Comment on Vopak Pacific Canada Draft Application Information Requirements or Terms of Reference (TOR)

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There are a number of themes which recur in our comments. We will begin in "Section I – Reocurring Themes" by addressing a number of these reoccurring themes in order to avoid excessive duplication. We will then proceed with a section by section analysis and comment (in order of section numbers in the Draft TOR in Section II – Section by Section Analysis.

I. REOCURRING THEMES

1) Scope - Boundaries need to be expanded

i) Rail line to Alberta

The draft TOR boundaries do not include areas along the rail line on the route from Alberta to Rupert and therefore do not address the potential project related impacts which may occur on the various valued components there. These areas should be included:

- residential areas along the route which might be impacted by toxic emissions from rail tank car vents; and
- the area along the Skeena River where a derailment could have devastating impacts.

The scope of the TOR needs to be broadened spatially to include areas along the rail line from Rupert to Alberta and the potential project related impacts which may occur on the various valued components there, for instance residential air quality or the potentially devastating impacts of a spill into the Skeena as a result of a derailment.

ii) Marine areas affected if there is a major spill and marine areas where vessels anchor

The boundaries for marine incidents and resulting adverse impacts do not include north coast areas. They only included a narrow strip around the navigation route and PRPA boundaries and need to be expanded to include areas:

- where anchoring may occur and

- areas which might be affected by a spill (e.g. Haida Gwaii and north coast shore)

The scope of the TOR also needs to be broadened spatially to include marine areas where marine incidents may occur (all the anchoring sites) and where spills may spread to (large areas of the whole north Coast waters in the case of a major spill), specifically:

- The spatial boundaries include all areas where vessels might reasonably be involved in an incident and all areas that might reasonably be impacted by an incident, for instance; all Prince Rupert area anchorages , any routes vessels might take travelling to and from anchorage, areas where vessels might drift (e.g. drifting or breaking anchor and grounding), berthing and at berth, waiting for the pilot by Triple, travelling in from Triple to the berth and back out and travelling in Dixon Entrance. (The Draft TOR will have to be revised accordingly)

- The spatial boundaries include areas which would potentially be impacted by a large (or small) spill. The spatial area to be considered will include waters up to the Alaskan Border, Chatham Sound, Dixon Entrance and parts of northern Hecate Straits. In summary, the boundaries will include spatial boundaries that match the realistic anticipated geographical scope of the potential spills from the Panamax tankers that are described as being associated with the proposed project. In addition, if the vessels can be expected to occasionally use a southerly route the boundaries should be correspondingly increased in that direction as well.

For more detailed discussion see "Anchoring and other MRA Issues" document submitted under separate cover – copy attached for ease of reference.

iii) Coastal and upriver communities

In the case of human health, economics and FN rights, the scope must be expanded to include communities which would be impacted if there was a spill near critical Skeena salmon habitat and other important habitat in the estuary or broader marine area along the shoreline- which resulted in loss of food, livelihood, cultural values, etc.

2 <u>The need for a new comprehensive Marine Risk Assessment to allow the Province of BC (EAO) to assess the project's potential impact on areas under provincial jurisdiction (health, economy, shellfish, etc.) and to ensure that the scope of review for federal authorities is clear.</u>

It is not clear from the Draft TOR whether or not a new comprehensive Marine Risk Assessment (MRA) is contemplated. Either a new MRA is not currently contemplated or the Draft TOR has failed to be sufficiently clear regarding the necessity for a new comprehensive MRA and has failed to set out sufficient detail regarding the scope and content of the intended MRA.

A properly carried out, new, comprehensive marine risk assessment (MRA) is absolutely necessary to allow the Province of BC (EAO) to assess the project's potential impact on areas under provincial jurisdiction (health, economy, shellfish, etc.) as well as to ensure that federal authorities including DFO, Transport Canada, Health Canada are clear in relation to the scope of their required review and input.

The Draft TOR as written seems to erroneously imply or assume that a proper baseline assessment of the risk of a marine incident resulting in a spill has been carried out or that the listed information and data sources are reliable or adequate to address the increased risk of a spill relevant to this particular project. That is false. A full and comprehensive MRA is required, which takes into account all relevant

shipping related risks and relevant existing information and data sources in order to ensure that federal authorities do not rely upon inadequate or unreliable information and to ensure that the BC (EAO) is not mislead into assuming that there are few or no risks that might significantly affect matters of provincial concern.

Of particular concern is a reference at p. 38 of the Draft TOR to a 2012 PRPA DNV[1] document purporting to be a form of "Marine Risk Assessment". Not only is the PRPA DNV 2012 out of date (it predates and therefore excludes significant information and incidents that have since occurred), it also specifically states on its face that it excludes anchoring, which we know to be a major risk. As a result, the PRPA DNV 2012, not only cannot be considered to be a complete "marine risk assessment" for this project; it cannot even be considered to be useful for reliable baseline information except when read in conjunction with the additional resources described in more detail in the attached "Anchoring and Other MRA Issues Document".

Deficiencies in the PRPA DNV 2012 are particularly worrisome because the TOR does not seem to list or make reference to other relevant Existing Information and Data Sources. Some of the relevant and necessary additional Information and Data Sources are described in the attached more detailed "Anchoring and Other MRA Issues" document. [Note: The detailed MRA document was submitted separately but is also attached to this document for ease of reference.]

A proper assessment of shipping risk is so fundamental to assessing the environmental effects of the Vopak project that it is impossible to present an accurate probability of environmental impacts with consequences to valued components without a new comprehensive MRA. That is, the potential for environmental impacts from a spill will necessarily be grossly underestimated if the probability of a shipping incident resulting in a spill is underestimated.

see Anchoring and other MRA Issues submitted under separate cover (copy also attached) for full detailed discussion.

The consequences of a spill are so potentially large and have such significant potential to impact so many valued components that, from a practical perspective, limiting consideration of potential spills to the section in the Draft TOR relating to accidents could foreseeably result in an MRA coming after Working Group (WG) members have already assessed some of the aspects which will be impacted or it might result in insufficient review of the MRA by all authorities. For example, the risk of significant adverse impact on harbour porpoises (or humans for that matter), as a result of the Project, is not stated to be dependent on the completion of the MRA, therefore a decision regarding noise impacts related to vessel traffic could well be made before the true risk of probable oil spill near Flora Bank, of a size capable of significantly reducing their food supply, is known from the MRA results. The TOR must specify that the MRA is an essential precondition required to inform to the assessment of the majority of the risks described in the TOR. Simply put, the new comprehensive MRA must be carried out <u>first, then assessment of other aspects can proceed in a manner that is informed by the findings of the MRA.</u>

[1] DET NORSKE VERITAS, Prince Rupert Marine Risk Assessment Navigational Risk Assessment Report, Prince Rupert Port Authority Report No./DNV Reg No.: / 13JIMVK-8 Rev 3, 2012-02-29 http://saveourskeenasalmon.org/wp-content/uploads/marine_risk_assessment.pdf [Referred to in TOR section 5.4.4 Existing Information/Data Sources as Det Norske Veritas (DNV). 2013]

3) Dioxin and Furan Contaminated sediment issue-

Proper consideration must be given to possible mitigation procedures to limit residual human health impacts from resuspension of dioxin and furan contaminated sediment. Dangerous resuspension potential exists during the dredge (as well as during the disposal)

An environmental assessment allows for public and WG input to discover special local factors which may require special mitigation considerations. Importantly, it is already well established that the sediment in the Vopak dredge location is well above CCME ISQG and there is a potential risk not only from the disposal of the dredge material but also as a result of resuspension during the dredge. The TOR must acknowledge that it will take into account the much higher than average local seafood consumption levels, particularly among First Nations, and the need for more stringent measures than average for protection of human health. The analysis of the residual human health impact needs to be assessed before the overall EED is made.

4) Cumulative effects cannot be considered in a process as it is now described in the TOR. The cumulative are being treated as if they are additive when they are not, thereby understating the cumulative effects. For example, in the case of the MRA, increased vessel traffic from other projects increases not only the number of vessels but also the incident per vessel rate as a result of congestion in traffic lanes. Another example is that an increasing number of vessels results in pushing more vessels into even worse (higher risk) anchorages. Synergistic cumulative effects must be taken into account.

II. SECTION BY SECTION ANALYSIS

1.4. Regulatory Context

There is some apparent confusion about the scope of responsibility of the various agencies.
We have received the following clarification from CEAA by email:

> *"Multiple Federal Authorities have responsibilities under Section 67 of CEAA 2012 related to the Vopak Pacific Canada Project, including the Prince Rupert Port Authority, Fisheries and Oceans Canada, Transport Canada, and Environment and Climate Change Canada. The Federal Authorities that are required to make a determination of significance on the Project plan to work together in completing their analysis and producing a single report. However, all Federal Authorities will be required to make their own separate determination."*

Therefore we recommend changes to 1.4 (as well as other changes to 1.4.1 below) to add the statement:
The EEE will include a statement that the EEE has been developed pursuant to the Terms of Reference (TOR) approved by ECCC, DFO and TC.

1.4.1. Federal Process

The following text should be incorporated, in order to clarify DFO's, ECCC's, HC's and TC's responsibility (one which cannot be delegated) to make their own EED for the overall project:

The Project will be subject to five separate Environmental Effects Determinations to be made by: PRPA, DFO, ECCC, HC and TC (i.e. DFO and ECCC are responsible for ensuring that any marine risk assessment (MRA) used in their determination is not biased or incomplete and is sufficient to allow each agency to arrive at an evidence based assessment).

The EEDs cannot be made until the MRA has been completed.
PRPA will coordinate the Section 67 EEE process, and the federal authorities involved in regulating the Project will each be required to make an EED. These federal authorities are expected to be PRPA, Health Canada (HC), Transport Canada (TC), Environment and Climate Change Canada (ECCC) and Fisheries and Oceans Canada (DFO). Each of the federal authorities will make their EEDs prior to the PRPA EED and prior to seeking a Governor in Council (GIC) decision. The EEE will be prepared by Vopak following the guidance of PRPA and other authorities.

Given the potentially serious health consequences of: a marine spill, improper dredge procedures and residential area CAC emissions (as well as others), Health Canada (HC) should be included in the list of federal authorities required to make EEDs and to approve the TOR.

4. METHODOLOGY

4.1. Selection of Valued Components

Table 6 List of Candidate Valued Components and Rationale for Selection

The rationale for including Marine Resources should include the need to assess the potential for a toxic product spill.

The rationale for including Socio-Economic Conditions should include Marine Use and Economic Conditions - may be impacted by a toxic product spill at the site, along the rail line or at sea

The rationale for including Human Health should include loss of and contamination of seafood as a result of a toxic product spill at the site, along the rail line or at sea.

4.2.1.1. Spatial Boundaries

These should include area along the rail line to Alberta, the lower reaches of the Skeena River, the Skeena estuary, and the marine area of Chatham Sound, Dixon Entrance and Hecate Strait (importantly including anchorages which project vessels may use but which are outside the PRPA jurisdiction)

Note: Maps at the end of TOR need to be changed so the assessment of potential impacts on Human Health and Economic Conditions includes the coastal and upriver villages which depend on marine resources for their food supply, culture and economy. The Marine Use and Navigation map needs to be expanded as noted in the paragraph above. Air Quality, Freshwater Fish and Fish Habitat, Terrestrial and Terrain maps needs to be expanded to include train derailment impacts and emissions in residential areas along the route to Alberta and they (except for the Air Quality map) also need to be expanded to cover the whole north coast area (including Haida Gwaii) to assess impacts as a result of marine spills.

4.3. Baseline Conditions

This section should include additional relevant reports and studies, for instance those of the Skeena Fisheries Commission.

4.4. Project Interactions and Potential Effects

Table 7 should also include under Operations:

- Railway operations along the rail from Alberta to Rupert which will interact with the VCs; Air Quality and GHG, Noise, Visual/Light, Terrestrial, Marine, Freshwater Fish and Freshwater Habitat, Soils and Terrain, Socio-Economic and Human Health
    1. Potential derailments- would impact Air Quality and GHG, Terrestrial, Marine, Freshwater Fish and Freshwater Habitat, Soils and Terrain, Socio-Economic and Human Health
    2. CAC emissions from the vents of upward of one hundred rail tank cars carrying toxic diesel and other toxic products stopped in residential areas- would impact Air Quality and GHG, and Human Health

- Marine and rail incidents outside of PRPA jurisdiction which will interact with the VCs; Air Quality and GHG, Noise, Visual/Light, Terrestrial, Marine, Freshwater Fish and Freshwater Habitat, Soils and Terrain, Socio-Economic and Human Health
    1. Potential marine shipping incidents related to anchoring nearby the project but outside PRPA jurisdiction may result in oil or other toxic chemical spills and both these and other marine incidents may impact areas over the whole north coast (see attached "Anchoring and other MRA Issues" and COMMENT ON FATE AND EFFECTS OF A DIESEL OIL SPILL ON MARINE LIFE AND HUMANS IN SEVERAL AREAS OF THE QUEEN CHARLOTTE BASIN –Dr. Chris Kennedy 2016 available online). The potential consequences of a spill would extend to VC's noted above except noise and visual
    2. See Railway operations (1+2) above

4.5. Mitigation Measures

Should include consideration of special mitigation efforts in response to exceptional local issues for instance:

- special arrangements to capture sediment and water portion of top meter of dredge(which will contain dioxin and furan) and separate the contaminated material for proper disposal. Special effort will be needed as a result of the exceptionally high level of sea food consumption locally, existing levels of contamination and FN rights.
- placement of mooring buoys in response to poor anchoring ground in the area and history of anchor dragging incidents
- lower train speed limits along the Skeena River in response to the exceptionally high habitat values and how the lower Skeena River is exceptionally closely tied/connected to the rail line.

Table 8: Table Format - Summary of Potential Project-related Effects and Mitigation

Table 8 should include the potential project related effect: marine incidents resulting in a toxic product spill

4.6. Residual Effects Characterization and Proponent's Determination of Significance

The description of the method of determining risk and significance is inadequate in relation to risk of a marine incident resulting in an oil spill, particularly a spill related to anchoring.

The development of a new complete MRA need to be addressed by EAO, ECCC, HC and DFO otherwise the lack of credible information will undermine environmental effects determinations. Arguably, in terms of "consequence x probability", the most significant adverse impact would come from a marine incident resulting in an oil or other toxic product spill. Furthermore, anchor dragging incidents are the most common marine incidents (disturbingly common) in the Prince Rupert area, yet the PRPA DNV 2012 mentioned in 5.4.4 does not include anchoring risk. (Please see attached "Anchoring and other MRA Issues")

It needs to be spelled out in the TOR that a new comprehensive MRA is required that will be sufficient to allow evidence based determinations by EAO, ECCC, HC and DFO.

4.7. Cumulative Effects Assessment

- should include Fairview Phase II(b)
- Furthermore some cumulative effects need to be considered prior to determining residual effects from Vopak related to the MRA. Forecast expansions and new projects will increase the number of vessels and this further congestion also increases the incident rate per vessel. Also vessels likely choose the safest anchorage first so the anchor dragging incident rate per vessel will likely also increase as the number of vessels increases.

5.1. Air Quality and Greenhouse Gas Emissions pages (21-26)

Page 33(21) 5.1.1. Assessment Boundaries
Table 11: Air Quality and GHG Emissions Local and Regional Study Boundaries
Boundaries should include the rail from Alberta to Rupert and the area around the rail line which may suffer negative impacts from rail traffic of unprecedented volumes of toxic product with associated emissions i.e. in cities and towns along the route where trains may stop near humans who may be affected by harmful emissions from full and empty rail tank cars.

5.1.3. Regulatory Context
Relevant Guidelines and Legislation should include CCME new Canadian ambient air quality standards (CAAQS) for nitrogen dioxide in 2017 and for sulphur dioxide in 2016.

5.1.4 Existing Information/Data Sources
The Vopak air emissions inventory which will be developed for the EEE should also consider emissions from rail tank cars through their vents.

5.1.5. Project Interactions and Potential Effects

Table 13: Potential Project-related Effects Associated with Air Quality and GHG Emissions

The section under "Operations" in Table 13 in the TOR should be changed to include:

Railway operations associated with inbound train staging and unloading and outbound train staging:

- Rail tank cars will emit CACs from their vents while full, while unloading and while empty
- CACs may be emitted by unloading process

Filling storage tanks and filling vessels:

- CACs may be emitted when polluted air is displaced by product
- and when pipes are purged

Railway operations along the rail from Alberta to Rupert:

- CACs will be emitted from the vents of upward of one hundred rail tank cars carrying diesel and other toxic products stopped in residential areas

5.1.6. Mitigation Measures

This section should consider the mitigation measure of not stopping trains with toxic emissions in residential areas and/or capturing rail tank car emissions in areas where there are issues.

5.4. Marine Resources

The Province needs to insure a proper marine risk assessment is done sufficient to allow for proper evidence based assessment of impacts on areas of provincial jurisdiction– some marine resources contribute to freshwater fishing, human health impacts from a spill (contamination of food, fumes, PAH...). The various federal bodies must also ensure sufficient MRA to allow for proper evidence based assessments.

5.4.1. Assessment Boundaries

Table 20: Marine Resources Local and Regional 1 Study Boundaries

The following spatial areas are missing from the assessment boundaries and should be included:

- the Skeena estuary along the rail corridor where a train derailment has the potential to cause serious harm to marine resources
- the area outside the 500 m on either side of the marine access route between the Project's marine terminal and the Triple Island pilot boarding area. The reasons for including this area are that a marine incident and diesel oil spill (or other spill methanol, gasoline, etc.) has the potential to harm marine resources over the whole of Chatham Sound. In addition many Chatham Sound anchorages are outside of the boundary areas noted in the draft TOR, and use of those anchorages is a a fairly routine occurrence (not only in emergency but while waiting for rerouting instructions, parts, etc.) and is associated with a considerable risk of an incident with extreme consequences to marine resources
- the whole Haida Gwaii and North Coast area could foreseeably be impacted by a spill and should be included in the study boundaries.

5.4.4. Baseline Assessment

This section lists under the heading “Existing Information/Data Sources Data/Information” the report titled “Det Norske Veritas (DNV). 2013. Prince Rupert Marine Risk Assessment. Navigational Risk Assessment Report produced for Prince Rupert Port Authority. Report No./DNV Reg. No.: / 13JIMVK-8 Rev 3, 2012-02-29” (PRPA DNV 2012). PRPA DNV 2012 does not provide a reliable basis for baseline risk assessment as it leaves out significant risk from anchor related incidents while pointing out that: “There have been a number of them in the last couple of years”(the inadequacy of this source is discussed in greater detail in attached Anchoring and other MRA Issues).

There are concerns about using information related to the Canpotex Project. The insufficient quality of the data and inappropriate use of “Draft Guidelines” prompted a federal court challenge siting various deficiencies including[2] :

- “the CEAA process was carried out without proper sampling for dioxins and furans, the most dangerous chemicals known to science.”
- “As a result of inadequate sampling at the CEAA phase, various environmental and other risks were not properly considered, including risks to human health.”
- “Sampling subsequent to the CEAA process disclosed a layer of sediment, highly contaminated with dioxins and furans that cannot be disposed of at sea without a human health risk assessment.”
- “applying invalid “DRAFT” Guidelines for dangerous chemicals that pose risks to the environment and human health to illegally avoid carrying out a human health risk assessment;”

Field and Desktop Studies

Marine Sediment Quality

At page 39 the TOR states:

> Existing baseline information collected from previous EAs will be supplemented with new data collection. The marine sediment quality program will focus on the collection of sediment samples from 10 sites within the proposed marine development area.

In addition to the issues with Canpotex data described above, 10 sites is too low a number and previous data may not be reliable. The TOR states that Pudget sound guidelines will be used however it is important to keep the top 0-5 cm separate as required by CCME guidelines. There are standard regulations for the number of samples needed to characterize this size of dredge and those should also be complied with.

When Canpotex was forced to do additional sampling it was determined that the area has levels of roughly 3-8 ppb D&F which is well over (almost an order of magnitude over) the CCME ISQG of roughly 0.8 ppb. If this fact is acknowledged, and it is accepted that the top one meter should be dealt with separately, resources could be focused on limiting resuspension. There was a previous failed attempt at disposing contaminated dredgeate onto Ridley Island (Tutt, David 1982 Ridley Island Port Construction Activities- 1982 background and environmental monitoring, regional program report no:83-02) without removing the excess water using clarifiers. The excess water proved too much for the filtering capacity of the peat/soil and the contaminated sediment simply ran back into the marine environment. It is suggested that Health Canada and Northern Health be involved with the project engineers so the engineers are engaged trying to find solutions which may assist combatting in rises of incidents of autism, diabetes, etc. which would be expected to arise from resuspension of dioxin and furans.

[2] excerpt from notice of application federal court file # T-393-16

5.4.5. Project Interactions and Potential Effects page 54 (42)

Table 7 and other tables which include “Associated activities: marine and rail shipping within PRPA jurisdiction” should also include marine and rail shipping outside of PRPA jurisdiction

Table 7 and other Tables which include: “Railway operations associated with inbound train unloading and outbound train staging” should also include “Railway operations associated with travelling along the rail from Alberta to Rupert”

Table 22 pg 54 Table 22
Under the heading Operations the table states:

Vessel berthing:
- Alteration of subtidal fish habitat (shade effects);
- Increased marine traffic resulting in vessel strike risk for marine mammals; and
- Deposit of potentially deleterious materials.

Associated activities: marine shipping within PRPA jurisdiction:
- Increased marine traffic resulting in vessel strike risk for marine mammals; and
- Harm or change in behaviour from underwater noise.

The spatial boundaries here again are inadequate.

In addition, “Potential Project-related Effects associated with Marine Resources” should include oil spills from marine incidents, including as a result of anchoring.

Under the heading “Operations” the following should be included:
Railway operations associated with travelling along the rail from Alberta to Rupert:
- possible derailments and spill risk for fish and fish habitat

5.4.6. Mitigation Measures

Estimates of the value of mitigation measures in relation to reducing the risk of marine incident should be determined by independent experts not those with an apparent conflict of interest (pilots, port employees, etc.) and should be supported by facts.

Consideration of these mitigation measures should be included: train speed reduction to lower risk of derailment in special area along Skeena river and putting in mooring buoys, changing pilot rules for anchoring gale/storm conditions, pre agreement to ban corexit in predetermined and agreed sensitive areas

5.4.7. Residual Effects Characterization and Determination of Significance

As discussed in 4.6: The description of the method of determining risk and significance is inadequate in relation to risk of a marine incident resulting in an oil spill.

Arguably the largest likely significant adverse impact of this project would come from a marine incident resulting in a spill of a petroleum product. Furthermore some of the potential marine incidents which might result in a spill are anchor dragging incidents which are disturbingly common in the Prince Rupert area (roughly one per year). The PRPA DNV 2012 mentioned in 5.4.4 does not include anchoring risk. A MRA as discussed in our attachment "Anchoring and Other MRA Issues" needs to be done. This most important aspect of the EEE needs to be spelled out in the TOR (what vessel counts to include, measuring cumulative effect, listing local history of incidents, making inputs public so they can be checked, independence of MRA, etc.)

5.4.8. Cumulative Effects Assessment

It is not sufficient to consider cumulative effects after the risk determination for this project; the cumulative effects cannot simply be added, for instance increased traffic increases the number of vessels and their chance of incident from collision. The cumulative multiplicative effects regarding anchoring incidents are potentially even greater as the best anchorage sites are very limited and vessels will be forced out to worse anchorages.

5.5. Soils and Terrain

This is an area under provincial jurisdiction which has the potential to be impacted by a marine incident causing an oil spill. An inaccurate MRA could cause the province to underestimate provincial impacts. The province will therefore wish to ensure that a new comprehensive MRA is sufficient to allow for a proper evidence based assessment.

5.5.1. Assessment Boundaries

Should include potential contamination of soil from a train derailment and from a marine incident affecting shoreline – so boundaries need to be increased

- to include shorelines throughout the north coast and
- the marine area outside PRPA jurisdiction where anchoring may occur and incidents which spread oil or other chemicals over an even wider area
- areas along rail line from Rupert to Alberta which may be polluted from a spill

5.5.3. Regulatory Context

Health Canada and Northern Health should be the authorities who determines if a residual significant health impact will result from resuspension of dioxin and furan

5.5.4. Baseline Assessment

Additional studies should be conducted to prove the capacity of the Ridley Island disposal site to handle large volumes of water with contaminated sediment if this mitigation is considered. Real time monitoring of the reintroduction of D&F into the environment should be done if this method is chosen and the regulations adhered to should not be the regular standards they should take into account the already high levels of human contamination and extra health risk resulting from exceptionally high sea food consumption levels in the area. Potential mitigation plans could include capture of contaminated

water during the dredging process and purification of it in clarifiers. This should be investigated and incorporated if feasible.

Existing Information and Data Sources

There is a report on the failure of an onland disposal on Ridley Island of contaminated dredge material. This is addressed in "Tutt, David 1982 Ridley Island Port Construction Activities- 1982 background and environmental monitoring, regional program report no: 83-02" this should be included.

5.5.5. Project Interactions and Potential Effects

Table 25 should include an additional heading "operation"
and add two items, which are:

1. under project activity/interactions of "shipping/tanker traffic" and under "the potential project related effect"
2. under project activity interactions of "vessel loading" and under "potential related effect "release of petroleum and other toxic products resulting in contamination of the shore soil and terrain

Again a marine risk assessment is essential to assess the risk to this valued component.

5.5.6. Mitigation Measures, 5.5.7. Residual Effects Characterization and Determination of Significance and 5.5.8. Cumulative Effects Assessment all need a proper marine risk assessment as noted above for other valued components.

5.6. Terrestrial Resources
This section needs to include impacts from a marine spill, loading and unloading operations spill and train derailments along the route to Rupert as in above sections (changes need to be made throughout this section for instance "Table 8 pg Rail Operations- Railway operations associated with inbound train unloading and outbound train staging" is too limited. Another example: the area is far too limited; large areas of whole north coast shoreline and migratory shorebirds, etc. could be impacted.

5.7. Freshwater Fish and Fish Habitat
Again a marine risk assessment is essential to assess the risk to this valued component- if freshwater fish includes anadromous fish. As well, increases in spatial boundaries will be required to allow for a full evaluation of risk from marine spills and train derailments in the estuary.

5.8. Socio-Economic Conditions
The risk posed by a marine incident resulting in a spill needs to be incorporated throughout this section as noted above. For instance –"Potential Project-related Effects Associated with Socio-Economic Condition" does not now include the potential effects from a marine spill!

5.10. Human Health
Marine Incident Risk and derailment and emission risk
Again this whole section is missing the exceptionally important risk (in terms of human health impacts) posed by a marine incident resulting in a spill. Changes need to be made throughout as noted above:

Especially note Table 40: Potential Project-related Effects Associated with Human Health which does not include operation risk of a marine spill. Nor does it include risk from emissions in residential areas along the route from Alberta.

Dioxin and Furan risk
Resuspension of contaminated sediment into the marine environment will also affect human health through contaminated seafood. An exceptional feature of the location is the historic pulp mill dioxin and furan contamination of the dredge site.

Experts have found that BC coastal First Nations have a much higher rate of seafood consumption than average Canadians: "Total consumption [for Natives on Vancouver Island] of all seafood averages 60 kg per person per year or 165 grams per day. That equals two daily servings, nearly 15 times that of the average Canadian!" (Peter Ross and Tom Child, 2009) Contamination of seafood is therefore a much greater concern in this Project's location than elsewhere.

The only international standard that has been based upon a risk assessment and that has addressed consumption levels from subsistence fisheries (such as First Nation fisheries) was carried out in Oregon. The Oregon State Guidelines (ref ODEQ 2007) (referenced in the EPAEPA Memorandum Dioxin Klamath 2010) for the general public are similar to the longstanding Canadian Council of Ministers of the Environment Interim Sediment Quality Guidelines but Oregon's guideline to protect subsistence human consumers (ref ODEQ 2007) is 1000 times more cautious than the longstanding Canadian Council of Ministers of the Environment Interim Sediment Quality Guidelines. The Oregon State Guidelines should be used to guide the Vopak evaluation.

7. ACCIDENTS AND MALFUNCTIONS

Arguably the largest likely significant adverse impact would come from a marine incident resulting in a spill of a petroleum or other product. And furthermore the most likely marine accident which will result in a spill is an anchor dragging incident, which are disturbingly common in the Prince Rupert area (roughly one per year).
The scope as it stands does not include risk related to anchoring incidents.
See further discussion in Anchoring and other MRA issues attached.

Mitigation
The need for skimmers to dispose of excess water in emergency spill recovery efforts should be considered. If that is not permitted there is an increased residual risk.
A plan of action specific to the Skeena inner estuary for spill response should be considered as a potential mitigation due to the particularly high habitat value.

Indirect effects need to be included in the assessment of the consequences.

See section 5.4 (1) (4) (5) (6)(7) (8) for comments regarding changes needed in the TOR to address marine risk assessment .