

**NATIONAL ENERGY BOARD**

IN THE MATTER OF the *National Energy Board*, R.S.C. 1985, c.N-7, as amended, and the Regulations made thereunder;

AND IN THE MATTER OF the *Canadian Environmental Assessment Act, 2012*, S.C., c.19, s.52, as amended, and the Regulations made thereunder;

AND IN THE MATTER OF an application by Trans Mountain Pipeline ULC as general partner of Trans Mountain Pipeline L.P. (collectively "Trans Mountain") for a Certificate of Public Convenience and Necessity ("Certificate") and other related approvals pursuant to Part II of the NEB Act.

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**WRITTEN ARGUMENT OF PIPEUP NETWORK**  
(Pro Information Pro Environment United People Network)

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## PART I: OVERVIEW

1. A high volume pipeline, tank farm and expanded marine transfer terminal in a densely populated urban area has the potential to devastate human health and the environment.
2. PIPEUP opposes the Trans Mountain pipeline proposal on the basis that net economic benefits are insufficiently probable and on the basis that the pipeline proposal generates risks to human health and the environment that cannot, on the evidence, be satisfactorily prevented or mitigated and remediated once they have occurred.
3. In the alternative, PIPEUP proposes that the NEB comply with a precautionary approach to adaptive management. This would necessitate the following before the Panel recommends that the Minister issue a s.52 certificate:
  - a. Cross-examination of experts by parties who have tendered expert evidence in key areas where expert evidence conflicts or there is uncertainty in respect of severe or irreversible harm;
  - b. Identification by the NEB of unacceptably severe and irreversible harms to human health and the environment and the imposition of specific conditions of construction that would prevent those unacceptable harms;
  - c. Imposition of specific mitigation methods that will adequately respond to worst-case spills and fires commensurate with past spill disasters; and
  - d. Imposition of remediation/compensation requirements that will ensure that the costs of spills is not shifted to taxpayers and a disaster management framework that will ensure that remediation of spills is not slowed to the pace of litigation or a pace desirable to the project proponent.

## PART II: INTRODUCTION

4. This is the final written submission of Pro Information Pro Environment United People Network (“PIPEUP”). The Panel granted intervener status to PIPEUP in the Ruling on Participation made April 2, 2014.
5. PIPEUP represents concerned citizens spanning the area from Hope to Surrey, British Columbia. PIPEUP members have local expertise and academic credentials in air quality, agriculture, water quality, fish and fish habitat, endangered species, and health and safety requirements for teachers and first responders. PIPEUP has engaged collaboratively with Fraser Valley residents through town hall meetings in Hope, Chilliwack, Abbotsford and Langley to share information and document residents’ concerns.

6. Many PIPEUP members have residences and farms on or near the proposed pipeline route or live close to future spills identified on the spill scenario maps. Members frequent the parks and trails on or near the proposed routes, and rely on the drinking water sources within the zone of risk created by the proposed pipeline. Children and grandchildren of PIPEUP members attend the many Fraser Valley elementary, middle and high schools in the path of the proposed pipeline.
7. PIPEUP makes its submissions on the basis of the expertise and interests of its members in strong and healthy communities and local environment.

### PART III: LEGAL PRINCIPLES: PRECAUTIONARY ADAPTIVE MANAGEMENT

8. PIPEUP respectfully submits that the NEB is bound to apply the principles of precautionary adaptive management to the adjudication of the issues arising under s.52 of the *National Energy Board Act* ("*NEB Act*").
9. Section 52 of the *NEB Act* provides as follows:

#### **Certificates**

52. (1) If the Board is of the opinion that an application for a certificate in respect of a pipeline is complete, it shall prepare and submit to the Minister, and make public, a report setting out

(a) its recommendation as to whether or not the certificate should be issued for all or any portion of the pipeline, taking into account whether the pipeline is and will be required by the present and future public convenience and necessity, and the reasons for that recommendation; and

(b) regardless of the recommendation that the Board makes, all the terms and conditions that it considers necessary or desirable in the public interest to which the certificate will be subject if the Governor in Council were to direct the Board to issue the certificate, including terms or conditions relating to when the certificate or portions or provisions of it are to come into force.

#### **Factors to consider**

(2) In making its recommendation, the Board shall have regard to all considerations that appear to it to be directly related to the pipeline and to be relevant, and may have regard to the following:

- (a) the availability of oil, gas or any other commodity to the pipeline;
- (b) the existence of markets, actual or potential;
- (c) the economic feasibility of the pipeline;
- (d) the financial responsibility and financial structure of the applicant, the methods of financing the pipeline and the extent to which Canadians will have an opportunity to participate in the financing, engineering and construction of the pipeline; and
- (e) any public interest that in the Board's opinion may be affected by the issuance of the certificate or the dismissal of the application.

### **Environmental assessment**

(3) If the application relates to a designated project within the meaning of section 2 of the [Canadian Environmental Assessment Act, 2012](#), the report must also set out the Board's environmental assessment prepared under that Act in respect of that project.

10. Section 19 of the *Canadian Environmental Assessment Act* ("CEAA") provides as follows:

### **Factors**

19. (1) The environmental assessment of a designated project must take into account the following factors:

- (a) the environmental effects of the designated project, including the environmental effects of malfunctions or accidents that may occur in connection with the designated project and any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;
- (b) the significance of the effects referred to in paragraph (a);
- (c) comments from the public — or, with respect to a designated project that requires that a certificate be issued in accordance with an order made under section 54 of the [National Energy Board Act](#), any interested party — that are received in accordance with this Act;

(d) mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;

(e) the requirements of the follow-up program in respect of the designated project;

(f) the purpose of the designated project;

(g) alternative means of carrying out the designated project that are technically and economically feasible and the environmental effects of any such alternative means;

(h) any change to the designated project that may be caused by the environment;

(i) the results of any relevant study conducted by a committee established under section 73 or 74; and

(j) any other matter relevant to the environmental assessment that the responsible authority, or — if the environmental assessment is referred to a review panel — the Minister, requires to be taken into account.

11. Section 4(1)(h) of the *CEAA* provides that the responsible authority should take steps to encourage sustainable development. Section 4(2) of the *CEAA* provides that the responsible authority must exercise its power in a manner that protects human health and the environment and applies the precautionary principle.

12. The Board determined in Hearing Order OH-001-2014, issued April 2, 2014, that its mandate with respect to this application is limited to consideration of 12 issues:

1. The need for the proposed project.
2. The economic feasibility of the proposed project.
3. The potential commercial impacts of the proposed project.
4. The potential environmental and socio-economic effects of the proposed project, including any cumulative environmental effects that are likely to result from the project, including those required to be considered by the NEB's *Filing Manual*.
5. The potential environmental and socio-economic effects of marine shipping activities that would result from the proposed project, including the potential effects of accidents or malfunctions that may occur.
6. The appropriateness of the general route and land requirements for the proposed project.

7. The suitability of the design of the proposed project.
  8. The terms and conditions to be included in any approval the Board may issue.
  9. Potential impacts of the project on Aboriginal interests.
  10. Potential impacts of the project on landowners and land use.
  11. Contingency planning for spills, accidents or malfunctions, during construction and operation of the project.
  12. Safety and security during construction of the proposed project and operation of the project, including emergency response planning and third-party damage prevention.
13. Hearing Order OH-001-2014 also determined that that the Panel would not 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. This limitation was confirmed by the Panel in Ruling No.25 issued July 23, 2014.
14. Ruling #14 determined that witnesses will not be tested by cross-examination, but only by means of Information Requests within a complex form of questioning consisting of preambles, references, and questions. Ruling #50 confirmed this limitation.

*Application of the Precautionary Principle*

15. The precautionary principle applies to the assessment of Trans Mountain's application. CEAA s.4(2) expressly provides that the NEB must apply the precautionary principle in the exercise of its powers.
16. The obligation to comport with the precautionary principle is entrenched in Canadian law. In *Spraytech*, L'Heureux-Dube, J., recognized the precautionary principle as an emerging principle of customary international law:

The interpretation of By-law 270 contained in these reasons respects international law's "precautionary principle", which is defined as follows in para.7 of the Bergen Ministerial Declaration on Sustainable Development (1990):

"In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

*114957 Canada Ltee (Spraytech) v. Hudson (Town of)*, 2001 SCC 40

17. The precautionary principle must be understood to be more than simply an exhortation to use caution, but it cannot be understood as a bar to economic development in the face of uncertainty or risk. To be clear: the precautionary principle does not mean that all development is halted or prohibited in the face of any risk or uncertainty. The precautionary principle is best understood as a set of administrative approaches to the evaluation of risk in the face of predictive uncertainty and mitigation of known risks.

*Castonguay Blasting Ltd. v. Ontario (Environment)*, 2013 SCC 52 at 20  
*Morton v. Minister of Fisheries and Oceans*, 2015 FC 575  
*Weir v. British Columbia (Environmental Appeal Board)*, 2003 BCSC 1441  
*Telstra Corporation Ltd. v. Horsby Shire Council*, [2006] NSWLEC 133  
*Environmental East Gippsland Inc. v. VicForests*, [2010] VSC 335  
*Sustain our Sounds Inc. v. The New Zealand King Salmon Co. Ltd.*, [2014] NZSC 40

18. The precautionary principle dovetails conceptually with broad purposeful interpretations of enabling statutes. In *Castonguay*, Abella J. affirmed the consonance of the precautionary principle with the Ontario *Environmental Protection Act*, even though the *EPA* makes no mention of the precautionary principle:

As the interveners Canadian Environmental Law Association and Lake Ontario Waterkeeper pointed out in their joint factum, s.15(1) is also consistent with the precautionary principle. This emerging international law principle recognizes that since there are inherent limits in being able to determine and predict environmental impacts with scientific certainty, environmental policies must anticipate and prevent environmental degradation (O. McIntyre and T. Mosedale, "The Precautionary Principle as a Norm of Customary International Law" (1997), 9 *J. Env'tl. L.*, 221, at pp.221-22; *114957 Canada Ltee (Spraytech, Societe d'arrosage) v. Hudson (Town)*, 2001 SCC 40 (CanLII), [2001] 2 S.C.R. 241, at paras.30-32.

19. Closer to home, the Federal Court of Canada in *Morton* made the following observations in respect of the *Fisheries Act*, which does not expressly provide for the application of the precautionary principle:

The precautionary principle recognizes that as a matter of sound public policy the lack of complete scientific certainty should not be used as a basis for avoiding or postponing measures to protect the environment, as there are inherent limits in being able to predict environmental harm. Moving from the realm of public policy to the law, the precautionary principle is at a minimum an established aspect of statutory interpretation,

and arguably, has crystallized into a norm of customary international law and substantive domestic law: *Spraytech* at paras.30-31.

*Morton v. Minister of Fisheries and Oceans*, 2015 FC 575

20. In *Canadian Parks and Wilderness Society v. Canada (Minister of Canadian Heritage)*, 2003 FCA 197, the Federal Court of Canada held that “the precautionary principle states that a project should not be undertaken if it may have serious adverse environmental consequences, even if it is not possible to prove with any degree of certainty that these consequences will in fact materialize”.

#### *Adaptive Management Approach to Environmental Damage and Human Health*

21. The adaptive management approach to regulation is contrary to the precautionary principle and is otherwise inappropriate to regulate pipeline safety in the area of irreversible environmental harm and human health.

22. Adaptive management is a broad term that may encompass any of the following regulatory approaches to projects:

**Staged Development:** Development is staged, with later stages contingent on compliance with environmental quality standards, construction standards or monitoring benchmarks for earlier stages.

**Tiered Approach to Monitoring:** Monitoring may increase in frequency and intensity if environmental quality standards, construction standards or monitoring benchmarks are not met.

**Ongoing Adaptive Management:** Operation and development conditions may be amended to respond to monitoring results or failures to meet environmental quality standards.

23. Adaptive management was held by the Federal Court of Canada to respond to the difficulty of predicting the environmental effects of a project and counters “the potentially paralysing effects of the precautionary principle of otherwise socially and economically useful projects”.

*Canadian Parks and Wilderness Society v. Canada (Minister of Canadian Heritage)*, 2003 FCA 197

24. In this sense, adaptive management should therefore be understood as a pragmatic staged response to approval of mega-projects, the detailed engineering of which represents a significant proportion of the overall costs. Without adaptive management strategies, proponents would be forced to sink extremely high costs into the detailed planning of a project without knowing

whether it will be approved. Prohibiting the staged development aspect of adaptive management would deter large projects by increasing the capital risk of preparing a regulatory proposal.

25. Nonetheless, adaptive management can get out of hand. Regulatory processes can devolve into a process for identifying risks, with approval granted on the basis of conditions that generally require the proponent to develop, design or implement an acceptable mitigation or remediation strategy, the details of which are left to be worked out later in a less rigorous and informal way that is not subject to public scrutiny.
26. The difficulty with failing to specify precise and detailed mitigation and remediation strategies is that risks are not truly known to be mitigated and harms are not known to be remediated. Imposing imprecise mitigation and remediation conditions renders illusory the notions of public participation, and democratic transparency and accountability that are necessary to foster social licence and underpin the NEB's legitimacy as an institution.
27. Adaptive management therefore requires detail, precision and rigour to implement the precautionary principle in harmony with a pragmatic adaptive management approach to economic development. PIPEUP applies the term "precautionary adaptive management" to the integration of adaptive management techniques with the precautionary principle. Precautionary adaptive management incorporates three principles.
28. The first principle is that adaptive management techniques should never be practiced unless there is an evidentiary foundation sufficient to achieve the goals of adequately reducing the risks and adequately managing any remaining risk. Unless the risks and mitigation strategies are sufficiently well known to control for risks, adaptive management is precluded.
29. The second principle is that adaptive management should never be practiced when the risk of serious or irreversible harm to human health or species at risk may be serious or irreversible. A project should not be allowed to proceed in the hopes that some type of mitigation can be later imposed if and when there are fatalities, long-term serious injuries or irreversible harm to humans or species at risk.
30. In considering whether a threat is "serious or irreversible", a variety of factors may be relevant, including:
  - a. The spatial scale of the threat (e.g. local, regional, statewide, national, international);
  - b. The magnitude of the possible impacts, on both natural and human systems;
  - c. The perceived value of the threatened environment;

- d. The temporal scale of possible impacts, in terms of both the timing and the longevity (or persistence) of the impacts;
  - e. The complexity or connectivity of the possible impacts; and
  - f. The reversibility of the possible impacts and the time frame and expense of reversibility.
31. The third principle of precautionary adaptive management should be that adaptive management must be precautionary. Precautionary adaptive management requires that:
- a. There is good baseline information about the receiving environment;
  - b. The conditions provide for effective monitoring of adverse effects using appropriate indicators; and
  - c. Thresholds are set to trigger remedial action before the effects become overly damaging.
32. It is a corollary of the third principle that adaptive management should not be practiced in an area where there is a lack of baseline information about the receiving environment, the conditions do not allow for effective monitoring of adverse effects or there are no appropriate indicators of adverse effects (i.e. adverse effects may be undetectable or only partially detectable). Compliance with thresholds and conditions (mitigation and monitoring) must be ascertainable and enforceable to avoid serious or irreversible harm.
33. In this context, even Trans Mountain does not dispute that there are known human health and species at risk concerns, including:
- a. Risks to fish habitat from river and stream crossing;
  - b. Risk to Orcas from increased noise pollution and increased risk of physical collisions between Orcas and tankers;
  - c. Risks to human health resulting from air quality exceedances from terminal emissions air quality;
  - d. Risks to human health from spills into ingested drinking water;
  - e. Risks to human health from spills resulting in inhalation of petrochemical vapour; and
  - f. Risks to human health in the form of psychological harm.
34. Adaptive management is particularly ill-suited to the prevention of long-term illness or injury or death. It is inadequate to describe the required response in the abstract as “world class” or other vague descriptors rather than setting out the details of the emergency response.
35. As expressed in a 2014 decision of the New Zealand Supreme Court:
- As to the threshold question of whether an adaptive management regime can even be considered, there must be an adequate evidential foundation

to have reasonable assurance that the adaptive management approach will achieve the goals of sufficiently reducing uncertainty and adequately managing any remaining risk. The threshold question is an important step and must always be considered.

*Sustain our Sounds Inc. v. The New Zealand King Salmon Co Ltd*, [2014] NZSC 40

36. That is to say: adaptive management must be approached as follows:

- a. The Panel should condition approval on the implementation of specific mitigation/remediation with as much detail as possible. Unnecessarily leaving detail to be determined later is inappropriate.
  - b. Where the details of mitigation/remediation cannot be specified, the Panel should identify the residual risk to the public interest – whether it relates to human health, the environment or the public treasury – and assess the magnitude of the risk and the likelihood of the risk materializing.
  - c. Where the risk relates to human health or the environment, and is not small, fleeting or transitory, the Panel should withhold approval and should refrain from an adaptive management approach. I.e. the project should not be approved until uncertainty in respect of the mitigation/remediation of the significant risks to life, health or sensitive aspects of the environment (e.g. species at risk) is ascertained.
37. Deferral of these issues to a time of lower political sensitivity and lesser public scrutiny is an abdication of the NEB's role. Limiting the NEB's role to environmental "issue spotting" or identification of risks is inconsistent with the *NEB Act*, *CEAA* and *SARA*, the purpose of which is to actually protect human health and the environment.

#### *Trans Mountain's Approach to the Precautionary Principle is Inadequate*

38. Trans Mountain's approach to the precautionary principle is inadequate. While Trans Mountain implicitly concedes that a form of caution is appropriate by its repeated reference to their "conservative" (n=29) approach to their application, and Trans Mountain repeatedly refers to "precautions" it intends to take, Trans Mountain's final submissions never mention the precautionary principle, even though the application of the precautionary principle is a statutory precondition of the exercise of the NEB's powers (*CEAA*, s.4(2)). In fact, Trans Mountain's approach to the precautionary principle is better described as a retreat.
39. The shortcomings in Trans Mountain's approach to the precautionary principle are exemplified in s.2.2.1.4 (at pages 65-67) of its final argument, dealing with

Orcas (referred to as “Killer Whales”). This argument is set out in full in fairness to Trans Mountain:

In assessing the potential environmental effects of Project-related shipping activities, Trans Mountain conducted an assessment of the potential impacts on marine mammals. In particular, it assessed the impacts on the southern resident killer whale as one of the indicator species. Due to the current Endangered status of the southern resident killer whale population, coupled with the fact that the entire population spends much of its time in the marine regional study area, the EA concluded that any residual effect, however small, beyond current levels was undesirable, and, for that reason, determined that underwater noise effects on southern resident killer whales may be significant. This conclusion is therefore of particular interest in evaluating the benefits and burdens of the Project.

As detailed in Section 7 – Environment of this final argument, the stressors affecting the southern resident killer whale population will continue to affect these species with or without the Project. Furthermore, if the Project proceeds, vessels calling at the Westridge Marine Terminal will continue to represent a comparatively small proportion of total marine transportation activity in the Salish Sea. It is forecasted that Project tankers in the future will comprise only about 6.6 percent of all large commercial vessels trading in the Project area. As such, rather than Project-specific efforts, industry wide efforts are necessary to mitigate the effects of maritime commerce and other activities on marine mammals in the region.

Under CEAA 2012, Project approval for these residual effects will require justification on any significant adverse effect. Trans Mountain submits that this justification must take into consideration the context in which the impact is predicted. As discussed above, neither Trans Mountain nor the NEB have direct control over marine vessel activity within the southern resident killer whale critical habitat. ...

With respect to mitigation, PMV has established the “Enhancing Cetacean Habitat and Observation Program” (“ECHO Program”), which seeks to better understand and manage potential effects on cetaceans (i.e. whales, porpoises and dolphins) resulting from commercial vessel activities throughout the southern coast of B.C. Along with other stakeholders, Trans Mountain is actively supporting the ECHO Program and its initiatives to undertake research and explore solutions to offset the effects of underwater noise from marine vessel traffic on the southern resident killer whale population and associated Aboriginal traditional uses. The ECHO Program is also investigating technological solutions such as real time whale detection technologies that may provide means to reduce ship strikes while simultaneously allowing maritime commerce and other

activities to proceed. On July 29, 2015, Trans Mountain executed a funding agreement with Vancouver Fraser Port Authority (doing business as PMV), wherein Trans Mountain will contribute \$1.6 million to the ECHO Program to support its research initiatives. The terms of this agreement are not contingent on approval of the Project.

Trans Mountain has also committed to developing a Marine Mammal Protection Program (“MMPP”) to support southern resident killer whale recovery. The program will focus on strategies that will be implemented during the operations phase in order to contribute to the ongoing southern resident whale recovery strategies. The results of the ECHO Program studies will be reviewed by Trans Mountain with a view to incorporating the resulting recommendations in the MMPP.

In addition, Trans Mountain considered two large scale mitigation measures: (i) altering the shipping lanes to avoid sensitive habitat; and (ii) setting speed restrictions. In response to an NEB IR, Transport Canada stated that it “is not currently contemplating alternative shipping lanes or vessel speed restrictions for the purpose of reducing impacts on marine mammals from marine shipping in British Columbia; however, Transport Canada is participating in the ECHO program ... as an Advisory working group member.” Therefore, Project-related marine vessel traffic will use the existing anchorages and shipping lanes for the entirety of their route in accordance with Transport Canada’s directions.

Trans Mountain’s evidence and commitments to cooperate and support the industry wide program regarding the southern resident killer whale, coupled with the benefits of the Project discussed herein, provide the Board with the necessary information to conclude that the significant adverse environmental effect predicted within this context is clearly justified, and is likely to be mitigated, in the circumstances.

*Trans Mountain Final Argument, pp.65-67*

40. Trans Mountain makes no effort to apply the principles of precautionary adaptive management or any recognizable form of the precautionary principle in the case of the endangered Orca.
41. Firstly, Trans Mountain makes no effort to consider whether the evidentiary foundation is sufficient to achieve the goals of adequately reducing the risks to the endangered Orca and adequately managing any remaining risk. Instead, Trans Mountain asserts, blinkingly, that the risks are likely to be mitigated by an investment into the ECHO Program research into mitigation.
42. An appropriate application of the first principle of precautionary adaptive management must conclude the evidentiary foundation in respect of mitigation

strategies for marine vessel noise disruption of Orca habitat is not sufficient to adequately manage the risk. This by itself should preclude adaptive management.

43. Secondly, Trans Mountain makes no effort to ascertain whether the risks to the Orcas are irreversible. Trans Mountain makes no serious effort to assess or describe whether increased vessel noise will result in fatalities, long-term serious injuries or irreversible harm to humans or species at risk. An appropriate application of the second principle of precautionary adaptive management would conclude that there is a significant risk that harm to Orcas and their habitat from the increase in vessel noise may be long-term or irreversible.
44. Thirdly, Trans Mountain makes no effort to assess whether:
- a. There is good baseline information about noise levels in the Orca habitat;
  - b. The conditions provide for effective monitoring of adverse effects on the Orca populations using appropriate indicators; or
  - c. Thresholds are set to trigger remedial action before the effects on Orca population becomes overly damaging.
45. Measured against the yardstick of the third principle of precautionary adaptive management, Trans Mountain's proposal to mitigate harm by making a large *ex gratia* donation to the ECHO research program appears crude and clumsy. In particular, Trans Mountain makes no effort to identify baseline noise levels or specify any detectable indicators of increased or unacceptable harm to Orcas or their habitat, or set thresholds for remedial action.

*The NEB's Proposed Approach to Precautionary Adaptive Management is Inappropriate*

46. The NEB's proposed approach to precautionary adaptive management is inappropriate. The weakness of the NEB's proposed approach to the precautionary principle is exemplified by proposed condition 78, which is the sole proposed condition in the List of Conditions that addresses the anticipated harm to Orcas and their habitat. Proposed condition 78 is as follows:

**78 Updates under the *Species at Risk Act***

Trans Mountain must file with the NEB, **at least 60 days prior to commencing construction**, a summary of any relevant updates under the *Species at Risk Act*, including new Schedule 1 listings and new or amended Recovery Strategies, Action Plans, and Management Plans for species that have the potential to be affected by the Project. For each species-specific update, the summary must include:

- a) a discussion of the Project activities' potential effects on the listed species or its critical habitat;

b) identification of all reasonable alternatives to the Project activities referred to in

a), including avoidance measures, and a discussion on the potential effects of the alternatives, the chosen approach, and the rationale for selecting the chosen approach;

c) any additional site-specific mitigation;

d) any monitoring to be undertaken and a commitment to include monitoring results as part of the post-construction environmental monitoring reports filed under Condition No. 140;

e) confirmation that Trans Mountain, throughout the life of the Project, will continue to track (under its Environmental Protection Program) updates under the *Species at Risk Act*, to consult with the appropriate government authorities, and to consider changes to construction and operational measures, plans, and procedures; and

f) a summary of Trans Mountain's consultation concerning a) to d) with appropriate government authorities, species experts, and any potentially affected Aboriginal groups, including any issues or concerns raised and how Trans Mountain has addressed or responded to them.

47. The NEB's proposed Condition 78 fails to incorporate any of the three principles of precautionary adaptive management. Firstly, Condition 78 fails to ensure that the evidentiary foundation is sufficient to ensure that mitigation strategies will reduce the risk. Secondly, Condition 78 does nothing to prevent (or even acknowledge) irreversible or long-term harm to the endangered Orca. Thirdly, Condition 78 does nothing to secure baseline noise data, impose ascertainable indicators of harm, or trigger mitigation if indicators are exceeded.

48. Nor would it satisfy the NEB's statutory duties to impose a condition that stated that TEMP is approved subject to meeting the three principles of precautionary adaptive management in respect of the adverse effect of marine vessel noise on Orcas and their habitat. The NEB's mandate is to advise the Minister whether a project accords with the principles of precautionary adaptive management, not to advise the Minister that a project should accord with those principles.

49. To fulfil its statutory duties, the Panel should advise the Minister that the NEB recommends that a Certificate not be issued because the proposed adaptive management techniques do not comport with the precautionary principle in respect of marine vessel noise disruption of Orcas and their habitat.

50. It is to be recalled that the purpose of the precautionary principle is to ensure that we do not act before we address scientifically credible threats to human health and the environment. It should also be recalled, just as vividly, that an important purpose of the CEAA, the s.52 NEB Act process and SARA is to ensure that the government is not seen by its constituents to be acting before addressing scientifically credible threats to human health and the environment.

#### PART IV: THE PANEL SHOULD ORDER CROSS-EXAMINATION ON CONFLICTING EXPERT EVIDENCE

51. The panel should order cross-examination on conflicting expert evidence. The oral hearing could be manageable if cross-examination is limited to probative areas of conflicting expert evidence and limited to participants who tendered the expert reports.

#### *Lack of Cross-examination Precludes Meaningful Adjudication of Conflicting Expert Opinion regarding Risk*

52. Lack of cross-examination on conflicting expert opinion regarding risks and mitigation of risk precludes meaningful adjudication of and findings of fact in respect of risks and mitigation of risks. Findings of fact in respect of risks and mitigation of risks is a precondition of precautionary adaptive management.

53. It is understandable that the Panel attempted to conduct this proceeding without *viva voce* evidence. There are many participants. There are many issues. A full hearing in respect of every issue that provided each participant with an opportunity to cross-examine on each issue would be lengthy and challenging.

54. Ruling #14, made May 7, 2014, dismissed the application of Robyn Allen for cross-examination. That application was supported by the City of Vancouver, the City of Burnaby, First Nations, Alberta Federation of Labour and other individuals and community groups including PIPEUP. Ruling #14 was issued by the Panel before the conflicts in the expert evidence were manifest. While cross-examination may have seemed *a priori* unnecessary to the Panel in May of 2014, that decision was made in an evidentiary vacuum.

55. It has now emerged that there is conflicting expert evidence in areas, the adjudication of which is central to the Panel's mandate in this s.52 hearing. This fact requires that the Panel re-consider its decision to proceed without cross-examination.

#### *Cross-examination Example 1: Muse Stancil/Gunton Report*

56. One example of contradiction in the expert reports in a highly probative area is the contradictions between the Muse Stancil Report and the Gunton Report. The

Gunton Report (December 2015) contradicts the Muse Stancil Report in a manner that cries out for cross-examination of the authors of both reports.

57. Section 4.1.1 of the Gunton Report asserts that the Muse Stancil Report underestimates Oil Pipeline Transportation capacity, which is a central pillar on which demand for the Trans Mountain project depends:

A comparison of MS's oil transportation capacity estimates to those provided by the Canadian Association of Petroleum Producers (CAPP 2015) shows that MS capacity estimates are 3,046 kbpd lower than CAPP estimates (Table 1). The reasons for MS's lower capacity forecast are that MS uses lower estimates of the capacity for existing pipelines such as the Enbridge Mainline and omits the capacity of proposed pipelines including Energy East, Keystone XL, and Enbridge Northern Gateway Project (ENGP). The decision by MS to omit these three proposed pipelines (Energy East, Keystone XL and ENGP) is inconsistent with the evidence MS submitted to the NEB and to the Minnesota Public Utilities Commission on behalf of Enbridge's Line 3 replacement, in which MS included all three pipelines in its analysis (MS 2014; MS 2015b). Interestingly, MS omitted any consideration of the TMEP in Enbridge Line 3 evidence.

MS provides no explanation for the inconsistencies in the different reports it has submitted to different pipeline hearings. Recent events including the US decision to reject the Keystone XL announced on November 6, 2015 and the recently elected Canadian government's stated opposition to ENGP, raise doubts about the likelihood of the Keystone XL and ENGP being built. But MS prepared its report for TMEP prior to the US announcement on Keystone XL and the Canadian election so these recent developments respecting these two pipelines are not relevant to MS's decision to omit them in its report. Therefore omitting any consideration of these two projects and omitting Energy East in the assessment of the need for the TMEP is a major deficiency in MS's report and is inconsistent with MS's own submissions in other current regulatory processes. The omission of these pipelines results in an inaccurate assessment of the need for TMEP.

58. The key pipeline capacity discrepancies between CAPP estimates and MS estimates are Energy East (-1,100 kbpd) and existing Enbridge capacity (-615 kbpd). There is also a discrepancies for existing rail capacity (-226 kbpd).
59. The contradictions between (a) the CAPP estimates and the MS estimates; (b) the MS estimates in different regulatory proceedings; and (c) the MS capacity conclusions and Gunter conclusions regarding capacity demand cross-examination.

60. Trans Mountain takes the position that tar sands producers' intention to use Trans Mountain capacity overrides any concerns about excess capacity. However, that is to confuse the interests of producers, some of which are owned or controlled by foreign governments with Canadian interests. Moreover, such argument cannot be used to override this Panel's statutory mandate to assess the need for the shipping capacity of the proposed pipeline.
61. Similar contradictions arise in respect of Muse Stancil's reliance on CAPP's high growth forecast while failing to consider CAPP's low growth forecast (see Gunton Report, page 11) and comparisons of cost of shipping bitumen and diluted bitumen by coiled/insulated tank cars as against the cost of shipping by pipeline (see Gunton Report, p.13, Table 2). The variance between the CAPP growth forecasts and the comparative cost of shipping by rail and pipeline is the difference between a need for the proposed pipeline and no need for the proposed pipeline.
62. PIPEUP respectfully requests that the NEB Panel reconsider its decision not to allow cross-examination of experts. With respect, cross-examination of experts is now indispensable to meaningful adjudication of anticipated oil production and anticipated pipeline shipping capacity, both of which are indispensable to the determination of whether the proposed pipeline is necessary and in the public interest.

*Cross-examination Example 2: Tank Fire and Boilover*

63. A second example of the need for cross-examination arises from conflicting expert evidence in the risk of tank fire and boilover explosion at the Burnaby Terminal Tank Farm and the viability of mitigation strategies in respect of those risks. The table below sets out direct conflicts in the respect to tank fire and boilover risks as well as viability of mitigation strategies:

a)	Affidavit of Dr. Terry Waterhouse dated May 27, 2015	A4Q0Z3. Pages 17-19, 25
b)	Affidavit of David Etkin dated July 16, 2015	A4R6A2. Paras.3 and 4.
c)	TM Response to SFU IR No. 2.3.07(1)	All
d)	Etkin et al. Hazards to SFU.... a Gap Analysis	A4Q5Z1. Pages 20, 24, 25, 59
e)	Bowcock, Tank Farm Tactical Risk Analysis	A4L8F6. Pages 6, 40, 62-65
f)	Bruce Jamer Consulting, Reply to SFU.. Gap Analysis	A4S7J7. Page 19
g)	M. Shum et al, Review of Human Health Risks	A4Q0X8. Page 2
h)	McCutcheon and Associates	A3W9S5, Page 26

- Consulting Ltd.
- i) Dr. Ivan Vince dated May 22, 2015 A4L8G6, Pages 4-8
  - j) Takaro Report pp.26, 30

64. The expert reports as cited above contradict one another. The expert reports at times attack the credibility and credentials of other experts.
65. Due to the magnitude of harm that would be caused by a fire or boilover at the tank farm, this issue is very sensitive to the appraisal of the probability of that harm materializing. Assessment of the viability of mitigation strategies is equally sensitive.
66. Trans Mountain asserts without evidentiary foundation that the risk of boilover can be completely mitigated by evacuation given the window between ignition of a fire and a boilover event. However, the potential for irreparable harm (death and/or chronic illness) must be assessed by the Panel on the basis of evidence. There must be expert evidence sufficient to adjudicate the sufficiency of mitigation techniques, such as mass evacuation from SFU and residential areas surrounding a tank farm, to mitigate the risk.
67. The Panel is required, in accordance with the principles of precautionary adaptive management, to make findings of fact in respect of (a) the risk of harm; (b) the magnitude of the harm; (c) the irreversibility of the harm; (d) the adequacy of the evidence dealing with mitigation of the harm; (e) the precise contours of the proposed mitigation strategies.
68. It would be inadequate for the Panel simply to approve the Project with an abstract condition that requires the proponent to develop a detailed mitigation strategy that is sufficient to reduce the risk of irreversible harm arising from a tank fire or boilover. Such a condition would not satisfy the Panel's mandate. Proposed Condition 29 is as follows:

Updated terminal risk assessments

Trans Mountain must file with the NEB for approval, at least 6 months prior to commencing construction, updated risk assessments for the Edmonton Terminal West Tank Area, the Sumas Terminal, and the Burnaby Terminal. The updated risk assessments must quantify and/or include the following:

- a) the effect of the revised spill burn rates;
- b) the potential consequences of a boil-over;
- c) the potential consequences of flash fires and vapour cloud explosions;

d) the cumulative risk based on the total number of tanks in the terminal, considering all potential events (pool fire, boil-over, flash fire, vapour cloud explosion);

e) the domino (knock-on) effect caused by a release of the contents of one tank on other tanks within the terminal's common impoundment area(s), or other tanks in adjacent impoundment areas; and

f) risk mitigation measures, including ignition source control methods.

For those risks that cannot be eliminated, Trans Mountain must demonstrate in each risk assessment that mitigation measures will reduce the risks to levels that are As Low As Reasonably Practicable (ALARP) while complying with the Major Industrial Accidents Council of Canada (MIACC) criteria for risk acceptability.

The quantitative risk analysis must be based on recognized methodology, models, and software. Product release frequencies and event probabilities must be based on recent, documented data sources. The effect of mitigation measures on the risk results must be justified and documented.

69. An abstract condition such as set out in Proposed Condition 29 is no more than a restatement that the precautionary principle applies to the issue of tank fires and boilovers. Proposed Condition 29 is not the product of the application of the precautionary principle; it is a reflection of the fact that a risk assessment has yet to be done because the evidence of risk before the Panel is presently inadequate to adjudicate the risk or the viability of the mitigation measures.

70. Proposed Condition 29 is further defective in that it fails to specify a process by means of which the satisfaction of the condition can be assessed. Proposed Condition 29 only provides a 6 month timeline and states that Trans Mountain must "demonstrate in each risk assessment that mitigation measures will reduce the risks..." Who will decide whether Trans Mountain has "demonstrated... that mitigation measures will reduce the risk"? When will the sufficiency of the demonstration be decided? Will the public be consulted about the sufficiency of the demonstration? Will the decision as to sufficiency of the demonstration be publicized? What happens if the condition is not met?

71. Through a democratic lens, Proposed Condition 29 and its ilk threaten to push the actual application of the precautionary principle out of the public spotlight of a s.52 *NEB Act* hearing into the shadows of an anonymous backroom decision lacking transparency or accountability. That is not what is intended by the *NEB Act*, *CEAA* or *SARA*.

72. In circumstances such as these, the statutory duty of the NEB Panel is to recommend against the issuance of a certificate for the project because the

Panel is unable to conclude on the evidence that the precautionary principle is satisfied. The Panel does not satisfy its mandate by recommending that a certificate be issued subject to satisfying the precautionary principle.

73. It is regrettable that the Panel has to this date blunted its adjudicative capacity by precluding cross-examination of the experts. Even at this late date, however, the Panel retains the power and flexibility to remedy this deficiency. The Panel could, given a small extension of time to complete its report, allow cross-examination of the experts on the issue of tank fires and boilovers only by the parties that introduced evidence on that issue. The Panel remains in control of its process until the very end and may still rectify its decision to deprive itself of the opportunity to make credible findings of fact in this area.

#### *Further Examples of Areas of Contradiction that Require Cross-Examination*

74. Other areas in which there are contradictions in the expert evidence dealing with key issues that are irreconcilable without *viva voce* evidence and cross-examination include:

- a. Air quality exceedances at the Burnaby Terminal;
- b. Trans Mountain's environmental record;
- c. Mitigation of risk to fish habitat resulting from watercourse crossing;
- d. Remediation of riparian habitat;
- e. Mitigation of harm and remediation of harm to wetlands; and
- f. Risk of harm, mitigation of harm and remediation of harm to other species at risk and their habitat.

75. The practice of precautionary adaptive management requires the adjudication of expert opinion of risks and mitigation of risk. It is not merely the case that there must be evidence filed in respect of risks and their mitigation, the Panel must be in a position to adjudicate those risks by making findings of facts. PIPEUP requests that the Panel reconsider its decision to prohibit cross-examination of experts and proposes that cross-examination of experts be limited to those participants that adduced expert evidence.

#### **PART V: TRANS MOUNTAIN UNDERESTIMATES RISK AND OVERESTIMATES BENEFITS**

##### *Trans Mountain's Environmental Record*

76. Trans Mountain's environmental record is poor. Its environmental record should be factored into anticipated risk to human health and the environment. Trans Mountain's attitude and environmental record in respect of pipeline integrity management and risk assessment is deficient in respect of major threat categories.

77. Since 1961, Trans Mountain has reported 80 spills on its pipeline system to the NEB.<sup>1</sup> More than 70 percent of all spills occurred at Trans Mountain pump stations or terminals.
78. There have been two significant spills in Burnaby in the past eight years. Notwithstanding their location, Trans Mountain purports that a worst-case scenario within Burnaby is not credible. Notwithstanding the failure of leak detection systems and post-spill mitigation methods in Burnaby in the past eight years, Trans Mountain insists of modelling worst-case scenarios assuming the success of leak detection systems and post-spill mitigation techniques, or in non-urban locations involving lower risk to human health.
79. The Accufacts Report dated April 24, 2015<sup>2</sup> identified the following deficiencies in Trans Mountain's approach to risk detection and other mitigation practices:
- a. Lack of critically important details and specificity in respect of actual mitigation practices (page 4);
  - b. Failure to produce baseline, data for integrity management purposes (page 4);
  - c. Failure to set out integrity management purposes for the current pipeline (page 4);
  - d. Exclusive and misplaced reliance on ILI technology for detecting the threat of rupture failure, contrary to a PHMSA Advisory Bulletin, and contrary to the fact that ILI technology is not capable of such detection (page 5). Increasing the frequency of use of ineffective detection methods will not diminish risk of rupture (page 11);
  - e. Failure to address geohazards for highly unpredictable transition to diluted bitumen (page 6);
  - f. Failure to address leak/rupture detection challenges during slack line operation, especially in respect of steep sloping operating environments within the Fraser Valley (page 7);
  - g. Failure to address high geohazard risks for very steep and unstable slopes in the Fraser Valley (page 8);
  - h. Assuming that the existing Line 1 path is the most stable and appropriate path for Line 2 in this geotechnically unstable region (page 8); and
  - i. Use of at-risk pre-regulation vintage pipeline that is susceptible to rupture (page 12).
80. Trans Mountain's response to the Accufacts Report is to assert that most of the Accufacts Report deals with the conversion of the existing Line 1 pipeline to moving diluted bitumen. Trans Mountain's response to the Accufacts Report fails

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<sup>1</sup> Trans Mountain Proposed Trans Mountain Expansion Project Public Information Sessions, November 15, 2012, page 29. This November 2012 report refers to 78 reported spills. Since that time there have been two more spills.

<sup>2</sup> The Accufacts Report was prepared for the Shxw'owhamel First Nation and the Peters Band, which have territory in the Fraser Valley, primarily near Chilliwack and Hope. The Accufacts Report is germane to the interests of PIPEUP members residing and working in this area.

to appreciate the inferences that may be drawn about Trans Mountain's attitude toward spill detection and response and the adequacy of its practices from Trans Mountain's current deficient operation of Line 1.

81. Lest it be said that the environmental record of Trans Mountain is not relevant, Trans Mountain's Final Argument is replete with self-congratulatory references to its own environmental record, including the following:

... Decades of operation of the TMPL has provided Trans Mountain with a comprehensive understanding of the risks inherent to this pipeline corridor and Trans Mountain has existing operations and maintenance systems in place to address these risks. For the TMEP, Trans Mountain will leverage its existing knowledge and systems, complete systematic assessments of risk and incorporate all planned mitigation and improvements described in its evidence to enhance system safety and reliability.

*TM Final Argument, p.9*

82. At page 148 of its Final Argument, Trans Mountain has the temerity to include the following, notwithstanding its earlier statement that its operation of Line 1 is irrelevant to this s.52 hearing:

Over the sixty year period, the existing TMPL system has been operated with the goal of preventing leaks. KMC has a long and successful history with the implementation of computational pipeline monitoring system ("CMP System"), which provides continuous leak detection. The CMP System is a state-of-the-art, real-time, transient, computational pipeline leak detection system, which are widely viewed as the most effective type of system for liquid petroleum transmission pipelines.

83. Similarly, Trans Mountain has publicly claimed that "[f]ollowing each spill we have conducted a thorough incident investigation, with recommendations and a Corrective Action Plan. Our pipeline spill history shows how we have learned from these recommendations and improved our technology and management programs."<sup>3</sup>

84. With respect, Trans Mountain's conclusion regarding its attitude towards spills is not founded in its own regulatory history. Trans Mountain's description of its own environmental record is not borne out by the evidence.

85. The Abbotsford Fire Chief relays in his affidavit that avoidable errors that led to two spills near the Sumas Tank Farm in Abbotsford in 2004 and 2012.<sup>4</sup> In the

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<sup>3</sup> Trans Mountain Proposed Trans Mountain Expansion Project Public Information Sessions, November 15, 2012, page 29.

<sup>4</sup> Affidavit of Donald Beer, Abbotsford Fire Chief, sworn May 25, 2015

first spill, which occurred from July 8, 2004, to July 15, 2004, Trans Mountain repeatedly failed to identify the location of the leak despite eight public complaints of petrochemical odour. Its employees were not equipped with detection equipment although it was available, and vegetation was overgrown in the ROW because Trans Mountain had reduced vegetation control to once a year from twice a year.<sup>5</sup> 210 cubic metres of crude oil was released from the Sumas Tank Farm, made its way into Kilgard Creek and affected 14,300 square metres. The Abbotsford firefighters who responded to the spill were not informed by Trans Mountain of the potential hazards of the spill and so lacked proper safety and detection equipment to protect against occupational health and safety issues.

86. After the July 2004 leak was cleaned up, the City of Abbotsford and Kinder Morgan established a set of coordinated command training protocols. In the second leak at the Sumas Tank Farm on January 24, 2012, Trans Mountain failed to abide by the command and communication protocols. Both Abbotsford spills were marked by Trans Mountain's failure to communicate leading to avoidable hazards.

87. These cases illustrate not only that Trans Mountain's safety, spill detection and spill response systems are prone to failure, resulting in unnecessary and significant oil spills, but also that Trans Mountain tends not to learn from its mistakes. Spills in urban centres, including Burnaby and Abbotsford, resulted from Trans Mountain's failure to coordinate and communicate with municipal contractors.

88. Even in respect of this project, Trans Mountain recently proved unable to reliably locate GPS coordinates for exploratory drilling, resulting in wrongful arrests of approximately 135 protesters.<sup>6</sup> It was Trans Mountain's failure to identify an urban buried pipeline location using GPS that led to one of the larger spills of 250,000 litres of oil in Burnaby in 2007, 70,000 litres of which flowed into the Burrard Inlet.<sup>7</sup>

89. Trans Mountain repeatedly refers to its receipt in 2010 of an Emerald Award from the Alberta Emerald Foundation (at pages 9, 27 and 274 of its Final Argument) as a basis to infer its consistent commitment to environmental excellence. Closer inspection of this award will give the reasonable observer some pause. The current Chair of the Board of the Alberta Emerald Foundation is Alan Ross, a litigation partner at the law firm Borden Ladner Gervais who acted for Kinder Morgan Canada in 2009 and 2010 before the NEB and acted as counsel for TransCanada Pipelines Limited in a wide variety of regulatory proceedings, including Ontario Energy Board, electricity and gas proceedings, and competition

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<sup>5</sup> Transportation Safety Board of Canada Report Number P05H0044

<sup>6</sup> Trans Mountain Pipeline ULC v. Gold, 2014 BCSC 2403 (CanLII) at paras.10-14

<sup>7</sup> There are serious concerns about deferred maintenance throughout the Kinder Morgan family of companies.

and energy trading matters.<sup>8</sup> Mr. Ross was on the Board of Directors of the Emerald Foundation in 2010.<sup>9</sup> In 2009, the Board of Directors of Alberta Emerald Foundation included Marilyn Carpenter, who is listed as working for TransCanada, who also sat on the Communications Committee of the AEF and sat on its Governance Committee.<sup>10</sup> In 2009, Trans Canada is listed as a “Patron Sponsor” of the Alberta Energy Foundation.<sup>11</sup> The list of Emerald Judges included Dave Kmet, who is listed as a Trans Mountain employee.<sup>12</sup> PIPEUP takes no issue with the oil industry at large or even Trans Mountain alone giving itself accolades for what it considers in its perspective to be achievements, but the NEB should hesitate before drawing positive inferences from Trans Mountain’s self-congratulations.

90. Apart from the lack of meaning of an award quite nearly given by Trans Mountain to itself, there is significant evidence that the Anchor Loop project for which Trans Mountain granted the award was not an environmental triumph. The Rosenau Report dated July 14, 2015 provides evidence that Trans Mountain caused extensive damage to riparian areas in the Anchor Loop project. At the crossing at Snaring River, for example, Trans Mountain caused a major loss of riparian habitat (Rosenau Report, page.20) and replanting to replace lost riparian vegetation has failed in part. Negative impact to ephemeral channels is extensive (Rosenau Report, page 23). Trans Mountain left Coco-mat debris behind (Rosenau Report, photo page 29). Touting the Anchor Loop project as evidence of environmental commitment is problematic.

91. Many of the NEB’s proposed conditions appear to assume that Trans Mountain can be trusted to self-regulate. Proposed Condition #113 intends to deal with slack line operation by requiring Trans Mountain to file, at least 60 days prior to opening, a list of slack line operating locations and a list of design and operational measures to detect slack flow in Line 1 and Line 2. The proposed condition does not impose any specific mitigation and does not require prior approval of any regulator for the design or operation of slack line mitigation measures, either prior to construction or prior to the commencement of operations. There is no evidentiary justification for placing faith in any corporation, but such faith is particularly misplaced for a corporation with a poor regulatory history that consistently fails to learn from its mistakes.

92. Similarly, Proposed Condition #125 plans to require Trans Mountain to file the final design for SCADA and leak detection systems 90 days before commencing operations. This approach is deeply problematic because the viability of the leak detection system, particularly in slack line operations, must be ascertained by the NEB in order to determine the probability of a spill and the magnitude of a spill in

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<sup>8</sup> Borden Ladner Gervais website: [blg.com/en/ourpeople/ross-alan](http://blg.com/en/ourpeople/ross-alan)

<sup>9</sup> Alberta Emerald Foundation. 2010-2011 Annual Report

<sup>10</sup> Alberta Emerald Foundation, 2009 Annual Report

<sup>11</sup> Alberta Emerald Foundation, 2009 Annual Report

<sup>12</sup> Alberta Emerald Foundation, 2009 Annual Report

the Fraser Valley area. Simply allowing Trans Mountain to specify its own design, without even requiring later NEB approval, creates significant uncertainty regarding the downside risks and potential costs associated with a spill. The NEB's apparent faith in Trans Mountain is misplaced, in PIPEUP's respectful submission.

*Trans Mountain Underestimates the Risk and Cost of Spill Events*

93. Trans Mountain has seriously underestimated the risk and cost of spill events resulting from pipeline rupture.

94. The Accufacts Report dated April 24, 2015 notes the following at pages 9 and 10:

An Accufacts detailed review of the Outflow Modeling for the segments of pipeline that could affect the First Nations [near Chilliwack and Hope] leads to a conclusion that the modeling seriously underrepresents the potential oil releases associated with rupture. The modelling assumes that a control centre operator will "immediately" recognize a rupture event, but "a time interval of ten minutes has been used for the release prior to pump shut-down." History is replete with liquid pipeline ruptures where trained and experienced control centre operators failed to promptly recognize such a rupture event for various reasons, and the time to finally recognize a rupture via SCADA, if ever, was well beyond the arbitrary 10 minutes utilized in the Line 2 oil spill volume modelling. In fact, Accufacts after investigating many pipeline ruptures spanning almost 40 years, cannot identify any pipeline rupture where the rupture was properly identified by control room operators within 10 minutes.

A recent example of delayed rupture recognition would be the Marshall, MI Enbridge Line 6B pipeline rupture where, over three different 12-hour control room shifts and four levels of pipeline operations management, the control centre failed to properly shut down and isolate the pipeline, even proceeding through two pipeline restart attempts, increasing oil released out the rupture. This lengthy rupture release event occurred despite having a "10 minute shutdown rule" imposed after a previous rupture release event on another Enbridge system...

Based on Accufacts' experience, a review of the highly challenging elevation profiles, indicating valving, and control room actual expected reaction time, the reported outflow volumes that could affect the First Nations appear to be low by at least one order of magnitude (2,500 M<sup>3</sup> is more likely 25,000 M<sup>3</sup>, or 15,735 bbls more likely 157,352 bbls) in the event of a rupture.

95. The consequences of underestimating spill volume are significant. The Accufacts Report predicts that "the serious underestimating of potential oil spill

volumes will result in highly under-resourced staging of oil spill response equipment, most likely rendering oil spill response ineffective” (page 10).

96. Trans Mountain does not respond to this aspect of the Accufacts Report in its Final Argument. It is to be noted that Trans Mountain afforded this Panel no empirical justification for its assumption of a 10-minute shutdown interval was appropriate to predict potential spill volumes in the Fraser Valley. Absent any empirical justification for the 10-minute assumption, that assumption cannot be found to be credible.
97. The Goodman Report dated November 10, 2014, concludes that Trans Mountain has underestimated the economic cost of a major pipeline rupture in the Metro Vancouver area. Noting that flammability of diluents, dense population, spillage into water, increased economic activity and loss of human life increase cost for spills in urban areas, the Goodman Report estimates the costs of a major rupture as varying between US\$1 billion to as high as US\$10 billion (page 2).
98. Increases in urban density can be expected to increase costs of a major pipeline rupture over the anticipated life of the project. With respect, Trans Mountain’s estimates assume static costs of a spill over more than ½ century while assuming ongoing consumption increases.
99. The Goodman Report estimate of US\$1-5 billion must be compared to the Trans Mountain estimate of CDN\$100-\$300 million. Like the Accufacts Report, the Goodman Report bases its methodology on real-world recent pipeline and oil spills. With respect, Trans Mountain’s approach requires the NEB to ignore history and pretend that disasters like Enbridge Line 6B in Marshall, MI in 2010, the derailment in Lac-Mégantic, QC, in 2013, the San Bruno pipeline rupture in San Francisco in 2010 and the pipeline rupture in Qingdao, China in 2013 are not “credible” (Goodman Report, pages 47-53).
100. Trans Mountain’s response to the Goodman Report is not forthright. In its Final Argument, Trans Mountain deals with the Goodman Report as follows at page 426:

Intervenors have relied on evidence such as the Goodman Report, the Sumaila Report, observations by Mr. Jeremy Stone and submissions by Brand Finance. The evidence in these reports typically does not pay attention to risk profiles, especially the likelihood of such an occurrence in the region, and the reports thus implicitly ignore the credibility of the scenario, the outflows, or the costs associated with outflows. Moreover, the evidence typically relies on selective, high-cost incidents that are not applicable to this Application. The scenarios routinely refer to incidents such as the Exxon Valdez single-hull tanker oil spill, the Deepwater Horizon well blowout or the Kalamazoo oil spill in Michigan among others.

These cases are not analogs for a spill associated with the TMEP. Costs are exaggerated, outflows are over-stated and the incident likelihood or credibility is not addressed, rendering these reports not particularly credible.

101. With respect, Trans Mountain's approach is both misdirected, attacking examples not given by the Goodman Report, and overly dismissive in the abstract. Trans Mountain's refutation lacks substance and lacks empirical support.
102. In assessing the credibility of Trans Mountain's estimate of spill frequency, the NEB should note that, in its first year, the US section of the Keystone pipeline had a spill frequency 100 times greater than Trans-Canada forecast.<sup>13</sup>
103. In assessing the cost of the Trans Mountain proposal, the NEB must anticipate the costs of displacement of current economic activity. If we accept Trans Mountain's premise in the Muse Stancil Report that pipeline delivery is less expensive than rail and that in the short and medium term transport of diluted bitumen will shift from rail to pipeline, then we must also accept the fact that profits and taxes will be lost by railways and companies that make and lease rail cars and transfer stations.
104. Similarly, because pipelines may decrease costs and connect Alberta supply to new demand, may increase price and decrease margins for domestic refiners (Gunter Report, page 19) and discourage new investment in refining capacity. Domestic refining internalizes economic activity and should generally be considered of economic advantage to Canada and Canadians. Loss or attenuation of economic opportunities, however difficult to estimate or predict, must also be taken into account.
105. One factor complicating the liability picture for large scale disasters is the unfortunate reality that it is difficult to trace chronic conditions, such as cancer or asthma, to specific environmental disasters that are statistically proven to increase the risk of serious health problems but are difficult to trace to those disasters as contributing causes in individual cases.
106. An example of this liability complication is the statistical relationship between children living within 2km of contaminated coastline and adverse respiratory outcomes.<sup>14</sup> These kinds of statistical relationships<sup>15</sup> are useful from a public health perspective but are insufficient to prove causation for the purpose of assessing corporate liability for significant individual health conditions.

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<sup>13</sup> Ott Report, filed by NOPE, p.28

<sup>14</sup> Takaro Report, p.30

<sup>15</sup> Another example of such strong statistical but weak individual relationships is smoking causing cancer. This special problem was addressed by the passage of the *Health Care Costs Recovery Act*, SBC 2008, c.27 in British Columbia.

107. Another useful example of confounded causes that arises from the fact that initial symptoms for chemical illness mimic cold and flu-like symptoms, complicating even the statistical appraisal of the acute effects of distributed toxic emissions.<sup>16</sup> Potentially confounding causes can limit or postpone liability determinations and settlement.<sup>17</sup>
108. Statistically related adverse effects tend to be borne by the public and are externalized because they elude the polluter-pay model. The NEB should take this weakness in the liability scheme for mass torts into account when appraising the anticipated public cost of this project.
109. Trans Mountain has also underestimated the cost to municipalities. The Cities of Surrey, Burnaby, Coquitlam, Abbotsford and the Township of Langley estimate their increased costs as a result of the proposed pipeline at \$93 million over 50 years. This exceeds anticipated property tax revenues.<sup>18</sup>

*There is a Significant Risk that Trans Mountain Will be Unable or Unwilling to Finance the Credible Worst-case Scenario*

110. There is a significant risk that Trans Mountain will be unable or unwilling to finance the credible worst-case scenario. Trans Mountain is not the financial equal of the cost of the worst case spill scenario. An implicit element of Trans Mountain's proposal is that the Canadian taxpayer is to provide unlimited liability insurance for catastrophic losses exceeding CDN\$1 billion.
111. The Goodman Report expresses concerns about Trans Mountain's ability to finance its liability in the event of a catastrophic spill, noting that there are concerns regarding Kinder Morgan and Trans Mountain's capacity and willingness to pay for cleanup and damages (pages 2 and 63), as follows:

In response to a series of interrogatories in the current case, KM/TMP has assured the NEB that it has sufficient financial capacity to cover its projected worst-case scenario of C\$300 million "or even the \$1 billion financial capacity that is anticipated to be legislated by the federal government." In its responses, the Company claims to have C\$750 million in insurance (C\$150 million specific to pollution events from KM Canada properties including TMP, plus \$600 million for general liability insurance for all KM activities including in the US). ... In addition to insurance, KM points out that it has extensive other financial resources. However, given the very high costs of a more credible bad to worst-case scenario for TMX

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<sup>16</sup> Ott Report filed by NOPE, p.9

<sup>17</sup> Ott Report filed by NOPE, p.16

<sup>18</sup> Affidavit and Expert Report of Larry Martin, sworn May 25, 2015. The Report notes that costs may be reduced if Trans Mountain is required to implement mitigation techniques desired by the Cities and the Township. However, the NEB's proposed conditions include no such requirement.

(estimated at US\$1-5 billion), we have concerns about KM's financial capability, responsibility and willingness to mitigate and compensate for all the potential damage for spills costing \$1 billion or more. ...

For smaller spills it is more credible that KM/TMP could internalize the cost. But for bad to worst-case scenarios (i.e. spills of \$1 billion or more), it is possible if not likely that taxpayers will end up paying for some portion of the damage and cleanup. And these liability concerns only increase if spill costs escalate into the multi-billion dollar range.

112. The Goodman Report notes that the Montreal, Maine & Atlantic Railway declared bankruptcy in response to the Lac Megantic disaster.
113. Proposed Condition 108 is inadequate to insulate the public treasury from the cost of a disastrous spill. Proposed Condition 108 caps total coverage at CDN\$1.1 billion, with a footnote that the NEB's basis for any final coverage level will be described in its report to the Governor in Council. Proposed Condition 108 is suggestive of prejudgment of the cost of credible worst-case scenario by the NEB. The flexibility accorded to the project proponent suggests that NEB places unwarranted faith in the project proponent and its parent company.<sup>19</sup> The allowance by Proposed Condition 108 that the financial assurances plan should be submitted for approval at least 6 months before commencing operations suggests that NEB does not intend to make financial acumen a pre-condition of construction. Proposed Condition 108 does not provide for annual re-assurance, which does not account for Trans Mountain's fast changing corporate structure.
114. Any reliance on Trans Mountain cash flows to pay the costs of a spill ignores the elevated 12% interest payable on US\$5.4 billion capital to Kinder Morgan parent plus associated fees and charges. Interest, fees and charges can be used to transfer pre-tax dollars to the US parent. Unlimited statutory liability for negligence will amount to little if the Canadian subsidiary is unable to satisfy that obligation. Insurance of CDN\$750 million will not satisfy even a small fraction of a credible worst-case scenario.

#### *Trans Mountain Overestimates Economic Benefits from Construction and Operation*

115. Trans Mountain overestimates economic benefits associated with construction and operation of the expansion project.
116. Economic benefits associated with construction are overstated. The Goodman Report notes that almost 90% of the jobs estimated by Trans Mountain to arise from construction are off-site, up-stream and down-stream (page 15). These estimates are based on various data, assumptions and methodology,

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<sup>19</sup> The notation in PC108 that financial assurances could be provided to the NEB by "other instruments developed by Trans Mountain" is indicative of the NEB's administrative flexibility.

including principally multiplier effects from on-site jobs and inferences that overall employment arising from a project will be a function of total expenditures (page 16).

117. The Goodman Report notes that the jobs multipliers employed by Trans Mountain to estimate employment are substantially higher than those estimated for other crude pipeline projects. The Goodman Report notes that 5.5 person-years of employment are estimated per \$1 million project costs for Northern Gateway compared with 11.3 person-years per \$1 million spent by Trans Mountain, despite the similarity of the physical works and the use by both projects of the Statistics Canada I-O model (page 17). Trans Mountain provides no empirical foundation for its rosier employment multipliers, except to reference in its reply material that the I-O model employed is from 2009 rather than the Goodman Report's 2008 I-O model and to say that different assumptions are involved in each report.<sup>20</sup> The Goodman Report urges skepticism in this area (page 25).
118. The Goodman Report also notes that given the anticipated tight labour market conditions in British Columbia, employment arising from Trans Mountain construction would not be employment of previous idle workers – it would involve the displacement of other economic activity (page 18).
119. Moreover, the Gunter Report is correct to indicate that increased profits for foreign shareholders cannot be considered an advantage to Canadians. 40% of shareholders of tar sands producers are foreign. The vast majority (67%) of economic purported benefits from increased netbacks are anticipated to accrue to tar sands producers. Trans Mountain is entirely foreign owned. While international trade agreements likely prevent the NEB from expressly discriminating against corporations on the basis of foreign ownership, the NEB is certainly not prevented from acknowledging that Canadian people and our environment will suffer from any sizeable spill.
120. There is a serious concern that Trans Mountain is double-counting existing employment arising from the operation of Line 1 and anticipated marginal increase in employment arising from the operation of Line 2. The Goodman Report notes that pipelines are highly automated and higher utilization or shipping volume are more likely to improve operating efficiencies than add significant employment (pages 25 and 26).
121. There is also a serious concern that Trans Mountain will avoid paying taxes in Canada by exploiting exemptions for ULCs in cross-border tax treaties, inflating interest payments on capital invested by US parent companies and

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<sup>20</sup> Trans Mountain Reply to Dr. Catherine Douglas and the Pro Information Pro Environment United People Network "Economic Costs and Benefits of the Trans Mountain Expansion Project (TMX) for BC and Metro Vancouver", August 2015, 2.2.1

inflating charges and fees charged by US parent companies. Between 2009 and 2013, Trans Mountain paid an average of \$1.5 million in taxes on an average of \$172 million in net revenue. The NEB should regard with skepticism any claim by Trans Mountain that its tax contribution to the Canadian treasury provides a benefit to Canadians.

122. In sum, Trans Mountain overstates the economic benefits that Canadians can anticipate from the proposed pipeline.

*Trans Mountain Overstates the Probability of Purported Benefits*

123. Trans Mountain overstates the probability of the benefits it purports will arise from its proposed pipeline.

124. PIPEUP concedes that it is not entirely implausible that by providing access to Chinese markets and by potentially reducing the cost of shipping below the costs of rail transport (assuming that the proposed pipeline operates at or near full capacity), the proposed pipeline will increase netbacks for tar sands producers, create profits for Trans Mountain, and increase royalties and potentially taxes for the federal and provincial treasuries (assuming that increased revenues are not transferred offshore by means of cross-border licensing/management fees or other unfortunately lawful means of tax avoidance commonly used by international corporations). Municipal property tax revenues may also increase.

125. However, the Panel's report to the Minister should be forthright that there are a number of unproven assumptions that limit the confidence the Panel may have that benefits will materialize. The assumptions that the pipeline will be at full or near-full capacity and the assumption that increased revenues will be taxable are among those assumptions.

126. Credible contingencies should limit the NEB's confidence that this project will increase profits and taxes. Credible adverse contingencies that could attenuate or eliminate any increase in profit or taxes include: (a) ongoing depression in the price of petroleum products resulting from increased OPEC supply; (b) decreased long-term demand resulting from the global shift to reliance on electrical power generation; (c) continued growth in US production; (d) limited expansion of tar sand production; (e) depressed consumption resulting from taxation of carbon production or other change in climate policy; and (f) increased capital costs that threaten the profitability of the line.<sup>21</sup>

127. There are signs that Trans Mountain is well aware that the economics of this proposed project can change dramatically. In its reply to the Goodman

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<sup>21</sup> Goodman Report, pages 36, 37. See also Gunton Report, pages 28-35, 42-43 and Report of Kathryn Harrison dated November 2015, pp.4-7

Report's assertion that employment in BC will not be generated by the project because the BC labour market is already tight, suggesting that that persons will be diverted from other gainful employment by this project, Trans Mountain writes:

It is also important to note that the supply of labour is an ever-changing figure. The number of people working or looking for work in British Columbia changes every day, and can be influenced by a variety of factors including demographics, migration patterns and the willingness of people to work. It is no coincidence that the regions with the strongest labour markets tend to experience the strongest inflows of migrants (Statistics Canada Quarterly Demographic Estimates, January to March 2015, Catalogue no. 91-002-X, page 44).

128. The passage above is a relatively clear expression by Trans Mountain that at least some of the purported employment benefits are uncertain.
129. It will not do for Canadians to say, as Trans Mountain does, that tar sands producers are willing to sign onto a pipeline so Canadians all should as well. The calculated risks and gambles of tar sands producers are different than the risks the government must weigh in respect of the Canadian economy as a whole. Notably, participants have not seen the contracts and are unaware of any conditions precedent or options built into those contracts.
130. Proposed Condition 146 would require Trans Mountain to confirm, at least 90 days prior to commencing construction, confirmation that the project has secured agreements or contracts that remain in force with shippers for a minimum term of 15 years for no less than 60 per cent of total capacity and any rights to terminate have lapsed or expired or waived. With respect, such a condition also presumes that shippers can be held to account for such commitments.
131. It does not enhance Trans Mountain's credibility to purport that economic benefits are guaranteed, risks are nearly non-existent and mitigation nearly foolproof. Brash overstatements of this type create the impression that Trans Mountain cannot be trusted. No regulator should be captivated by such excesses.
132. The NEB must ensure that it does not create the impression that the regulatory outcome is pre-determined. Regional imbalances are particularly strong in this case where the economic benefits (including profits and employment) accrue to Calgary-based companies and the environmental and health risks gravitate to the West Coast (Gunton Report, page 23; Goodman Report, pages 38-42). As a regulator anchored to Calgary by its enabling statute, the NEB must ensure that the broader public will accept that the NEB is able to put aside parochial self-interest when adjudicating what will benefit Canada as a whole.

*Trans Mountain Fails to Address Net Benefits, Opportunity Costs and Trade-Offs*

133. Trans Mountain's evidence fails to address net (rather than gross) benefits, opportunity costs and trade-offs that must be anticipated if its proposed pipeline is built.
134. The NEB must account for displacement of current economic activity. If we accept Trans Mountain's premise in the Muse Stancil Report that pipeline delivery is less expensive than rail and that in the short and medium term transport of diluted bitumen will shift from rail to pipeline, then we must also accept the fact that profits and taxes will be lost by railways and companies that make and lease rail cars and transfer stations.
135. Similarly, because pipelines may decrease costs and connect Alberta supply to new demand, may decrease anticipated margins for domestic refinement. Tar sands producers confined to lower volume/higher cost shipping to fewer markets may be inclined to invest in a domestic refinery rather than accepting lower or non-existent profit margins resulting from oversupply of bitumen.
136. More generally, as the Gunton Report concludes that Trans Mountain fails to provide an assessment of the net benefit of the proposed pipeline to Canadians (Gunton Report, 4.4, p.20). The Conference Board of Canada evidence fails to assess how the proposed pipeline will affect other firms and industries, wages, prices, and interest and exchange rates. When assessing whether the proposed pipeline is in Canada's interests, the Panel must engage in a net benefits analysis.
137. As with the Conference Board of Canada evidence, the Muse Stancil Report confines itself to purporting that the proposed pipeline has gross benefits, but fails to account for environmental or economic trade-offs (Gunton Report, page 25, 4.9).

*There is a Strong Probability that the Net Benefit to Canada is Negative*

138. There is a strong probability that the net benefit to Canada is negative. PIPEUP commends the analysis of the Gunton Report, which concludes that the proposed pipeline will generate a net loss of between \$4.6 and \$23 billion in net present value (Gunton Report, p.75). We would also note that in the balance between granting and withholding a certificate would suggest withholding a certificate at this time:

Under CAPP's high growth forecast, construction of the TMEP along with Enbridge Line 3, Enbridge Clipper and Energy East will result in surplus transportation capacity beyond 2040. Under CAPP's low production

growth forecast, construction of the TMEP along with just Enbridge Line 3 and Enbridge Clipper will result in surplus capacity beyond 2047. This magnitude of potential surplus transportation capacity is unprecedented. The risk of approving the TMEP application is that approval will result in irreversible creation of high cost surplus capacity. The risk of not approving the TMEP application is minimal because if markets change and new transportation capacity is required earlier than forecast, there is sufficient lead time to develop new transportation capacity to accommodate demand.

*Gunton Report, page 75*

139. The NEB should not take an overly exuberant approach to anticipated profits. Its report to the Minister should be tempered by uncertainty.

#### PART VI: CONDITIONS OF APPROVAL

140. PIPEUP does not support the issuance of a certificate of convenience and necessity for Trans Mountain's proposed pipeline. However, if the NEB does issue a certificate, PIPEUP offers the following submissions dealing with the appropriate conditions on construction and operation of the pipeline.

##### *Seismic Hazards and Geohazards*

141. PIPEUP submits that the seismic standards for urban and sensitive environmental areas should be the equal of that expected of a dam site. PIPEUP adopts the conclusions of the Molnar Report filed by Burnaby Residents Opposing Kinder Morgan Expansion. The Molnar Report is the best evidence of seismic risks in the record before the Panel.
142. In respect of the populous areas of the Fraser Valley, including Hope, Chilliwack, Abbotsford, Langley and Surrey, PIPEUP requests that the NEB recommend a condition that seismic standards for urban areas be set at a moderate-to-high consequence level from the probabilistically-evaluated earthquake ground motion with a very long return period of approximately 3,000 – 10,000 years.
143. Setting seismic standards at a moderate-to-high consequence level is justified by the flammable and toxic nature of the substance transported, the sensitivity of the receptors (i.e. human beings) and the economic consequences of a spill. The special difficulty in the seismic area is that a significant earthquake will result in simultaneous crises of which a pipeline and tank farm spill will be just one. Mitigation of a disastrous urban bitumen spill will compete with other emergency urban response needs resulting from an earthquake.

144. Proposed Conditions 25, 26 and 71 in relation to seismic hazards and Proposed Conditions 68, 69 and 73, dealing with geohazards, are inadequate. The proposed conditions require filing geotechnical reports for the proposed new tank facility and marine terminal and other areas. With respect, Proposed Conditions should specify the mitigation standards with precision rather than deferring the decision to a later time out of the public eye.

#### *Wetlands At Risk*

145. PIPEUP submits that the conditions for avoiding and remediating wetlands should be specified in advance of the construction of any pipeline segment.
146. Proposed Condition 52 proposes that at least 4 months before beginning construction, Trans Mountain is to provide for approval a plan consisting of a description of the crossing methods, mitigation methods and reclamation methods, measureable goals for evaluating wetland mitigation and reclamation success, no net loss details and details of any monitoring plan. Proposed Condition 52 fails to implement precautionary adaptive management because it fails to identify the mitigation and reclamation methods with any precision.
147. Moreover, Proposed Condition 52 provides no indication of who within the NEB will approve the crossing, mitigation and reclamation methods or what criteria will be used to approve them. Proposed Condition 52 does not provide for notice to the public or any form of transparency of accountability for decision making. Proposed Condition 143 proposes that Trans Mountain has no obligation to remediate lost wetlands until five years after final clean up, and no deadline for final cleanup is specified. These conditions are inadequate.
148. PIPEUP strongly urges the Panel to specify the following criteria for wetlands at risk:
- a. The NEB should specify conditions for public notification of construction and remediation within 50 km of the wetlands – local residents know their wetlands best;
  - b. Remediation plans for individual wetlands should be subject to independent expert review prior to approval, with independent experts not being directly remunerated by the project proponent;
  - c. The NEB should require independent monitoring of construction and remediation by a monitor not paid by the project proponent;
  - d. The NEB should require post-construction monitoring reports to be filed with the NEB every 30 days following the commencement of construction within a wetland, with the NEB providing public notification and access to the reports;
  - e. The NEB hearings into destruction and remediation of wetlands should be open and transparent; and

- f. The NEB should specify the criteria for the preservation of and remediation of wetlands in the certificate. These criteria should include:
  - i. Remediation should be immediate and should be done on the basis of immediate no-net-loss, rather than waiting 5 years to assess the loss and then ordering remediation;
  - ii. The costs of remediation should never exceed 1/3 the cost of preservation, so as to encourage preservation; and
  - iii. Remediation should be subject to annual independent monitoring.

#### *Air Quality and Fugitive Emissions for Terminals, Pump Stations and Tank Farms*

149. Conditions proposed for air quality and fugitive emissions for terminals, pump stations and tank farms are inadequate. Emissions standards must forcefully cap ordinary operational emissions and must mitigate risks dealing with extraordinary emissions. Residents of the Fraser Valley are particularly vulnerable to increases in airborne emissions given the already critical levels of air quality exceedances in the Valley.
150. Exposure to the low levels of emissions over longer durations are at risk of the same level of symptoms and illness as people exposed to higher levels of shorter duration. Conservative appraisal of the increases in chronic exposure must account for the sensitivity of the Fraser Valley airshed to increases in emissions. In PIPEUP's submission, no increase in airborne emissions is acceptable for the Fraser Valley. Any increase in emissions from pumping stations or the Sumas tank farm must be counterbalanced by an equal or greater decrease in emissions from another source of Fraser Valley emissions. The application of the no-net-loss principle to the airshed of the Fraser Valley should be scrutinized by means of public notification and public hearing, and should not be relegated to a back room of the NEB in Calgary.
151. Conditions dealing with air quality and fugitive emissions should at a minimum specify that emissions should not exceed the strongest of EPA, World Health Organization, CAAQ, Provincial or Metro Vancouver air quality standards for PM<sub>2.5</sub>, Benzene, 1,3-Butadiene, NO<sub>x</sub>, SO<sub>2</sub>, VOCs, hydrogen sulphide, and other regulated substance. Merely saying, as Proposed Condition 23 says, that Trans Mountain should develop air quality criteria or thresholds and possible mitigation measures, is inappropriately aspirational and fails to provide impose any meaningful standard.
152. Proposed Condition 23 does not anticipate or prevent leaks, for example, of benzene and 1,3-butadiene, which are Class 1 human carcinogens with no known safe threshold of exposure.<sup>22</sup> Proposed Condition 23 imposes no specific

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<sup>22</sup> Takaro Report, page20

requirement to prevent the demonstrated risk of respiratory effects for vulnerable populations within a 2 kilometer radius of spills.<sup>23</sup>

153. Proposed Condition 23 requires that Trans Mountain file for approval an air emissions management plan for the Burnaby Terminal 6 months before commencing construction. The Proposed Condition is inadequate because it fails to specify any criteria or thresholds that if triggered or exceeded, will require mitigation measures and fails to specify mitigation measures. Proposed Condition 19, which deals with the Westridge Marine Terminal, has the same problem, as do Proposed Condition 47 and Proposed Condition 54, which deal with fugitive emissions from the terminals.

154. Preventative mitigation, air emissions thresholds, monitoring obligations and strict mitigation (i.e. shut down) requirements for exceedances should also be imposed in respect of all pumping or transfer stations. The Takaro Report, submitted by BROKE and NOPE in May of 2015, details the childhood leukemia risk from chronic and acute exposure to benzene and 1,3-Butadiene. In terms of air quality, the following conditions should be imposed:

- a. No pumping or transfer station within 1,000 metres of a residence;
- b. No pumping or transfer station within 2,000 metres of a school, hospital or senior's residence<sup>24</sup>;
- c. Increased municipal taxation rates to pay for specialized emergency equipment, including emergency equipment and training, for first responders;
- d. A detailed evacuation plan for a 2km radius from all pumping stations and transfer locations;
- e. Imposition of specific air quality standards (i.e. at least EPA standards) appropriately adjusted for urban environments including maximum emissions for all airborne emissions with adverse health consequences;
- f. Imposition of continuous monitoring stations for VOCs, including Benzene and 1,3-butadiene, within Surrey, Langley, Abbotsford, Hope, to be placed in reference to pumping stations;
- g. Imposition of mitigation strategies that will prevent exceedances; and
- h. Imposition of liability standards that anticipate increased public health costs depending on toxic emissions.

155. Proposed Condition 23, Proposed Condition 19, Proposed Condition 47 and Proposed Condition 54 do not identify a decision-maker to approve the air quality standards or what criteria will be used to approve them. The proposed conditions do not provide for notice to the public or any form of transparency of accountability for decision making.

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<sup>23</sup> See Takaro Report, p.30

<sup>24</sup> Older adults are more likely to suffer from comorbidities, making them more vulnerable than the average population (Health Canada, 2011, Takaro Report, p.8)

### *Species At Risk*

156. The NEB's Proposed Conditions dealing with species at risk contain no meaningful precise requirements that could be considered to comply with the principles of precautionary adaptive management. PC22 (Sowaqua Spotted Owl), PC20, PC21, PC110, PC144 and PC145 (Caribou), PC44 (Wildlife Species at Risk), PC45 (Grizzly Bear), PC50 (Rare Plants), PC51 (Old Growth), PC99 (Nooksack Dace and Salish Sucker), PC143 (rare plants) and PC78 (dealing generically with all species at risk) provide no empirical standards for assessing unacceptable harm to the species or their habitat and specify no mitigation strategies. These Proposed Conditions fail to apply the precautionary principle in respect of these species at risk.
157. With respect, the Panel should specify that Trans Mountain is to collect baseline data for all species at risk and their habitat, impose monitoring methods and mitigation thresholds and require reporting to the relevant authority and specific mitigation methods when thresholds are exceeded.
158. Some of the above-noted Proposed Conditions require prior approval, but the person providing approval is not specified, the criteria for approval are not specified, and no requirement for any further public notification or consultation is set out. Proposed Condition 142 suggests that Trans Mountain would not have any obligation to remediate habitat or losses until five years after final clean up, and the date of final clean up is not specified. Proposed Condition 144 and Proposed Condition 145 suggest the NEB proposes to allow Trans Mountain to collect baseline data only after the commencement of operations, which would obscure the damage done to caribou and their habitat.

### *Riparian Habitat*

159. The NEB's Proposed Condition 79, which deals with riparian habitat, is inadequate. PC79 requires, at least 60 days before construction commences, an assessment of riparian habitat, specification of measurable goals, reclamation plans, and habitat offset plan. Again, the failure to specify any standards for assessment, goals or offsets for losses is inadequate to satisfy the precautionary principle. PC79 says nothing about anticipated losses and sets no concrete standards for remediation; it provides no public assurance.
160. Moreover, Proposed Condition 79 provides no indication of who within the NEB will approve the riparian habitat management plan or what criteria will be used to approve it. It provides for no notice to the public or any form of transparency of accountability for decision making.
161. Proposed Condition 141 is inadequate to protect riparian habitat. Proposed Condition 141 suggests Trans Mountain must get approval, on or

before January 31 after the fifth complete growing season after completing final clean-up, a plan to remediate riparian habitat that has not returned to pre-construction functionality. Proposed Condition 141 suggests that Trans Mountain will have no obligations to remediate riparian habitat for the first five years following completion of final clean up. No deadline is imposed for the date of final clean up.

162. The evidence of Dr. Marvin Rosenau filed on behalf of the Salmon River Enhancement Society (“SRES”) in May of 2015 contradicts and challenges the credibility of evidence of Triton Environmental Consultants by Trans Mountain in respect of riparian habitat. Dr. Rosenau sets out the following conclusion in respect of riparian habitat:

Large, mature trees are key habitat features for CRA streams and they are found consistently throughout the TMEP route in the riparian areas of the construction zone. In large part, these riparian trees will be destroyed as a result of the pipeline activities. The destruction of mature forest in the riparian areas of the West and Nathan creeks, both legally-designated as sensitive streams under the *Fish Protection Act* are examples of watercourse that will be negatively impacted in the area of SRES interest. They will have significant portions of their mature forest destroyed, in the upland and riparian areas, that cannot be recovered easily or quickly by planting. In other words, contrary to the position of TMP and Triton Environmental Consultants, damage to this critical habitat feature cannot be mitigated in a reasonable or timely manner. Many other streams along the course of the TMEP will suffer large-scale removal of mature vegetation in the riparian areas (as well as the upland terrestrial zones). There is no evidence that TMEP is prepared to properly mitigate or compensate for such losses of critical habitat. Of great concern, TMP’s consultants have publicly stated within information meetings that they have been in dialogue with DFO staff who will support the position that these large-scale destructions of riparian areas will not cause *Serious Harm* under the habitat provision of the *Canada Fisheries Act*. This is contrary to dialogue with the federal Department of Justice that indicates that the removal of riparian vegetation constitutes *Serious Harm* to fish habitat. SRES takes the position that removal of such vegetation in its area of interest, and throughout the rest of the TMEP comprises *Serious Harm*; that damage cannot be meaningfully mitigated. There needs to be full compensation to offset the deleterious effects.

163. PIPEUP supports Dr. Rosenau’s conclusion that trenchless horizontal directional drilling is required to protect riparian habitat for stream crossings. Aerial crossings will not protect riparian habitat. Dr. Rosenau notes that Trans Mountain has refused to commit to HDD for all stream crossings.

164. PIPEUP submits that the following conditions should apply to any certificate:

- a. HDD for all fish-bearing watercourse crossings, unless demonstrated to be technically unfeasible by means of an engineering report. Trans Mountain is only prepared to commit to HDD crossing for some ultra-sensitive “selective” crossings (Final Argument, pages 121, 124-128, 211, 263-269) and make a vague commitment to adopt “appropriate mitigation” for all serious harm to habitat. In the main, Trans Mountain remains uncommitted and relies on a Department of Fisheries suggestion that HDD and aerial crossings may not be economically feasible in all cases (Final Argument, page 270);
- b. Remote and manually operated shut-off valves fore and aft of all fish-bearing watercourse crossings. Trans Mountain does not make any such commitment in its Final Argument – it says only that Trans Mountain has installed such valves in some locations (Final Argument, page 84); and
- c. Monitoring by independent monitors who are not paid directly by Trans Mountain.

#### *Protection of Well Water and Aquifers*

165. Proposed Condition 80 and Proposed Condition 81 are a very poor attempt to address the protection of water wells and aquifers, including municipal water supplies. They do not provide for baseline quality standards, water quality monitoring and impose no form of mitigation. PIPEUP submits that the NEB Panel should impose specific conditions to protect and preserve groundwater aquifers in the Fraser Valley.

166. Specifically, the Sardis-Vedder Aquifer, also known as the Vedder River Fan Aquifer, includes the main potable water supply for the City of Chilliwack as well as Yarrow Waterworks District potable water supply. The Sardis-Vedder Aquifer is also the groundwater source for a large proportion of agricultural irrigation within Chilliwack. Chilliwack does not have an adequate alternative source of supply; its best alternative can supply only 60L/s (compared with average requirements of 400 L/s and peak requirements of 675 L/s) and would not be operational in the immediate or short term.

167. Remediation of aquifer contamination by bitumen is particularly challenging because bitumen (as opposed to diluent) is resistant to dredging and tends to persist in aqueous environments.<sup>25</sup> The pipeline route crosses land where the aquifer’s vulnerability is classified as high and extreme.

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<sup>25</sup> Ipp Report, p.23

168. Trans Mountain has made no specific commitments to protect groundwater from spills or to promptly remediate contaminated groundwater. Although it notes a p.173 of its Final Argument that “the preferred method of protecting ... groundwater aquifers is to prevent the product from entering those environments”, Trans Mountain’s commitments are limited to “working with municipalities” and developing plans that it described as “enhanced EMPs”:

The enhanced EMP will include the development of Geographic Response Plans (“GRPs”) that will be tailored to the geographic setting in each region of the TMPL system. Each GRP will indicate whether a vulnerable aquifer is present and outline the spill response tactics will be designed to provide protection to the aquifer. Through these plans, Trans Mountain will ensure that aquifers are protected after a release or incident.

169. These assurances are too vague to be described as a “commitment”. A promise to develop a prevention and mitigation plan cannot be regarded as a meaningful regulatory response.

170. The NEB’s proposed conditions currently provide no meaningful protection for groundwater aquifers. Proposed Condition 63(d) provides that a certificate could be granted on the following condition:

63(d) Pipeline Environmental Protection Plan

Trans Mountain must file with the NEB for approval, at least 90 days prior to commencing construction, an updated Project-specific Pipeline Environmental Protection Plan for the construction of the pipeline.

The updated Environmental Protection Plan must be a comprehensive compilation of all environmental protection procedures, mitigation measures, and monitoring commitments, as set out in Trans Mountain’s Project application, its subsequent filings, the evidence it provided during the OH-001-2014 proceeding, or as otherwise committed to during questioning and in its related submissions. The updated plan must describe the criteria for implementing all procedures and measures using clear and unambiguous language that confirms Trans Mountain’s intention to implement all of its commitments.

The updated Environmental Protection Plan must include the following:

...

d) Updated contingency plans and management plans, including a plan that includes procedures for protecting identified vulnerable aquifers along the pipeline route and specific measures to mitigate any construction or operation impacts to these aquifers.

171. PIPEUP finds it deeply troubling that the NEB might consider Proposed Condition 63(d) suitable as a regulatory proposal to protect the drinking water of 73,000 people. It is hard to fathom how a requirement to “include a plan .. for protecting” could be appropriate.
172. Proposed Condition 80 would require Trans Mountain to take an inventory of water wells, but would require no steps to be taken to safeguard against spills or remediate spills when they occur. Proposed Condition 81 would require Trans Mountain to report on municipal and Aboriginal consultations regarding water, but would again require no preventative or remediative steps to be taken.
173. PIPEUP submits that construction (rather than operation) should be predicated on the following conditions dealing with wells and aquifers:
- a. Use of heavy wall pipe (14.7 mm wall thickness) within 500 meters of all collective (i.e. non-individual) water wells or aquifers;
  - b. Installation of remote and manual emergency shut-off valves within 100 meters of the fore-and-aft boundaries of all collective wells or aquifers;
  - c. Immediate spill notification of registered well owners within 3 km of all wells and aquifers:
  - d. Ground truthing and collection of water quality baseline data for all collective wells within 150 metres of the pipeline. The Provincial Ministry of Environment’s “Wells Database” that was used to assess the location of the wells does not include all wells constructed in the Fraser Valley;
  - e. Independent monthly monitoring of water quality for all collective wells within 100 metres of the pipeline, at locations and for substances agreed to by well owners and operators;
  - f. Provide for compilation and publication of groundwater quality baseline and ongoing monitoring data by independent monitor;
  - g. Municipal and Provincial approval of mitigation and monitoring proposals for well water and aquifers;
  - h. Confirmation by independent expert report that the cost of rerouting the pipeline around the aquifer does not exceed 1/3 of the total cost of the average spill that can be expected to occur during the life of the project. This is to prioritize prevention over remediation;

- i. Establish a groundwater protection for local governments and First Nations reliant on groundwater aquifers to conduct research regarding contamination, mitigation and remediation of groundwater by bitumen and diluted bitumen; and
- j. Use Direct Pipe (a micro-tunneling technology) for any river or stream crossing that may affect a collective well or aquifer, unless contra-indicated by a report stamped by a qualified geotechnical engineer.

#### *Mitigation of Harm at River and Stream Crossings*

174. The proposed pipeline crosses numerous rivers and streams within the Fraser Valley. These features offer exceptional aquatic and terrestrial ecosystem values, including numerous Class A (salmon-bearing) watercourses, such as the Brown Creek Wetlands and Peach Creek Ponds, containing all five species of Pacific salmon (Chinook, chum, coho, pink and sockeye) as well as cutthroat and steelhead trout. The Vedder River corridor provides habitat for aquatic species at risk, including salish sucker, Cultus Lake sockeye salmon, great blue heron, western painted turtle, Oregon forestsnail, pacific sideband snail, red legged frog and others.
175. Construction involving water crossings present significant seasonal vulnerabilities. While Proposed Condition 15 proposes to allow the proponent to phase in filings for construction activities for different segments at different times, the NEB has not considered imposing a condition that requires construction phases to be timed to minimize the risk to endangered species and species of high economic value.
176. PIPEUP submits that the project proponent should be required to assess the sensitivity of the environment at various water crossings and plan its construction schedule to minimize adverse consequences to species at risk and other sensitive species. This work will need to be coordinated with Fisheries and Oceans Canada. Any construction schedule that is not coordinated with seasonal windows of least risk will inevitably cause environmental destruction that could be eliminated by means of routine project management. For instance, construction at the Vedder River, Browne Creek Wetlands and Peach Creek Ponds should occur during summer, from July 15 to September 15, outside the spawning cycle and when water levels will minimize habitat disruption.
177. PIPEUP respectfully requests that the Panel impose specific requirements to create baseline water samples, water quality monitoring standards, mitigation thresholds and mitigation methods if thresholds are exceeded.
178. Proposed Condition 100 and Proposed Condition 101 are a poor attempt to address harm to fish and fish habitat resulting from watercourse crossings. The proposed conditions make no effort to specify what type of crossing will be

used in any of the various watercourse types, sets no standards for mitigation or habitat enhancement or reclamation. It does not even impose a generic requirement for no net loss of fish or fish habitat.

### *Firefighting Capacity*

179. Proposed Condition 118 is a poor attempt to address the dangers associated with tank fires and boilover that were identified by Burnaby firefighters. The proposed condition requires Trans Mountain to develop appropriate firefighting capacity for a safe, timely and effective response to credible worst case for a fire at the marine terminal. Proposed Condition 112 requires Trans Mountain to file risk assessment for the Burnaby Terminal, Westridge Marine Terminals, and requires mitigation measures to reduce the risks to levels that are As Low As Reasonably Practicable (ALARP) while complying with the Major Industrial Accidents Council of Canada (MIACC) criteria for risk acceptability.
180. Proposed Condition 129 requires confirmation of firefighting capacity at terminals to be filed with the NEB at least 30 days prior to commencing operations. Proposed Condition 129 is mostly redundant of Proposed Condition 118. Nonetheless, it bears noting that Proposed Condition 129 is requires a filing, does not require any approvals, and assumes that there are no unacceptable public safety or risk issues associated with the Burnaby tank farm.
181. With respect, Proposed Condition 118 and Proposed Condition 112 assume that the tank spacing proposed in the Burnaby Tank Farm is acceptable. Because approval will come before operation rather than construction, the proposed conditions assume that the design is satisfactory. There is no evidence to suggest that the design is satisfactory from a public safety or firefighting capacity perspective. Moreover, there is no requirement for public notification or public consultation. Proposed Condition 118 is not subject to approval – it is only a reporting requirement.
182. Proposed Condition 112 and Proposed Condition 118 do not adequately address, for example, the enhanced risk of explosion or carcinogenic emissions from fire that attend the transportation of benzene and 1,3-butadiene.<sup>26</sup> Any conditions of approval should include a term requiring Trans Mountain to consent to increased rates of municipal taxation to pay for emergency respiratory and firefighting equipment and related training, as well as counselling and psychological resources for emergency responders.<sup>27</sup>

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<sup>26</sup> Takaro Report, pages 24 and 26

<sup>27</sup> The Takaro Report, page 29, sets out that negative mental health experiences have been directly associated with past oil spills (Sim *et al*, 2010; Lyons *et al*, 1999).

183. Similarly Proposed Condition 121 purports to require an evacuation plan for persons near the Burnaby tank farm, but the proposed evacuation plan is not subject to NEB approval. Trans Mountain is granted discretion to self-regulate. Moreover, there are no requirements for public consultation (aside from consultation with municipalities and first responders).
184. The Sumas Tank Farm and McDermott Pump Station are located in Abbotsford. There is no Oil Spill Containment and Recovery unit in Abbotsford.
185. The Abbotsford Fire Department has had to respond to two emergency incidents relating to the existing Trans Mountain pipeline within Abbotsford.<sup>28</sup> In the first leak, which appears to have occurred from at least July 8, 2004, to July 15, 2004, Trans Mountain repeatedly failed to identify the location of the leak despite eight public complaints of petrochemical odour. Its employees were not equipped with detection equipment although it was available, and vegetation was overgrown in the ROW because Trans Mountain had reduced vegetation control to once a year from twice a year.<sup>29</sup> 210 cubic metres of crude oil was released from the Sumas Tank Farm, made its way into Kilgard Creek and affected 14,300 square metres. The Abbotsford firefighters who responded to the spill were not informed by Trans Mountain of the potential hazards of the spill and so lacked proper safety and detection equipment to protect against occupational health and safety issues.
186. After the July 2004 leak was cleaned up, the City of Abbotsford and Kinder Morgan established a set of coordinated command training protocols. In the second leak at the Sumas Tank Farm on January 24, 2012, Trans Mountain failed to abide by the command protocols.

### *Leak Detection Systems*

187. Proposed Condition 113 intends to deal with slack line operation by requiring Trans Mountain to file at least 60 days prior to opening, a list of slack line operating locations and a list of design and operational measures to detect slack flow in Line 1 and Line 2. With respect, the proposed condition does not impose any specific mitigation and does not even require prior approval of design and operational measures, either prior to construction or prior to the commencement of operations.
188. Similarly, Proposed Condition 125 plans to require Trans Mountain to file the final design for SCADA and leak detection systems 90 days before commencing operations. This approach is deeply problematic because the viability of the leak detection system, particularly in slack line operations, must be ascertained by the NEB in order to determine the probability of a spill and the

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<sup>28</sup> Affidavit of Donald Beer, Abbotsford Fire Chief, *sworn May 25, 2015*

<sup>29</sup> Transportation Safety Board of Canada Report Number P05H0044

magnitude of a spill in the Fraser Valley area. Simply allowing Trans Mountain to specify its own design, without even requiring later NEB approval, creates significant uncertainty regarding the downside risks and potential costs associated with a spill.

189. Proposed Condition 113 and Proposed Condition 125 do not accord with the principles of precautionary adaptive management.

All of which is submitted this 12<sup>th</sup> day of January, 2016.

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