EPA information release*, Found online at:http://www.epa .gov/enbridgespill/pdfs/enbridge_fs_201308. pdf
iii. Volume 8C, TERMPOL TR 8C-12 S7: A Study of Fate and Behavior of Diluted Bitumen Oils in Marine Waters (Gainford Study) (A56029, A2S5G2 & A3S5G4 & A3S5G5)

Preamble:

Reference 'i' discusses the 2010 Enbridge Line 6B Kalamazoo River oil spill in many places. The fact that the diluted bitumen spill sank in the Kalamazoo River is acknowledged, but the extent of that sinking is significantly downplayed. Statements from Volume 7 of the application include:

> "The Marshall spill, into Talmadge Creek and Kalamazoo River, resulted in oil transport down river with most oil remaining on the water surface. A portion of the oil, mixed with river bank and/or suspended sediment, did submerge and in places sank." (page 7-71).

According to the USEPA (Reference 'ii'), as of May 2013, between 9% and 33% of the total volume of diluted bitumen spilled into the Kalamazoo River remains submerged on the river bottom. Between 162,000 and 168,00 gallons of the 843,000 gallon spill (close to 20%) will remain in the river as unrecoverable (US EPA 2013) Three years after the spill occurred, after significant efforts to remove oil from the river, its banks, and its bottom sediments, as much as 1/3 of the total spill volume remained submerged in the river. This fact suggests that "most oil" did not remain on the water surface.

Reference 'iii' emphasizes, "Neither of the two weathered dilbits sank under the conditions tested." (pg 2). The report acknowledges (pg 60) that the circumstances which have been observed to cause buoyant oils to sink in past spills and experiments - namely, fresh water and sediment loads -were not included in the trials. Therefore, it is questionable whether any conclusions can be drawn about potential sinking and submergence, absence experimental data that incorporates sediment loading.

Request:

a) Provide mass balance calculations from the Kalamazoo River spill to support assertions of "most" oil remaining on the water surface.

b) Explain how definitive statements can be made about diluted bitumen sinking behaviour given the fact that test conditions did not incorporate sediment loads or low salinity water.

Response:

a) Please refer to the discussion in Section 6.2.2.1 of the Pipeline ERA (Application B18-15_-_V7_TR_71).

b) Please refer to the response to City of Vancouver IR 1.08.05h.

1.12.04 Weathering Processes and Behaviour in Freshwater Environments

Reference:

i. Volume 7, section 5.2.8

Preamble:

The application includes information from the Gainford Sudy, designed to assess the weather behaviour of Access Western Blend and Cold Lake Winter Blend in a marine environment. There are no references to, or data from, behaviour studies conducted on freshwater environments.

Request:

a) Provide study data to explain the weathering behaviour of representative diluted bitumen blends in freshwater.

Response:

a) Please refer to SLRoss (2011) for tests done in a freshwater flume. Other data relevant to the weathering behaviour of representative diluted bitumen blends in freshwater are from case studies such as the Marshall (Line 6B) spill.

Please refer to the references listed in the response to Province BC IR No. 1.1.08a.

Reference:

SL Ross. 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway

1.12.05 Diluted Bitumen vs. "Conventional Heavy Crude Oil"

Reference:

i. Volume 8C,TERMPOL TR 8C-12 S7: A Study of Fate and Behavior of Diluted Bitumen Oils in Marine Waters (Gainford Study) (A56029, A2S5G2 & A3S5G4 & A3S5G5)
ii. "Submerged Oil," in Oil Spill Science and Technology, Edited by M. Fingas, Elsevier, Inc., 2010. pp 959-981.

Preamble:

A key focus of reference 'i' was to explore whether diluted bitumens "behave any differently than other heavy crude oils as they weather" (p.1). A key conclusion of the report was that "the behavior of both [diluted bitumen] products proved to be no different than what might be expected of so-called conventional heavy crude oils when exposed to similar conditions" (p. 2).

One problem with this assertion is that the authors never properly define what a "so-called conventional heavy crude oil" might be. There are no control experiments performed on a "conventional heavy crude oil" to support the observation that the diluted bitumen behavior mimicked a heavy crude oil.

Reference 'i' uses "heavy oil" and "heavy crude oil" interchangeably; however, from an oil spill fate and behavior perspective these two oil types behave differently. For example, a 2010 review of heavy oil spill incidents found that heavy fuel oils, such as Bunker C or Fuel Oil No.6 have a strong tendency to sink after sediment mixing, whereas the only heavy crude oils reported to have sunk in actual spills were heavy Venezuelan crudes (Michel, 2010).

Request:

a) Provide evidence of studies where "conventional heavy crude oil" was observed to behave "no differently" than diluted bitumen during similar trials.

b) Clarify which "conventional heavy crude oils" the authors are describing when comparing diluted bitumen fate and behavior.

Response:

a) Weathering tests of other heavy oils using the same testing equipment and conditions as those implemented at Gainford are not available. Tests of heavy oils, including crude oil, have been undertaken under other conditions. Information gained from tests and from actual spills provides for an assessment and comparison of the general behaviour of the oils for purposes of oil spill response, as discussed in Volume 8C TR8C-12 S8: A Comparison of the Properties of Diluted Bitumen Crudes with Other Oils.

Reference:

Application Volume 8C, TERMPOL Reports, TR 8C-12 S8 – A Comparison of the Properties of Diluted Bitumen Crudes with other Oils

b) Please refer to the discussion in Volume 8C TR8C-12 S8: A Comparison of the Properties of Diluted Bitumen Crudes with Other Oils.

Reference:

Application Volume 8C, TERMPOL Reports, TR 8C-12 S8 – A Comparison of the Properties of Diluted Bitumen Crudes with other Oils

1.12.06 Mechanical Recovery of Diluted Bitumen

Reference:

i. TERMPOL TR 8C-12 S7: A Study of Fate and Behavior of Diluted Bitumen Oils in Marine Waters (Gainford Study) (A56029, A2S5G2 & A3S5G4 & A3S5G5)
ii. "Fate, Behaviour & Modeling of Spilled Oil Sands Products (Freshwater & Marine Environments)", Bruce Hollebone, Environment Canada. Presentation to Oil Sands Products Training, Seattle, WA 16 April, 2013.

Preamble:

Skimmer tests described in Reference 'i' were conducted in relatively small tanks, which contained the oil and enhanced skimmer encounter rates. Skimmer testing began four hours after the release, on relatively fresh oil.

The results of these tests are described qualitatively as follows: "All of the skimmers proved effective in recovering the product, whether it was fresh, emulsified, or naturally weathered after a 10-day exposure to ambient element conditions." There is also an observation that "Vendors and contractors both agreed that under the test conditions this dilbit behaved no differently than other crude oils and proved to be mechanically recoverable by the skimming units tested." However, the recovery rates presented in Table 6-4 in Reference 'i' are never compared or related to recovery rates for the same equipment on other crude oils.

Page 54 of Reference 'i' contains an anecdotal observation that skimmer manufacturers would have preferred to begin the experiments with skimmers more suited to less viscous oils, and then switch to the brush skimmers later as the oil weathered and became more viscous. The fact that diluted bitumen products change quickly and dramatically as they weather has been described in the published literature, including Reference 'ii', which was presented at workshops held in December 2012 and April 2013. In fact, the quickly changing nature of diluted bitumen presents a spill response challenge because equipment that may be effective on Day 1 of a spill may not be effective by Day 3 or 4. This is an important practical consideration that is not reflected at all in the TMX application discussions of spill response equipment.

Request:

a) Provide empirical evidence to compare skimmer recovery rates for the equipment tested on diluted bitumen in Reference 'i' with tests conducted on other crude oils under similar conditions.

b) Explain how the quickly changing nature of diluted bitumen will be addressed in spill response planning and equipment stockpiling.

Response:

a) All skimmer manufacturers conduct extensive tests on their products according to established international standards. Some tests are executed with crude oils while other tests employ a special calibration blend specified by standard. Trans Mountain is not in possession of manufacturers' test data. Accordingly, Trans Mountain encourages the

City of Vancouver to contact the manufacturers directly if it wishes to review this information. Contacts for each equipment test participant in the Gainford Study are listed below:

Aqua-Guard Spill Response Inc.
#100 - 1055 West 14th Street North Vancouver, British Columbia Canada V7P 3P2
Email: sales@aquaguard.com
Tel: (+1) 604.980.4899
Fax: (+1) 604.980.956

DESMI Inc.
4021 Holland Blvd
Chesapeake, VA 23323, USA
Phone: (757) 857 7041
Fax: (757) 857 6989
E-mail: info@desmiusa.com

Lamor USA Corporation
155 Hill St.
Milford, CT 06460, USA
tel: +1 203 888 7700
fax: +1 203 888 7720
email: info@lamor.com

b) Please refer to the response to Katzie IR No. 1.11b.

1.12.07 Gainford Study Conclusions

Reference:

i. TERMPOL TR 8C-12 S7: A Study of Fate and Behavior of Diluted Bitumen Oils in Marine Waters (Gainford Study) (A56029, A2S5G2 & A3S5G4 & A3S5G5)

Preamble:

Table 8-1 in Reference 'i' presents "Frequently Asked Questions" that offer a mix of observations, some of which are not supported by the study's results. For example,

- The answer to "Does dilbit sink in water when spilled?" seems to be "possibly," but it is presented very indirectly and without any reference to the study.
- The answer to "Can dilbit be recovered using conventional skimmers" states that "a variety of skimmer systems, ranging from weirs to oleophilic units," but the experiments did not test any weir skimmers, so this statement is unsupported.
- The answer to the question of toxicity considers only BTEX. Toxicity was not addressed in this study, therefore the source of this information is unclear.
- The question about variability in weathering is answered with the statement that "The Gainford tests showed that the weathering patterns between CLB and AWB are similar and that oil physical and chemical properties are consistent with other heavy crude oil." The tests, in fact, looked only at winter blends of the two diluted bitumens, tested under summer conditions. There were no reference tests of "other heavy crude oils" that could be used to support the comparison.

The question of whether dilbit can be contained on water is answered with the statement that "Lab and meso-scale tests have consistently shown both AWB and CLB dilbits to float on freshwater and saltwater." No citations are provided for this broad generalization.

Request:

a) Provide references from within reference 'i' or in other published studies to support Frequently Asked Question responses regarding:
   1) Does dilbit sink or float.
   2) Recoverability of dilbit with weir skimmers.
   3) Relative toxicity of dilbit.
   4) Consistency of weathering between CLB and AWB, and comparability to "other heavy crude oils."
   5) Consistent demonstration that dilbit floats on water and therefore can be contained with floating barriers.

Response:

a) 1) Please refer to the response to City of Vancouver IR No. 1.08.05b and oil density results in tests conducted.

2) Conclusion drawn from initial equipment testing on fresh oil; note that weir skimmers have been used on heavy oil spills (see examples with the Prestige spill)

3) Refer to Vol. 8CA Comparison of the Properties of Diluted Bitumen Crudes with Other Oils, for comparisons of BTEX components in a range of oils

4) Reply states “The Gainford tests showed that the weathering patterns between CLB and AWB are similar and that oil physical and chemical properties are consistent with other heavy crude oil.” See additional discussion in Volume 8C TR8C-12 S8: A Comparison of the Properties of Diluted Bitumen Crudes with Other Oils.

5) The Gainford tests, Government of Canada (2013) studies, and SLRoss (2011) studies show that both AWB and CLB will float on water for days during which time “spill containment strategies and tactics for floating oils are quite applicable.”

References:

Application Volume 8C, TERMPOL Reports, TR 8C-12 S8 – A Comparison of the Properties of Diluted Bitumen Crudes with other Oils

Government of Canada, 2013. Properties, Composition, and Marine Spill Behaviour, Fate and Transport of Two Diluted Bitumen Products from the Canadian Oil Sands.

SL Ross. 2011. Meso-scale Weathering of Cold Lake Bitumen/Condensate Blend. Report prepared for Enbridge Northern Gateway