April 16, 2020

Joe Mackenzie
Chair
Wek’eezhii Land and Water Board
1 - 4905 48 St.
Yellowknife, NT X1A 3S3

Ryan Fequet
Executive Director
Wek’eezhii Land and Water Board
1 - 4905 48 St.
Yellowknife, NT X1A 3S3

Re: Diavik A21 Underground Proceeding

Dear Joe and Ryan,

The Environmental Monitoring Advisory Board (EMAB) has decided not to intervene in the Proceeding for W2015L2-0001 Type A Water Licence Amendment for Underground Mining at A21.

EMAB did have a few outstanding questions on the information provided to date, and forwarded the attached memo to Diavik on April 2, 2020 and received a response (also attached) on April 10, 2020. We request these documents be added to the record for the proceeding.

If you require further information, please contact John McCullum at the EMAB office.

Sincerely

Charlie Catholique
Chair
Environmental Monitoring Advisory Board

Attach.

Cc EMAB members (by email)
Parties to the Environmental Agreement (by email)
Memorandum

To: John McCullum, Janyne Matthiessen – Environmental Monitoring Advisory Board
From: Rasheeda Slater, Bill Slater – Slater Environmental Consulting
Date: March 11, 2020

Re: Review of DDMI Responses to EMAB Comments on A21 Below Pit Mining WL Amendment Version 3

Slater Environmental has reviewed Diavik Diamond Mines Inc.’s (DDMI) responses to the comments and recommendations submitted by EMAB on the Water Licence Amendment to the existing W2015L2-0001 for the proposed “A21 Below Pit Mining Project.” In addition, Bill Slater participated in the March 3, 2020 Technical Session convened by the Wek’èezhii Land and Water Board (WLWB). Many of the EMAB comments and DDMI responses were discussed at the technical session.

Based on the responses and discussion at the Technical Session, we do not believe that further formal discussion at a public hearing would be beneficial. However, it would be useful to provide clarification to the WLWB about the current status of comments and recommendations provided in previous EMAB submissions. The following points describe Slater Environmental’s views about the current status of each of the previous comments/recommendations, having considered the responses and discussions at the Technical Session.

1. EMAB comment 1 pertained to the need to update the security estimates and bonding to address addition of A21 Below Pit Mining. Diavik has proposed that the licence already addresses this through regular updates. However, the regular update procedure in the licence is designed to address changes in liability associated with activities and facilities that are already approved in the licence. Any approval for a new component should specifically address the need to update estimates and bonds on appropriate time frames regardless of the regular update schedule. Otherwise there is a risk that new components would lead to periods of government being under-secured.

2. EMAB Comment 2 raised concerns pertaining to statements about meromictic conditions in A21 pit. Section 6.4.3.10 of the “Summary Environmental Assessment: A21 Below Pit Mining Project” (Golder Associates Ltd., Appendix B of the Project Description) states that the project’s post-closure effects on groundwater inflow into the pits will be mitigated by the presence of a stable meromixis. To support their statement Golder refers to modelling presented in Appendix X-3 of ICRP Version 3.2. However, the modelling presented was completed to represent 10 years post-closure for pit A154, not A21.

Slater Environmental’s previous review considered the results of modelling in support of the Water Licence Amendment Application for the Processed Kimberlite to Mine Workings (PKMW) Project. In its response, DDMI argued that the PKMW Project modelling was not relevant because it considered PK disposal in the pits.
In fact, the Base Case scenario for that modelling was defined as: "No PK; represents the reference scenario to assess if, given the pit lake geometry, bathymetry and atmospheric conditions, the resulting pit lake would be meromictic." Furthermore, Section 4.1.3 of the 2018 Golder Technical Memo that described the results of modelling states the following conclusion:

"The TDS concentrations for the Base Case, Sensitivity Scenarios 2 are predicted to stay relatively constant along the vertical profile, indicating a lack of permanent stratification (Figure 14) because of a high volume of exchange with lake water by Year 100 post-closure."

Because the modelling completed was for an A21 Base Case scenario for 100 years post-closure with no PK in the pit, it should be considered relevant to the discussion of post-closure meromictic conditions for the A21 Below Pit Mining.

As noted in the December 2019 review comments, the modelling for the PKMW project "indicates that the water quality effects are expected to be tolerable" but that "there is outstanding uncertainty" about that water quality modelling. This uncertainty extends to predictions for closure of the A21 Pit and A21 Below Pit Mining if it proceeds. The December 2019 recommendation for more detailed site-specific modelling as part of reclamation and closure planning remains applicable.

3. EMAB Comment 3 recommends requiring the submission of an updated Waste Rock Management Plan (WRMP) to address the protocols for verification of waste rock characteristics and management actions during mining. DDMI acknowledges the need for WRMP updates in its response and appears to agree with the recommendation. The requirement for an update should be incorporated into the licence.

4. EMAB Comment 4 addresses mining methods, including potential mining from platforms in a flooded pit. The comment recommended that additional design and operational information should be provided before granting approval for mining from platforms in a flooded pit. DDMI provided additional information about these methods in its response. The information indicates that the issues arising from these mining methods are similar to effects caused by past and existing activities at the site. As a result, DDMI asserts that it has facilities and experience necessary to manage effects (primarily associated with management of Total Suspended Solids) that may arise from mining in a flooded pit. Updating of appropriate management plans will be needed before application of these mining methods. The licence should require timely updates of appropriate management plans before application of mining methods that entail activities in a flooded pit.

5. EMAB Comments 5 and 6 pertain to groundwater data used to support modelling of future receiving water quality conditions. The modelling assumptions about future groundwater quality led to predictions that dewatering of A21 underground will result in reduced concentrations of some constituents (e.g., Total Dissolved Solids [TDS]) in mine effluent. DDMI provided additional water quality information in its response to comments and prior to the Technical Session. It provided further explanation of the data and the modeling assumptions at the Technical Session.
The limited data available for Well 19 (5 samples collected in spring/summer 2019) confirm that concentrations of most parameters in this well are lower than those from A154/A418 dewatering and North Inlet water. Concentrations are also generally lower than water collected in the A21 underground decline developed in 2007. At the Technical Session, DDMI confirmed that the modelling applied the lower Well 19 concentrations only to the portion of A21 dewatering inflow that is expected from groundwater inflows.

Unfortunately, none of the additional water quality data provided for comparison with Well 19 are from groundwater sources. All of the comparison data are for sampling locations that consolidate water from numerous sources. DDMI stated that it does not have any groundwater data from A418/A154 to compare with the data from consolidated dewatering data from this area. As a result, there is remaining uncertainty about whether Well 19 data provide a reasonable basis for estimating contaminant loading from this source.

However, because the model applies the Well 19 concentrations only to a small component of the inflows, the implications for model results would be small. It is unlikely that more conservative assumptions (e.g., that all A21 dewatering has water quality similar to current A21 dewatering, or current A154/A418 dewatering) would lead to predictions of unacceptable effects. To address the uncertainty and verify assumptions, monitoring results for A21 dewatering (quality and quantity) should be compared with modelling assumptions and inputs as mining of A21 Below Pit progresses. If monitoring results show loading that is greater than the input assumptions, modelling should be updated to refine predictions and confirm conclusions about effects. Monitoring information should also be used to support updated modelling for reclamation and closure (as proposed in Comment No. 2).

Thank you for the opportunity to review this project on behalf of the EMAB. If you have any questions about the results of the review, please feel free to contact us.

Bill Slater
Dear Mr. Catholique,

Subject: DDMI Response to EMAB’s Follow-up Comments on the Diavik Water Licence Amendment for the A21 Below Pit Project

This letter is in response to a Memorandum from Slater Environmental submitted to Diavik Diamond Mines Inc.’s (DDMI) by Environmental Monitoring Advisory Board (EMAB) on April 2, 2020. The Memorandum included EMAB’s follow-up comments after its review of DDMI’s responses to the comments and recommendations submitted by EMAB on the “Water Licence Amendment to the existing W2015L2-0001 for the proposed A21 Below Pit Mining Project”. EMAB’s specific comments in the Memorandum have been reproduced in this letter for reference. If any responses require further clarification, DDMI encourages EMAB to reach out directly and request DDMI arrange a meeting next week.

EMAB Comment-1

EMAB comment 1 pertained to the need to update the security estimates and bonding to address addition of A21 Below Pit Mining. Diavik has proposed that the licence already addresses this through regular updates. However, the regular update procedure in the licence is designed to address changes in liability associated with activities and facilities that are already approved in the licence. Any approval for a new component should specifically address the need to update estimates and bonds on appropriate time frames regardless of the regular update schedule. Otherwise there is a risk that new components would lead to periods of government being under-secured.

DDMI Response to EMAB Comment-1

DDMI notes that the security estimate for the A21 Below Pit Project has already been incorporated in the Interim Closure and Reclamation Plan Version 4.1, currently under review by the Wek’éezhii Land and Water Board (WLWB). Hence, all project components within the scope of the Diavik Water Licence Amendment Application for the A21 Below Pit Project will be included in security estimates for the Diavik Diamond Mine reducing risk of time periods where the government could be under-secured.
EMAB Comment-2
EMAB Comment 2 raised concerns pertaining to statements about meromictic conditions in A21 pit. Section 6.4.3.10 of the “Summary Environmental Assessment: A21 Below Pit Mining Project” (Golder Associates Ltd., Appendix B of the Project Description) states that the project’s post-closure effects on groundwater inflow into the pits will be mitigated by the presence of a stable meromixis. To support their statement Golder refers to modelling presented in Appendix X-3 of ICRP Version 3.2. However, the modelling presented was completed to represent 10 years post-closure for pit A154, not A21.

Slater Environmental's previous review considered the results of modelling in support of the Water Licence Amendment Application for the Processed Kimberlite to Mine Workings (PKMW) Project. In its response, DDMI argued that the PKMW Project modelling was not relevant because it considered PK disposal in the pits.

In fact, the Base Case scenario for that modelling was defined as: "No PK; represents the reference scenario to assess if, given the pit lake geometry, bathymetry and atmospheric conditions, the resulting pit lake would be meromictic." Furthermore, Section 4.1.3 of the 2018 Golder Technical Memo that described the results of modelling states the following conclusion:

"The TDS concentrations for the Base Case, Sensitivity Scenarios 2 are predicted to stay relatively constant along the vertical profile, indicating a lack of permanent stratification (Figure 14) because of a high volume of exchange with lake water by Year 100 post-closure."

Because the modelling completed was for an A21 Base Case scenario for 100 years post-closure with no PK in the pit, it should be considered relevant to the discussion of post-closure meromictic conditions for the A21 Below Pit Mining.

As noted in the December 2019 review comments, the modelling for the PKMW project “indicates that the water quality effects are expected to be tolerable” but that “there is outstanding uncertainty” about that water quality modelling. This uncertainty extends to predictions for closure of the A21 Pit and A21 Below Pit Mining if it proceeds. The December 2019 recommendation for more detailed site-specific modelling as part of reclamation and closure planning remains applicable.

DDMI Response to EMAB Comment-2
The referenced base case (no PK) modelling indicates there is not a significant risk of poor water quality in the pit and therefore meromictic conditions would not be a requirement to achieve adequate water quality. The A21 Below Pit Project would result in a deeper and narrower mine working and this structure is expected to improve potential meromictic conditions in the pit. The referenced ‘outstanding uncertainty’ is related to modelling of scenarios with processed kimberlite (PK) in the pit, not without PK. Therefore, DDMI is of the opinion that updated modelling of ‘no PK’ scenarios that would be relevant to the A21 Below Pit Amendment are not necessary.
EMAB Comment-3
EMAB Comment 3 recommends requiring the submission of an updated Waste Rock Management Plan (WRMP) to address the protocols for verification of waste rock characteristics and management actions during mining. DDMI acknowledges the need for WRMP updates in its response and appears to agree with the recommendation. The requirement for an update should be incorporated into the licence.

DDMI Response to EMAB Comment-3
DDMI notes that the current Water Licence for the Diavik Mine includes conditions requiring the annual review of management plans, including the management plan for waste rock, by DDMI and the submission of any management plan updates to the WLWB for approval a minimum of 90 days prior to the implementation of proposed changes. Also, the Board, on its own, may request that DDMI update any of these management plans. Hence, DDMI believes that a condition in an amended Water Licence for Diavik with specific reference to required waste rock management plan updates due to the A21 Below Pit Project will not be necessary.

EMAB Comment-4
EMAB Comment 4 addresses mining methods, including potential mining from platforms in a flooded pit. The comment recommended that additional design and operational information should be provided before granting approval for mining from platforms in a flooded pit. DDMI provided additional information about these methods in its response. The information indicates that the issues arising from these mining methods are similar to effects caused by past and existing activities at the site. As a result, DDMI asserts that it has facilities and experience necessary to manage effects (primarily associated with management of Total Suspended Solids) that may arise from mining in a flooded pit. Updating of appropriate management plans will be needed before application of these mining methods. The licence should require timely updates of appropriate management plans before application of mining methods that entail activities in a flooded pit.

DDMI Response to EMAB Comment-4
As noted in DDMI’s response to EMAB Comment-3, the current Water Licence for the Diavik Mine includes conditions requiring the annual review of management plans by DDMI and the submission of any management plan updates to the WLWB for approval a minimum of 90 days prior to the implementation of proposed changes. The Board may also request that DDMI update any of these management plans, at any time, to reflect any proposed changes to project activities. Hence, DDMI is of the opinion that changes to the existing conditions related to management plan updates in Diavik Water to specifically reference the A21 Flooded pit will not be necessary.

EMAB Comment-5
EMAB Comments 5 and 6 pertain to groundwater data used to support modelling of future receiving water quality conditions. The modelling assumptions about future groundwater quality led to predictions that dewatering of A21 underground will result in reduced concentrations of some constituents (e.g., Total Dissolved Solids [TDS]) in mine effluent. DDMI provided additional water quality information in its response to comments and prior to the Technical Session. It provided further explanation of the data and the modeling assumptions at the Technical Session.
The limited data available for Well 19 (5 samples collected in spring/summer 2019) confirm that concentrations of most parameters in this well are lower than those from A154/A418 dewatering and North Inlet water. Concentrations are also generally lower than water collected in the A21 underground decline developed in 2007. At the Technical Session, DDMI confirmed that the modelling applied the lower Well 19 concentrations only to the portion of A21 dewatering inflow that is expected from groundwater inflows.

Unfortunately, none of the additional water quality data provided for comparison with Well 19 are from groundwater sources. All of the comparison data are for sampling locations that consolidate water from numerous sources. DDMI stated that it does not have any groundwater data from A418/A154 to compare with the data from consolidated dewatering data from this area. As a result, there is remaining uncertainty about whether Well 19 data provide a reasonable basis for estimating contaminant loading from this source.

However, because the model applies the Well 19 concentrations only to a small component of the inflows, the implications for model results would be small. It is unlikely that more conservative assumptions (e.g., that all A21 dewatering has water quality similar to current A21 dewatering, or current A154/A418 dewatering) would lead to predictions of unacceptable effects. To address the uncertainty and verify assumptions, monitoring results for A21 dewatering (quality and quantity) should be compared with modelling assumptions and inputs as mining of A21 Below Pit progresses. If monitoring results show loading that is greater than the input assumptions, modelling should be updated to refine predictions and confirm conclusions about effects. Monitoring information should also be used to support updated modelling for reclamation and closure (as proposed in Comment No. 2).

**DDMI Response to EMAB Comment-5**

DDMI agrees with EMAB that more conservative groundwater quality assumptions (e.g., that all A21 dewatering has water quality similar to current A21 pit dewatering, or current A154/A418 dewatering) would not lead to predictions of unacceptable effects. At the request of GNWT, DDMI re-ran the phosphorus loading calculations assuming a constant concentration of 0.61 mg/L P, which is the 75th percentile of 232 samples from 1645-75B (A154/A418 dewatering) and double the concentration observed at A21 Well 19. The resulting more conservative upper loading estimate of 527 kg P to Lac de Gras is still within the range of historical loads and would not cause unacceptable effects (Attachment 1). Monitoring of future A21 Below Pit water quality will be used to confirm effects predictions. In the unlikely scenario that measured water quality is not within the range predicted, the A21 monitoring results will inform adaptive management actions. DDMI would like to emphasize that even doubling expected concentrations from A21 does not result in unacceptable effects based on P loading (remains within historical range) or mixing zone metal concentrations (remains below AEMP benchmarks). DDMI would also like to reiterate that the water quality data for 1645-75B that was provided for comparison with Well 19 is representative of consolidated A154/A418 dewatered groundwater and it is reasonable to compare this data to A21 Well 19.

Please do not hesitate to contact the undersigned if you have any questions related to this submission.
Yours sincerely,

Sean Sinclair,
Principal Advisor, Environment and Closure Readiness

cc: John McCullum, EMAB

Attachment 1: Phosphorus Loading Table using more conservative P Upper Bound
<table>
<thead>
<tr>
<th>Month</th>
<th>Flow (m³/day)</th>
<th>Load (kg/day)</th>
<th>Flow (m³/day)</th>
<th>Load (kg/day)</th>
<th>Difference in Monthly Load¹</th>
<th>Flow (m³/day)</th>
<th>Load (kg/day)</th>
<th>Difference in Monthly Load¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>44312</td>
<td>1.06</td>
<td>52705</td>
<td>1.18</td>
<td>8%</td>
<td>62930</td>
<td>1.48</td>
<td>26%</td>
</tr>
<tr>
<td>Feb</td>
<td>42750</td>
<td>0.95</td>
<td>51131</td>
<td>1.04</td>
<td>12%</td>
<td>61356</td>
<td>1.43</td>
<td>38%</td>
</tr>
<tr>
<td>Mar</td>
<td>38240</td>
<td>0.95</td>
<td>46637</td>
<td>1.03</td>
<td>6%</td>
<td>56862</td>
<td>1.22</td>
<td>18%</td>
</tr>
<tr>
<td>Apr</td>
<td>34786</td>
<td>0.90</td>
<td>42514</td>
<td>0.95</td>
<td>10%</td>
<td>52739</td>
<td>1.23</td>
<td>30%</td>
</tr>
<tr>
<td>May</td>
<td>33540</td>
<td>1.21</td>
<td>40870</td>
<td>1.30</td>
<td>5%</td>
<td>51095</td>
<td>1.48</td>
<td>14%</td>
</tr>
<tr>
<td>Jun</td>
<td>44134</td>
<td>1.33</td>
<td>51908</td>
<td>1.38</td>
<td>4%</td>
<td>62133</td>
<td>1.54</td>
<td>12%</td>
</tr>
<tr>
<td>Jul</td>
<td>43585</td>
<td>0.81</td>
<td>50912</td>
<td>0.87</td>
<td>4%</td>
<td>61137</td>
<td>0.97</td>
<td>12%</td>
</tr>
<tr>
<td>Aug</td>
<td>42396</td>
<td>1.23</td>
<td>50950</td>
<td>1.27</td>
<td>2%</td>
<td>61175</td>
<td>1.34</td>
<td>6%</td>
</tr>
<tr>
<td>Sep</td>
<td>31849</td>
<td>1.18</td>
<td>39485</td>
<td>1.21</td>
<td>2%</td>
<td>49710</td>
<td>1.27</td>
<td>5%</td>
</tr>
<tr>
<td>Oct</td>
<td>33370</td>
<td>1.03</td>
<td>41720</td>
<td>1.11</td>
<td>8%</td>
<td>51945</td>
<td>1.38</td>
<td>24%</td>
</tr>
<tr>
<td>Nov</td>
<td>24935</td>
<td>1.55</td>
<td>33917</td>
<td>1.60</td>
<td>2%</td>
<td>44142</td>
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<tr>
<td>Dec</td>
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<td>1.72</td>
<td>37861</td>
<td>1.83</td>
<td>8%</td>
<td>48086</td>
<td>2.28</td>
<td>25%</td>
</tr>
<tr>
<td>Total Annual Load (kg/yr)</td>
<td>-</td>
<td>424</td>
<td>-</td>
<td>449</td>
<td>-</td>
<td>474</td>
<td>-</td>
<td>527</td>
</tr>
</tbody>
</table>

¹ Uses constant upper estimate phosphorus concentration of 0.61 mg/L; 75th percentile of 232 samples from 1645-75B (A154/A418 dewatering)