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**Reasons for Decision**

<b>Water Licence Amendment Application</b>	
<b>Reference/File Numbers</b>	MV2011L2-0004
<b>Applicant</b>	De Beers Canada Inc.
<b>Project</b>	Snap Lake Project, Snap Lake, NT

**Decision from Mackenzie Valley Land and Water Board meeting of**

March 30, 2015

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Issued pursuant to sections 36 and 54 of the *Waters Act* and  
section 72.25 of the Mackenzie Valley Resource Management Act

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These Reasons for Decision describe the Mackenzie Valley Land and Water Board's (the Board or MVLWB) decision on an application made by De Beers Canada Inc. to the Board on November 12, 2014 to amend Water Licence (Licence) MV2011L2-0004 (November 2014 Amendment Application). This Application was made following a previous amendment application submitted to the Board in December 2013 that was subject to an Environmental Assessment (EA) EA1314-02, conducted by the Mackenzie Valley Environmental Impact Review Board (Review Board). A summary of the regulatory history is provided in Section 1 below. Section 2 describes the regulatory process for the November 2014 Amendment Application. Sections 3 and 4 describe the Boards decision on the November 2013 Amendment Application.

## **1.0 Regulatory History**

### **1.1 Initial Application: Water Licence MV2001L2-0002**

On February 2, 2001, De Beers Canada Mining Inc. (De Beers or Applicant<sup>1</sup>) applied to the Mackenzie Valley Land and Water Board for a Type A Water Licence MV2001L2-0002. This Application was for the mining and milling of diamonds and associated activities at Snap Lake, which is located approximately 220 km northeast of Yellowknife, NT. In May 2001, a preliminary screening was conducted and the Board determined that the proposed operation might be a cause of public concern and might have significant adverse impacts on the environment.<sup>2</sup> Therefore, the Application was referred to the Review Board for an EA under paragraph 125(1)(b) of the *Mackenzie Valley Resource Management Act* (MVRMA).

### **1.2 Environmental Assessment: EA01-004**

On July 24, 2003, the Review Board completed their report of *Report of Environmental Assessment and Reasons for Decision on the De Beers Canada Mining Inc. Snap Lake Diamond Project* (EA01-004) under subparagraph 128(1)(b)(ii) of the MVRMA.<sup>3</sup> On October 10, 2003, the Minister of Indian Affairs and Northern Development distributed the decision regarding the EA01-004 Report under subparagraph 130(1)(b)(i) of the MVRMA.<sup>4</sup> Section 62 and subsection 130(5) of the MVRMA required that measures within the jurisdiction of the MVLWB must be reflected in conditions set out in a Licence issued by the Board.

### **1.3 Regulatory Phase: Licence MV2001L2-0002**

On June 4, 2004, the MVLWB issued Licence MV2001L2-0002.<sup>5</sup> Reasons for Decision were released on April 28, 2004 under section 26 of the *Northwest Territories Waters Act* (NWTWA).<sup>6</sup>

### **1.4 Regulatory Phase: Licence MV2011L2-0004 ("Renewal")**

Licence MV2001L2-0002 was renewed following a Type A public hearing process, which resulted in Licence MV2011L2-0004. On April 13, 2012, the MVLWB recommended Licence MV2011L2-0004 and

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<sup>1</sup> De Beers Canada Mining Inc. changed their company name to De Beers Canada Inc. on December 1, 2004. The [MVLWB acknowledged this name change](#) on January 25, 2005. "De Beers" will be used throughout these reasons to reflect both company names.

<sup>2</sup> See [Preliminary Screening](#), May 2001.

<sup>3</sup> See [Report of Environment Assessment and Reasons for Decision EA01-004](#), July 24, 2003.

<sup>4</sup> See Minister's [Decision regarding EA01-004](#), October 10, 2003.

<sup>5</sup> See [Water Licence MV2001L2-0002](#), June 4, 2004.

<sup>6</sup> See [Reasons for Decision for MV2001L2-0002](#), April 28, 2004

Reasons for Decision be approved by the Minister of Indian Affairs and Northern Development.<sup>7</sup> The Minister approved Licence MV2011L2-0004 on May 23, 2012 under section 81 of the MVRMA.<sup>8</sup>

### **1.5 Regulatory Phase: Submission of December 2013 Amendment Application**

On December 20, 2013, De Beers submitted an application to amend Licence MV2011L2-0004 (December 2013 Amendment Application)<sup>9</sup>; this included changes proposed to conditions regarding the effluent quality criteria (EQC) for chloride, nitrates, and total dissolved solids (TDS), amongst other changes. Part F, item 13 in Licence MV2011L2-0004 states, “The calculated whole lake average of TDS, (as described in the Surveillance Network Program) at sampling locations comprising Surveillance Network Program Station Number 02-18 shall remain below 350 mg/L at all times.” This condition was incorporated into Licence MV2011L2-0004 because it was a measure approved in EA01-004. De Beers proposed to alter Part F, item 13, as follows:

Whole-lake average TDS Water Licence limit of 350 milligrams per liter (mg/L) be removed, and an AML [Average Monthly Limit] of 684 mg/L and an MDL [Maximum Daily Limit] of 1,003 mg/L for TDS be added to the Water Licence and applied at the end-of-pipe: average TDS concentrations from samples collected over a 30-day period in treated effluent should remain below 684 mg/L (the AML) and the maximum concentration in any grab sample should remain below 1,003 mg/L (the MDL).

The Board determined that the December 2013 Amendment Application raised jurisdictional questions related to the proposal to change a condition that had resulted from measures from an approved EA.<sup>10</sup> After hearing from the parties the MVLWB made a decision on the process for dealing with the December 2013 Amendment Application and released Reasons for Decision.<sup>11</sup> On January 22, 2014, the MVLWB referred the December 2013 Amendment Application to the Review Board for an environmental assessment because the Board determined the development proposal might have significant adverse impact on the environment and be of public concern, under paragraph 126(2)(a) of the MVRMA.<sup>12</sup> The MVLWB encouraged coordination and collaboration for the scoping process under paragraph 24.1(a) of the MVRMA, “To allow for the efficient and effective review” of the December 2013 Amendment Application.

### **1.5 Environmental Assessment: EA1314-02**

On February 24, 2014, the Review Board and MVLWB released a letter<sup>13</sup> and coordinated draft work plan<sup>14</sup> which outlined the processes for the December 2013 Amendment Application and related EA1314-02.

On April 1, 2014, responsibility for the management of public land, water, and resources in the Northwest Territories was devolved from the federal government to the Government of the Northwest Territories.

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<sup>7</sup> See [Water Licence MV2011L2-0004, Reasons for Decision, and MVLWB recommendation to AANDC Minister](#), April 13, 2012.

<sup>8</sup> See [Minister of AANDC approval of MV2011L2-0004](#), May 23, 2012.

<sup>9</sup> See [De Beers' December 2014 Amendment Application](#), submitted to the MVLWB on December 20, 2014.

<sup>10</sup> See [MVLWB Staff Report – jurisdictional questions](#), January 15, 2014.

<sup>11</sup> See [MVLWB Reasons for Decision – jurisdictional questions](#), January 21, 2014.

<sup>12</sup> See [MVLWB Referral of December 2013 Amendment Application to the Review Board](#), January 22, 2014.

<sup>13</sup> See [MVLWB/Review Board Coordination of process letter](#), February 24, 2014.

<sup>14</sup> See [MVLWB/Review Board Coordinated draft Work Plan](#), February 24, 2014.

The Review Board held its public hearing on June 5 and 6, 2014, and on September 5, 2014, released its *Report of Environmental Assessment and Reasons for Decision on the De Beers Canada Inc. Snap Lake Amendment Project* (EA1314-02)<sup>15</sup>.

On October 31, 2014, under subparagraph 130(1)(b)(i) of the MVRMA, the Minister of Lands for the Government of the Northwest Territories (Minister - GNWT) distributed his decision approving Environmental Assessment EA1314-02, adopting the measures and recommended that the Snap Lake Project proceed through the regulatory process. The Minister clarified that, “When approving measure 1(b), it was understood that the “water in Snap Lake” is to mean the whole lake average. He also indicated his understanding that the results of this environmental assessment (EA1314-02) would replace Measures 5 and 10 from the 2003 environmental assessment (EA01-004).”<sup>16</sup>

### **1.6 Regulatory Phase: Post-Environmental Assessment Information Package**

On October 31, 2014, the regulatory process for the December 2013 Amendment Application resumed as per subsection 72.22(2) of the MVRMA. The Board sent a letter to De Beers outlining the timelines and requirements to recommence the licensing process, including submission of the post-EA information package.<sup>17</sup> This information was requested under subsection 34(2) of the *Waters Act*. De Beers acknowledged this letter on November 5, 2014, and indicated they intended to respond by November 28, 2014.<sup>18</sup> They further noted that “There will also be new evidence filed based on new information and outcomes of the environmental assessment decision”.

De Beers submitted their post-environmental assessment information package to support the December 2013 Amendment Application on November 28, 2014.<sup>19</sup>

### **2.0 Regulatory Process: November 2014 Amendment Application to Licence MV2011L2-0004**

On November 12, 2014, De Beers submitted a second (additional) Application to amend Licence MV2011L2-0004. This is referred to as the November 2014 Amendment Application.<sup>20</sup> The purpose of the November 2014 Amendment Application was to allow mining operations to continue while the MVLWB developed an interim water quality objective for TDS, which would be applied until the regulatory phase of the December 2013 Amendment Application was completed.

On November 13, 2014, Board staff requested additional information for the November 2014 Amendment Application including: an engagement record specific to the November 2014 Amendment Application; relevant information from EA1314-02; and, additional evidence to support the removal of the effluent limit for chloride.<sup>21</sup> This supplemental information was received from De Beers on November 14, 2014.<sup>22</sup>

On November 20, 2014, a review of the November 2014 Amendment Application commenced. Comments and recommendations were specifically requested regarding the draft work plan<sup>23</sup>,

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<sup>15</sup> See [Review Board - Report of Environment Assessment and Reasons for Decision EA1314-02](#), September 5, 2014.

<sup>16</sup> See [Minister of Lands - GNWT – decision regarding EA1314-02](#), October 31, 2014.

<sup>17</sup> See [MVLWB letter – submission requirement of Post-EA information package](#), October 31, 2014.

<sup>18</sup> See [De Beers letter – acknowledgment of post EA-information package letter from MVLWB](#), November 5, 2014.

<sup>19</sup> See [De Beers' Post-EA Information Package - table of contents](#), November 28, 2014.

<sup>20</sup> See [De Beers' November 2014 Amendment Application](#) and [Appendices](#), submitted to the MVLWB on November 12, 2014.

<sup>21</sup> See [MVLWB letter – application incomplete](#), November 13, 2014.

<sup>22</sup> See [De Beers letter – supplemental information for November application](#), submitted to the MVLWB on November 14, 2014.

<sup>23</sup> See [MVLWB work plan – for the November 2014 Amendment Application](#), November 20, 2014.

engagement plan, and whether the November 2014 Amendment Application should be exempt from screening under Part 5 of the MVRMA. All interested parties were given the opportunity to participate in these regulatory processes.

On November 20, 2014, the Board also received a request from De Beers to delay the effective dates of chloride, nitrate, and fluoride EQC included in MV2011L2-0004. These EQC were scheduled to come into effect on January 1, 2015. This request was distributed for review the same day, with review comments due on December 4, 2014, and proponent responses due on December 8, 2014. On December 15, 2014, the Board extended these compliance dates to January 1, 2017.<sup>24</sup>

Notice of the November 2014 Amendment Application and public hearing was advertised in the *News North* newspaper the week of November 24, 2014, and indicated the hearing was scheduled to occur January 26 and 27, 2015, in Yellowknife, NT.<sup>25</sup>

On November 28, 2014, Board staff circulated a review of the November 2014 Amendment Application conducted by an independent expert consultant EcoMetrix Incorporated (EcoMetrix).<sup>26</sup> Parties were requested to include any comments or recommendations regarding EcoMetrix's review in their information requests and interventions for the November 2014 Amendment Application.<sup>27</sup>

By December 3, 2014, comments and recommendations regarding the November 2014 Amendment Application were submitted to the Board from the following parties: Environment Canada (EC), the Government of the Northwest Territories – Department of Environment and Natural Resources (GNWT-ENR), Lutsel K'e Dene First Nation (LKDFN), and Yellowknives Dene First Nation (YKDFN).<sup>28</sup> The Department of Fisheries and Oceans Canada (DFO) indicated they had no comment. De Beers responded to the Ecometrix review and parties' comments and recommendations on December 5, 2014.<sup>29</sup>

## 2.1 Combined Process for Amendment Applications

On December 9, 2014, the Board sent a letter to De Beers and the distribution list regarding the regulatory processes for the December 2013 and November 2014 Amendment Applications; this also included a work plan.<sup>30</sup> The Board noted that because of the interconnections between these Applications, they had decided to align the processes and that a consolidated work plan would be most efficient because it would enable the Board to address parties' concerns and ensure that all evidence relevant to the decisions is reviewed and considered for each of the Amendment Applications. This work plan also noted that parties should include their comments and recommendations regarding whether the December 2013 Amendment Application should be deemed exempt from Part 5 of the MVRMA in their information requests. The review of the December 2013 Amendment Application commenced following the distribution of this letter. All parties were given the opportunity to participate in the regulatory process.

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<sup>24</sup> See [MVLWB letter – approval of request to change effect dates for effluent limits](#), December 15, 2014.

<sup>25</sup> See [Notice of public hearing in News North](#), November 24, 2014.

<sup>26</sup> See [EcoMetrix's review of November 2014 Amendment Application](#), November 27, 2014.

<sup>27</sup> See [Board staff – email request for comments on EcoMetrix review](#), November 28, 2014.

<sup>28</sup> See Reviewer comments and recommendations by [EC](#), [GNWT-ENR](#), [LKDFN](#), [YKDFN](#), and Board staff (Board staff comments and recommendations can be found in the De Beers responses to the parties comments and recommendations in the hyperlinked footnote below).

<sup>29</sup> See [De Beers letter – response to EcoMetrix review](#), submitted to the MVLWB on December 5, 2014; and [De Beers' responses to the parties' comments and recommendations](#), submitted to the MVLWB on December 5, 2014.

<sup>30</sup> See [MVLWB letter – process and work plan](#), December 9, 2014.

On December 12, 2014, Board staff received comments from the GNWT-ENR<sup>31</sup> and De Beers<sup>32</sup> regarding the December 9, 2014 work plan. Board staff subsequently circulated a final work plan for December 2013 and November 2014 Amendment Applications to the distribution list.<sup>33</sup> Circulation of this final work plan notified parties that Board staff had deemed the information supplied by De Beers to be sufficient, that the regulatory process would proceed, and that the legislated timelines defined in subsection 72.18(1) of the MVRMA and in subsection 47(1) of the *Waters Act* had commenced.

On December 19, 2014, De Beers sent a letter to the LKDFN (dated December 12, 2014) responding to the LKDFN's December 3, 2014 comments and concerns regarding engagement specific to the November 2014 Amendment Application.<sup>34</sup> De Beers also sent a similar letter to the YKDFN on December 19, 2014.<sup>35</sup>

By December 22, 2014, information requests regarding the December 2013 and November 2014 Amendment Applications were submitted to the Board from the following parties: EC, GNWT-ENR, LKDFN, North Slave Métis Alliance (NSMA), YKDFN, Snap Lake Environmental Monitoring Agency (SLEMA) and Board staff.<sup>36</sup>

On December 23, 2014, Board staff requested that De Beers respond to the information requests.<sup>37</sup> De Beers requested and was granted a second extension to the information request response deadline, to January 8, 2015.<sup>38</sup> Board staff also sent an email to the GNWT-ENR requesting a response to the YKDFN's information request #15 by January 16, 2015.<sup>39</sup>

The DKFN submitted their information requests to the Board on January 8, 2015.<sup>40</sup> On January 9, 2015, De Beers indicated by email that they would respond to the DKFN information requests;<sup>41</sup> responses were received on January 16, 2015.<sup>42</sup>

The week of January 5, 2015, the notice of the public hearing for the combined process was advertised in *News North*.

On January 8, 2015, De Beers responded to the information requests from the parties.<sup>43</sup>

On January 13, 2015, the technical session agenda was circulated.<sup>44</sup>

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<sup>31</sup> See [GNWT-ENR letter – comments on draft work plan](#), December 12, 2014.

<sup>32</sup> See [De Beers letter – comments on draft work plan](#), December 12, 2014.

<sup>33</sup> See [Final work plan for December 2013 and November 2014 Amendment Applications](#), December 12, 2014.

<sup>34</sup> See [De Beers letter to LKDFN - engagement](#), December 12, 2014.

<sup>35</sup> See [De Beers letter to YKDFN - engagement](#), December 19, 2014.

<sup>36</sup> See Information requests from [EC](#), [GNWT-ENR](#), [LKDFN](#), [NSMA](#), [YKDFN](#), and [SLEMA](#), submitted to the MVLWB on December 22, 2014. Board staff information requests can be located in [De Beers' responses to information requests](#), submitted to the MVLWB on January 8, 2015;

<sup>37</sup> See [MVLWB letter – information requests to De Beers](#), December 23, 2014.

<sup>38</sup> See [MVLWB email – second extension to information request response deadline](#), December 23, 2014,

<sup>39</sup> See [MVLWB email – YKDFN15 to GNWT-ENR](#), December 23, 2014.

<sup>40</sup> See [DKFN letter – information requests](#), submitted January 8, 2015, dated December 22, 2015.

<sup>41</sup> See [De Beers email – re response to DKFN IRs by January 10 2015](#), dated January 9, 2015.

<sup>42</sup> See [De Beers' responses to DKFN information requests](#), submitted to the MVLWB on January 16, 2015.

<sup>43</sup> See [De Beers' responses to information requests](#), submitted to the MVLWB on January 8, 2015; [MVLWB Letter – acknowledging receipt of responses](#), January 9, 2015. See also responses to DKFN information requests which were submitted January 16, 2014.

<sup>44</sup> See [Technical session – agenda](#), January 13, 2015.

On January 15, 2015, the GNWT-ENR responded to YKDFN information request #15.<sup>45</sup>

De Beers' technical session presentations were submitted on January 21, 2015 and January 22, 2015.<sup>46</sup> Technical sessions were held on January 22 and 23, 2015, in Yellowknife, NT, to discuss and seek clarity on issues raised by parties and Board staff. The technical sessions were facilitated by Board staff and consultants, and were transcribed.<sup>47</sup> Attendees included; De Beers, GNWT-ENR, GNWT-Lands, GNWT- Industry, Tourism and Investment (ITI), EC, Northern Projects Management Office – Canadian Northern Economic Development Agency (NPMO-CANNOR), YKDFN, NSMA, DKFN, and SLEMA.<sup>48</sup> Information requests resulting from these sessions were circulated to the distribution list on January 27, 2015.<sup>49</sup> There were eight (8) Technical Session Information Requests (TS-IR); TS-IRs#1 to 7 were directed at De Beers, and TS-IR#8 was directed to all parties. De Beers submitted responses to TS-IR#1 through 7 on January 30, 2015; they informed Board staff by telephone that they would not include a formal written response to TS-IR#8, and would prefer to respond during the upcoming pre-hearing conference.<sup>50</sup> The GNWT-ENR was the only party to respond in writing to TS-IR#8.<sup>51</sup>

On January 23, 2015, Health Canada responded to YKDFN information request #16.<sup>52</sup>

On January 28, 2015, GNWT-ENR and Canada (as NPMO-CANNOR) responded to YKDFN information request #17.<sup>53</sup>

The pre-hearing conference was held on February 2, 2015 in Yellowknife, NT to discuss the conduct of the public hearing, the written interventions and presentations, notices of intent to appear at the hearing, and to briefly outline the Board's Rules of Procedure.<sup>54</sup> The pre-hearing conference was attended in-person by representatives from De Beers, GNWT-ENR, and YKDFN; EC, DKFN, LKDFN, and Northwest Territory Metis Nation (NWTMN) participated by teleconference. Summary notes were recorded and distributed on February 3, 2015, along with a letter containing instructions for De Beers and parties to prepare and submit interventions.<sup>55</sup>

## 2.2 Public hearing Format

Following the technical session, the Board issued an information request to parties (TS-IR#8) seeking submissions regarding the format and structure of the public hearing(s) for the Amendment Applications.<sup>56</sup> Only GNWT-ENR formally responded:<sup>57</sup>

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<sup>45</sup> See [GNWT-ENR letter – response to YKDFN IR 15](#), submitted to the MVLWB on January 15, 2015.

<sup>46</sup> See De Beers' technical session presentations, [Day 1: January 22, 2015](#) and [Day 2: January 23, 2015](#).

<sup>47</sup> See Technical session transcripts: [Day 1: January 22, 2015](#) and [Day 2: January 23, 2015](#).

<sup>48</sup> See [Technical session – sign-in sheet](#), January 23, 2015.

<sup>49</sup> See [Technical session – information requests](#), January 27, 2015. Information requests resulting from the technical session should be referred to as a "technical session information request (#X)"; this distinguishes them from the previous round of information requests submitted December 22, 2014 – these are simply referred to as IR#X throughout these Reasons.

<sup>50</sup> See [De Beers' responses to TS-IR#1 through 7](#), submitted to the MVLWB on January 30, 2015.

<sup>51</sup> See [GNWT-ENR letter – response to TS-IR#8](#), submitted to the MVLWB on January 30, 2015.

<sup>52</sup> See [Health Canada letter – response to YKDFN IR#16](#), received January 23, 2015, dated January 30, 2015. Note that this IR originated from the initial review period and not the technical sessions.

<sup>53</sup> See [GNWT-ENR and NPMO-CANNOR – joint response to YKDFN IR#17](#), submitted to the MVLWB on January 28, 2015. Note that this information request originated from the initial review period and not from the technical sessions.

<sup>54</sup> See [Pre-hearing conference – agenda](#), distributed January 29, 2015.

<sup>55</sup> See [MVLWB letter - instructions for De Beers and parties and pre-hearing conference summary notes](#), February 3, 2015.

<sup>56</sup> See pages 221-229, Technical session transcript, Day 1, January 22, 2015.

<sup>57</sup> See [GNWT-ENR – Response to Technical Session – Information Request #8](#), submitted to the MVLWB on January 30, 2015.

Within both applications, De Beers is requesting amendments to several of its existing effluent quality criteria, for discharges from the Snap Lake mine. Although both amendments propose increased effluent quality criteria for the same parameters, one amendment proposes interim values, while the other proposes different values over the longer term.

For either amendment, the Board must ensure, when making a decision on effluent quality criteria, that the measures of the Report of Environmental Assessment issued by the Review Board at the conclusion of EA1314-02 are met. As a result of this overlapping consideration, ENR is intending to submit a single technical intervention to the MVLWB which will address both amendment applications.

With respect to the format of the upcoming Public Hearing, a single public hearing to discuss both amendment applications is likely the most transparent and efficient path forward, considering the overlapping nature of the amendments. A typical hearing format would also likely suffice.

Based on this submission and discussion at the pre-hearing conference, it was determined that the public hearing would be a single, consolidated event that would enable the Board to hear evidence on both Amendment Applications. The Board has filed the November 2014 Amendment Application record with that of the December 2013 Amendment Application, and vice versa.

### **2.3 Interventions and Public hearing**

On February 12, 2015, the Board confirmed the December 2013 and November 2014 Amendment Applications were exempt from preliminary screening based on Part 1, Schedule 1, section 2.1 of the Exemption List Regulations to the MVRMA.<sup>58</sup>

On February 13, 2015, written interventions were received from GNWT-ENR, EC, DKFN, YKDFN, and LKDFN.<sup>59</sup> All interveners were clear that their interventions encompassed both Amendment Applications.

On February 17, 2015, De Beers requested an extension to the submission date for their written intervention; Board staff granted this extension until February 23, 2015 at noon.<sup>60</sup> De Beers submitted a response to written interventions on February 23, 2015.<sup>61</sup> On February 25, 2015, Board staff circulated the draft public hearing agenda.<sup>62</sup>

On February 27, 2015, public hearing presentations were received from GNWT-ENR, EC, DKFN, and LKDFN,<sup>63</sup> and the NSMA, in their anticipated role as a registered speaker, provided a synopsis of its presentation for the public hearing.<sup>64</sup> The YKDFN submitted an outline of their public hearing

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<sup>58</sup> See [MVLWB preliminary screening exemption confirmation](#), February 12, 2015.

<sup>59</sup> See Written interventions from [GNWT-ENR](#), [EC](#), [DKFN](#), [YKDFN](#), and [LKDFN](#); submitted to the MVLWB on February 13, 2015.

<sup>60</sup> See [De Beers' extension request to intervention deadline granted](#), February 18, 2015.

<sup>61</sup> See [De Beers' response to written interventions](#), submitted to the MVLWB on February 20, 2015.

<sup>62</sup> See [Public hearing agenda](#), February 25, 2015.

<sup>63</sup> See Public hearing presentations from [GNWT-ENR](#), [EC](#), [DKFN](#), and [LKDFN](#); submitted to the MVLWB on February 27, 2015.

<sup>64</sup> See [NSMA public hearing presentation synopsis](#); February 27, 2015.

presentation on March 6, 2015.<sup>65</sup> De Beers submitted a public hearing presentation on March 6, 2015.<sup>66</sup>

A public hearing was held March 11 and 12, 2015, in Dettah, NT, at the Chief Drygeese Centre, in accordance with subsection 41(2) of the *Waters Act*. Translation services were provided and the proceeding was recorded and transcribed.<sup>67</sup> No undertakings were recorded during the course of the public hearing.

On March 19, 2015, closing arguments were submitted to the Board in writing, from interveners, and from De Beers on March 24, 2015.<sup>68</sup> Parties had an opportunity, in their closing arguments, to update their position on issues raised during the public hearing and to summarize their final recommendations to the Board.

On March 30, 2015, the Board met to make decisions regarding the November 2014 Amendment Application. These amendments will allow De Beers to operate under an interim effluent equality criteria for total dissolved solids until a subsequent Board decision is made for the life-of-licence amendments, requested in the December 2013 Amendment Application.

### **3.0 Procedural Conclusions**

In conducting the review processes for the Amendment Applications as described in Sections 1 and 2 above, the Board has ensured that all applicable legal and procedural requirements have been satisfied, including:

- 1) Notice of the Permit and Licence applications was given in accordance with sections 63 and 64 of the MVRMA and section 43 of the *Waters Act*. The Board is satisfied that a reasonable period of notice was given to communities, First Nations and the public so that they could provide comments to the Board; and,
- 2) The holding of a public hearing in Dettah, NT on March 11 and 12, 2015.

The scope, definitions, and conditions set forth in the Licence have been developed/amended in order to address the Board's statutory responsibilities and the concerns that arose during the regulatory processes. These Reasons for Decision focus on the major issues and those that were the subject of substantive argument submitted by one or more parties.

### **4.0 Decision**

After reviewing the evidence and submissions from De Beers and the written comments and submissions from parties received by the Board, and having due regard to the facts, circumstances, and the merits of the submissions made to it, and to the purpose, scope, and intent of the MVRMA and the *Waters Act*, the Board has determined that Licence MV2011L2-0004 should be amended, subject to the conditions contained therein. The Board's determinations and reasons for this decision are set out below.

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<sup>65</sup> See [YKDFN public hearing presentation outline](#); March 6, 2015.

<sup>66</sup> See [De Beers' public hearing presentation](#), March 6, 2015.

<sup>67</sup> See Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project: [March 11, 2015](#) and [March 12, 2015](#).

<sup>68</sup> See Closing arguments from [GNWT-ENR](#) and [EC](#), submitted to the MVLWB on March 19, 2015; and [De Beers](#), submitted to the MVLWB on March 24, 2015.

## **4.1 Determinations: Section 26 of the *Waters Act***

### **4.1.1 Existing Licensees**

After reviewing the submissions filed on the public registry and made at the public hearing, the Board is satisfied that, with respect to paragraph 26(5)(a) of the *Waters Act*, the granting of this Licence to De Beers will not adversely affect, in a significant way, any existing Licensee, provided that compliance with the conditions of the Licence are adhered to. There are no other Licensees or Applicants with precedence in relation to the Snap Lake watershed.

### **4.1.2 Existing Water Users**

Paragraph 26(5)(b) of the *Waters Act* prohibits the issuance of a Licence unless the Board is satisfied that appropriate compensation has been or will be paid by the Applicant to persons who were, at the time when the Applicant filed its application with the Board, members of the classes of water users, depositors, owners, occupiers, or holders listed under paragraph 26(5)(b), who would be adversely affected by the use of waters, or deposit of waste proposed by the Applicant.

The Board received no claims for compensation either during the prescribed period or afterwards. Provided that compliance with the Licence conditions is achieved, the Board does not believe that any users or persons listed in paragraph 26(5)(b) of the *Waters Act* will be adversely affected by the use of Waters or the deposit of Waste proposed by the Applicant. The Board notes that the taste of the water in Snap Lake may be affected. This is described in Section 4.3.6 of these Reasons.

### **4.1.3 Water Quality Standards**

With regards to subparagraph 26(5)(c)(i) of the *Waters Act*, the Board is satisfied that compliance with the Licence conditions will ensure that waste produced by the Snap Lake Project will be collected and disposed of in a manner which will maintain water quality consistent with applicable standards and the Board's *Water and Effluent Quality Management Policy*.

### **4.1.4 Effluent Quality Standards**

Consistent with subparagraph 26(5)(c)(ii) of the *Waters Act*, the Board is satisfied that the effluent quality standards it has set out in the Licence as conditions are consistent with the Board's *Water and Effluent Quality Management Policy* and will protect the receiving waters and environment.

### **4.1.5 Financial Responsibility of the Applicant**

The Board must satisfy itself of the financial responsibility of De Beers under paragraph 26(5)(d) of the *Waters Act* before it can issue the Licence.

There is no evidence that the requested amendments would have any consequence to the amount of security for closure and reclamation currently held by the Minister. DeBeers' evidence indicates that it continues to operate as a subsidiary of Anglo American plc and that it has the financial capacity to meet any new conditions imposed by the Board.

### **4.1.6 Requirements of Subsection 27(2) of the *Waters Act***

It is the opinion of the Board that adherence to the Licence terms and conditions it has imposed on De Beers will ensure that any potential adverse effects on other water users, which might arise as a result of the issuance of the Licence, will be minimized.

## **4.2 Determinations: Measures from the Environmental Assessments**

The Snap Lake Project has been the subject of two (2) EAs conducted by the Review Board: EA01-004 and EA1314-02. Section 62 and subsection 130(5) of the MVRMA require that measures within the jurisdiction of the Board must be reflected in conditions set out in any Licence issued by the Board.

The Board carefully reviewed each measure, suggestion, and commitment from both EAs to determine whether such conditions must be included in the Licence. The Board noted that EA measures are sometimes written in broad terms which are not appropriate for direct inclusion in a regulatory instrument or are not within the Board's jurisdiction. Furthermore, although the reflection of suggestions and commitments in a Licence is not mandatory, the Board reviewed the suggestions and commitments to ensure the closest possible conformity with the EAs decisions by the Ministers. In this way, the Board is of the opinion that the Licence meets the requirements of section 62 of the MVRMA. Overall, the Board is confident that the amended Licence contains terms and conditions that implement the Review Board measures from both EA01-004 and EA1314-02, will ensure that the Snap Lake Project can be adaptively managed, and that project-related effects on the environment will remain within an acceptable range.

## **4.3 Reasons for Decision on the November 2014 Amendment Application**

In the November 2014 Amendment Application, De Beers' proposed changes to Water Licence MV2011L2-0004 can be summarized as follows:

- 1) To remove the requirement in Part F, item 13 to maintain the whole-lake average TDS concentration below 350 mg/L at all times;
- 2) To set a new EQC of 850 mg/L TDS in order to achieve De Beers' proposed site-specific water quality objective (SSWQO) of 684 mg/L TDS in Snap Lake; and,
- 3) To remove the existing chloride EQC in Part F, item 9a.

Each of these requested amendments are addressed below.

The Board notes that in the original December 2013 Amendment Application, De Beers had requested that the Board base a TDS EQC on achieving a SSWQO of 684 mg/L for the life of the mine. Subsequently, De Beers performed additional toxicity testing and analysis to support a revised SSWQO of 1000 mg/L TDS for the life of mine. Therefore, in the post-environmental assessment information package that was submitted to the Board on November 28, 2014, De Beers changed their request regarding the TDS EQC in order to correlate it to the higher SSWQO. Supporting rationale for the increased SSWQO and EQC was provided in the post-environmental assessment information package and subsequent submissions made during the water licensing process. For the purposes of the November 2014 Amendment Application; however, De Beers has made it clear that, they are proposing the lower TDS SSWQO of 684 mg/L, and an associated EQC of 850 mg/L TDS. De Beers believes that this EQC will achieve the lower SSWQO at least until the end of 2015, and will be achievable using existing mitigation methods during the same time period.

As discussed earlier, the records for the two Amendment Applications have been combined so that all parties were able to review the additional information submitted by De Beers on November 28, 2014 and consider how it might affect their recommendations for November 2014 Amendment Application. Despite the parallel process and shared record, the work plan defined two decision points: one for each Amendment Application.

The reasons that follow address only the specific requests made within the November 2014 Amendment Application. According to the current work plan, the Board expects to finalize its decision on the December 2013 Amendment Application in May 2015.

In making its decision and preparing these Reasons, the Board has considered:

- 1) The comments and recommendations made during the scoping and technical phases of Environmental Assessment EA1314-02, which were conducted jointly between the MVLWB and Review Board;
- 2) The Report of Environmental Assessment EA1314-02 and the measures and suggestions therein as approved by the Minister of Lands for the Government of the Northwest Territories; and,
- 3) The comments and recommendations made during the two (2) concurrent MVLWB regulatory processes (for the December 2013 and the November 2014 Amendment Applications).

The amendments to Licence MV2011L2-0004 have been drafted to reflect the portions of these processes that apply to the November 2014 Amendment Application. The Board also updated the name of the Licensee and mailing address on the cover page, and has included a Table of Contents for the body of the Licence and the Schedules.

#### **4.3.1 Part A: Scope and Definitions**

Part A, item 1(a) [Scope] and item 2 [definitions] were updated to include all amendment applications that have been approved by the Board to date, and the EA1314-02 regulatory process. Water collection and treatment facilities were added to the list of activities in the scope, to include the proposed reverse osmosis water treatment facility.

Part A, item 1(b) and item 2 were updated to reflect the devolution of responsibilities for the management of land and water from the federal government, to the Government of the Northwest Territories on April 1, 2014.

New definitions were included for Analyst, Water Use, and Water Use Fee as these terms were already in the Licence but previously undefined. This administrative update is consistent with other recently issued licences. Definitions for Environmental Assessment and Project were streamlined to be more inclusive of submissions De Beers has made to the Board; these changes made the definition for Water Licence Application redundant, thus, it was removed.

#### **4.3.2 Part B: General Conditions and Schedule 1**

Part B of the Licence contains general administrative conditions and connections to the attached Schedules and annexed Surveillance Network Program. No amendments were made to Part B, or Schedule 1.

#### **4.3.3 Part C: Conditions Applying to Security Requirements and Schedule 2**

Part C and Schedule 2 of the Licence contain conditions regarding reclamation liabilities for the Snap Lake Project. References to the *Waters Act* in Part C, item 2 and Schedule 2, item 1 were updated to reflect devolution.

#### **4.3.4 Part D: Conditions Applying to Construction and Schedule 3**

Part D of the Licence contains conditions applying to construction for the Snap Lake Project. No amendments were made to Part D or Schedule 3.

#### **4.3.5 Part E: Conditions Applying to Waste Management and Schedule 4**

Part E of the Licence contains conditions applying to the management of waste for the Snap Lake Project. No amendments were made to Part D or Schedule 4.

#### **4.3.6 Part F: Conditions Applying to Water and Wastewater Management and Schedule 5**

Part F and Schedule 5 of the Licence contain conditions applying to the management of water and wastewater for the Snap Lake Project. Amendments were made to both, as described below.

Part F, item 1 was updated to more accurately reflect the defined terms in Part A.

##### 4.3.6.1 Effluent Quality Criteria for TDS: Part F, Item 9(a)

Part F, item 9 concerns the EQC for water and waste from the Snap Lake Project that enters the receiving environment. Maximum average and maximum grab EQC were added to the table for total dissolved solids equal to 850 and 1003mg/L, respectively. The EQC for chloride was removed. The following sections describe the Board's Reasons for Decision regarding these EQC.

Based on the Board's *Water and Effluent Quality Management Policy* (Policy),<sup>69</sup> the Board has considered an EQC for TDS that will meet the objectives of ensuring that water quality objectives are maintained in the receiving environment and that the amount of waste discharged to the environment is minimized.

To meet the first Policy objective, the Board must first set a water quality objective for TDS in Snap Lake, and this is discussed below. With respect to the Policy's second objective regarding minimizing waste, the Board notes that De Beers continues to implement source control measures including targeted grouting of high flow areas underground. As well, De Beers is planning on implementing reverse osmosis later in 2015 to treat effluent as per the December 2013 Amendment Application.

##### 4.3.6.1.1 Determination of a Site Specific Water Quality Objective (SSWQO) for TDS

In the TDS Response Plan submitted to the MVLWB in December 2013, De Beers proposed a TDS SSWQO of 684 mg/L. The proposed SSWQO was based on toxicity tests, commissioned by De Beers, which were conducted on a variety of aquatic species using water spiked with TDS that had the same ionic composition as the effluent from the Snap Lake Mine. It was necessary for De Beers to commission its own tests because the effects of TDS on aquatic life depend on the exact ionic composition, and in this case, the effluent from the Snap Lake Mine contains TDS that is dominated by calcium and chloride in amounts that have been relatively constant since 2008. The tests focused on low level chronic effects to aquatic life, using endpoints that included growth, survival and reproduction. Overall, the results showed that the aquatic species that are the most sensitive to TDS included members of the daphnid family of zooplankton.

During EA1314-02, the only SSWQO proposed by De Beers was 684 mg/L, which was equal to the IC20 measured for *Daphnia magna* in the tests commissioned by De Beers up to December, 2013.<sup>70</sup> EcoMetrix Incorporated (EcoMetrix) was engaged by both the Review Board and the MVLWB as an independent consultant, and was requested to review and comment on several of De Beers'

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<sup>69</sup> See Mackenzie Valley Land and Water Board (2011), [The Water and Effluent Quality Management Policy](#), March 31, 2011.

<sup>70</sup> An IC20 or inhibitory concentration(20) is that concentration of a substance that has been measured to cause a 20% inhibition to the growth, survival or reproduction of a biological organism

submissions, including the SSWQO proposed for TDS. In its May, 2014 report (submitted during EA1314-02), EcoMetrix commented on the proposed TDS SSWQO of 684 mg/L, concluding<sup>71</sup> that:

The use of an IC20 level for a sensitive daphnid species as the SSWQO seems reasonable. The 20% response level is a level at which effects often become statistically discernable or measurable in both laboratory and field studies (Suter 1995). It represents a threshold for effect.

However, EcoMetrix also noted that daphnids form only a minor part of the total zooplankton community in Snap Lake and that De Beers had not performed toxicity tests on copepods – one of the dominant taxa of zooplankton in Snap Lake.

Other parties to EA1314-02 also raised concerns about the methodology that De Beers used to derive the TDS SSWQO.<sup>72</sup> For example, the GNWT-ENR noted that De Beers did not use the appropriate Canadian Council of Ministers of the Environment (CCME) protocols for deriving SSWQOs and that, therefore, the proposed SSWQO did not meet the CCME guiding principle of ensuring that, “All forms of aquatic life cycles, including the most sensitive life stage of the most sensitive species over the long term are protected (CCME 2007).”<sup>73</sup> Environment Canada also expressed disagreements with the methodology used by De Beers’ consultants with respect to some of the toxicity testing and the calculation of inhibitory concentrations.<sup>74</sup> Finally, the DKFN<sup>75</sup> and the YKDFN<sup>76</sup> continued to raise concerns about De Beers’ proposed TDS SSWQO in their closing comments to the Review Board.

In its Reasons for Decision for EA1314-02, the Review Board considered all of the evidence with respect to the SSWQO of 684 mg/L TDS and concluded:

Based on the issues that arose from the measures in the first EA from 2003 and the uncertainties and considerations described in section 2.2, the Review Board holds that numerical SSWQOs are not required for the purposes of determining thresholds of significance for this EA. The Review Board expects that additional testing and further analysis is required to finalize numerical SSWQOs. Considering this, the Review Board has decided not to set specific numerical SSWQOs in the measures for this EA.<sup>77</sup>

Instead, the Review Board recommended the following, set out as **Measure 1** of EA1314-02:

To prevent significant impacts from TDS, and its constituent ions of concern, from the Snap Lake mine on water quality, traditional uses and the aquatic ecosystem in Snap Lake and downstream, the Mackenzie Valley Land and Water Board will set numerical Site Specific Water Quality Objectives for Total Dissolved Solids and constituent ions of concern to apply during mine operations, closure and post-closure. The numeric Site Specific Water Quality Objectives will ensure that the following objectives are met:

- a. The aquatic ecosystem is protected so that fish populations and fish species composition are not adversely affected compared to pre-mining conditions;

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<sup>71</sup> See page 2.1, EcoMetrix Inc. Review of December 2013 Amendment Application, submitted to MVEIRB on May 9, 2014.

<sup>72</sup> See the Review Board’s Reasons for Decision for EA1314-02 for a full description of the evidence presented during the EA and the concerns and uncertainties raised by parties during the EA.

<sup>73</sup> See page 2, GNWT-ENR Public Hearing Closing Arguments for EA1314-02, submitted to MVEIRB on July 7, 2014.

<sup>74</sup> See pages 2-5, Environment Canada Public Hearing Closing Arguments for EA1314-02, submitted to MVEIRB on July 4, 2014.

<sup>75</sup> See Deninu Kue First Nation Public Hearing Closing Arguments for EA1314-02, submitted to MVEIRB on July 3, 2014.

<sup>76</sup> See YKDFN Public Hearing Closing Arguments for EA1314-02, submitted to MVEIRB on June 18, 2014.

<sup>77</sup> See page 62, MVEIRB Report of Environmental Assessment and Reasons for Decision EA1314-02, September 5, 2014.

- b. Water in Snap Lake is safe to drink according to the health-based standards of Health Canada's Guidelines for Canadian Drinking Water Quality;
- c. Fish are safe to eat in Snap Lake and downstream; and,
- d. No Total Dissolved Solids or its constituent ions from the Snap Lake mine effluent will be detectable, relative to the range of natural variability, at the inlet to Mackay Lake, 44 km downstream of Snap Lake.

In implementing this measure, the MVLWB will consider the CCME 2003 Guidance on the Site-Specific Application of Water Quality Guidelines in Canada: Procedures for Deriving Numerical Water Quality Objectives, or any update.

Since it first proposed a TDS SSWQO of 684 mg/L in December 2013, De Beers has commissioned several more toxicity tests in an effort to refine the TDS SSWQO for Snap Lake and meet the requirements of Measure 1. Many of these additional tests were done in response to specific issues raised by parties during EA1314-02, and the results were reported in Appendix 1 of the post-environmental assessment information package submitted to the MVLWB on November 28, 2014. Based on the additional information it had gathered, De Beers revised its proposed SSWQO to 1000 mg/L TDS for what De Beers has termed the "life of mine" Licence. However, the November 2014 Amendment Application requests only that the Board base an "interim" TDS EQC on the originally proposed SSWQO of 684 mg/L TDS. Below, the Board considers whether the SSWQO of 684 mg/L TDS meets the narrative objectives described in Measure 1 of EA1314-02.

*Measure 1(a): The aquatic ecosystem is protected so that fish populations and fish species composition are not adversely affected compared to pre-mining conditions.*

During the course of EA1314-02 and regulatory processes, the Boards heard evidence from a number of well-qualified scientific experts, from both the company and the interveners, on the subject of deriving a TDS SSWQO that will protect the aquatic ecosystem in Snap Lake. Unfortunately, there was disagreement between these experts that was still not resolved by the close of the public hearing. Most of the disagreements were based on differing professional opinions about the methodology for toxicity testing and about the derivation of the SSWQO itself.

The Board notes that Measure 1 from EA1314-02 states that the MVLWB, "Will consider the CCME 2003 Guidance on the Site-Specific Application of Water Quality Guidelines in Canada: Procedures for Deriving Numerical Water Quality Objectives, or any update" when implementing the Measure. In its intervention, the GNWT-ENR presented a TDS SSWQO derived, in its opinion, "Strictly following the CCME procedures", as prepared by GNWT-ENR's consultants at MacDonald Environmental Science Limited (MESL).<sup>78</sup>

MESL derived two SSWQOs for TDS using the Species Sensitivity Distribution (SSD) method, which is favored by the CCME for use in the development of water quality guidelines for the protection of aquatic life.<sup>79</sup> Using the SSD method, measured chronic effect thresholds (e.g., an IC20) for a range of aquatic organisms are plotted on a graph of percentage of species affected versus concentration of the contaminant (i.e., TDS in this case). Using various statistical models, the data is fit to a curve and an "HC<sub>5</sub> concentration" is determined as that concentration of the contaminant at which 5% of the aquatic species in a receiving water body would experience an effect equivalent to the effect being modeled (e.g., an IC20 effect or a 20% of decrease in reproduction). As noted by the GNWT-ENR,

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<sup>78</sup> See page 10, GNWT-ENR Intervention, submitted to the MVLWB on February 12, 2015.

<sup>79</sup> See page 1, Canadian Council of Ministers of the Environment, A Protocol for the Derivation of Water Quality Guidelines for the Protection of Aquatic Life – Part II, Section 3.1, 2007.

“The 5<sup>th</sup> percentile of an SSD has been chosen as it is thought that an effect on 5% of species still preserves ecosystem functionality.”

In Appendix 1 of the GNWT-ENR’s intervention, MESL describes how it followed the CCME guidance for first evaluating the toxicity data provided by De Beers and then generated the SSD curves. Two curves were generated using different endpoints (i.e., IC10 and IC20 values), giving HC<sub>5</sub> values of 399 and 690 mg/L TDS. Based on uncertainties discussed in section 4.1.1.4 of the GNWT-ENR’s intervention, the GNWT-ENR believes that the lower HC<sub>5</sub> value, “May over-estimate the toxicity of TDS under the laboratory conditions that were used to generate the underlying data” and recommended the use of the 690 mg/L value as an appropriate SSWQO for TDS in Snap Lake. The GNWT-ENR concluded: “It is GNWT’s position that an SSWQO of 690 mg/L TDS would be adequately protective of the aquatic ecosystem of Snap Lake and be in compliance with Measure 1(a).”<sup>80</sup>

In its response to interventions, De Beers disagreed with the approach taken by the GNWT-ENR with respect to the SSD curves:

De Beers considered development of SSDs but determined that technically defensible SSDs could not be developed because the toxicity data were unbounded, in other words, greater than (>) values, and thus the actual IC10 or IC20 values could not be determined. Further, the unbounded toxicity data had similar concentrations, obviating the level of discrimination between different data points required for SSDs.<sup>81</sup>

At the public hearing, De Beers asked the independent consultant, Dr. Don Hart of EcoMetrix, whether, in his profession opinion, there would be uncertainty in a SSD curve derived with unbounded values.<sup>82</sup> Dr. Hart answered that he thought there would be uncertainty and that he didn’t think it would be “an appropriate thing to do” in his opinion; however, it is important to note that Dr. Hart answered the question only generally, since he was not given the opportunity to review the GNWT-ENR’s SSD curves specifically.<sup>83</sup> No evidence was presented indicating that the CCME specifically disallows the use of unbounded values in a SSD curve derivation, but the GNWT-ENR did acknowledge the uncertainties in its proposed SSWQOs for the reasons discussed above.<sup>84</sup>

Despite the uncertainties in the derivation of a TDS SSWQO of 690 mg/L by the GNWT-ENR, it is obviously similar to (and therefore supports) the value of 684 mg/L TDS that has been proposed by De Beers in its November 2014 Amendment Application. The Board notes that EC did not specifically support or refute the specific numerical SSWQOs put forward by De Beers but instead offered the following comment:

In the broader context, EC notes that the increase in TDS in Snap Lake will result in changes to the aquatic ecosystem. Organisms that are less tolerant of increased salinity or of the higher chloride concentrations will be reduced in numbers (e.g., daphnids, sphaerid clams), while species which are more tolerant, will be favored and increase in numbers. It is difficult to predict the extent to which changes will cascade up the trophic levels over the life of the mine, and it would be expected that communities would shift back over a period of time following mine closure.<sup>85</sup>

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<sup>80</sup> See page 11, GNWT-ENR Intervention, submitted to the MVLWB on February 12, 2015.

<sup>81</sup> See page 19, De Beers’ Response to Interventions, submitted to the MVLWB on February 20, 2015.

<sup>82</sup> See page 175, Transcripts from the MVLWB’s Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>83</sup> See page 176, Transcripts from the MVLWB’s Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>84</sup> See pages 10-11, GNWT-ENR Intervention, submitted to the MVLWB on February 12, 2015.

<sup>85</sup> See page 10, EC Intervention, submitted to the MVLWB on February 13, 2015.

Overall, the evidence supports EC's conclusions. For example, since the SSWQO of 684 mg/L TDS is equal to a measured IC20 for *Daphnia magna* reproduction, by definition it would be expected that this species of zooplankton could experience up to or about a 20% reduction in its reproductive rate when chronically exposed to TDS at 684 mg/L. The 690 mg/L TDS SSWQO proposed by the GNWT-ENR, based on the SSD approach, is also, by definition, equal to a level at which up to 5% of the aquatic species in Snap Lake will experience a 20% relative reduction in a chronic endpoint like reproduction. The GNWT-ENR, however, also notes, "It is thought that an effect on 5% of the species still preserves ecosystem functionality."<sup>86</sup> De Beers also observed that daphnids, the most sensitive species to TDS, comprise less than 1% of all the species and less than 5% of the total zooplankton species in Snap Lake.<sup>87</sup> The more dominant species of zooplankton, including copepods and rotifers, are much more tolerant to TDS with IC20 values greater than 1500 and 1300 mg/L TDS, respectively.<sup>88</sup>

With respect to Measure 1(a), none of the parties expressed a concern that a water quality objective of 684 mg/L TDS would result in a direct effect on fish in Snap Lake. However, like EC, the GNWT-ENR acknowledged that, "Fluctuations in lower trophic levels have the potential to impact food web dynamics and competition, and have the potential to result in a shift in fish population and composition."<sup>89</sup> At the public hearing, the following was confirmed through questioning of De Beers<sup>90</sup>, EcoMetrix<sup>91</sup>, the GNWT-ENR<sup>92</sup> and EC.<sup>93</sup>

- 1) That changes in the zooplankton community (which include the most sensitive of the aquatic species to the effects of TDS) will occur before any changes to fish population or composition;
- 2) That, in general, aquatic effects monitoring programs (AEMPs), like the one currently being implemented at the Snap Lake Diamond Mine, can be designed to detect these potential changes in the zooplankton community; and,
- 3) That thresholds or action levels for measured effects in the zooplankton community can be set to provide an early warning of potential effects in higher trophic levels.

De Beers confirmed that its current AEMP design was robust enough to detect changes in the zooplankton community, but acknowledged that it would be reasonable to update the AEMP to ensure that these questions are addressed specifically.<sup>94</sup> De Beers proposed to update the AEMP following the Board's decision on the December 2013 Amendment Application.<sup>95</sup>

With respect to Measure 1(a), the Board is satisfied that a TDS SSWQO of 684 mg/L meets the narrative objective that "The aquatic ecosystem is protected so that fish populations and fish species composition are not adversely affected compared to pre-mining conditions." Although there may be effects to some minor species of zooplankton in Snap Lake, there is no evidence that this will necessarily lead to effects on the aquatic ecosystem as a whole. If the sensitive species of zooplankton are affected, the evidence confirms that the AEMP should be able to detect those changes long before there are any effects to fish.

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<sup>86</sup> See page 10, GNWT-ENR Intervention, submitted to the MVLWB on February 13, 2015.

<sup>87</sup> See pages 65-69, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>88</sup> See page 4, De Beers' Post-EA Information Package – Appendix 1, submitted to the MVLWB on November 28, 2014.

<sup>89</sup> See page 11, GNWT-ENR Intervention, submitted to the MVLWB on February 13, 2015.

<sup>90</sup> See pages 136-139, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>91</sup> See pages 189-192, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>92</sup> See pages 60-61 Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, 12, 2015.

<sup>93</sup> See pages 116-117, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 12, 2015.

<sup>94</sup> See page 139, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015

<sup>95</sup> See page 10, De Beers Closing Statement, submitted to the MVLWB on March 24, 2015.

With respect to the “constituent ions of concern” for TDS, the Board notes that these ions were never specifically defined in the Report of EA1314-02. The definition given in De Beers’ response to interventions indicates that TDS can be calculated as the sum of calcium, carbonate, sodium, magnesium, potassium, sulphate, chloride, nitrate, fluoride and silica.<sup>96</sup> Of these ions, only sulphate, chloride, nitrate and fluoride have published CCME guideline values for the protection of aquatic life in Canada and, therefore, can be considered as being “of concern”.<sup>97</sup> Of these four ions, chloride and sulphate were present in the TDS mixtures used for toxicity testing by De Beers at levels commensurate with the TDS composition in Snap Lake; therefore, the TDS SSWQO proposed by De Beers accounts for the potential toxicity of chloride and sulphate as long as the ionic composition of the TDS remains constant.

With respect to nitrate and fluoride, during the regulatory proceedings for Licence MV2011L2-0004 (renewal of MV2001L2-0002), the Board set the SSWQOs for these ions equal to the values in the CCME’s Canadian Water Quality Guidelines for the Protection of Aquatic Life (CWQG-PAL),<sup>98</sup> and De Beers has not requested a change to the SSWQOs for these ions in the November 2014 Amendment Application. Since the CWQG-PAL values are set<sup>99</sup> to, “Protect all forms of aquatic life and all aspects of the aquatic life cycles, including the most sensitive life stage of the most sensitive species over the long term”, the Board concludes that the current SSWQOs for nitrate and fluoride meet the objectives in Measure 1(a).

*Measure 1(b): Water in Snap Lake is safe to drink according to the health-based standards of Health Canada’s Guidelines for Canadian Drinking Water Quality.*

There is no health-based standard for TDS in the Guidelines for Canadian Drinking Water Quality, so the Board concludes that the TDS SSWQO of 684 mg/L meets this objective of Measure 1(b).<sup>100</sup> With respect to the constituent ions of concern in TDS, only fluoride and nitrate have health-based standards for drinking water, and these standards are higher than the current SSWQOs for fluoride and nitrate, so these SSWQOs also meet Measure 1(b).

*Measure 1(c): Fish are safe to eat in Snap Lake and downstream.*

As there is no evidence that TDS or any of its constituents accumulate in fish tissues, the Board concludes that the TDS SSWQO of 684 mg/L meets this objective of Measure 1(c).<sup>101</sup>

*Measure 1(d): No Total Dissolved Solids or its constituent ions from the Snap Lake mine effluent will be detectable, relative to the range of natural variability, at the inlet to Mackay Lake, 44 km downstream of Snap Lake.*

During the EA1314-02 process, traditional users of the Snap Lake area acknowledged that water quality changes in Snap Lake have already affected use of the Lake,<sup>102</sup> and expressed concern that the effluent plume from Snap Lake will travel downstream into the Lockhart River system and affect

<sup>96</sup> See page 49, De Beers’ Response to Interventions (see TDS equation), submitted to the MVLWB on February 23, 2015.

<sup>97</sup> See Canadian Council of Ministers of the Environment, Canadian Water Quality Guidelines for the Protection of Aquatic Life – Summary Tables, 1999 and online at <http://ceqg-rcqe.ccme.ca/en/index.html>; British Columbia Ministry of Environment, Ambient Water Quality Guidelines for Sulphate, Update April 2013.

<sup>98</sup> See pages 8-11 and 13-15, MVLWB Reasons for Decision on Issuance of MV2011L2-0004 – Appendix C, April 13, 2012

<sup>99</sup> See page 1, Canadian Council of Ministers of the Environment, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Introduction 1999.

<sup>100</sup> See Table 2, Health Canada Guidelines for Canadian Drinking Water Quality - Summary Table, October, 2014

<sup>101</sup> See page 61, Transcripts from the MVLWB’s Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>102</sup> See pages 99-100, 125, 142-143 and 155 of the MVEIRB Public Hearing transcripts, June 6, 2014.

other culturally important areas.<sup>103</sup> Snap Lake is not part of the Lockhart River system, but water from Snap Lake flows into the Lockhart River system through Downstream Lakes 1 and 2, Lac Capot Blanc, a series of small un-named lakes, King Lake, and Mackay Lake. Mackay Lake in particular was identified during EA1314-02 as a threshold location,<sup>104</sup> and Measure 1(d) reflects the Review Board's conclusion that, "Although the mitigated and the unmitigated scenarios are not likely to cause a significant effect to aquatic life in Mackay Lake, any change in water quality in Mackay Lake is unacceptable to Aboriginal groups and would likely result in significant impact to traditional use of MacKay Lake."<sup>105</sup>

As of 2013, TDS from Snap Lake had been detected as far as five (5) kilometers from the inlet of Lac Capot Blanc, approximately 30 km upstream of Mackay Lake.<sup>106</sup> At the public hearing, De Beers also noted that TDS from Snap Lake is not currently evident in King Lake or Mackay Lake.<sup>107</sup> Based on these observations, and the results of downstream modeling based on a TDS SSWQO of 684 mg/L, De Beers does not expect effluent to be detectable beyond Lac Capot Blanc during the anticipated term of this amended Licence. Accordingly, De Beers asserts that Measure 1(d) will be met.<sup>108</sup>

At the public hearing, GNWT-ENR and LKDFN also concluded that the proposed TDS SSWQO of 684 mg/L would ensure that Measure 1(d) would be met for the anticipated term of this amended Licence.<sup>109</sup> Other parties did not specifically comment on whether this SSWQO would meet the requirements of the Measure; however, this SSWQO is consistent with recommendations made by YKDFN and NSMA.<sup>110</sup>

Having reviewed the information available at this time, the Board concludes that the evidence suggests that Measure 1(d) will not be contravened at the inlet or the body of Mackay Lake during the anticipated term of this amended Licence. While De Beers has further stated that its proposed long-term TDS SSWQO will also ensure that this Measure is met for the full term of this amended Licence<sup>111</sup>, the Board recognizes that there are some limitations in the current evidence with regard to downstream modeling, monitoring locations, and Mackay Lake baseline data. Accordingly, the Board has developed conditions within this Licence that require De Beers to conduct a special study of the downstream watercourses (Part G, items 13-15 and Schedule 6, items 6 and 7). This study sets the framework for ensuring that Measure 1(d) is met over the long term.

Overall, the Board concludes that the evidence supports the adoption of a SSWQO of 684 mg/L as proposed by De Beers in the November 2014 Amendment Application and that this SSWQO meets the requirements of Measure 1 from EA1314-02

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<sup>103</sup> See pages 5-6, LKDFN Technical Report, submitted to MVEIRB on May 21, 2014; page 8, YKDFN Technical Report, submitted to MVEIRB on May 21, 2014.

<sup>104</sup> See pages 92-93, 97, and 107-108 of the MVEIRB Public Hearing transcripts, June 6, 2014.

<sup>105</sup> See page 63, MVEIRB Report of Environmental Assessment and Reasons for Decision EA1314-02, September 5, 2014.

<sup>106</sup> See page 25, November 2014 Amendment Application, submitted to the MVLWB on November 12, 2014.

<sup>107</sup> See page 39, De Beers' Public Hearing Presentation, submitted to the MVLWB on March 11, 2015.

<sup>108</sup> See page 26, November 2014 Amendment Application, submitted to the MVLWB on November 12, 2014.

<sup>109</sup> See page 219, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015; page 89, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 12, 2015.

<sup>110</sup> See pages 10 and 12, YKDFN Intervention, submitted to the MVLWB on February 12, 2015; page 154, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, Public Hearing transcripts, March 12, 2015.

<sup>111</sup> See pages 41, 49, and 71, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015.

#### 4.3.6.1.2 Determination of an EQC that will meet the TDS SSWQO of 684 mg/L in Snap Lake

In its November 2014 Amendment Application, De Beers requested an average monthly EQC of 850 mg/L TDS (and a maximum grab EQC of 1003 mg/L) that would be valid starting as soon as possible up until December 31, 2015. During EA1314-02, De Beers submitted modelling evidence that predicted that if TDS was discharged at a concentration of 850 mg/L from June 2014 until December 31, 2015, the TDS concentrations in Snap Lake would not exceed their proposed SSWQO of 684 mg/L.<sup>112</sup> According to Figure 2.1 of the November 2014 Amendment Application, De Beers may not be able to consistently achieve an EQC of 850 mg/L if upper bound predictions of flows from the underground are realized. However, the monitoring data in the same figure shows that the flows are currently tracking on the lower bound predictions, which would ensure that the proposed EQC would be achievable at least until December 2015. Although there is a risk of increased flow, the Board notes that it is granting the EQC that has been requested by De Beers and so concludes that the company is confident that the EQC will be achievable for the intended time period with existing mitigation measures.

In its review of the November 2014 Amendment Application, EcoMetrix stated that it concurred with De Beers' predictions that no exceedances of the SSWQO would be expected in 2015 at the edge of the mixing zone, if the monthly average EQC for TDS was set to 850 mg/L.<sup>113</sup> The GNWT-ENR also concluded that an average monthly limit for TDS of 850 mg/L could be implemented in the short-term to maintain the GNWT-ENR's proposed SSWQO of 690 mg/L in the receiving environment.<sup>114</sup> No other party to the water licensing process commented on De Beers' proposed interim EQC.

The Board concludes that an average monthly EQC for TDS equal to 850 mg/L will maintain the concentration of TDS below 684 mg/L at the edge of the mixing zone in Snap Lake, at least until December 31, 2015. According to the work plan for the Amendment Applications, the Board expects to have made a decision on the December 2013 Amendment Application in May of 2015.

#### 4.3.6.1.3 Analysis of whether of the proposed EQC for TDS will meet Measure 2

The Board also considered whether the proposed EQC for TDS will meet **Measure 2** of EA1314-02, which reads as follows:

In order to prevent significant adverse impacts, including traditional uses, in Snap Lake and downstream, De Beers will implement additional water treatment, or other mitigations, to reduce the concentration and loading of TDS and its constituent ions of concern to Snap Lake as approved by the Mackenzie Valley Land and Water Board. The mitigation implemented by De Beers will achieve the numerical Site Specific Water Quality Objectives, and associated Effluent Quality Criteria, set by the Mackenzie Valley Land and Water Board which meet the objectives of Measure 1.

Although Measure 2 is directed at De Beers, the Board notes that the company does not anticipate having to employ any mitigation in addition to the source control (e.g., targeted grouting of high flow areas underground) and water management measures it is already implementing in order to meet the EQC for TDS of 850 mg/L from now until December 31, 2015.

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<sup>112</sup> See pages 22-30, De Beers' Responses to Information Requests from the joint technical sessions, submitted to MVEIRB on May 1, 2014.

<sup>113</sup> See page 3, Eco Metrix Inc, Review of Application for Interim Water Licence Limits for the Snap Lake Mine, submitted to the MVLWB on November 27, 2014.

<sup>114</sup> See pages 11-12, GNWT-ENR Intervention, submitted to the MVLWB on February 13, 2015.

#### 4.3.6.2 Removal of the Chloride EQC: Part F, Item 9(a)

In both Amendment Applications, De Beers has requested that chloride be regulated through the new EQC for TDS instead of a separate EQC for chloride. The rationale for this is that chloride was present in the TDS mixtures used for toxicity testing by De Beers at levels commensurate with the TDS composition in Snap Lake. Therefore, the proposed TDS SSWQO and EQC can be considered to be inclusive of chloride as long as the ionic composition of TDS in the effluent remains constant. In the TDS Response Plan submitted in December 2013, De Beers presented a graph of the measured ionic composition of TDS in Snap Lake from 1998 to 2012. The data shows that the TDS composition has been relatively constant since 2007, with chloride concentrations comprising between about 45 and 47% of the TDS. There is no evidence to suggest that the TDS composition of the Snap Lake Diamond Mine effluent will change from now until the end of mine life.<sup>115</sup>

EcoMetrix<sup>116</sup> and EC<sup>117</sup> agreed that it was reasonable to regulate chloride as part of the TDS EQC. In its intervention, the GNWT acknowledged that chloride concentrations correlated well with TDS concentrations and they made no recommendation for a separate chloride EQC.

The YKDFN and the LKDFN have recommended that the chloride EQC should be preserved. In its intervention, the YKDFN note that De Beers admitted during the technical sessions that although they felt it unnecessary to keep a separate chloride EQC, that there was “no harm” in keeping it.<sup>118</sup> One reason that both the YKDFN<sup>119</sup> and the LKDFN have given for maintaining the chloride EQC is because of the connection between chloride and the taste of water. For example, in its intervention, the LKDFN stated:<sup>120</sup>

De Beers has not offered any affected communities a true representation of how the taste of Snap Lake water will change with such dramatic increases in chloride; but it is incontrovertible that this change will be negative, changing the perception of Snap Lake’s water quality and discouraging traditional activities.

The issue of the diminishing taste of water due to TDS or chloride during mining operations was addressed during EA1314-02. De Beers has consistently predicted that the aesthetic drinking water objectives for TDS would be exceeded during mine life. In its report of EA1314-02, the Review Board acknowledged that, “Exceedances of the aesthetic guidelines may affect traditional uses of the water” and that, “Traditional land users may not want to drink water that does not taste clean, even if it does not pose a health hazard.”<sup>121</sup> However, the Review Board also heard from Aboriginal groups that, “Members are unlikely to drink out of Snap Lake during mine operations”, suggesting to the Review Board, “That traditional use has already been adversely affected.”<sup>122</sup> In the end, the Review Board was not compelled to recommend a measure to protect the taste of drinking water in Snap Lake during mine operations, although it did make a suggestion (Suggestion 2) that water quality in Snap Lake meet drinking water aesthetic objectives within five (5) years after mine closure.<sup>123</sup>

The LKDFN also presented examples of chloride water quality objectives in other jurisdictions that were lower than what the chloride concentrations in Snap Lake will be should TDS concentrations

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<sup>115</sup> See pages 58-59 , Transcripts from the MVLWB’s Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>116</sup> See pages 164-165, Transcripts from the MVLWB’s Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>117</sup> See page 117, Transcripts from the MVLWB’s Public Hearing on De Beers Snap Lake Project, March 12, 2015.

<sup>118</sup> See pages 210-211, Transcripts from the MVLWB’s Public Hearing on De Beers Snap Lake Project, January 22, 2015.

<sup>119</sup> See pages 7-8, YKDFN Intervention, submitted to the MVLWB on February 12, 2015.

<sup>120</sup> See pages 3-5, LKDFN Intervention, submitted to the MVLWB on February 13, 2015.

<sup>121</sup> See page 62, MVEIRB Report of Environmental Assessment and Reasons for Decision EA1314-02, September 5, 2014.

<sup>122</sup> See page 58, MVEIRB Report of Environmental Assessment and Reasons for Decision EA1314-02, September 5, 2014.

<sup>123</sup> See page 66, MVEIRB Report of Environmental Assessment and Reasons for Decision EA1314-02, September 5, 2014.

reach the SSWQO of 684 mg/L. However, for reasons given above, the Board has accepted the SSWQO of 684 mg/L TDS as proposed by De Beers in its November 2014 Amendment Application, which was developed so that it is inclusive of chloride. The Board acknowledges LKDFN's concerns about the uncertainty of impact predictions in general, but based on the evidence, the Board believes that AEMP monitoring will be able to detect any potential effects to the most sensitive aquatic species in Snap Lake long before permanent ecosystem changes take place.

The Board concludes the accepted TDS SSWQO of 684 mg/L was based on toxicity testing that incorporated chloride at concentrations that could be realized in Snap Lake, and therefore, a TDS EQC that maintains that SSWQO will adequately account for chloride as well. The caveat to this is that the ionic composition of TDS in the effluent must remain similar to what it has been over the last several years. To ensure this remains the case, the Board has required De Beers to report on the ionic composition of TDS in the effluent on a quarterly basis in the Total Dissolved Solids Mitigation Implementation Report (see Part F, item 20, and Schedule 5, item 5 described in Section 4.3.6.4 below).

#### 4.3.6.3 Removal of the: Part F, Item 13

Part F, item 13 previously set out a compliance limit for the calculated whole lake average of TDS. This condition was removed from the amended Licence because the EQC for TDS are now applicable at the final discharge point as noted above with regard to Part F, item 9. In reaching this conclusion, the Board notes that none of the interveners objected to De Beers' request to amend this condition. The whole lake average for TDS must still be calculated and reported under Part D, item 2 of the Surveillance Network Program, as recommended by YKDFN, LKDFN and GNWT-ENR.<sup>124</sup>

#### 4.3.6.4 Requirement for a Total Dissolved Solids Mitigation Implementation Report

Part F, item 20 is a new condition that sets out the requirements for a quarterly Total Dissolved Solids Mitigation Implementation Report, with the first report due October 1, 2015. As noted in EC's intervention, the, "Management and mitigation of high TDS water will be complex, and rely on a number of factors behaving or performing as predicted."<sup>125</sup> In its February 23, 2015 response to interventions, De Beers agreed with EC's recommendations for ongoing operational reviews of TDS mitigation measures and practices implemented on site, and for continued investigation of emerging technologies to reduce TDS. De Beers also agreed that specific reporting on the performance of its TDS mitigation measures would be appropriate.<sup>126</sup> The Board concludes that requiring this Report will be both useful for reviewers and that it is reasonable to require it of the Licensee. Schedule 5, item 5 outlines the specific information requirements for this Report, including summaries of implementation and performance of total dissolved solids mitigation measures, tracking of flows and concentrations relative to predictions, and updates on ongoing investigations into mitigation improvements.

Based on the timeline provided in the Best Available Technologies Economically Achievable Report (BATEA), the Board does not anticipate that De Beers' proposed TDS mitigation strategy will be fully implemented during the term of this amended Licence; however, the initial 'proof of concept' reverse osmosis facility should be installed and commissioned by the end of 2015.<sup>127</sup> Additionally, the Board

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<sup>124</sup> See page 7, YKDFN Intervention, submitted February 12, 2015; pages 2-3, LKDFN Intervention, submitted February 13, 2015; page 23, GNWT-ENR Intervention, submitted to the MVLWB on February 13, 2015.

<sup>125</sup> See page 14, EC Intervention, submitted to the MVLWB on February 13, 2015.

<sup>126</sup> See page 60, De Beers' Response to Interventions, submitted to the MVLWB on February 23, 2015.

<sup>127</sup> See pages 40-42, November 2014 Amendment Application – BATEA Report, submitted to the MVLWB on November 28, 2014.

notes that De Beers has been storing high-TDS mine-water underground in order to meet current discharge compliance limits. To continue mine development safely, De Beers will need to discharge some of this water following the issuance of this amended Licence.<sup>128</sup> Any short-term changes associated with this increased discharge should be reported as soon as possible. Consequently, the Board finds that it is appropriate to initiate TDS reporting requirements immediately, and has set October 1, 2015 as the submission date for the first quarterly TDS Mitigation Implementation Report.

#### **4.3.7 Part G: Conditions Applying to Aquatic Effects Monitoring and Schedule 6**

Part G and Schedule 6 of the Licence contain conditions applying to the Aquatic Effects Monitoring Program (AEMP) for the Snap Lake Project. Amendments were made to both, as described below.

As noted above in Section 4.3.6 (Part F of the Licence), De Beers has acknowledged the need to update the AEMP Design Plan. In its closing statement, the GNWT-ENR recommended that revision of the AEMP Design Plan commence as soon as possible.<sup>129</sup> In response, De Beers stated that it would be more efficient to commence this revision following the Board's decision on the December 2013 Amendment Application, which addresses the longer-term SSWQOs.<sup>130</sup> The Board agrees that the approach proposed by De Beers would be more appropriate given the timing of this amendment. If the Board required a revised AEMP immediately, it could not be developed, reviewed and approved prior to the upcoming field season, and therefore, would not be implemented until 2016 anyway. The Board concludes that it would not be beneficial to rush through the revision process, and that it would be more reasonable to address the need for a revised AEMP through its upcoming decision on the December 2013 Amendment Application. Accordingly, no amendments have been made to Part G, items 1-12, or Schedule 6, items 1-5.

Part G, items 13, 14, and 15 are new conditions concerning a special study of the downstream watercourses, which will address existing information gaps, and ultimately inform the establishment of downstream monitoring locations and action levels within the AEMP.

Baseline data for Mackay Lake was identified as a limiting factor in assessing whether Measure 1(d) will be met, because the range of natural variability for TDS in Mackay Lake cannot be well characterized with the available dataset.<sup>131</sup> At the public hearing, De Beers committed to conducting a special study to establish the range of natural variability for TDS and its constituent ions in Mackay Lake in all seasons.<sup>132</sup> While GNWT-ENR disagreed that more data was absolutely necessary to determine the range of natural variability in Mackay Lake, both GNWT-ENR and EC agreed that the special study proposed by De Beers would provide greater certainty regarding the range of natural variability for TDS and its constituent ions in Mackay Lake.<sup>133</sup>

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<sup>128</sup> See pages 23 and 48, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>129</sup> See page 1, GNWT-ENR Closing Statement, submitted to the MVLWB on March 19, 2015.

<sup>130</sup> See page 10, De Beers' Closing Statement, submitted to the MVLWB on March 24, 2015.

<sup>131</sup> See pages 38 and 41, De Beers' Public Hearing Presentation submitted to the MVLWB on March 11, 2015; pages 66-67 of the Public Hearing transcripts, March 11, 2015; pages 48-50, De Beers' Response to Interventions, submitted to the MVLWB on February 23, 2015.

<sup>132</sup> See page 39, De Beers' Public Hearing Presentation, March 11, 2015; page 68 of the Public Hearing transcripts, March 11, 2015.

<sup>133</sup> See pages 215-216, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015; page 106, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 12, 2015; page 16, EC Intervention, submitted February 13, 2015.

De Beers' current predictions indicate that, in mitigated scenarios, TDS from the mine may be detectable up to 44 km downstream at Mackay Lake during the long term.<sup>134</sup> These predictions are based on De Beers' Downstream Lakes Model (DLM), which the Board understands to be conservative at this time, because this version of the DLM does not account for dilution from lake volumes or for seasonal variability, and assumes a worst-case scenario in terms of TDS outflow from Snap Lake.<sup>135</sup> At the public hearing, De Beers has committed to updating the DLM in order to provide better confidence in downstream TDS predictions over the long term.<sup>136</sup> GNWT-ENR supported this update and recommended that the DLM be further revised to include constituent ions of concern, rather than just TDS.<sup>137</sup>

Part G, item 13 requires that De Beers submit a Special Study Plan (SSP) that describes how these limitations will be addressed. The SSP will be for Board approval, and must describe how De Beers will determine the range of natural variability for TDS and its constituents in the downstream watercourses; how De Beers will identify the final monitoring locations downstream; and how the information gathered through the SSP will inform updates to the DLM. Once the SSP is approved by the Board, it must be implemented as per Part G, item 14. Following the completion of the Special Study, a report on the findings must be submitted to the Board as per Part G, item 15. The specific information requirements for the SSP and the report are outlined in Schedule 6, items 6 and 7, respectively.

#### **4.3.8 Part H: Conditions Applying to Contingency Plans**

Part H of the Licence contains conditions applying to spills, unauthorized discharges, and emergency response for the Snap Lake Project. No amendments were made to Part H.

#### **4.3.9 Part I: Conditions Applying to Closure and Reclamation**

Part I of the Licence contains conditions applying to closure and reclamation of the Snap Lake Project. One clarification was made to Part I, item 1. "Interim" was added to more accurately reference the Interim Closure and Reclamation Plan, and distinguish it from the Final Closure and Reclamation Plan in Part I, item 4.

#### **4.3.10 Part J: Conditions Applying to Modifications**

Part J of the Licence contains conditions applying to modification of structures and facilities associated with the Snap Lake Project. No amendments were made to Part J.

#### **4.3.11 Annex A: Surveillance Network Program**

Annex A of the Licence contains conditions applying to the Surveillance Network Program (SNP).

The rationale for SNP station 02-18 was updated to reflect the fact that TDS is no longer regulated as a whole-lake average. TDS in treated effluent will now be regulated with other parameters at SNP station 02-17b, which is the final discharge point to Snap Lake. Reporting requirements under Annex A, Part D were also updated to reflect this change. Monitoring at SNP station 02-18 will continue, and the whole-lake average for TDS will continue to be calculated and reported for this Station.

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<sup>134</sup> See page 26, November 2014 Amendment Application, submitted to the MVLWB on November 12, 2014.

<sup>135</sup> See pages 40 and 42, De Beers' Public Hearing Presentation, March 11, 2015; pages 68-70 of the Public Hearing transcripts, March 11, 2015.

<sup>136</sup> See pages 70-71, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015.

<sup>137</sup> See pages 19-20, GNWT-ENR Intervention, submitted to the MVLWB on February 13, 2015; see pages 217-, Transcripts from the MVLWB's Public Hearing on De Beers Snap Lake Project, March 11, 2015.

Figures 1 through 3 have been retained at the end of Annex A to support the location descriptions for each sampling station.

**4.3.12 Annex B: Table of Revision History**

Annex B of the Licence contains a table which identifies any updates and changes that have been made. This table was updated to reflect this amendment and should continue to be updated throughout the life of the Licence.

**4.3.13 Engagement**

The Board is satisfied that the engagement carried out by the proponent and the Board is adequate for the Board to make a decision on the November 2014 Amendment Application. The Board notes concerns were raised by YKDFN and the LKDFN during the amendment processes; however, these will be dealt in the Reasons for Decision for the December 2013 Amendment Application.

**5.0 Conclusion**

Subject to the terms and conditions set out in the Licence, and for the reasons expressed herein, the MVLWB is of the opinion that the licensed undertaking for water use and waste disposal associated with the Snap Lake Project can be completed by De Beers while providing for the conservation, development, and utilization of Waters in a manner that will provide the optimum benefit for all Canadians and in particular for the residents of the Mackenzie Valley.

Water Licence MV2011L2-0004 contains amended provisions that the Board feels necessary to ensure and monitor compliance with the MVRMA, *Waters Act*, and the Regulations made thereunder, and to provide appropriate safeguards in respect of the Applicant’s use of the water affected by the Licence.

SIGNATURE

Mackenzie Valley Land and Water Board



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Chair



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Witness