



Yellowknives Dene First Nation

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November 24, 2020

To: Wek'eezhii Land and Water Board

From: Yellowknives Dene First Nation Department of Environment: Sarah Gillis

Re: YKDFN Intervention for PKMW Water Licence Amendment Application Proceeding

Dear Ryan and Cassandra,

Thank you and all those involved at the Wek'eezhii Land and Water Board (WLWB) for the opportunity to participate in the review of Diavik Diamond Mine Inc.'s (DDMI) Water Licence W2015L2-0001 Amendment.

To resume the conversation at DDMI's Processed Kimberlite to Mine Workings (PKMW) environmental assessment (EA), submitted to the Mackenzie Valley Environmental Impact Review Board on October 24th, 2019, several of YKDFN's closing arguments remain unresolved. YKDFN recommended the proponent not be allowed to place processed kimberlite (PK) into mine and underground workings (MW) until it has demonstrated due consideration for the concerns of the indigenous through meaningful engagement and taken measure to allay fears and smoothen adverse perception through the develop for culturally acceptable criteria to define significance. Additionally, YKDFN Elders and Knowledge Holders have never supported this method of land reclamation and waste disposal.

To date, DDMI has been setting the pace for IGO engagement requirements, such as the water quality workshop, the development of an engagement plan and TK workshops. YKDFN's understaffed Department of Environment has been logging significant overtime hours to keep up with resource pressures and DDMI continues to move forward without YKDFN able to participate the regulatory process. This manner of proceeding has far reaching impacts, our government structure relies on guidance from Elders and leadership and we require a longer timeframe than other organizations to review and respond. Proceedings that occur without proper consultation and engagement of Elders, leadership, and community often result in the slowing down of internal YKDFN processes. Currently, our Department is not up to date on DDMI's water quality modelling and technical reports.

Consequently, YKDFN maintains that DDMI's explanation of this modelling throughout the public and community proceedings did not provide YKDFN staff and membership with trust in and understanding of model predictions.

YKDFN staff and membership remain uncertain that:

- Meromixis will be maintained over the long term (100+ years) thus limiting mixing;
- Wall fracture will not occur and potentially compromise meromixis;



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- Unforeseeable events caused by climate change such as earthquakes, flooding events, permafrost loss, changes in groundwater flow regimes, etc., will not have some effect on the project as proposed or predicted by modelling. The proponent did state that there were fault lines running through the pits proposed as receptors for PK; and
- End use by YKDFN membership will be possible.

Again, YKDFN is concerned DDMI has not taken into due consideration the perception of YKDFN members beyond that of those who might have been a part of the Advisory Traditional Knowledge Panel (TK Panel). Consequently, YKDFN believes that DDMI's assessment of "...overall impacts on cultural use are predicted to be not significant" to be negligent and insufficiently informed. It must be stated that meaningful engagement occurs at the community level and is conducted by YKDFN. TK gathered this way must undergo a stringent verification process, by YKDFN, to ensure this information being applied appropriately. Additionally, YKDFN does not consider DDMI's TK Panel, TK monitoring programs, and community assistance with environmental monitoring programs as accurate representations of YKDFN's traditional knowledge now and in the past.

Additionally, during the public hearing process, DDMI stated that they would develop culturally acceptable criteria for pit-water reconnection and monitoring starting with its advisory TK panel, which would then be provided to EMAB for review. However, no outline was provided for clarity. This is particularly important considering DDMI's emphasis on using its TK panel which we maintain is just advisory and should be used only for onsite undertakings without far-reaching cultural and environmental impacts.

To provide context on where YKDFN guidance originates and the history of the area, a traditional knowledge report was conducted in 1997. The Weledeh Yellowknives Dene Elder's who knew the barrens as unspoiled, mostly untouched by industrial development and the pollutants associated with them were interviewed. In 1997, large-scale mining developments around Ek'ati were already changing the land and waters on which many Dene families had and continued to rely for meat, fish, hides, and fur. At least nine open-pit diamond mines were planned to operate for at least twenty-five years. Four of the pits located in Lac de Gras itself, were to be surrounded by wide granite-filled dykes. The indicated that mining would not be a good idea for the Barrenlands, a wild place, the home of the animals. Having observed the effects of development impacts in Yellowknife Bay from Con and Giant mine, they had grave doubts that mining near Ek'ati could do anything but harm to their people's traditional territory and way of life.

The shallow spawning grounds around Ek'ati Ndi (islands near Diavik mine) and in the narrow inlet that nearly separates the north part from the rest of the east island was where Diavik was proposing to operate. They knew the mines were going to be located within wide C-shaped dykes, constructed in the lake itself where important fish spawning grounds. Elders and land users were concerned not only about the timing of construction of these dykes, but also the effect of mining operations and dust on fish spawning patterns. Other impacts the Elder's advised DDMI to consider were the effects of the dykes on migrating caribou and other animals.



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At the time, DDMI representative thought that caribou would walk on the dykes, but the Dene participating in this project believed there would be too much noise and dust coming from the pits inside the dykes. They discussed many aspects of these concerns and considered a range of possible ways to reduce the impacts before developing their final recommendations. Many of which were not considered or implemented.

The location of Diavik on Lac de Gras overlaps most dominantly with the Bathurst Barrenground caribou range have a population of 8,400 reported in 2018, down from 20,000 reported in 2015 and 472,000 reported in 1986. This mine is not the only contributor to the reduction of this herd but is none-the-less considered by YKDFN membership to play a role. Now for DDMI to be moving forward with PKMW operations without proper engagement of YKDFN Elders and community members, we are concerned this lack of consideration will perpetuate community mistrust and the perception that all mines, including Diavik are continually attempting to do the minimum when it comes to caring for the land in the eyes of our community. Additionally, we are concerned for water quality, fish habitat and for our spiritual connection to the waters and lands on-site and surrounding the mine.

Currently community members do not trust water quality around Diavik nor would anyone set fish nets in that area. Community engagement, specifically community meetings, must occur before members will trust water and fish near Diavik, especially if mine waste is approved to be placed in the MW, and Lac de Gras.

To re-iterate our capacity constraints, YKDFN is unable to complete a thorough technical analysis of PKMW operations-related documents. However, upon a brief technical review, YKDFN would like to see improvements in water quality modeling's ability to predicting future health concerns and traditional/cultural end use feasibility. The purpose of water quality modeling is not to chose parameters and components that will yield results favouring deposition of mine waste into Lac de Gras. The purpose should be to forecast potential risks and be used to create a monitoring framework. In order for modelling to be used practically, input concentration values should reflect the "worst case scenario" to inform end users, monitors and future generations what they should be concerned about and attentive to. YKDFN supports the comments and recommendations submitted by the following consultants and organizations:

- North/South Consultants Inc.:
 - 4.1.1: Add TN, TP, and mercury to modeling;



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- 4.1.2: Please provide information on concentrations of TP, TN, and mercury for all model inputs;
- 4.2.1: Provide statistical mean, median, sample size, standard deviation, standard error, minimum, maximum, 5, 25, 75, and 95th percentiles, geometric means, number of detections, and analytical detection limits for PK porewater chemistry and include in the water quality modeling report;

AND: 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;

- 4.2.2: Please 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;
- 4.2.3: 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;

AND: 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;

- 4.3: 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;

AND: adopt the most recent Health Canada drinking water quality guideline as the benchmark for strontium;

AND: adopt a benchmark based on the current CCME PAL guideline for zinc;



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AND: revise 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);

- 4.4.1: 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: This comment and recommendation applies to base case modeling, as well as sensitivity analyses;

- 4.5.1: Provide a rationale for the use of a 25% increase in nitrite concentrations in PK porewater as a sensitivity analysis;

AND: 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 4.5.4, we recommend use of maximum concentrations or 95th percentiles from the PK porewater consolidation testing results to represent a relatively “worst-case scenario”;

- 4.5.2: Develop a reasonable worst-case scenario for a sensitivity analysis where key inputs are increased, and other model settings where applicable, to determine if benchmarks will be exceeded and by what factor for all parameters with the potential to exceed the benchmarks;
- 4.5.3: Results of sensitivity analyses should include presentation of predictions for all parameters with the potential to result in exceedances of benchmarks. Alternatively, a summary statement indicating no exceedances for any parameter is predicted should be included (including for the full depth above the chemocline)



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if applicable (i.e., graphics do not necessarily need to be included for all parameters if a general conclusion can be provided in the text);

- 4.5.4: 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 increases in precipitation relative to the long-term climatological record);
- 5.1: NSC agrees with the panel recommendation to increase PK porewater testing to reduce uncertainty with respect to porewater on modeling results. However, we also recommend conducting a sensitivity analysis using the maximum (or near maximum such as 95th percentile) concentrations of measured values for porewater chemistry. Given the sensitivity of the model to this input and the concerns expressed by the panel regarding the robustness of the existing data, it is even more prudent to model a worst-case scenario; and
- 5.2: Information be provided 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.
- Slater Environmental Consultants:
 - 2: Recommendation: Before deposition 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;
 - 3: Before deposit of PK into the pit begins, DDMI should be required to:
 - 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;
 - Undertake additional characterization programs to understand expected porewater conditions, including testing of fresh PK as proposed by the IRP



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and also additional testing of porewater from PK that has aged in saturated conditions within the PKC Facility;

- 4: DDMI should be required 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;
 - 5: 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;
 - 6: The next progression of modelling for deposit of PK into pits should address the issues related to modelling of loading from the mine areas into the pits, described in comment 6 "Closure Water Balance and Closure Site Water Quality Models"; and
 - 7: The IRP report provides valuable review and comments about the modelling, including a number of conclusions and recommendations. There should be a regulatory requirement for DDMI to address the conclusions and either implement the recommendations or provide rationale for why it does not intend to implement them.
- The Environmental Monitoring Advisory Board's (EMAB):
 - 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);



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- 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;
- 2.1 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;



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- 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 be 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;



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- 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);



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- 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);



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- 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;
- 4.1 Ecological thresholds for water quality should not be higher, or lower as appropriate, than those established for the protection of aquatic life;
- 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 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.";
- 6.1 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;



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- 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;
- 7.1 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;
- 8.1 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



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- 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;



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- 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



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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;
- 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;
- 10.1 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;



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- 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;
- 11.1 Diavik should provide a detailed description of the methods used to predict cumulative effects to water quality;
- 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; and
- 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.
- Additionally, YKDFN recommends:
 1. Before PK is deposited in MW, DDMI should be required to adhere to culturally relevant water quality criteria as defined in YKDFN's Engagement Protocol when a final draft is mutually agreed upon by YKDFN and DDMI;



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2. DDMI should be required to halt progress on deposition of PK into MW until its modelling includes predictions of water quality in Lac de Gras to establish impact prevention, and less ideally mitigation plans able to avoid/minimize contaminant loading from the A418 pit lake and other contributing sources; and
3. Should DDMI's request to place PK in MW be accepted, DDMI should be required to establish wells and a monitoring system in the pits before PK placement, gathering data after PK placement and pit filling to use the measured results in model simulations before reconnecting the pit to Lac de Gras. This monitoring system may be used indefinitely to observe the stability of the chemocline.

YKDFN's understaffed Department of Environment has been logging significant overtime hours to keep up with resource pressures and DDMI continues to move forward without YKDFN able to participate the regulatory process. YKDFN has submitted a statement of need outlining how additional funding from DDMI would be used for internal capacity dedicated to Diavik's regulatory processes and community engagement. Through this staff, YKDFN hopes to build a relationship and start to develop trust with DDMI through communications, ability to review technical reports, and community liaison works.

In summary, YKDFN's position remains unchanged from initial approval of the water license, in opposition of the PKMW project. However, we understand that the WLWB is unable to consider this stance.

Current and future staff are not yet experienced in the regulatory process, if you require further information or have any feedback, please contact Sarah Gillis or Ryan Miller at the Ndilo Band Office.

Sincerely,

A handwritten signature in red ink, consisting of several loops and a long horizontal stroke at the end.



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Sarah Gillis

CC: Ryan Miller (by email)