

**Trans Mountain Pipeline ULC
Trans Mountain Expansion Project
NEB Hearing Order OH-001-2014
Responses to Information Request from
Rod MacVicar**

Preamble:

I would like to acknowledge that the N.E.B. is providing persons with interest and expertise full opportunity for participation in the application hearings.

I would like to qualify my expertise and interests in this Project. I was born and raised on the water's edge in Vancouver, I started net fishing in Vancouver Harbour with my father and grandfather when I was only three years old. I am from a seafaring family. My grandfather was killed in a tugboat accident in 1947. My uncle was killed in the shipyard and I inherited his fishing boat the "Cape Breton" in 1958. I had a Fishing Vessel Masters for operating the 85 ton packer/research vessel Aliford Bay, 1976).

I worked at Frasers Boathouse, Kitsilano when I was in high school and attended U.B.C. receiving an undergraduate degree in botany/zoology/marine biology . I later finished a graduate degree in Marine Environmental Education at S.F.U. While working and attending school .I accumulated enough sea-time for a DOT Master Ltd. CDN 49256H, (still current) operating from Portland Oregon to the Arctic. I also hold a BC Marine Oil Spill Workforce certificate number WF01105.

I have received numerous awards for my work in the environment (Prov. Min. of Envir., Prime Ministers Award, Murray Newman Award, R.T. Peterson Award (USA) and others. I co-founded and operate the Mossom Creek Hatchery (SEP 1976), Medusa Soc. (inc. 1974), past president Northwest Assoc. of Marine Educators , founder/curator of the floating Marine Education Centre, Reed Point Marina (2nm. from Westridge Term.) and am a director of the Pacific Wildlife Foundation, currently collecting wildlife data in Vancouver's IBA.

I notice that the NEB recognizes ATK (Aboriginal Traditional Knowledge) and its subset TEK. I would ask if the NEB would recognize Local Ecological Knowledge (LEK). For I have been asked by first nations and DFO (S. Hollick Kenyon DFO, CA) about fish populations that existed in areas where records of them were not being kept by anybody.

I have a practical and academic background of knowledge. I have lifejackets that have more sea time than the oldest marine consultants on the Project. Do I qualify as a source of LEK?

Request:

1. P.8A-38 I understand that it is not the role of the shipper to enforce IMO regulations, nor the NEB. Yet the nature and hazards presented while shipping oil, gasoline, jet fuel and LNG through heavy traffic areas and the centre of large cities could potentially be catastrophic. Will the NEB request an increase in Transport Canada's oversight and enforcement of the Can. Shipping Act for these vessels engaged in the Project?

- 2a. Will the NEB consider a non-profit organization such as "Ocean Rangers" to protect the sea and its creatures? The state of Alaska's , Department of Environmental Conservation Spill prevention and Response had to implement Ocean Rangers to insure that the regulations were being followed when the number of vessels involved in the cruise trade increased by about the same amount as this Project will increas freighter traffic in B.C.
- 2b. Will the NEB consider a Marine Response Alliance as was founded by Crowley Towing? Crowley manages the AK Ocean Rangers in a \$4 million dollar contract.
3. Has the NEB considered approaching Crowley (that currently ships out of the Westridge Terminal and exceeds operating fleet standards of ISO 9001-20001 and 14001 enviro. cert.) with an inquiry about the logistics of setting up a B.C. program?
- 4a. Has the NEB paid attention to some issues raised in the Mar.22, Van. Sun Shepherding the Oil Giants? Where Seaspans VP , states in reference to the Exxon Valdes that it precipitated "The transition between old school and where we are now". Has the NEB considered the implications of "distracted driving" and impaired driving and their enforcement? We can do this for cars in a city.
- 4b. Will they consider enforcement for tankers? For in the Sun it is quoted "that tug crew members are knownalso to receive cell roaming charges". It notes that they have WiFi.
- 4c. Was the NEB aware that the TSB implicated a cellphone in the accident involving the tug Jose Narvaez towing an energy barge out of Van. Hbr? (2001).
- 4d. Are vessel operators on their cell phones? I realize that communications are necessary but isn't that what VHF channel 16 is for? Emergencies and calling?
5. Was the NEB aware of the background of the ship FSL Shanghai featured in the Van Sun article mentioned above? I bring this up so as to ask a question:

Were you aware that the vessel FSL Shanghai has had a somewhat checkered past? It started life as the oil tanker "Action". It was chartered by the Turkish company Geden. Geden defaulted on payments for the vessel Action. The vessel was repossessed and renamed FSL Shanghai. Then June 2013 , FSL (First Ship Lease) Trust was suspended on the Singapore Exchange from trading for two weeks. FSL Trust posted a \$65.2 million loss for 2013. To complicate the situation, all senior management of FSL quit enmasse, even high profile CEO Philip Clausius. In the company's own words , defaults effect revenue and costs and it's expensive to change management (this is the group that would delegate maintenance such as software upgrades to nav. sys. etc.) . It is difficult to keep the vessel at standards. We all know that a company going into receivership stops doing repairs and replacements.

Now this leads me to today's Sun where Stephen Brown says," Transport Canada has committed that every tanker visiting a Canadian port will at least annually subjected to a thorough physical inspection". I wager FSL has not done a thorough inspection. If it was inspected, was that before it reached J buoy and entered Canadian waters?

- 6a. FSL wanted the Shanghai out on charter and that they did charter to an unnamed oil company. It is on short term charter, which probably falls under the category # 5 in the Van Sun's "Oil Spills, 10 Lessons "use of numbered companies to reduce liability and financial risk". Would the NEB be able to suggest that Canadian products be shipped in vessels that are registered in countries that reflect the vessel ownership and not flags of convenience?
- 6b. Could they also suggest the use of numbered companies should not be used. Would the Project elaborate of the "quality of common carriers" used?
- 6c. Would the Project elaborate of the "quality of common carriers" used?
- 6d. Could it explain who the "spot shippers" are? NEB and the Project should encourage companies like Crowley that are proud to put their name on their assets.
- 6e. Could the NEB get the Project report to elaborate of the use of the phrase "world class standards". Could it explain "working to promote best practices" but not requiring them?
7. Could the NEB explain why spills are the accident of most consideration in the Project report when collisions in a busy harbour are more frequent? The socio-economic effects of the SunBuoy /Narvez collision and fatalities in Vancouver Harbour were huge. Is there a positive correlation between volume increase in traffic and the increase in risk of accidents?
8. Was the NEB aware that the US N.T.S. B. recognized 6 factors contributing to the Valdes incident produced 6 recommendations?
 1. fatigue of the 3rd mate...still no enforcement of these rules , no drinking within 4 hrs of starting a watch, an offence will cost he offending party their lic.
 2. Failure to maneuver the vessel , not enough rudder. Wasn't this the reason for Cape Apricot collision at the coal terminal under direction from a pilot?
 3. Captain's failure to provide proper watch (impaired)
 4. Company's failure to provide a good captain, rested crew and sufficient crew.
 5. U.S.C.G. ineffective VTS
 6. Lack of pilot service

Has the NEB noted that only the last two of these causal items have been addressed?

It has been said that, as high as 80% of maritime accidents are caused by the personnel, that unquantifiable nature of the human element.

Some observations:

-ships with crews of a single nation are dwindling. Brazil, China, India and the Philippines (I chose these as they are a substantial % in the merchant fleet). These are in no way similar languages.

- 8a. Is the NEB aware that the more languages spoken on board the more mishaps, accidents and 'near misses'?

-there are a number of different religious and social festivals/ traditions on ships even daytime fasting, ship on autopilot , all crew in galley at sunset.

- 8b. Has the N.E.B. CONSIDERED THE SIGNIFICANCE OF LOW DOSE ALCOHOL EXPOSURE AND IMPAIRMENT? (low dose generally >.04% blood alcohol B.A).,

Does NEB track interesting findings from a U.S. DoT study conducted in Castine, Maine dealing with safety issues in transportation or does it defer to other agencies the task of suggesting and patrolling standards in energy transport?

9. Of interest to the NEB should be the following study:
Performance on Bridge Simulator Tasks Under Slight Impairment

-conducted a double blind test on performance effects of operating a loaded vessel through a channel with commercial traffic.

-results reported significantly impaired operating skill.

-a slight impairment in a large number of crew yields more untoward events than a small number of impaired crew. (Mangione, 1999)

- 9a. -THEREFORE DOES THE NEB HAVE A CONCERN FOR SHIP, NEARBY FACILITY AND CITIZEN SAFETY?

-note: low dose behavioural clues are not apparent. They are frequently unobserved and if alcohol is smelled it is usually considered benign (a drink with lunch or dinner).

-note DoT sanctions .04%B.A. or less on ships. Airline pilots , tanker truck drivers, machine operators ,we are not so tolerant.

-Simulator data showed a 21% lower score or reduced ability in normal everyday tasks. The simulator deck is stable and not rocking, they did not introduce any system failures or other vessel unexpected behaviours requiring emergency, creative responses. So this simulator data was not “real world” simulation.

When I asked U.S. Coast Guard why they did not enforce the drinking laws on ships, like the police do randomly for drivers of a car? They had an interesting response:

“Alcohol on docks and terminals is not limited to sailors, although sailors have a tradition of a daily tot of rum (ration, half a pint/day overproof rum , split over two servings) We do not have the expertise to gather blood samples or obtain evidence with the crews we have presently trained.

- 9b. Did the NEB know that DeltaPort, in the fast running Fraser River, has a rescueboat in the water 24/7 to recover any dockworker that has stumbled or fallen overboard? Would this be acceptable at an energy terminal?

- 10a. I have a question about the product being shipped, dilbit. I understand it is a thick hydrocarbon mix, with some heavy metals, sulphur and sediments. these sediments

- grate against any transport surface increasing wear and tear and likelihood of surface failure, hence the stronger pipes on the pipeline. Are you aware that tankers have had to be epoxy coated to protect them?
- 10b. Those carrying this product are suffering from accelerated corrosion stemming from the 'aggressiveness' of this product?
- 10c. (PrimeTankers site). Are shippers hesitant to put their newest ships into this trade and hence we get older ones?
11. Is the tanker market now favouring LR1 . Panamax 90DWT tankers as they are more flexible in the marketplace and increasing in numbers.? (Prime-Marine net). If the Project has to use 90 DWT tankers, it will need about 30% more of them. Will this change traffic patterns. Do the Aframax LR2's get loaded to their 120 DWT max. What would using smaller tankers do to traffic volumes?
12. Will the project be asked by the NEB to compare their plans with other state of the art and global best practices such as on the Hudson river , N.J. where tanke security is maximized by loading inside a surrounded berth or as in antwerp where they use lock loading facilities and don not need to worry about spills, tides or dredging. Why is there no discussion about MARSEC levels in the Project plans?
- 13a. What actual data will the Project provide? From the most up-to-date ,12 month IBA surveys of Vancouver Harbour by the Pacific WildLife Foundation, there are gaps in their data and errors on which these projections were made.
- 13b. Will a bird data program be initiated?
- 13c. Will there be a baseline to evaluate the state of the populations? One consultant states that during terminal construction any bird loss of habitat can be recovered in one or two year natural cycles, even for minor spills, Yet another expert says that the buffleheads that are present at the terminal could take as long a 20 years to be replaced, because of their high site fidelity. We definitely need some peer reviews of the science. Does the NEB have 'inhouse capability to do this?
14. Table 4.4.4.2 "The cumulative disturbance to intertidal fish habitat that has a periodic frequency of disturbance is not significant? Are they aware that the extent of the oiled beaches after the 2007 spill in Burnaby? I see no signs of spawning of food fish. The consultants state that oil on the beach will be ameliorated in between 2 to 5 years. There is a sandy beach and cobble /boulder beach at Westridge that was oiled in 2007 (seven years ago) and as of May 11, 2014 there are patches of oil on rocks and lumps of asphalt or bitumen that have been formed from the mixing of oil and sand/rocks in the intertidal and may remain like this for another seven years. It seems that asphalt doesn't biodegrade very quickly. No sand lance or surf smelt would ever spawn on this beach in the foreseeable future.
15. Can the NEB ask consultants why the biodiversity of the region is so poorly represented in their report. Being the southern-most fjord on the west coast ,Van Harbour has been

historically the northern limit to many southern fish and the southern range limit to many northern fish. May first spp were collected in Van Hbr. (Fisheries Research Bulletin No.68). I have beach seined at Lumberman's Arch , Stanley Park on the Dec. low tides for decades. Did you know that substantial schools of small individuals of Pacific tomcod were present and most likely a valuable food fish for all higher order consumers? The Project report does not mention many of the rare fish that come into the harbour in winter to spawn, like the spiny lump sucker.

- 16a. Table 4.3.8.3 Would the NEB get the Project to explain 1(b) the probability and confidence figures being NOT significant , when my personal observation on the sea on the UBC Open Water research vessel, Curve of Time, do not support this as "Not significant".

Would the NEB question the statement "bird strikes are expected to be uncommon".

- 16b. What data do they have for strikes on tankers in Juan De Fuca Strait?
- 16c. Tankers have a much more complex deck superstructure than bulk cargo ships. Would the Project consider gathering some data to support their conclusions?
17. Will the NEB ask consultants if they have been off the coast at night with lights on a ship and if they had been, what was the season? How would they comment on injury and mortality resulting from night bird strikes? in 8A 4.3.8.4.2
18. Why does the project assume that the same types of effects on birds assessed in Canadian waters is the same as in US waters when US has different regulations for running with halogen flood lights on and deck floods?
19. Some of the references quoted in the application are dated. Does the NEB know that seal pups are born locally on wharves and log booms with the nearest haulout and pupping site being 2.3 nm north of W.M.T? Seals congregate to breed 3.3nm E. of WMT (on the cedar mill log booms) contrary to the literature cited (Baird 2001). The harbour porpoise, a spp. of special concern (it is not the smallest cetacean sp. The Vaquitas are smaller, although not in Canada) is regularly and frequently seen at the entrance to Vancouver Harbour on a line between Pt Atkinson and Pt Grey. (Butler 2014).
20. Table 5.4 Can the NEB ask how the recovery of herring and squid stocks, adjacent rockfish conservation area, important Dungeness crab habitat both for rec. and comm. fishers and productive salmon streams aren't accounted for or inventoried?
- 20a. 5.3.3 Says the area provides bird habitat. But why doesn't it mention that it is an internationally recognized Important Bird Area , with tens of thousands of birds overwintering (w.grebes, b. goldeneye, scoters, scaups and bufflehead) and only 2.6nm from W.M.T. there were hundreds of nests of double crested cormorants?
- 20b. Why do they not talk about or consider the marbled murrelet as an indicator species? It is a threatened bird that is found in the channels to the harbour where it often feeds in the tide rips and passages. Recovery of this species outlines reducing risks faced at sea.

Would they do some “at sea surveys” to provide improved data on the murrelet? Their seasonal distribution needs mapping to assess sensitivity to spills. It is much more of an indicator than an eagle.

21. Why is “oil ingestion ...a potentially important exposure pathway”? They discuss thermal loss on fur. This is minimal for seals and sealions. Did you know that oil aspiration is the immediately lethal factor in small doses? Its not about vapours. 5 ml. or a 1/4 teaspoon swallowed and regurgitated and aspirated in a choking reflex is fatal. This is why merchant marine sailors died in WW2, they abandoned ship into oil slicks and aspirated small quantities of oil. We know why we are not to induce vomiting if a human swallows a toxic oil product. If they choke on vomit and the oil gets into their lungs they are in respiratory distress almost immediately. (monomolecular layer coats the lung alveoli and suffocates them).

Response:

1. This information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
- 2a. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
- 2b. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
3. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
- 4a. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
- 4b. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
- 4c. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
- 4d. This information request is speculative and cannot be answered.
5. The information request appears to be directed at the National Energy Board, and Transport Canada not Trans Mountain Pipeline ULC.
- 6a. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.
- 6b. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. All vessels calling at Westridge have to meet all applicable local and international rules and regulations and also meet the criteria listed in the Tanker Acceptance Standards.

- 6c. Trans Mountain assumes this is in reference to common carriers in marine transportation.

Please also refer to the response to MacVicar R IR No. 1.6b.

Vessels calling at Westridge Marine Terminal must meet stringent requirements. Please refer to the responses to MacVicar R IR No. 1.10a and 1.10c.

- 6d. Spot shippers are those producers who have not entered into a long term contract with Trans Mountain for carriage of their products in the pipeline.

The Trans Mountain Expansion Project is based on support from shippers who move products through the line to various markets. In 2013 Trans Mountain publicly announced the names of the thirteen committed shippers that have signed long term contracts: BP Canada Energy Trading Company, Canadian Natural Resources, Canadian Oil Sands Limited, Cenovus Energy Inc., Devon Canada Corporation, Husky Energy Marketing Inc., Imperial Oil Limited, Nexen Marketing Inc., Statoil Canada Ltd., Suncor Energy Marketing Inc., Suncor Energy Products Partnership, Tesoro Refining & Marketing Company and Total E&P Canada Ltd. Many of these same companies are spot shippers on the pipeline today. Other companies that currently ship volumes on the pipeline to refineries in British Columbia and Washington State and that may continue to ship spot volumes on the pipeline in the future are: Chevron, Shell and Phillips 66.

Reference:

Trans Mountain Expansion Project. 2013. Commercial Support.
<http://www.transmountain.com/commercial-support>

- 6e. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

Trans Mountain has explained its interpretation of World-class in its submission to the Tanker Safety Expert Panel, which document can be found in Volume 8A, Appendix A.

Regarding the second part of this information request (“working to promote best practices”) Trans Mountain cannot provide further information because the inquiry lacks context without the rest of the sentence or paragraph in the application where this phrase might have been used.

7. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

The marine risk assessment, Volume 8C Termpol 3.15, Section 7 may be reviewed for incident frequency.

- 8a. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

Trans Mountain's Tanker Acceptance Standards requires the vessel to meet all applicable local and international rules and regulations. It does not consider the degree of crew multiculturalism onboard as detrimental to the manner in which the vessel is operated. The IMO has set language guidelines onboard and Trans Mountain has certain language requirements that have to be met in order for a vessel to be accepted.

- 8b. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

Trans Mountain has conducted a marine risk review and filed with the application, Volume 8C, Termpol 3.15.

- 9a. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

Trans Mountain requires all vessels enforce a Drug & Alcohol Policy that meets OCIMF recommendations, which require the operator as part of Company policy control onboard alcohol distribution and monitor its consumption. This policy has to support the principle that officers and ratings should not be impaired by alcohol when performing scheduled duties. Officers and ratings are required to observe abstinence from alcohol for several hours prior to scheduled watchkeeping duty or work periods.

- 9b. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

There is one boat in the water at Westridge as part of existing operations.

- 10a. The following study, "A Comparison of the Properties of Diluted Bitumen Crudes with Other Oils" (see the technical report S8 in TR8C-12, Volume 8C) highlights the key characteristics of diluted bitumen and finds dilbits have physical properties very much aligned with a range of intermediate fuel oils and other heavy crude oils. A report commissioned by the Canadian Energy and Pipeline Association (CEPA) finds diluted bitumen is no more corrosive than comparable heavy sour crudes.

The particulars and characteristics of the actual ships that will call at Westridge Terminal are specified by the Oil Companies International Marine Forum (OCIMF) in Ship Inspection Report Programme (SIRE). This includes the structural condition details of cargo tanks, coatings, anodes, etc. (See Section 2.12 of Technical Report TC 8C-7, TERMPOL 3.9 in Volume 8C).

Reference:

CEPA. February 2013. State of the Art Report - Dilbit Corrosivity. Richmond Upon Thames, UK. <http://www.transmountain.com/uploads/papers/1361942280-penspen-report-dilbit-corrosivity-final.pdf>. Accessed May 24, 2014.

- 10b. Trans Mountain does not agree with the assertion in this question. Transporting diluted bitumen is as safe as transporting other types of crude oil. Please refer to the response to MacVicar R IR No. 10a.
- 10c. Trans Mountain is not aware of any hesitancy on the part of shippers or ship owners to transport product from Westridge on new vessels. Refer to Attachment 1 to the response to Belcarra IR No. 1.9 for Trans Mountain's Tanker Acceptance Standard which defines vessel age requirements for tankers that can call at Westridge.
11. Trans Mountain is aware that LR1 vessels are more often assigned exclusively to the carriage of refined petroleum products where their design and construction allow for switch over between products after tank cleaning. Trans Mountain is not able to comment on whether the market is favouring LR1 vessels for carriage of crude oil.

Due to the draft restriction at 2nd Narrows, Aframax tankers can only be loaded to between 75% - 85% of their volume capacity.

As described in Section 3.1.1, Technical Report TR8C-5, of Volume 8C:

While substitutions by Panamax class tankers would have the tendency to slightly increase the number of loadings that tendency would be offset by fluctuations in demand and greater cargo volumes per tanker as a result of the combination of factors discussed. Thus Trans Mountain believes that 34 tanker loadings per month is a reasonable estimate for purpose of assessing the project.

Table 3.1 of Section 3.1.1, TR8C-5 of Volume 8C provides details on size distribution of vessels forecast to call Westridge Marine Terminal.

Aframax Tanker Characteristics are outlined in technical report TR8C-12 S13 of Volume 8C.

12. The first part of this question appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

Please refer to Volume 8A, Section 1.4.1.7 that acknowledges the purview of the Marine Transportation Security Act on marine traffic.

Trans Mountain is not directly involved with vessels outside of docking at the Westridge facility but, as indicated in Section 9.1 of the Port Metro Vancouver Harbour Operations Manual (Security Requirement for Vessels Entering the Port), vessels entering the Port must declare their MARSEC level to MCTS 96 hours prior to arrival. As per Section 11.0, Volume 4C, Trans Mountain has a Security Management Program in place which includes an Operations Facility Security Plan (OFSP) following the Marine Transportation Security Regulations SOR/2004-144 (MTSR). The OFSP, approved by and filed with Transport Canada, considers MARSEC levels for planning and response to terrorist threats as it pertains to the Westridge Facility.

References:

Marine Transportation Security Regulations SOR/2004-144. 2004. <http://lois-laws.justice.gc.ca/eng/regulations/sor-2004-144/index.html>. Accessed May 24, 2014.

Port Metro Vancouver. 2014. Harbour Operations Manual. Vancouver, BC. <http://www.portmetrovancouver.com/docs/default-source/environment/2014-01-22-harbour-operations-manual.pdf?Status=Temp&sfvrsn=2>. Accessed May 24, 2014.

13a. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. The assessment of Project effects was based on an understanding of the ecology and behaviour of marine birds, including a comprehensive review of available literature (Volume 8A, Section 4.3.8.4.2). Predictions were not dependent on detailed knowledge of the distribution and abundance of marine birds.

13b. It appears that the question in the above IR Request is to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. However, Trans Mountain has attempted to address the question in the following response.

Trans Mountain recognizes the importance of understanding baseline conditions for marine birds (e.g., distribution and abundance) as it relates to routine Project operations as well as accidents and malfunctions. Given the existing volume of vessel traffic within the Marine regional study area (RSA), and the fact that vessels associated with the Project will represent only a portion of total traffic, Trans Mountain is supportive of a collaborative approach to long-term monitoring for marine birds. As committed in EC P-IR No. 1.19 (provided in GoC EC IR No. 1.001 – Attachment 1), Trans Mountain will endeavour to meet with Environment Canada to discuss the potential for development of a long-term monitoring program as a partnership with others.

13c. Please refer to the response to MacVicar R IR No. 1.13b. It appears that the last portion of the information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

14. The current status of marine resources following the 2007 Burnaby spill is discussed in Section 6.2.4 of Volume 7.

Table 4.4.4.2 in Volume 8A provides the significance evaluation for cumulative effects on intertidal habitat resulting from the increase in Project-related marine vessel traffic. As discussed in Section 4.3.6.4 of Volume 8A, effects to intertidal habitat during routine operations (i.e., Project-related vessel movements) will be limited to disturbance due to vessel wake. The assessment concludes that the height of wake waves generated by Project-related vessels will be well within the range of natural wave conditions throughout the Marine regional study area (RSA); therefore, disturbance to intertidal habitat is expected to be of negligible magnitude.

For a discussion on the potential effects of an accidental tanker spill on shoreline habitats, please refer to Section 5.6.2 of Volume 8A. Potential effects of an accidental

spill at the Westridge Marine Terminal on shoreline habitats are discussed in Section 8.0 of Volume 7.

15. Species of marine fish and invertebrates that occur (or are likely to occur) within the proposed footprint of the expanded Westridge Marine Terminal, and elsewhere in the Marine regional study area (RSA; Burrard Inlet east of the First Narrows) were identified through a comprehensive literature review, an intertidal habitat survey conducted August 18-19, 2012, and a subtidal habitat survey conducted September 17-20, 2012. Detailed results of the literature review and field surveys are presented in Sections 4.0 and 5.0 of Volume 5C, Biophysical Technical Report 5C-13, Marine Resources – Westridge Marine Terminal Technical Report (Stantec Consulting Ltd. December 2013).
- 16a. It appears that the question in the above IR Request is to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. However, Trans Mountain has attempted to address the question in the following response.

Bird collisions with vessels are sporadic events that are highly dependent on location, weather and season. Vessel strikes are mostly due to attraction to light of nocturnally foraging species, such as storm-petrels and other procellariiforms. Because these birds feed on bioluminescent prey, they are naturally attracted to light. The attractive effect of light is enhanced by fog, haze, or drizzle because the moisture droplets in the air refract the light and greatly increase the illuminated area. Weir (1976) noted that nocturnal collisions are likely with any structure that extends vertically into a flight path, but that time, location, height, light, and cross-sectional area of the obstacle all factor into the magnitude of risk. Documented mortality is often higher during migration periods when large numbers of birds are present, and particularly when they are forced to a lower flight path due to inclement weather (Wiese et al. 2001).

It is acknowledged in the assessment that such effects will occur. Per definition, however, effects are considered 'significant' when a population of a species is affected beyond what is expected based on natural variation, and threatens the sustainability of the regional population. Given the sporadic nature of vessels strikes and the total number of birds involved, the effects of vessel strikes on bird populations in the region do not fulfil these criteria and are thus determined to be not significant.

References:

- Weir, R.D. 1976. Annotated bibliography of bird kills at man-made obstacles: a review of the state of the art and solutions. Canadian Wildlife Service, Ottawa.
- Wiese, F.K., W.A. Montevecchi, G. Davoren, F. Huettmann, A.W. Diamond and J. Linke. 2001. Seabirds at risk around offshore oil platforms in the North Atlantic. *Marine Pollution Bulletin* 42: 1285-1290.
- 16b. It appears that the IR Request is to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. However, Trans Mountain has attempted to address the question in the following response.

To Trans Mountain's knowledge, there is no database of marine bird strikes on tankers in Juan de Fuca Strait. Please also refer to the response to MacVicar R IR No. 1.16a.

- 16c. It appears that the question in the above IR Request is to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. However, Trans Mountain has attempted to address the question in the following response.

Tankers arguably have a less complex deck superstructure than bulk cargo ships as they generally lack the cranes and loading arms that bulk cargo ships have. Regardless, the particular design of vessels is expected to be much less of a factor in collision risk than the ecology and behaviour of marine birds and the speed of the vessels. Please refer to the response to MacVicar R IR No. 1.16a.

17. It appears that the questions in the above IR Request are to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. However, Trans Mountain has attempted to address the questions in the following response.

Specific nocturnal surveys on ships with lights were not conducted for the Project. However, bird collisions with vessels are sporadic events that are highly dependent on location, weather and season. Vessel strikes are mostly due to attraction to light of nocturnally foraging species, such as storm-petrels and other procellariiforms. Because these birds feed on bioluminescent prey, they are naturally attracted to light. The attractive effect of light is enhanced by fog, haze, or drizzle because the moisture droplets in the air refract the light and greatly increase the illuminated area. Weir (1976) noted that nocturnal collisions are likely with any structure that extends vertically into a flight path, but that time, location, height, light, and cross-sectional area of the obstacle all factor into the magnitude of risk. Documented mortality is often higher during migration periods when large numbers of birds are present, and particularly when they are forced to a lower flight path due to inclement weather (Wiese et al. 2001).

Due to the variety of factors that influence the risk of bird strikes, it is not currently possible to provide a quantitative evaluation of this effect without further study. However, given the distribution and abundance of potentially sensitive birds in the area and the already present light levels at the Westridge Marine Terminal and along the marine shipping lanes, the occurrence of strikes is expected to only be sporadic and not at any level that would create a concern at the population level.

References:

- Weir, R.D. 1976. Annotated bibliography of bird kills at man-made obstacles: a review of the state of the art and solutions. Canadian Wildlife Service. Ottawa, ON.
- Wiese, F.K., W.A. Montevecchi, G. Davoren, F. Huettmann, A.W. Diamond and J. Linke. 2001. Seabirds at risk around offshore oil platforms in the North Atlantic. Marine Pollution Bulletin 42: 1285-1290.

18. Within the caveats of weather and species distribution (as described in the response to MacVicar R IR No. 1.17), the Project assumes similar effects in the US and Canada because the vessels that will be traversing these waters follow international regulations and will not be changing their lights as they cross different jurisdictions. As such, the effects are applicable in both the US and Canada.
19. Some intervenor comments in the Preamble specifically appear to be directed at the National Energy Board, not Trans Mountain Pipeline ULC.

Thank you for the information provided. Unlike Steller sea lions, which congregate to breed, birth and rear their pups on a very limited number of rookeries in British Columbia (BC), harbour seals are ubiquitous in BC's coastal waters, and use over a thousand haulout sites to rest, moult, mate, and give birth to their pups, which enter the water only a few hours after birth (Fisheries and Oceans Canada 2010). These haulout sites often include reefs, rocks, islets, sandbars, floats, wharves and log booms (as mentioned in the request) and are acknowledged to occur within the Marine Regional Study Area (RSA) as well as throughout the rest of the BC's coastal waters (see Table 6.2-1 of Volume 5A). Harbour porpoises are also recognized to occur within the Marine RSA, and mitigations proposed for construction of the Westridge Marine Terminal are expected to be effective at reducing the occurrence of injury and the degree of sensory disturbance to all marine mammals in the area.

Reference:

Fisheries and Oceans Canada. 2010. Population Assessment Pacific Harbour Seal (*Phoca vitulina richardsi*). Fisheries and Oceans Canada Canadian Science Advisory Secretariat Science Advisory Report. 2009/011.

20. Please refer to Volume 5C, Biophysical Technical Report 5C-13, Marine Resources – Westridge Marine Terminal Technical Report (Stantec Consulting Ltd. [Stantec] December 2013) for baseline information on marine fish and fish habitats in the Marine regional study area (RSA; Burrard Inlet east of the First Narrows). Rockfish conservation areas (RCAs) in the Marine RSA are shown on Figure 4.5 and discussed in Section 4.3.6 (Stantec December 2013). Important habitats for Dungeness crab are shown on Figure 4.3 and discussed in Section 4.3.4 (Stantec December 2013). Salmon bearing rivers and streams entering the Marine RSA are shown on Figure 4.4 and discussed in Section 4.3.5 (Stantec December 2013). Pacific herring (*Clupea pallasii*) and opal squid (*Loligo opalescens*) are likely to occur within the Marine RSA, though there are no records of these species spawning within the proposed footprint of the expanded Westridge Marine Terminal or within the Marine Resources local study area (LSA). For the assessment of potential effects of construction and operation of the Westridge Marine Terminal on Dungeness crab, inshore rockfish, Pacific salmon and other marine fish and fish habitat indicators, please refer to Section 7.6.9 of Volume 5A.

- 20a. The information request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. However, Trans Mountain has attempted to address the question in the following response.

Section 4.3.1 of Technical Report 5C-14 in Volume 5C, Marine Birds – Westridge Marine Terminal Technical Report (Stantec Consulting Ltd. December 2013) describes the English Bay – Burrard Inlet Important Bird Area (IBA020) and mentions that it attracts tens of thousands of migratory birds. The double-crested cormorant colony was not specifically addressed due to its distance from the Westridge Marine Terminal, but potential effects on double-crested cormorants are represented in the assessment of pelagic cormorant (see Section 7.6.12 of Volume 5A).

- 20b. This request appears to be directed at the National Energy Board, not Trans Mountain Pipeline ULC. However, Trans Mountain has attempted to address the question in the following response.

Given the reference, it is unclear whether this reference pertains to the assessment of the Westridge Marine Terminal (Volume 5A) or Marine Transportation (Volume 8A). Alcids do not regularly occur in the vicinity of the Westridge Marine Terminal, and therefore, were not explicitly assessed in Volume 5A, although potential effects on them in this area would be well represented by the assessment of Barrow's goldeneye.

For the Marine Transportation assessment, marbled murrelet is represented by Cassin's auklet (Volume 8A, Section 4.3.8.1). Alcids tend to share broadly similar characteristics, but among the species that occur in the Marine regional study area (RSA), Cassin's auklet tends to forage offshore more than the others. It is therefore more likely to be exposed to potential effects of the increase in Project-related marine vessel traffic, which is why it was selected as an indicator to represent marbled murrelet, among others.

21. Section 5.3.4 of Technical Report 7-2 of Volume 7, Ecological Risk Assessment of Westridge Terminal Marine Spill Technical Report (Stantec Consulting Ltd. December 2013) discusses the characterization of sensitivity to spilled crude oil for marine mammals and supporting habitat. Within this section the potential for external oiling, inhalation, and ingestion of crude oil are all identified as potentially causing harm.

While aspiration of liquid crude oil has the potential to cause harm to marine mammals, whales can close their blowholes, and have a trachea that is separated from their esophagus. This prevents them from breathing through their mouths, and prevents aspiration of vomitus. Seals and sea lions similarly can close off their nostrils, reducing the potential for oil to enter the respiratory tract in the unlikely event of marine spill.