Information Requests for TMAC's Doris North Project
Reconsideration of Terms and Conditions within Project Certificate No. 003
Request to amend Water Licence 2AM-DOH13232

IR Source	IR Number	IR Addressed To	Subject	Reference	Issue / Concern	Information Requested
EC	1	Proponent	Baseline Data – Water and Sediment Quality	Environmental Effects Mitigation Section 4.3 – Existing Physical Marine Baseline Conditions	The Proponent completed sampling programs in Roberts Bay from 2009 to 2011 in order to establish baseline conditions. Since then the discharge location has changed and therefore the baseline data collected during those studies may be insufficient to provide an accurate representation of the existing conditions in the new location. According to figures 4.3-13 (water quality sampling locations), and 4.3-14 (sediment quality sampling locations) limited data has been collected in the proposed discharge location. The Proponent proposes to release the effluent at a depth of 40 m. The proposed release point is below the pycnocline which makes it unlikely that surface or near shore samples will be useful in establishing a baseline that will aid in detecting changes resulting from effluent discharge.	a) Outline what additional baseline sampling will be undertaken in Roberts Bay to ensure that project related changes can be detected; b) Describe how plume modelling was incorporated into the selection of appropriate baseline sampling locations within Roberts Bay.
EC	2	Proponent	Marine Water Quality Objectives	Environmental Effects Mitigation (Table 4.5-1)	CCME guidelines for parameters in the marine environment are limited and it is logical to use the guidelines where they exist. However, EC notes that the effluent may contain contaminants of concern for which guidelines do not exist.	a) Identify the contaminants of concern in the TIA and groundwater effluent that could cause impacts to the Roberts Bay receiving environment; b) Describe the potential impacts to the Roberts Bay receiving environment from contaminants of concern identified in a);

					In order to understand potential effluent related impacts the constituents of the effluent must be identified and assessed to determine if they are of potential concern. Guidelines/objectives/thresholds for action should be developed for any contaminants of concern identified in the effluent so that project related impacts can be identified. In some cases it may be appropriate to adopt guidelines from another jurisdiction or to development of site specific guidelines to encompass any contaminants of concern that may be elevated in the effluent.	c) develop objectives/thresholds for action for contaminants of concern for which there are no CCME guidelines are identified.
EC	3	Proponent	Sediment Baseline Exceedances	Environmental Effects Mitigation – 4.3.7 – Marine Sediment Quality	The Proponent indicates that when sediment quality sampling was completed at the one deep location (RB1) it was found that copper and chromium exceeded the ISQGs but remained below the PEL. Copper and chromium may naturally exceed guidelines in the receiving environment around the discharge therefore an accurate baseline for these parameters is required to assess changes due to effluent deposition.	Clarify what copper and chromium guidelines/indicators will be used to identify project related impacts on sediment- associated biota.
EC	4	Proponent	Roberts Bay Marine Life Baseline	Environmental Effects Mitigation – Section 4.4.1	Section 4.4.1 indicates that in order to establish baseline phytoplankton and zooplankton samples were collected throughout Roberts Bay between 2009 and that benthos were sampled in shallow water near the southern and southwestern shores of the Bay and at one deep location near the centre of the Bay. Given that baseline sampling occurred at different depths throughout Roberts Bay they are representative of the communities at those depths. It would therefore be inappropriate to draw conclusions about overall baseline	a) Describe how data will be pooled and analyzed to establish baseline given depth differences; b) Describe what additional baseline sampling is to be conducted in order to accurately determine baseline conditions in the receiving environment around the diffuser.

					conditions based on the pooling of data from shallow and deep sites. Depth specific baseline conditions should be determined. It would appear that insufficient data was collected to determine a benthic invertebrate baseline in the receiving environment of immediately adjacent to the diffuser.	
EC	5	Proponent	Sediment Quality	Environmental effects mitigation – Section 4.5.3	Marine sediment quality is only briefly mentioned in the environmental effects assessment which indicates that the discharge of TIA water and groundwater through the diffuser in Roberts Bay is expected to have little interaction with the sediments. Further, the Proponent indicates that the effluent will meet MMER limits and will therefore have a low concentration of suspended solids. Based on this assessment TMAC does not anticipate adverse effects on Roberts Bay sediments. The EIS addendum indicates that the effluent will be discharged from a diffuser located on the ocean floor in close proximity to the generally fine natural sediments of Roberts Bay. The predicted low TSS concentration in the effluent does not eliminate all potential impacts to sediments from other contaminants, such as metals, present in the effluent.	a) Provide information to support the conclusion that impacts to marine sediments are unlikely. b) Provide any modelling results on impacts to sediments that could result from increased metal concentrations in the effluent and describe the potential impacts.
EC	6	Proponent	Effluent Quality	Environmental Effects Mitigation – figures 4.5 1 to 3	Figures 4.5-1 to 4.5-3 include projections of concentrations of several parameters (total N, Salinity, As, Cd, Cr and Hg) in the Roberts Bay receiving environment. Section 4.5.3 also indicates what the maximum concentration of the above noted parameters can be without resulting in receiving environment concentrations exceeding CCME marine water quality	Provide: a) A comprehensive list of contaminants to be evaluated in the receiving environment, and that discharge targets identified. b) Estimates of predicted effluent chemistry for all parameters at end of pipe; c) Figures presenting the expected concentrations within Roberts Bay over time (operations throught post-closure)

					guidelines. However the Proponent does not indicate what the concentrations of these parameters are expected to be in the effluent nor what impacts might occur in Roberts Bay.	based on actual effluent quality predictions for all parameters in the effluent which may be above background levels in the receiving environment; d) An estimate of the range of groundwater inflow that is predicted, including episodic high inflow scenarios, and how these inflow fluctuations would affect concentrations of each parameter of concern in the effluent; e) A description of how effluent salinity will be managed to ensure effluent is non-toxic at end of pipe and is appropriate for the immediate receiving environment.
EC	7	Proponent	Effluent Quality – Toxicity Testing	Section 4.5.7	The Proponent states that "Any TIA effluent and groundwater discharged to the marine environment will meet the MMER limits prior to discharge. This includes passing the required MMER toxicity tests." No discussion has been provided regarding toxicity testing and whole effluent predicted characterization.	a) Describe any toxicity testing carried out on the effluent to date, includeing testing results; b) Describe any proposed toxicity testing of effluent at end of pipe.
EC	8	Proponent	Aquatic Effects Monitoring Program	Environmental Effects Mitigation – 4.5.8	The Proponent indicates that the current version of their AEMP includes two near-shore sites in Roberts Bay and one reference site in Ida Bay. The Proponent has indicated that they intend to modify the monitoring program to include the new areas that may be impacted.	Provide an updated version of the AEMP as soon as possible so that the Proponent can identify sampling sites and collect baseline data prior to construction.
EC	9	Proponent	Marine Outfall Discharge	P6-6 Roberts Bay Discharge System: Water Management Options Environmental Effects Mitigation – 4.5 TMAC	The Proponent proposes a marine outfall which will be designed to disperse effluent at a depth of 40 m such that mixing is optimized and effects on the upper productive layer of the water column are minimized. The Proponent has indicated that the diffuser will be anchored on the sea floor and discharge will be occurring at a rate of up to 81 L/s. Sediment composition analysis shows that this area is primarily composed of fine material. The turbulence caused by the effluent flow will cause scouring of the adjacent sediments which will	a) Clarify the statement that the buoyancy of the discharge will deflect plumes upward; and discuss the effects of differences in salinity and temperature between the discharge and the marine receiving waters. b) Identify monitoring and mitigation measures which will be used to ensure the outfall is performing as predicted;

				Response to EC IR #4 (April 22, 2014)	result in disturbance to the benthic areas and turbidity in the water column. However: a) Section 4.5 of the addendum suggests that the salinity of the effluent could be up to 260 PPT (many times the average salinity found in Roberts Bay) which would make the effluent negatively buoyant and more likely to impact the sediments. b) The Proponent response to EC IR #4 (April 18, 2014) states that: ….. "The current design of the outfall includes mitigation measures to avoid and prevent disturbance of the bottom sediments. Risers branching off the diffuser have been designed to direct the turbulent jets outward horizontally and upwards. The buoyancy of the discharge will deflect the plumes upward in the water column which will avoid and minimize disturbance of the bottom"	
EC	10	Proponent	Closure Water Management	Package 6 Part 10 Site-Wide Water and Load Balance Section 6.2.3; Appendix B	The Proponent indicates that at closure the TIA waters will be drawn down, with year-round pumping of the dewatering flows from the TIA to the mixing box and on to Roberts Bay at a rate of 4000 m3/day. At closure the effluent will consist of TIA water only, as groundwater collection will cease at closure and no longer be pumped to the mixing box. Appendix B of the Site –Wide Water and Load Balance presents figures B1 – B17 which show predicted water quality in the TIA over time. At the time of drawdown, a number of the parameters have predicted concentrations that are elevated well above CCME guidelines.	a) Describe contingency measures that are available if the water in the TIA is not suitable for discharge to the marine environment. b) Provide information on the potential effects of discharging 4000 m3/day of fresh water to Roberts Bay?

					Table 6-2 shows low salinity in the TIA waters at closure; 4000 m3/day of fresh water would be discharged to Roberts Bay.	
EC	11	Proponent	Loss of migratory bird habitat	Package 4 – Identification of potential environmental effects and proposed mitigation, Freshwater Environment, Section 2.5	The Proponent explains that there is a possibility that the water level in Doris Lake could change temporarily as a result of encountering groundwater while mining under the lake. The Proponent assessed possible effects to fish habitat under water loss scenarios greater than those currently permitted but did not assess the possible loss of migratory bird habitat. Paragraph 6(a) of the Migratory Bird Regulations states that no one shall disturb or destroy the nests or eggs of migratory birds. Migratory birds, the nests of migratory birds and/or their eggs can be inadvertently harmed or disturbed as a result of many activities–including but not limited to draining or flooding land, vegetation clearing or using fishing gear. This inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is known as incidental take. Incidental take, in addition to harming individual birds, nests or eggs, can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different incidents.	Indicate if water level reductions could occur during the period when migratory birds are present and provide an assessment of potential effects on migratory bird habitat resulting from the activities propose under this amendment including: a) quantifying potential habitat loss in terms of lost wetland, water surface area and/or exposed soil; b) summarizing available migratory bird information for Doris Lake and other potentially impacted areas downstream; and c) assessing whether there is a risk of incidental take of migratory birds, the nests of migratory birds and/or their eggs due to changes in water level in Doris Lake and other possible impacted areas downstream d) identifying possible mitigation measures to address any risks.

EC	12	Proponent	Shipping impacts on marine birds	Project Description, Section 3.14	The Proponent states that expanded mining activities will result in additional materials shipped to the site and that marine transport activities will remain limited to seasonal resupply and waste backhaul. Melville Sound is part of a larger area of national importance for migratory birds that EC refers to as a Key Habitat Site (KHS). The *Bathurst and Elu Inlets* KHS supports more than 10% of the national populations of Pacific Common Eider and Thayer's Gull. Project related marine shipping has the potential to negatively impact marine birds during feeding, brood-rearing, staging and migration periods. Marine shipping also has the potential to cause the direct loss of marine birds through collisions and oil spill incidents.	a) Assess how much marine shipping traffic will increase as a result of the activities proposed under this amendment. b) Describe any changes to potential marine impacts as a result of the activities proposed under this amendment.
EC	13	Proponent	Marine bird surveys	Package 4 – Identification of potential environmental effects and proposed mitigation, Marine Environment, Section 4.4.3.2	The Proponent conducted seabird surveys aboard a ship from 10-12 August 2010 between Roberts Bay and Cambridge Bay. Few birds were observed during these surveys and details on the methodology were lacking to provide any weight to the observations or conclusions. The survey was also not summarized in the 2010 Wildlife Mitigation and Monitoring Program Annual Report. Melville Sound is part of a larger area of national importance that EC refers to as a Key Habitat Site (KHS) for migratory birds. The *Bathurst and Elu Inlets* KHS supports more than 10% of the national populations of Pacific Common Eider and Thayer's Gull. Marine shipping could potentially lead to disturbance to marine birds during feeding, brood-rearing, staging and migration periods. Marine shipping could also potentially lead to the direct loss of marine birds through collisions and oil spill incidents.	Provide the following information regarding the ship-based seabird surveys described in Section 4.4.3.2: a) a map indicating the ship survey route including the survey effort and observations along that route; b) the source for the selected methodology; c) the general weather and ice conditions during surveys; and d) a description of the observer's experience in conducting ship-based seabird surveys.

EC	14	Proponent	Overwintering of fuel barges	Project Description PK 2, Section 3.14.1 winter Fuel Barges	The Proponent proposes to maintain the ongoing option of overwintering fuel in vessels and/or barges in Roberts Bay in the future to allow some logistical flexibility. The Proponent indicates that the activity would occur in full compliance with all applicable regulatory requirements. Melville Sound is part of a larger area of national importance that EC refers to as Key Habitat Site (KHS) for migratory birds. The *Bathurst and Elu Inlets* KHS supports more than 10% of the national populations of Pacific Common Eider and Thayer's Gull. Overwintering fuel barges could potentially lead to the direct loss of marine birds through oil spill incidents. This was originally proposed as a temporary strategy to be used when there was insufficient fuel storage on site.	Given the complexities of an arctic oil spill response: a) Clarify when sufficient on-land storage will be constructed to avoid the use of overwintering fuel barges as a long term fuel storage option; b) provide an assessment of alternatives to this fuel storage strategy including a rationale for not implementing a permanent land based storage solution; c) describe what procedures will be implemented to ensure that overwintering barges are regularly inspected; d) identify the mitigations that will be in place to detect and clean up a spill from such a vessel.