Environmental Monitoring Advisory Board

Intervention to the Wek'èezhìi Land and Water Board

on

Diavik Diamond Mines' Water Licence W2015L2-0001 Amendment Proceeding

Deposition of Processed Kimberlite into Mine Workings

November 23, 2020

EMAB intervention – PKMW Water Licence Proceeding

Note to Readers: all documents cited in this intervention are either included in the attachments to the intervention or hyperlinked in the Citations section

Contents

1. Water quality thresholds and definition of significance

Issue:
Water quality in the pit lake may not meet AEMP Benchmarks, taking into account runoff entering from East Island. Diavik has proposed Revised Ecological Thresholds in the proposal that are 20% higher than AEMP benchmarks.

Background:
It appears that for the purposes of this water licence amendment, Diavik has not modified its proposal to use the approach to water quality benchmarks that it put forward in the amendment application and in ICRP 4.0 (Diavik, April 2017) ie. using the significance definitions from the Comprehensive Study Report (Canada, 1999). Following from this definition, Diavik proposed that a one-kilometer mixing zone be established around East Island, and that the water quality benchmarks that would be required to be met at this distance would be the current AEMP benchmarks plus 20% (see Diavik Summary Impact Statement, p 44-45, Table 4-3, Revised Ecological Thresholds for Water Quality, Rio Tinto (May 2019b)). This approach is inconsistent with Measure 1 of the Environmental Assessment Report (MVEIRB, January 2020), which requires that Diavik will meet water quality objectives at closure:

- Water quality objective 1 of Measure 1 requires: water in at least the top 40 meters of the pit lake that is safe for people, aquatic life and wildlife
    - This objective means that water quality in the pit lake must meet AEMP Benchmarks at a minimum in order to be protective of aquatic life; Diavik's proposed Revised Ecological Thresholds are not adequate.

Diavik's proposed water quality benchmarks are also inconsistent with the direction given by the WLWB in its Reasons for Decision on ICRP 4.0 (WLWB, December 2018), and with the approach Diavik has proposed in ICRP 4.1 (Diavik, December 2019).

- On p. 42 of the WLWB Reasons for Decision on ICRP 4.0 the WLWB gave the following direction:
  "Based on the above discussion, DDMI still has some work to do in order to develop closure criteria for SW2 that will be acceptable to all parties. To accomplish this, the Board has determined that the following steps are necessary:
  1. If DDMI wishes the Board to consider the use of a regulated mixing zone for setting closure criteria, it should more clearly outline the information as required by the Mixing Zone Guidelines (see Section 6.0 of the Mixing Zone Guidelines).
  2. A better understanding of the following is needed to help demonstrate whether a regulated mixing zone will be required:
      a. The expected dilution in Lac de Gras at the various potential discharge points; and
      b. Water quality predictions for water in all potential discharge streams and in Lac de Gras.
  3. Consideration and discussion of options to address potentially problematic parameters (e.g., different mixing zones and passive treatment)."

  These steps are reflected in the following revisions the WLWB required to be included in Version 4.1 of the interim CRP (WLWB Reasons for Decision on ICRP 4.0):
  "**Re*vision # 31: For closure objective SW2:***

> ***a) Refine and compile predictions for water quality in all streams entering Lac de Gras in consideration of the different sources (e.g., WRSA and PKC Facility) and possible dilution prior to entry into the lake;***
> ***b) Follow the steps required by the Mixing Zone Guidelines (see Section 6.0) and provide evidence to demonstrate the smallest practicable mixing zone;***
> ***c) Outline a plume delineation study plan and/or provide substantive information to refine the dilution factor;***
> ***d) Revise closure criteria for SW2 based on the results of (a) through (c);***
> ***e) Provide evidence to support the achievability of proposed closure criteria; and***
> ***f) Include a consideration and discussion of alternative options to address potentially problematic parameters (e.g., different mixing zones, passive treatment, and changes to the proposed closure design).***"

- In general, it is EMAB's view that the principles behind the WLWB's direction should also be followed in relation to mixing of water from the pit lakes with Lac de Gras in order to meet the requirements of Measure 1. Diavik should revise its proposed amendment to address the relevant direction from the WLWB with respect to water quality benchmarks and mixing zones.
- Diavik has done a great deal of work in ICRP 4.1 to identify discharges, dilution factors and mixing zones from East Island. This same approach should be applied to discharges from the pit lakes.
- EMAB notes Table 4-3 in the SIS: Revised Ecological Thresholds for Water Quality – these are above AEMP benchmarks so not protective of aquatic life. Diavik should commit to meeting benchmarks for protection of aquatic life.
- Diavik should clarify whether water entering Lac de Gras from the pit lake is expected to meet AEMP Benchmarks, and whether runoff entering the pit lake from East Island is expected to meet AEMP Benchmarks.
- EMAB expects that plankton will live throughout the water column, so Diavik will have to meet aquatic health standards to the depth that any form of aquatic life, including plankton, populate.

Recommendations:

1.1 EMAB recommends that Diavik propose mixing zones for runoff entering the pit lake, and for water entering Lac de Gras from the pit lake, if these waters are predicted to be above AEMP Benchmarks. Any proposed mixing zone should include a rationale, dimensions, dilution factors and concentrations of COPC's at the mixing zone boundary, following the approach used in ICRP 4.1 and Diavik's Response to the WLWB Conformity Check for ICRP 4.1 (Diavik, May 2020).

1.2 If water quality is predicted to be heterogeneous in the pit lakes and/or in the mixing zone (if one is predicted) on the exterior of the pit lakes, describe water quality conditions within constructed fish habitat and provide a graphical representation of the mixing zone and locations of constructed habitat.

1.3 EMAB recommends that any proposed mixing zone meet the MVLWB Guidelines.

1.4 Table 4-3 in the SIS: Revised Ecological Thresholds for Water Quality should not apply to any part of the amendment application. With reference to Section 6 of this intervention, water quality in the pit lakes must meet AEMP benchmarks to at least 40 meters depth. If monitoring shows fish or aquatic life dwell below 40 meters then Diavik must ensure water quality meets AEMP benchmarks to whatever depths fish or other aquatic life are using or dwelling.

2. Reliability of predictions

Issue:
Environmental Assessment Report Measures 3 & 4 required Diavik to provide updated water quality modelling results, and that they be reviewed by an Independent Review Panel before PK is placed in the pit. While the modelling has been improved, there are a number of areas that need further examination.

Background:
Diavik has provided updated water quality modelling for the A418 pit that addresses Measures 3 and 4 of the Environmental Assessment report for the PKMW project. The updated modelling and predictions address many of the concerns raised during the EA hearings and improve confidence that the water quality in the pit after filling is unlikely to exceed the AEMP benchmarks in the top 40 meters of the pit lake.

There are a number of outstanding uncertainties:

Model inputs:

- There is a lack of detail describing how some inputs to the models were derived
- unclear what meteorological data were used for the long-term modeling
- The approach used for PK porewater chemistry inputs may underestimate source concentrations
- water quality parameters for nitrogen, phosphorus, and mercury not included in model inputs
- modelling does not consider materials that may be suspended in the water column. In its August 2019 response to Tłı̨chǫ Government recommendations, DDMI describes that fine and extra-fine PK settle and consolidate differently, with finer materials settling more slowly. In Appendix A of the "*Response to Interventions for the Environmental Assessment of the Processed Kimberlite to Mine Workings Proposal (MVEIRB File No.: EA1819-01)*" (Diavik, August 2019), DDMI provides photos of jar tests for settling and consolidation of fine and extra-fine PK materials. The photos illustrate, and annotations refer to, a distinct layer of sediment for the extra-fine PK remaining at the interface after two months. If this occurs as a result of deposit of PK into the A418 pit, the material could mix with the inflowing Lac de Gras water during pit filling.

Benchmarks:

- Several benchmarks do not reflect current water quality guidelines that have either been updated or that have entirely new guidelines by CCME and Health Canada (including manganese, strontium, and zinc).
- It should be identified if benchmarks will be exceeded in the pit lake across depth and identify what depth the exceedances would begin. Aquatic biota may utilize water depths greater than 40 m, yet modeling results are only presented for the surface and 40 m depths in the pit.

Sensitivity Analyses:

- Short term sensitivity analyses only reports on TDS and nitrite. Valuable to have more parameters.

- None of the sensitivity analysis scenarios included a 'reasonable worst-case-scenario'. (e.g. inputs for PK porewater were increased by 50%, but using maximum concentrations would be more conservative).

Recommendations:

2.1 Before deposit of PK into the pit begins Diavik should undertake additional characterization programs to understand expected porewater conditions, including testing of fresh PK as proposed by the IRP and also additional testing of porewater from PK that has aged in saturated conditions within the PKC Facility.

2.2 Provide additional detailed summary statistics for PK porewater chemistry and include in the water quality modeling report (including mean, median, sample size, standard deviation, standard error, minimum, maximum, 5, 25, 75, and 95th percentiles, and geometric means).

2.3 Add TN, TP, and mercury to modeling. Provide information on concentrations of TP, TN, and mercury in all model inputs.

2.4 Provide details on water quality summary statistics for groundwater inputs. Statistics should include sample size, mean, median, percentiles (5th, 25th, 75th, and 95th), minimum, maximum, standard error, standard deviation, and the number of samples that were above detection limits. Analytical detection limits (where applicable) should also be identified.

2.5 If total fractions cannot be derived, or if it is expected that the majority of metals will be in dissolved form in site runoff, provide a qualitative discussion of expected effects on total fractions of metals.

2.6 Identify the parameters and associated detection limits for which measurements were below the detection limit. Apply non-zero values for these parameters using values equal to the detection limit.

2.7 Apply values equivalent to the analytical detection limit for PK porewater chemistry measurements that were reported below the detection limit for deriving statistical values for model inputs.

2.8 Review the most recent Health Canada drinking water quality guidelines and the CCME PAL guidelines for manganese and revise the benchmark to incorporate the most sensitive current guidelines.

2.9 Recommend adopting the most recent Health Canada drinking water quality guideline as the benchmark for strontium.

2.10 Recommend adopting a benchmark based on the current CCME PAL guideline for zinc.

2.11 Recommend revising benchmarks used for modeling, and subsequent monitoring, on a regular basis to incorporate updates/revisions to national water quality guidelines and/or other sources (e.g., guidelines from other jurisdictions) as appropriate.

2.12 If the model predictions indicate that water quality conditions for all parameters are expected to below benchmarks at all depths above the chemocline, include a statement to this effect in the report.

OR

If exceedances are predicted, provide detailed information on the predicted depth of the exceedance and the range of concentrations predicted within the entirety of the mixolimnion.

Note: recommendation 2.12 applies to base case modeling, as well as sensitivity analyses.

2.13 Provide information regarding the potential to exceed benchmarks throughout the mixolimnion – not just to a depth of 40 m. As previously noted, aquatic biota may utilize depths greater than 40 m and therefore water quality conditions need to be characterized below 40 m.

2.14 Before deposit of PK into the pit begins, DDMI should be required to define and model reasonable worst-case conditions to provide evidence that these conditions will not cause unacceptable water quality outcomes, including use of upper limit concentrations of PK porewater, site runoff, and groundwater.

2.15 Conduct additional sensitivity analysis, considering more adverse concentrations of contaminants in porewater. This analysis should incorporate data from other relevant test methods, including data from porewater extracted from in-situ samples.

- Provide a rationale for the use of a 25% increase in nitrite concentrations in PK porewater as a sensitivity analysis.
- Adopt values for PK porewater that are derived from the actual dataset statistics – specifically at or near the upper end of the range of values – for sensitivity analysis. It is noted that Sensitivity Analysis A used the 75th percentile of measured concentrations (pit filling model). As described in Section 4.54 of the November 2020 North-South Consultants report (North-South Consultants, November 2020, see attachment 3) use of maximum concentrations or 95th percentiles from the PK porewater consolidation testing results is recommended to represent a relatively "worst-case scenario".
- Provide a rationale for the use of a 50% change in site runoff (i.e., on what basis was this setting selected), and relate this change to real world conditions (e.g., what would this increase represent in terms of increased in precipitation relative to the long-term climatological record).

2.16 There should be a regulatory requirement for Diavik to address the conclusions and recommendations of the Independent Review Panel and either implement the recommendations or provide rationale for why it does not intend to implement them.

2.17 DDMI should be required to progress its modelling as soon as possible to include predictions of water quality in Lac de Gras, before deposit of PK into mine workings begins. This will allow consideration of potential effects in combination with other sources, and identification of any management actions that are needed to minimize loading from sources including the A418 pit lake.

2.18 DDMI should be required to monitor suspended sediment conditions during and following PK placement in the pit. After completion of PK placement and before the start of infilling with lake water, the monitoring program should include monitoring at the interface between the PK and overlying water. Planning for filling the pit with fresh water must address the results of the monitoring, for example by

designing and implementing mechanisms aimed at preventing mixing of lake water with decant water during filling (see also recommendation 3.1).

2.19 Comments on closure water balance modelling from EMAB review of ICRP 4.1 should be addressed in the next progression of modelling, where they are applicable to the PKMW project including (see attachment 4 Slater Environmental November 2020 for details):

- Effect of using a single runoff coefficient
- Provide additional details on the method used to incorporate contributions from natural catchments
- Modelling more adverse geochemical inputs
- Modelling of parameters below detection limits

2.20 Provide updated predictions on concentrations of DO for a hypothetical fully mixed condition using a mass-balance modeling approach for pit A418 based on the information generated from the revised modeling (i.e., depth of chemocline).

3. Fresh water cap filling design

Issue:
How will Diavik manage water for the freshwater cap entering the pit lake to minimize disturbance of the PK and porewater?

Recommendation:
3.1 EMAB recommends that Diavik provide a design plan for placing the fresh water cap over the deposited PK, that minimizes disturbance or mixing of the PK and porewater with the cap (see recommendation 2.5). This plan should require approval of the WLWB.

4. Benchmarks for unanticipated mixing

Issue:
Diavik is proposing Ecological Thresholds for Water Quality that are above AEMP Benchmarks.

Background:
DDMI has proposed that Ecological Thresholds for Water Quality be set at 20% above AEMP benchmarks, following the approach they proposed in ICRP 4.0. DDMI based this on the definition of significance they proposed for magnitude of effect. Diavik has changed this approach in ICRP 4.1 and those changes should also be reflected in this application. It is EMAB's view that it is inconsistent with Measure 1 and with WLWB direction with regard to ICRP 4.0 (see Section 1 of this intervention), to propose ecological thresholds above the levels considered to be protective of aquatic life i.e. AEMP benchmarks; this leaves potential that the thresholds may not be protective of aquatic life that is exposed to these concentrations for chronic periods.

EMAB notes that closure objective M1 states that water quality in the flooded pit and dike area should be similar to Lac de Gras (LDG), or at a minimum protective of aquatic life (Diavik, July 2011, ICRP Ver 3.2).

Note: Table 4-4 in the SIS: 2018 AEMP Water Quality concentrations, appears to include some errors. A number of parameters show the average concentration to be lower than both the minimum and maximum eg. nitrate, nitrite, nitrate + nitrite. The maximum for soluble reactive phosphorus is lower than the minimum and average.

Recommendations:

4.1 Ecological thresholds for water quality should not be higher, or lower as appropriate, than those established for the protection of aquatic life.

5. Decision to reconnect pit lake to Lac de Gras

Issue:

Criteria for reconnecting the pit lake to Lac de Gras are not comprehensive enough.

Background:

Once PK has been deposited into a pit and the water cap has been placed over top, DDMI will apply various criteria for deciding when, or if, the pit should be reconnected with LDG. DDMI proposes to use water quality as the sole physical criterion for making this decision, and has proposed limited monitoring of the pit lake to support the assessment of whether water quality is adequate to reconnect. EMAB's view is that there are a number of other criteria that should also be considered in the decision.

DDMI is developing Traditional Knowledge (TK) based cultural criteria for reconnecting the pit lake to Lac de Gras through engagement with Parties to the Environmental Agreement and other parties identified by MVEIRB. Diavik has proposed additions to Part H of its existing water licence to submit cultural criteria to the WLWB for approval before it deposits any processed kimberlite into the pits ie. after the water licence proceeding is completed. EMAB finds Diavik's proposed wording for Part H, Item 18 unjustifiably narrows the scope of cultural use criteria beyond that defined by Measure 2 of the Environmental Assessment Report.

DDMI has indicated that, as a contingency, they may not reconnect the pit lake with LDG. There are a number of other factors that EMAB believes should be taken into consideration in this decision. These are addressed in section 9 of this intervention, on contingency plans.

Recommendations:

5.1 DDMI should define appropriate sediment quality criteria that it will apply before reconnecting pit lakes with LDG. These criteria should be developed as part of the approval for the PK to Mine Workings (PKMW) Project and should be protective of the aquatic ecosystem. The application of the

criteria should be limited to areas that may affect fish or other aquatic life, i.e., where fish or other aquatic life are likely to be present.

5.2 Water and sediment quality in the pit lake should be monitored comprehensively throughout the pit lake and over a sufficient time period to identify trends to ensure conditions are protective of aquatic ecosystem health prior to reconnecting with LDG.

5.3 Diavik's proposed cultural criteria for reconnecting the pit lake to Lac de Gras must be reviewed and accepted by the communities Diavik engaged with, before submission to the WLWB. Following submission to the WLWB parties to the proceedings, including EMAB, must have an opportunity to review and comment on the cultural criteria and they must be approved by the WLWB, before any PK is deposited to the pits.

5.4 Ensure that cultural water quality criteria align with direction in MVEIRB's Report of Environmental Assessment. In Diavik's proposed wording for the amended Water Licence Part H Section 18 remove last line of sentence which states "where success is demonstrated by pre-deposition water quality modelling."

6. Effects on fish/habitat

Issue:
Diavik needs to broaden predictions related to effects on fish and establish monitoring to verify assumptions and predictions about fish and fish habitat.

Background:
Uncertainties about water quality and meromictic pit lake stability for the PKMW project pose risks to aquatic life. Additionally, assumptions that fish will only reside in the upper 40m of the water column are critical, and may not be correct. If this assumption is wrong, there is potential for fish to be exposed to water quality parameters that could have adverse impacts on the health of fish and other aquatic life. This issue was not addressed directly in the Environmental Assessment Report on the PKMW Project.

We note that ICRP Version 4.1 (Appendix VI, p. 34) indicates: "Fish habitat within the back-flooded pits will be restricted to the upper layer of the pit above the chemocline, which is referred to as the mixolimnion. Fish are not expected to use the deeper water within and beneath the chemocline. Therefore, only water quality results for the mixolimnion will be required to meet closure criteria; however, data from all sample depths will be reviewed to monitor and assess water quality throughout the water column and provide additional information if needed to address any issues during post-closure."

Other than through water quality monitoring, DDMI has not proposed to monitor effects on fish and aquatic health. EMAB addresses this inadequacy in the section below. Inadequacies include monitoring fish (including other aquatic components such as benthic invertebrates), use of the pit lake (particularly

at or below 40m), fish habitat monitoring plans (other than limited monitoring of enhanced fish habitat as required by Fisheries Authorizations) and monitoring for contamination of fish tissue. In general, we do not think that DDMI has provided sufficient evidence to support their assumptions, nor have they proposed a sufficient monitoring plan for monitoring fish and fish habitat after breaching the dikes.

The assumption that fish will not go below 40m is critical. If fish are found to go below 40m, impact predictions could be affected. EMAB believes this assumption presents risk, and has potential to cause adverse effects, if the assumption remains unverified. MVEIRB addressed this assumption in Measure 1 of its report on the Environmental Assessment by requiring that water "in **at least** the top 40 meters of the pit lake(s)" meet water quality objectives. Water quality must meet AEMP benchmarks wherever fish or other aquatic life are present.

It is important that subsistence harvesters, who rely on fish in LDG, have reassurance that it is safe to consume fish from LDG. Monitoring and reporting the levels of metal contaminants, specifically mercury, could provide some reassurance to harvesters who want to fish near the reclaimed DDMI site. As LDG is a traditional and cultural area, it is important that the affected peoples have confidence that the area is safe to use for subsistence activities. EMAB's view is that if tissue metal concentrations are not confirmed and people do not have assurance that the fish are safe to eat, then people may choose to avoid returning to the LDG area for subsistence harvesting.

EMAB believes that there is potential for the PKMW project to interact with fish and other aquatic life and cause adverse impacts. We do not think that DDMI has provided sufficient evidence to support their assumptions, nor have they proposed a sufficient monitoring plan for monitoring fish and fish habitat after breaching the dikes.

<u>Assumptions</u>

DDMI's assumed lower boundary for water that will be used by fish is 40m. DDMI claims this assumption is supported by Traditional Knowledge, which says that fish in LDG typically reside between 6-7m depth for most of the year, and between 15-20m during the summer months (Rio Tinto, May 2019b (SIS), 2019). However, at the DDMI Traditional Knowledge Panel Session #11, it was suggested that fish can go down to around 100m. It is unclear how the maximum depth suggested by TK relates to DDMI's chosen boundary of 40m. DDMI's February 2019 literature review in response to WLWB IR# 9 (Rio Tinto, February 2019) also provides some context for why the boundary of 40m was chosen, but EMAB does not feel like a clear answer has been provided as to why the 40m boundary was specifically chosen.

Additionally, fish assumptions stated in DDMI's February 2019 literature review in response to WLWB IR# 9 (Rio Tinto, February 2019) are related to mobile, large-bodied fish, and do not address implications for smaller, less mobile fish like slimy sculpin, or other aquatic life. Slimy sculpin have small home ranges and would be unlikely to move away from contaminants (Rio Tinto, May 2019b

(SIS), 2019). They would be exposed to direct and indirect effects that would occur due to a worst-case-scenario event (Rio Tinto, May 2019b (SIS), 2019).

Dissolved Oxygen

Overall, EMAB is satisfied with DDMI's DO predictions based on the modelling provided. The responses provided by DDMI indicate that DO levels during an unanticipated mixing event will remain within a safe range for survival of aquatic life, even under ice. Effects on DO could be different than those predicted if DDMI's modelling inputs are inaccurate.

Mass-balance models were not run for A154. The mass-balance model conducted for DO in A418 under destratification may overestimate DO (NSC, July 2019).

Fish Habitat Monitoring

DDMI has noted that they will be conducting aerial drone surveys to monitor constructed fish habitat starting one year prior to filling the pits and continuing for 5 years (Appendix VI-1 of Appendix 1, DDMI Responses to MVEIRB IR's). DDMI has also planned for geotechnical inspections of constructed fish habitat and shoreline stability before and during infilling. Geotechnical surveys would cease once the pits are infilled (Appendix VI-1 of Appendix 1, DDMI Responses to MVEIRB IR's, Rio Tinto, May 2019a). Post-closure fish and fish habitat monitoring are mentioned, but not described. We note that there is some description of this monitoring in Appendix VI of ICRP 4.1. As the intention of reconnecting the pits is to restore enhanced fish habitat, how fish are using the area after breaching the dikes should be confirmed through monitoring.

Fish Tissue Chemistry

DDMI no longer has a scientific monitoring plan for sampling large bodied fish tissue chemistry, even though concern about mercury levels in fish in LDG has continued to be raised by Affected Communities since as far back as the CSR. This concern continues, including with respect to the potential effects of the PKMW project. Reinstating a large-bodied fish tissue chemistry monitoring plan would provide information on the safety of consuming fish in LDG for subsistence users. This information would be very valuable for those wanting to use the area for subsistence harvesting.

While DDMI does some analysis of fish tissues collected at TK camps, the data is not collected scientifically, making it difficult to use for analysis and comparisons. The SIS states that mercury levels recorded in large bodied fish at the 2018 TK camp were higher than the levels observed in 1997 (Rio Tinto, May 2019b (SIS), 2019). Though this information was not collected via a scientific method, there is indication that mercury levels in some fish have been above guidelines for subsistence users. The PKMW project has the potential to increase public concern about metal contaminants, including mercury, in fish tissue, and it is something that should be monitored moving forward.

Recommendations:

6.1 It is recommended that monitoring of fish use of the pelagic zone of the pit lake be required, at least initially after breaching the dikes, to confirm that fish and other aquatic life are only using the upper 40 m portion of the water column. Methods could include non-lethal techniques such as acoustic monitoring, trap nets, and fish tagging.

6.2 Monitoring of fish use of the enhanced habitats required by the Fisheries Authorizations should be described.

6.3 DDMI should also address the predicted effects on DO in the A154 pit using a mass-balance model before any PK is deposited there.

6.4 A dissolved oxygen survey should also be completed at additional sites, including shallow sites over substrate, to confirm the predictions that dissolved oxygen concentrations will be high above the chemocline in all seasons.

6.5 Monitoring the top 40m of the water column before breaching should be considered a minimum, given that the actual depth of the mixolimnion is not known. The depth of the mixolimnion should be confirmed before breaching the dikes to confirm to which depth the water quality is safe for aquatic life.

6.6 It is recommended that a metals (including mercury) in fish tissue survey be undertaken on large bodied fish that are harvested in the study area (e.g. lake trout), following breaching of the dikes. The survey would measure metal concentrations in the tissues that are consumed.

6.7 Prior to breaching of the dikes, sampling of biota (fish and benthic invertebrates) that may have been introduced when water from LDG was pumped in to form the closure cap should be conducted. These biota would have been exposed to higher concentrations of contaminants in water prior to the formation of a stable chemocline. If significant numbers of organisms are present, the need to assess them for concentrations of metals and mercury to avoid potential risk to fish that will be introduced after breaching of the dikes should be considered.

7. Effects on wildlife

Issue:

Proposed wildlife management/monitoring needs to be refined to address potential impacts of the proposed project.

Background:

During operations, using the pits for PK disposal will create large open water areas. it is anticipated that open water will occur in the pit lakes earlier in the season than in LDG, potentially attracting waterfowl and/or other birds and wildlife.

The expelled porewater immediately above the PK will likely not be within AEMP benchmarks before the end of mine operations. This is likely to happen while operations are still occurring at the minesite, while PK disposal to the pits is ongoing (SEC, July 2019).

In the Project Summary dated September 2020, DDMI references its 2020 Wildlife Management and Monitoring Plan (WMMP) and states the plan is consistent with the GNWT's *Wildlife Management and Monitoring Plan (WMMP) Process and Content Guidelines, June 2019.* DDMI states that the new WMMP will address wildlife management, effects of the PKMW Project on wildlife, and adaptive management measures for wildlife protection. EMAB notes that the GNWT has identified a number of areas that need to be addressed in DDMI's 2020 WMMP and has directed DDMI to submit a plan for approval by April 2, 2021 (letter of Sep 18, 2020 from ENR Deputy Minister to DDMI President, Attachment 1).

The 2020 WMMP does not appear to directly address keeping wildlife safe during filling the pits, particularly in relation to waterfowl.

Recommendation:

7.1 To mitigate potential effects, Diavik should develop/refine management plans to incorporate specific requirements for wildlife monitoring and response protocols related to waterfowl and wildlife use of pits during the operational period.

8. Monitoring (pre and post dike breach)

Issue:

Proposed water quality monitoring is not comprehensive enough.

Background:

Effectively monitoring water quality is an important factor in establishing conditions and trends in the pit lake, in considering when the pit lakes should be reconnected to LDG and in monitoring post-breach effects in the pit lake and on LDG. It is crucial that monitoring plans can adequately assess water quality, both before and after reconnection. In EMAB's view there are improvements that must be made to Diavik's proposed water quality monitoring for the pit lake and potential effects on Lac de Gras, specifically regarding sampling locations and sampling frequency. MVEIRB agreed with Diavik that detailed discussions of monitoring could be dealt with through the Water Licence proceeding.

For information on EMAB's views on DDMI's proposed fish and fish habitat monitoring, refer to section 6.

DDMI proposes to primarily rely on a single sampling location in the pit to characterize conditions. The description of proposed SNP Station 1645-88 includes sampling at various depths and frequencies at this

location. Diavik proposes to do a monthly bioprofile to monitor the chemocline but does not describe what the bioprofile would consist of, the methods involved, or the depths that will be sampled.

DDMI does not propose to sample the water stored in the pit while PK is being deposited, although it does propose to sample decant water. The decant water likely will not be representative of the water stored in the pit due to aging of the process water and the influence of other sources like groundwater, porewater release and local runoff. The quality of the supernatant water is a key component of the model and monitoring should be conducted to verify model assumptions (SEC, July 2019).

The modelling currently relies on temperature data from Snap Lake. Temperature monitoring in LDG should be initiated to support model updates.

The monitoring program should include monitoring of quantity and quality of groundwater inflows into the pits where possible.

The primary reliance on a single station to characterize water quality after the pit(s) is full may not provide a representative characterization of water quality conditions. Water quality may be variable due to influences from pit walls, local runoff, winds, or internal pit currents. Similarly, a single sampling event with one transect prior to pit reconnection may not accurately characterize variability in pit water quality over time. A more comprehensive monitoring program is needed to confirm the model predictions and the suitability of water quality for reconnection with LDG. The program should aim to understand spatial (in three dimensions) and temporal variability of water quality conditions to support validation of modelling and decision-making about pit lake reconnection. Pit lake reconnection should only occur once monitoring confirms that water quality is suitable in all relevant locations in the pit, and through all seasons (SEC, July 2019).

Diavik's proposed SNP site 1645-88 includes quarterly sampling of water quality at 2m below surface, 2m above the chemocline, 2m below the chemocline and 2m above the bottom. This approach will require a good understanding of the location of the chemocline – which is not possible without profiles that extend throughout the depth of the pit. Sampling should occur throughout the water column at least until the chemocline is established and at a consistent depth (SEC, July 2019).

After a stable gradient has formed and until such time as water quality has improved to the point that dikes may be breached, monitoring should be conducted at a station in the centre of the lake in late winter, after the spring turnover, during late summer and after the fall turnover. The intent would be to obtain information when stratification in the epilimnion and hypolimnion (both above the chemocline) has been established for much of the season and after the water column above the chemocline has been mixed (NSC, July 2019).

During each sampling episode, a sample for analysis of laboratory parameters should be collected from near the bottom. Water quality from below the chemocline could be used to support risk assessments to address the effect of unanticipated mixing (NSC, July 2019).

Once water quality at 1645-88 has reached AEMP benchmarks the water quality sampling should be expanded for a two-year period to address potential spatial and temporal variability of water quality in all areas of the pit lake, and over time, rather than the single transect that Diavik proposes to sample one time in 1645-88.

The monitoring program should include monitoring of sediment quality in areas that may be accessible to fish once the pit lakes are reconnected to LDG. Monitoring should be conducted to support decision-making about reconnection, and also after reconnection to confirm continuation of suitable conditions.

DDMI proposes that monitoring in the pits can be reduced to two times per year once the dikes are breached. This reduced frequency may be appropriate once monitoring confirms temporal variability (e.g., seasonal) of conditions after reconnection. More frequent sampling should continue for a period of at least two years after breaching to confirm temporal variability.

Recommendations:

8.1 DDMI should develop a comprehensive water and sediment quality monitoring program to confirm the model predictions and the suitability of water quality for reconnection with LDG. The program should aim to understand spatial (in three dimensions) and temporal variability of water quality conditions to support validation of modelling and decision-making about pit lake reconnection. Pit lake reconnection should only occur once monitoring confirms that water quality is suitable in all relevant locations in the pit, and through all seasons (suggest late winter, after spring turnover, late summer and after fall turnover). Monitoring should be conducted to support decision-making about reconnection and continue after reconnection to confirm continuation of suitable conditions.

8.2 DDMI should develop a sampling plan to verify model calibration, inputs and assumptions. This should include sampling the supernatant water above the PK, porewater quality of the PK placed into the pit, groundwater (as possible) and LDG temperatures.

Prior to Breaching Dike:

8.3 We note that Diavik proposes a monthly bioprofile at proposed SNP station 1645-88 with a limited number of parameters and does not include a description of the sampling depths. Initial sampling should extend throughout the water column, to determine when meromixis is established and monitor development of a chemocline. Sampling frequency should be based on the anticipated rate of gradient formation. Initial conditions should be recorded for the suite of AEMP parameters.

8.4 When water quality at the proposed SNP 1645-88 location is considered suitable for breaching of the dikes, an expanded water quality sampling program should be conducted to address potential

spatial and temporal variability. It is recommended that sampling be conducted for two years to ensure that there are not seasonal or interannual variations in conditions that result in adverse effects to water quality in the pit lakes above the chemocline. The sampling should be designed to determine whether there is marked spatial variation in water quality between the open pelagic area of the lake and shallow areas, in particular where fish habitat has been constructed. This short-term comprehensive sampling could be included in the Water Licence as a Specific Effects Study as described in Schedule 8.

8.5 The criteria for breaching of the dikes should consider sampling over the two years, in different areas of the lake. If there is marked temporal or spatial heterogeneity, then the criteria should be adjusted accordingly.

8.6 The monitoring program should include monitoring of sediment quality in areas that may be accessible to fish or other aquatic life once the pit lakes are reconnected to LDG.

8.7 The monitoring program should be adaptive.

After Breaching Dike:

8.8 Monitoring of the pit lake for the first year(s) after breaching of the dikes should confirm that the meromictic gradient remains stable.

8.9 Sampling in the pit lake should include vertical profiles of pH, dissolved oxygen, temperature and conductivity above and immediately below the chemocline. Sampling should be conducted in late winter, after the spring turnover, in late summer and after the fall turnover. Parameters sampled for laboratory analysis should include those monitored in the AEMP, and comparisons would be to both the AEMP benchmarks and water quality in LDG.

8.10 Initial monitoring after breaching of the dikes should include various locations in the pit lake, including at the dike breaches, to determine which areas are more affected by direct water exchange with LDG and which are more affected by water quality within the pit lake. If spatial heterogeneity is observed then the locations of sample collection should be adjusted.

8.11 The frequency of water quality sampling in the pit lake can be reduced if conditions are observed to be stable. An assessment of the risk of an unanticipated mixing event would need to be completed to determine what frequency of sampling is required to support implementation of the contingency plan (i.e., closing the breaches in the dike). Monitoring data available at the time will assist in informing this assessment.

8.12 If water quality in the pit lakes is markedly different from that in LDG, then initial sampling of conductivity, or some other parameter suitable for tracing the plumes from mixing with the pit lakes, should be conducted to determine the spatial extent of effects in LDG. It is anticipated that sampling at multiple times during the open water season would be required to address seasonal variation in mixing

as well as stabilization after initial breaching of the dikes. This could be included in the Water Licence as a Specific Effects Study as described in Schedule 8.

8.13 After the spatial extent of the effect of the pit lakes has been established, sampling sites should be located close to and further from the breaches to determine the extent to which water quality in LDG is affected by the pit lakes.

8.14 Parameters should include those in the AEMP, and be compared to AEMP benchmarks and background conditions in the LDG.

8.15 Sediment quality sampling should continue after breaching in areas of the pit lake used by fish.

8.16 DDMI should describe how they will monitor for unacceptable water quality in the pit in relation to the contingency plan to close the breaches.

See the proposed monitoring plans included in NSC, July 2019 and SEC, July 2019 for further detail. Please refer to Section 6 of this document for recommendations for fish and fish habitat monitoring.

9. Contingency plans

Issue:
Diavik's contingency plans for closing dike breaches need much more detail in order to be reviewed.

Background:
DDMI has proposed a number of contingencies to respond to unacceptable water quality in the pit lake:

- To not reconnect the pit lake with LDG
- To close the breaches in the dike to disconnect the pit lake from LDG
- To allow contamination resulting from an unanticipated mixing of the pit lake to be diluted by mixing with uncontaminated LDG water while increasing loadings to LDG.

DDMI proposes to provide details of these contingency plans following approval of the PKMW proposal by MVEIRB and the WLWB.

It is EMAB's view that DDMI should describe each of the contingency plans in sufficient detail that the feasibility of the plan to mitigate impacts can be evaluated and any potential adverse impacts associated with the plan can be assessed prior to depositing any PK to the pit. This issue was not addressed directly in the Environmental Assessment Report on the PKMW Project.

DDMI has provided its assessment of the impacts associated with not reconnecting the pit with LDG, or disconnecting them, in its July 4 response to MVEIRB IR# 55 (Rio Tinto, July 2019a). It has also provided a very short (less than a paragraph) description of how it would investigate in situ treatment if water

quality became unacceptable in the pit lake, with the backup plan of filling the breaches to isolate the pit lake from LDG (e.g. Rio Tinto, July 2019b, July 4 Response to EMAB IR# 20, July 4 Response to LKDFN IR# 14).

EMAB's view is that one sentence is not sufficient to describe DDMI's plan to investigate in situ treatment in the pit lake, or to close the breaches in the dike. DDMI should provide more detail on both these contingencies. In the case of the plan to close the breaches DDMI should indicate how it would monitor for unacceptable water quality to provide for detection as soon as possible. It should also describe the longest period unacceptable water quality could go undetected, and the period of time that would elapse between detection and completion of closing of the dikes, both if equipment is available onsite, and if it would need to be mobilized from the south. Clarity on the response time will allow a better idea of the potential impacts that might occur.

Recommendations:

9.1 DDMI should develop a description of the contingency plan to re-close the dike after breaching. This description should be sufficiently detailed to allow assessment of the feasibility of DDMI being able to execute the plan and should provide the worst-case time period between unacceptable water quality occurring, detection, and finalizing closing the breaches.

9.2 DDMI should provide more information on the potential impacts associated with the contingency plans, and on how it has incorporated the views and desires of Affected Communities and Aboriginal Peoples in describing these impacts.

9.3 DDMI should describe the impact on LDG of loadings associated with unanticipated mixing of the pit lakes.

10. Revised closure objectives

Issue:

Diavik has not proposed closure objectives or criteria to address the effects of the project on the pits or on the PKC. This issue was not addressed directly in the Environmental Assessment Report on the PKMW Project.

Background:

The current closure objectives and draft criteria included in DDMI's Interim Closure and Reclamation Plan (ICRP) Version 3.2 approved in 2011 (this is the most recently approved ICRP although these statements apply to ICRP Ver 4.1 that is still under review) do not describe closure measures for pit lakes containing PK and do not consider associated effects (SEC, July 2019). They also do not consider the effects of PKMW on the Processed Kimberlite Containment facility (PKC), notably that the pond covering the EFPK in the PKC is expected to drain within a year of PK being redirected to the pit (Response by

Sean Sinclair from DDMI to question from John McCullum from EMAB at January 2019 WLWB Technical Session).

In addition to existing site-wide objectives that water should be safe for humans, wildlife and aquatic life, objectives for the pits are that water quality should be similar to LDG or at a minimum, protective of aquatic life, and that the pits do not have adverse effects on water uses in Lac de Gras, the Coppermine River, or groundwater use. Because DDMI is now proposing that mining activities will include the storage of PK in pits and discontinuation of PK placement in the PKC Facility, these need to be incorporated in closure planning, including objectives and criteria that address potential effects of the revised PK management on VCs (SEC, July 2019).

For example, the ICRP would benefit from objectives that address potential for resuspension of PK material (both during pit filling and for post-closure conditions) and interaction of PK material with the aquatic ecosystem. Criteria will be required to define acceptable outcomes for these objectives. These may include criteria that prescribe minimum depth of closure water cap and depth of water needed to avoid potential direct contact of fish with PK. Criteria related to stratification of the closure pit lakes may also be relevant because stratification is likely to remain important for maintaining suitable water quality at the pit lake surface where it interacts with LDG.

Establishing criteria related to interaction of PK with the aquatic environment will likely need to consider the perspectives of the TK Panel including the following:

> "*One panel member said that they have set nets 12–14 metres deep on an extremely hot day. One suggestion was to make sure PK was at least 30 metres below the surface of the water, as this is deep enough and fish will not go that deep without a food source to attract them. However, the Inuit contingent suggested that fish can go much deeper, up to roughly 100 metres, which may be a regional difference*." (Thorpe Consulting Services, May 2018; DDMI Traditional Knowledge Panel Session #11, Options for Processed Kimberlite, Section 2)

There would also be benefit from the development and implementation of a reclamation research plan focused on addressing slimes in the PKC Facility. DDMI is proposing further feasibility research related to relocating EFPK to the pits, which offers a potential long-term solution for storage of these materials. Research scope should be expanded to take advantage of the expected draining of the pond and include investigation of other closure methods, for example covering in place. Methods used for covering of mature fine tailings at oil sands facilities may provide examples.

Recommendations:

10.1 The WLWB should establish requirements for timely updating of the closure and reclamation plan to incorporate the PKMW Project. This intervention includes a number of recommendations directly related to closure planning.

10.2 Updated closure planning should include updates of closure objectives and criteria to address potential interactions between wildlife and PK stored in pits, as well as changes in conditions

at the PKC Facility. WLWB should also require a comprehensive reclamation research project to investigate methods for closure and reclamation of PK slimes (see section 12 for EMAB's views on the slimes in relation to this project proposal).

10.3 Revise Closure Objective M8

- Include PK Deposition in addition to pit filling
- Clarify post-closure monitoring duration (if occurring); (ICRP v4.1, Appendix VI, Section 3.2.5).
- ICRP v4.1, Appendix VI, Section 3.2.5 states that surveys will be completed daily for the duration of pit flooding activities. Please clarify if daily monitoring is continuous or intermittent.

11. Cumulative effects on water quality

Issue:

Cumulative effects assessment methodology is not described well enough to allow for review.

Background:

The SIS submitted to the MVEIRB (Rio Tinto, May 2019b, section 4.5) and DDMI's responses to EMAB IR# 10 in MVEIRB EA1819-01 (Rio Tinto, July 2019b; IR Responses) describe a cumulative effects assessment for water quality. In the assessment DDMI considers existing DDMI operations and operations at Ekati Mine, including the Jay Project.

EMAB does not feel that DDMI's assessment of cumulative effects to water quality are adequate. Overall, DDMI has not provided enough information to understand the basis for the cumulative effects to water quality assessment.

Appendix B of the SIS shows different results between tables B7 through B9 and B10 through B12 (SEC, July 2019). Although the tables appear to confirm the use of modelling predictions, details on how the modelling was conducted are not described. This makes it difficult to understand how the existing effects at DDMI, and effects from Ekati mine were incorporated into the model (SEC, July 2019).

Section 4.5.2.3 of the SIS does not provide a direct explanation of how effects from DDMI's and Ekati's operations are considered in combination with the proposed PK to Pits project (SEC, July 2019).

DDMI discusses cumulative effects for water quality parameters in section 4.6.2.1 of the SIS. They state that modelling was completed for nitrate, cadmium and molybdenum in the pit lakes. However, they do not provide any rationale for the selection of considered parameters. They also do not provide any information as to why other parameters were not considered (SEC, July 2019).

Recommendation:

11.1 Diavik should provide a detailed description of the methods used to predict cumulative effects to water quality.

12. Feasibility of moving PKC slimes

Issue:

Diavik has not started its review of the feasibility of relocating the PKC slimes to the pit where PK will be disposed.

Background:

EMAB believes that Diavik should be required to evaluate feasibility of relocating the Extra-fine Processed Kimberlite (slimes) from the PKC Facility to the open pit as a condition of regulatory approval. This was mentioned in Suggestion 3 of the Environmental Assessment Report.

It is EMAB's view that relocating the slimes was the main advantage of the original PK to Mine Workings proposal. Placing all PK, including slimes, in the pits would provide a long-term storage location with minimal long-term stability risks (SEC, June 2019). It would require less maintenance and monitoring than keeping the slimes in the PKC Facility, as well as reduce the risks associated with long-term containment of the slimes in the PKC facility (SEC, June 2019). EMAB's consultants and DDMI's TK Panel have also recommended that the slimes be relocated to the mine workings along with the rest of the PK material to be deposited.

In the original project timetable DDMI proposed to undertake a feasibility study for re-mining EFPK in the second half of 2020. They have now pushed this study back to the second half of 2021 (Rio Tinto, July 2019a; DDMI responses to MVEIRB IR# 17, table 6). In EMAB's view the study should begin at the earliest possible time.

EMAB's consultants, Slater Environmental (SEC) and Randy Knapp, reviewed DDMI's Water Licence Amendment Application. SEC also reviewed the SIS, and associated Information Requests. SEC and Knapp both agree with EMAB's view that the ability to move the slimes to the pits would be the primary advantage to this project proposal (SEC, June 2019; Knapp, Feb 2019).

Uncertainties about the currently approved PKC closure plan also provide rationale for the consideration to move the slimes to the mine workings. Slimes in the PKC facility will require long-term containment via permanent dams. The dams will need to be maintained and monitored long-term and will create challenges during closure and post-closure. Conversely, the pits are a physically stable storage location that would require much less long-term monitoring (SEC, June 2019).

It is unknown if it is feasible to maintain the proposed wet cover over the PKC slimes as currently approved, or to cover the fine PK at the edge of the pond. Ability to retain the pond is uncertain as the measured seepage rates from the pond would not allow for a permanent pond (Knapp, June 2020,

Technical Review of ICRP 4.1; Slater Environmental, August 2020 Technical Memorandum on ICRP 4.1) (see EMAB Attachments). Current seepage estimates predict that the PKC pond would be drained within a year (Sinclair, Sean, January 2019; Response by Sean Sinclair from DDMI to question from John McCullum from EMAB at January 2019 WLWB Technical Session). Without a stable PKC pond, the slimes would be exposed and present a hazard to wildlife and humans. Depositing the slimes to the pits would allow DDMI to develop a dry closure concept for the PKC facility.

Additionally, the TK Panel has identified that they have concerns with the current plan to leave the slimes in the PKC facility. They have recommended that they want the slimes removed from the PKC facility because of concern about risks to wildlife (DDMI, October 2018; TK Recommendations Table/Oct 2018). Furthermore, the TK panel recommended that if the PK to pits proposal is approved, and DDMI moves forward with putting PK into the pits, that the slimes should also be put in the pits (Thorpe Consulting Services, May 2018; DDMI Traditional Knowledge Panel Session 11).

EMAB also notes that draining of the PKC pond within a year of PK being redirected to the pit will provide an opportunity for DDMI to investigate options for covering the EFPK other than maintaining a pond over it.

Recommendations:

12.1 EMAB recommends that DDMI be required to evaluate feasibility of relocation of the slimes to the pits as a condition of any project regulatory approval and provide justification if it concludes that re-mining of the slimes for pit disposal should not be undertaken.

12.2 It should be a condition of any regulatory approval of the PKMW project that DDMI should proceed with the feasibility assessment at the earliest possible opportunity to get a clear understanding of timing requirements as well as the potential effects and benefits of re-mining. The timing of the assessment should be brought forward, not pushed back to 2021 as currently proposed by DDMI.

13. WLWB Workplan for Water Licence Amendment Application

EMAB wishes to register its concern at the compressed schedule for review of Diavik's Amendment Application, and particularly the length of time between the submission of the Post-EA Information Package and the Deadline for Interventions. The relatively short time to have the Package reviewed by EMAB's technical consultants, then assembled into an intervention and reviewed by the Board, has resulted in an abbreviated discussion of EMAB's position, and may have reduced the quality of our intervention.

EMAB appreciates the difficult situation of deadlines for WLWB decisions, some of which are unique to the review process this application has followed to date. We also appreciate the WLWB's efforts to accommodate interveners, and the proponent, while meeting legislated deadlines. At the same time the

tight schedule is a hindrance to EMAB doing a full and complete review of the amendment application, and we are concerned that the schedule will also limit or reduce community participation.

List of Acronyms

AEMP: Aquatic Effects Monitoring Program

CCME: Canadian Council of Ministers of the Environment

CEAA: Canadian Environmental Assessment Agency

CSR: Comprehensive Study Report

DDMI: DDMI Diamond Mines Inc.

DO: Dissolved oxygen

EA: Environmental assessment

EIA: Environmental impact assessment

EFPK: Extra fine processed kimberlite

EMAB: Environmental Monitoring Advisory Board

FPK: Fine processed kimberlite

ICRP: Interim Closure and Reclamation Plan

IR: Information request

LDG: Lac de Gras

LDS: Lac du Sauvage

MVEIRB: Mackenzie Valley Environmental Impact Review Board

MVRMA: Mackenzie Valley Resource Management Act

NSC: North-South Consultants

ORS: Online Review System

PK: processed kimberlite

PKC: Processed Kimberlite Containment

PKMW: Processed Kimberlite to Mine Workings

PR: Public registry

RAA: Regional Assessment Area

SEC: Slater Environmental

SIS: Summary Impact Statement

TDS: Total dissolved solids

TK: Traditional Knowledge

UofA: University of Alberta

VC: Valued component

WLWB: Wek'èezhìi Land and Water Board

Citations

Canada (1999): CEAA Comprehensive Study Report: DDMI Diamonds Project.

Diavik Diamond Mines (Oct 2018): Diavik TK Panel Recommendation Tracking Table V10 Diavik Responses.

Diavik Diamond Mines (May, 2020): Response to Conformity Check

Diavik Diamond Mines (December 2019): Interim Closure and Reclamation Plan Version 4.1.

Diavik Diamond Mines (August 201): Response to Interventions for the Environmental Assessment of the Processed Kimberlite to Mine Workings Proposal (MVEIRB File No.: EA1819-01)

Diavik Diamond Mines (April 2017): Interim Closure and Reclamation Plan Version 4.0.

Diavik Diamond Mines (July 2011): Interim Closure and Reclamation Plan Version 3.2.

Environmental Agreement (March 2000): Environmental Agreement – Diavik Diamond Project.

GNWT (September 2020): Letter from Dr. Erin Kelly to Richard Storrie. *(EMAB Attachment #1)*

Knapp, Randy (June 2020: Technical Review: Diavik Interim Reclamation and Closure Plan, Version 4.1. *(EMAB Attachment #2)*

Knapp, Randy (Feb 2019): Review of DDMI's Water Licence Amendment. Diavik Responses to WLWB Information Request re: Water License W2015L2-0001 Amendment Request.

Knapp, Randy (August 2017): Review of Diavik Version 4 Closure and Reclamation Plan: Final report to the Environmental Monitoring Advisory Board

MVEIRB (January 2020): Report of Environmental Assessment and Reasons for Decision EA1819-01 Diavik Diamond Mines Inc. Depositing processed kimberlite into pit(s) and underground.

North-South Consultants (November 2020): Review of Diavik's Diavik Mine - Hydrodynamic and Water Quality Modelling of Pit Lakes and Lac De Gras: Processed Kimberlite to Mine Workings Project. *(EMAB Attachment #3)*

North-South Consultants (July 2019): Diavik Diamond Mines Inc. EA1819-01 Processed Kimberlite in Pits and Underground Environmental Assessment: Support to EMAB for MVEIRB Hearing Presentation.

North-South Consultants (June 2019): Review of Diavik's Summary Impact Statement for the Processed Kimberlite to Mine Workings Project (MVEIRB File No.: EA1819-01) Technical Memorandum 367-19-03. *(PR #84)*

Rio Tinto (July 2019a): Diavik Response to MVEIRB Information Requests for the Environmental Assessment pf the Processed Kimberlite to Mine Workings Proposal (MVEIRB File No.: EA1819-01). *(PR #86)*

Rio Tinto (July 2019b): Diavik Response to Party Information Requests for the Environmental Assessment pf the Processed Kimberlite to Mine Workings Proposal (MVEIRB File No.: EA1819-01). *(PR #83)*

Rio Tinto (May 2019a): Diavik Response to MVEIRB Information Requests for the Environmental Assessment pf the Processed Kimberlite to Mine Workings Proposal (MVEIRB File No.: EA1819-01). *(PR #84)*

Rio Tinto (May 2019b): Summary Impact Statement: Processed Kimberlite to Mine Workings Project. *(PR #53)*

Rio Tinto (February 2019): Diavik Responses to WLWB IRs re: Water Licence W2015L2-0001 Amendment Request for the Deposition of Processed Kimberlite to Mine Workings. *(PR #16)*

Rio Tinto (June 2018): DDMI Water License W2015L2-0001 Amendment Request for the Deposition of Processed Kimberlite to Mine Workings. *(PR #5)*

Sinclair, Sean (January 2019). Pers. Comm. Response from DDMI to question from John McCullum from EMAB at January 2019 WLWB Technical Session.

Slater Environmental (November 2020): Memo Re: Diavik Diamond Mine – Updated Modelling – PK to Mine Workings. *(EMAB Attachment #4)*

Slater Environmental (August 2020): Memo Re: Diavik Diamond Mine – Closure and Reclamation Plan, Version 4.1 *(EMAB Attachment #5)*

Slater Environmental (July 2019): Memo Re: Diavik Diamond Mine – Processed Kimberlite to Mine Workings Project.

Slater Environmental (June 2019): Memo Re: Diavik Diamond Mine – Processed Kimberlite to Mine Workings Project Summary Impact Statement. *(PR #84)*

Thorpe Consulting Services (May 2018): Diavik Traditional Knowledge Panel Session #11. Options for Processed Kimberlite: Diavik Diamond Mines. *(PR #85)*

WLWB (December 2018): Reasons for Decision, ICRP 4.0.

List of Attachments

Attachment 1 - GNWT (September 2020): Letter from Dr. Erin Kelly to Richard Storrie.

Attachment 2 - Knapp, Randy (June 2020: Technical Review: Diavik Interim Reclamation and Closure Plan, Version 4.1

Attachment 3 - North-South Consultants (November 2020): Review of Diavik's Diavik Mine - Hydrodynamic and Water Quality Modelling of Pit Lakes and Lac De Gras: Processed Kimberlite to Mine Workings Project.

Attachment 4 - Slater Environmental (November 2020): Memo Re: Diavik Diamond Mine – Updated Modelling – PK to Mine Workings.

Attachment 5 - Slater Environmental (August 2020): Memo Re: Diavik Diamond Mine – Closure and Reclamation Plan, Version 4.1