



Box 32, Wekweètì, NT X0E 1W0  
Tel: 867-713-2500 Fax: 867-713-2502

#1-4905 48<sup>th</sup> Street, Yellowknife, NT X1A 3S3  
Tel: 867-765-4592 Fax: 867-765-4593  
[www.wlwb.ca](http://www.wlwb.ca)

February 11, 2019

File: W2012L2-0001

Lukas Novy  
Dominion Diamond Ekati ULC  
900-606 4 Street SW  
Calgary, Alberta T2P 1T1

Dear Mr. Novy,

Re: Potassium Toxicity Study Design Version 1.0 and Potassium Response Plan Version 2.0

The Wek'èezhìi Land and Water Board (WLWB or the Board) met on January 24, 2019 to consider the Potassium Toxicity Study Design Version 1.0 and the Potassium Response Plan Version 2.0. These Plans were submitted for approval in accordance with Part H, Condition 38(a) and Part J, Condition 9(b) of Water Licence W2012L2-0001 (the Licence).

The Board has approved the Potassium Toxicity Study Design Version 1.0 and the Potassium Response Plan Version 2.0 with additional direction for each, as described in the attached Reasons for Decision. Dominion is to submit the Potassium Toxicity Study Design Version 1.1 and the Potassium Response Plan Version 2.1 with the required revisions by March 13, 2019.

The Board has approved the submission deadline for the Potassium Toxicity Study Report of August 30, 2019. In submission of the Potassium Toxicity Study Report, Dominion is to include a discussion of the results of the Potassium Toxicity Study in consideration of the previous chloride testing completed on Fingernail Clams (referenced by ECCC comment 2).

With respect to the sodium-potassium investigation, described in the Potassium Response Plan Version 2.0, Dominion is to provide the results and discuss the implications for potassium management with the submission of the 2019 Aquatic Effects Monitoring Program (AEMP) Annual Report.

Sincerely,

A handwritten signature in blue ink, appearing to read "Joe Mackenzie".

Joe Mackenzie  
Chair, Wek'èezhìi Land and Water Board

Copied: Ekati Distribution List



Box 32, Wekweètì, NT X0E 1W0  
Tel: 867-713-2500 Fax: 867-713-2502

#1-4905 48<sup>th</sup> Street, Yellowknife, NT X1A 3S3  
Tel: 867-765-4592 Fax: 867-765-4593  
[www.wlwb.ca](http://www.wlwb.ca)

---

## Decision

<b>Reference/File Number:</b>	W2012L2-0001 (Type "A" Water Licence)
<b>Licensee:</b>	Dominion Diamond Ekati ULC (Dominion)
<b>Subject:</b>	Potassium Toxicity Study Design Version 1.0 and Potassium Response Plan Version 2.0

## Decision from the Wek'èezhìi Land and Water Board Meeting of January 24, 2019

---

### 1.0 Decision

At the Wek'èezhìi Land and Water Board's (WLWB or the Board) January 24, 2019 meeting, the Board met to consider the Potassium Toxicity Study Design Version 1.0 and the Potassium Response Plan Version 2.0 submitted by Dominion Diamond Ekati ULC (Dominion) on October 3, 2018.

The Board has determined the following:

1. The Board has approved the Potassium Toxicity Study Design Version 1.0 with additional direction for Version 1.1;
2. Dominion is to submit Version 1.1 of the Potassium Toxicity Study Design to incorporate Revisions A and B within 30 days of communication of the Boards' decision;
3. Dominion is to include a discussion of the results of the Potassium Toxicity Study in consideration of previous testing results referenced by ECCC comment 2, in submission of the Potassium Toxicity Study Report;
4. The Board has approved the submission deadline for the Potassium Toxicity Study Report of August 30, 2019;
5. The Board has approved the Potassium Response Plan Version 2.0 with additional direction for Version 2.1;
6. Dominion is to submit Version 2.1 of the Potassium Response Plan to incorporate Revisions C through E within 30 days of communication of the Boards' decision; and

7. Dominion is to provide the results of the sodium-potassium investigation and discuss the implications for potassium management, with the submission of the 2019 Aquatic Effects Monitoring Program (AEMP) Annual Report.

## **2.0 Background**

On July 21, 2017, Dominion submitted a Type A Water Licence Amendment Application to the Board.<sup>1</sup> In the Application, Dominion requested an amendment to the potassium effluent quality criteria (EQC) set out in Licence W2012L2-0001.<sup>2</sup> In its June 15, 2018 decision,<sup>3</sup> the Board required Dominion submit a Potassium Toxicity Study Design to the Board for approval (Part H, Condition 38(a)). The Study is to evaluate the toxicity responses of sensitive species using site water spiked with potassium concentrations at minimum 64 mg/L, 80 mg/L, and 100 mg/L. In addition, the Board required Dominion submit a Response Plan Version 2.0 to reflect the concerns raised through the Amendment Proceeding.

On October 3, 2018, Dominion submitted the Potassium Toxicity Study Design to the Board for approval, in accordance with Part H, Condition 38(a) of Water Licence W2012L2-0001 and the Board's June 15, 2018 Reasons for Decision. Dominion also submitted the Potassium Response Plan Version 2.0 to the Board for approval, in accordance with Part J, Condition 9(b) of Water Licence W2012L2-0001 and the Board's June 15, 2018 Reasons for Decision. In its covering letter, Dominion identified Version 2.0 is intended to address action level exceedances during both the 2018 under-ice (i.e., low, medium, and high action level exceedances), and open-water (i.e., low action level exceedance) seasons.

Both submissions were distributed for public review on October 18, 2018. Comments were received by the deadline of December 7, 2018 by Environment and Climate Change Canada (ECCC), the Department of Environment and Natural Resources of the Government of the Northwest Territories (GNWT-ENR), and the Independent Environmental Monitoring Agency (IEMA). Board staff also submitted comments. Dominion provided responses to reviewer comments by the deadline of December 21, 2018. The Review Summary Table is available online.<sup>4</sup>

## **3.0 Reasons for Recommendations**

Dominion has provided a Potassium Toxicity Study Design which proposes testing of three sensitive species to meet Part H, Condition 38(a) of Water Licence W2012L2-0001. The proposed design analyzes the impacts of potassium toxicity on three sensitive species: *Hyalella azteca*, *Sphaerium simile* (Fingernail Clams), and *Pimephales promelas* (Fathead Minnows).

---

<sup>1</sup> See WLWB Online Registry for [W2012L2-0001 - Ekati - Water Licence Amendment - Potassium EQC - Jul 21 17.pdf](#)

<sup>2</sup> See WLWB Online Registry for [W2012L2-0001 - Ekati - Water Licence - Amendment - Misery UG - Aug 24 18.pdf](#)

<sup>3</sup> See WLWB Online Registry for [W2012L2-0001 - Ekati - Water Licence - Amendment - Potassium EQC - RFD and Recommendation to Minister - Jun 15 18.pdf](#)

<sup>4</sup> See WLWB Online Registry for [W2012L2-0001 - Ekati - AEMP - Potassium Toxicity Study and Response Plan V2 - Review Summary and Attachments - Dec 21 18](#)

In review of the submission, reviewer comments, and proponent responses, the Board has required two revisions to the Potassium Toxicity Study Design Version 1.0. The Board does not want to delay the implementation of the Potassium Toxicity Study Design.

- **Decision #1: The Board has approved the Potassium Toxicity Study Design Version 1.0 with additional direction for Version 1.1.**
- **Decision #2: Dominion is to submit Version 1.1 of the Potassium Toxicity Study Design to incorporate Revisions A and B within 30 days of communicating its decision.**

#### **4.1.1 Study Methods**

##### Duration of *Hyalella azteca* Test

The GNWT-ENR acknowledged that the 28-day test for *H. azteca* proposed in the Potassium Toxicity Study Design is appropriate for understanding the implications of current predictions for under-ice exceedances of the potassium site-specific water quality objective (SSWQO; GNWT comment 9). However, the GNWT-ENR stated its concern that the 28-day test cannot be used to evaluate potential reproductive effects for *H. azteca* for the open-water season. The GNWT-ENR recommended that the 42-day test with *H. azteca* be considered to characterize potential effects in the future should potassium projections be found to exceed the potassium SSWQO in the open water season.

In response to the GNWT-ENR recommendation, Dominion indicated that:

- the approved long-term potassium SSWQO was developed following the Canadian Council of Ministers of the Environment guidance (CCME, 2007),<sup>5</sup> which includes 7-day tests with fathead minnows and 14-day tests using *H. azteca*;
- the intent of the additional toxicity studies is to provide additional confidence that adverse effects would not be expected if under-ice exceedances of the approved potassium SSWQO were to occur in the aquatic receiving environment; and
- the future predictions of potassium concentrations during the open-water season are not likely to exceed the potassium SSWQO.

This recommendation was previously discussed through the Potassium ECQ amendment, at which time the Board determined it was “not convinced that the toxicity tests proposed for these organisms should include reproductive endpoints.”<sup>6</sup> The Board recognizes that the intent of the additional toxicity studies is to address concerns about potential effects of the predicted under-ice concentrations of potassium that may exceed the approved SSWQO, as noted by Dominion. As such, the Board is not convinced of the need

---

<sup>5</sup> CCME (Canadian Council of Ministers of the Environment). 2007. A protocol for the derivation of water quality guidelines for the protection of aquatic life 2007. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, 1999, Winnipeg.

<sup>6</sup> See WLWB Online Registry for [W2012L2-0001 - Ekati - Water Licence - Amendment - Potassium EQC - RFD and Recommendation to Minister - Jun 15 18.pdf](#); pg. 20

for a 42-day amphipod test, which differs from the 28-day test by inclusion of the reproductive endpoint, to be included in these additional studies. The Board acknowledges that the 28-day test exceeds the length of the CCME (2007) long-term test protocol for *H. azteca*, which is a 14-day test.

#### Frequency of Ammonia Testing

Dominion has proposed to measure ammonia concentrations at test initiation and termination. In these experiments, water is renewed three times a week for the *H. azteca* and Fingernail Clam toxicity tests, and daily for the Fathead Minnow toxicity test. It is not clear if variability in the total ammonia concentrations throughout the investigation would be captured if total ammonia is measured only at test initiation and termination.

Dominion was asked to discuss the pro/cons of measuring total ammonia concentrations at test initiation and termination compared with capturing concentrations throughout the investigation (WLWB staff comment 2). In response, Dominion indicated that ammonia is not anticipated to become elevated during the toxicity tests. Dominion stated that the measurement of total ammonia at test initiation and termination is included as a quality control measure measurement, similar to pH and dissolved oxygen, to confirm that water quality constituents remain within acceptable ranges for the test organisms. The Board notes that the other referenced quality control measures (i.e., pH and dissolved oxygen) are proposed to be measured more frequently throughout the course of the test.

Dominion stated that “measurement at the start and end of exposure is a common practice in toxicity testing, and is considered acceptable by the CCME in determining data quality to be of primary quality (CCME 2007)” (response to WLWB staff comment 2). Dominion has referenced the Protocol for the ‘Derivation of Water Quality Guidelines for the Protection of Aquatic Life’ which uses measurement at the start and end of exposure as a minimum screening requirement. In contrast, the Environment Canada tests methods for *H. azteca* recommend “water quality ammonia at test start and end and before and after each test solution renewal (i.e., minimum of three times weekly) in representative concentrations”.<sup>7</sup> It is unclear whether ammonia concentrations, based only on an initial and a terminal measurement, could demonstrate the water quality was acceptable for test organisms over the course of the test. For *H. azteca*, the Board believes it would be prudent to measure total ammonia more frequently to confirm that concentrations remain at acceptable levels throughout the test, consistent with the *H. azteca* Environment Canada Protocol. An Environment Canada protocol does not exist for Fingernail Clams; however, because of the similar water renewal schedule, the Board has determined it is appropriate to require ammonia be measured prior to each water renewal for both *H. azteca* and Fingernail Clams.

The Board acknowledges that it is less likely that total ammonia concentrations would be elevated for the seven-day Fathead Minnow toxicity test, where water is renewed daily. The Board has determined that no changes to the methods for Fathead Minnows is required.

---

<sup>7</sup> Environment Canada. 2017. Biological test method: test for survival, growth and reproduction in sediment and water using the freshwater amphipod *Hyalella azteca*. Third Edition. EPS1/RM/33. September 2017. Table 4.

- **Revision A: In addition to ammonia testing at test initiation and termination, Dominion is to measure ammonia prior to each water renewal for both *H. azteca* and Fingernail Clams.**

#### Frequency of Potassium Testing

Dominion has proposed to measure potassium at test initiation and termination. Dominion was asked to discuss the pro/cons of measuring total potassium concentrations at test initiation and termination compared with capturing concentrations throughout the investigation (WLWB staff comment 2). Dominion stated that measurement at the start and end of exposure is a “common practice in toxicity testing and is considered acceptable by the Canadian Council of Ministers for the Environment (CCME) in determining data quality to be of primary quality (CCME 2007)”. In addition, Dominion identified that specific conductivity will be measured on a regular basis throughout the tests. Dominion explained that an increase in potassium chloride will increase the specific conductivity directly; therefore, consistent values for this measurement would demonstrate that potassium concentrations were maintained throughout the exposure period. The Board believes that it is necessary that Dominion demonstrate that potassium concentrations have been maintained throughout the exposure. In cases where the specific conductivity measurements are not consistent with test initiation measurements, this may require additional potassium measurements to be taken.

- **Revision B: Dominion is to add the following text: “The Potassium Toxicity Study Report will describe how the results demonstrate that potassium concentrations have been maintained throughout the exposure.”**

#### Water Temperature

Dominion proposes to run toxicity tests at 23 and 25 degrees Celsius (°C). In its comments, IEMA identified that these temperatures differ from the environment at the Ekati Mine and recommended that the toxicity tests described in the Potassium Toxicity Study Design should be conducted at test water temperatures between 6 and 8 °C to better represent field conditions (IEMA comment 3). In response to IEMA’s recommendation, Dominion noted that the toxicity tests were proposed at standardized temperatures (23 and 25°C) for the following reasons:

- these are the temperatures specified in the test method, which allows for the comparison of toxicity data between studies; and
- the effect concentrations of the toxicity studies at standardized temperatures are likely conservative relative to conditions where water temperatures are lower and physiological processes are slower, because toxicants generally exhibit a higher degree of activity at higher temperature, and more significant development milestones can be achieved within the test duration at standard temperature.

Dominion has recommended no changes to the water temperatures proposed in the Potassium Toxicity Study Design. The Board believes Dominion’s response to be reasonable and has not required any changes.

#### **4.1.2 Potassium Toxicity Study Report**

Part H, Condition 38(b) requires Dominion submit the Potassium Toxicity Study Report to include a summary of the results of the Study conducted in accordance with the approved Potassium Toxicity Study Design referred to in Part H, Condition 38(a), and identify any implications to potassium management at the Ekati Diamond Mine.

In its comments, ECCC identified that exposures of Fingernail Clams to chloride have previously been conducted, and this information would be relevant to interpretation of the results of the Potassium Toxicity Study Design (ECCC comment 2). ECCC recommended that the Potassium Toxicity Study Design include the referenced information on the sensitivity of Fingernail Clams to chloride. In addition, ECCC recommended that the Potassium Toxicity Study Design consider whether the toxicity responses to potassium and chloride would be additive. In response to ECCC's recommendation, Dominion acknowledged that the requested information on Fingernail Clams sensitivity to chloride exists, and that these results can be compared with results from the Potassium Toxicity Study. Given that the referenced results are available in ERM Rescan (2014),<sup>8</sup> the Board believes that the additional information requested by ECCC does not need to be included in the Study Design; however, should be considered in preparation of the Potassium Toxicity Study Design Report.

- ***Decision #3: Dominion is to include a discussion of the results of the Potassium Toxicity Study in consideration of previous testing results referenced by ECCC comment 2, in submission of the Potassium Toxicity Study Report.***

The GNWT-ENR recommended Dominion provide the following information as part of the Potassium Toxicity Study Report (GNWT-ENR comment 10):

- data on the potassium to sodium molar ratios and water hardness of test waters for the potassium toxicity study;
- a comparison of the potassium toxicity study results to the previous toxicity test results that supported the development of the approved potassium SSWQO; and
- the projected potassium to sodium molar ratios and water hardness under the current mine plan).

In response to the GNWT-ENR's recommendation, Dominion noted that the concentration of potassium and sodium will be reported for each test conducted, and the relevance of these data will be discussed in the Potassium Toxicity Study Report. Dominion also stated that the relevance of this data will be discussed "in the context of sodium concentrations that are observed at the site and that were present in previous toxicity tests used in the development of the potassium [SSWQO]". The Board believes Dominion's commitment addresses the GNWT-ENR's concern.

---

<sup>8</sup> ERM Rescan. 2014. Ekati Diamond Mine: Toxicity of Chloride to the Fingernail Clam, *Sphaerium simile*. Prepared for Dominion Diamond Ekati Corporation by ERM Consultants Canada Ltd.: Yellowknife, Northwest Territories.

### Submission Deadline

The Potassium Toxicity Study Report is to be submitted to the Board for approval in accordance with the timelines of the approved Study Design.

In the Study Design, Dominion describes the schedule for testing and reporting:

Laboratory testing is expected to be completed by the end of March 2019, if the laboratory-reared clams successfully produce the offspring that are required for the tests and water is collected in February 2019. Alternatively, if water is collected during freshet, it is anticipated that tests will be initiated in mid-June, and testing being complete by the mid-July 2019. If laboratory testing is completed as planned, Dominion stated that the Potassium Toxicity Study Report is therefore anticipated to be produced by August 30, 2019.

No concerns were raised with this proposed timeline. The Board expects the Potassium Toxicity Study Report to be submitted by August 30, 2019.

- ***Decision #4: The Board has approved the submission deadline for the Potassium Toxicity Study Report of August 30, 2019.***

### **1.1 Potassium Response Plan**

The Potassium Response Plan Version 2.0 (Response Plan) was submitted to satisfy the Board's June 15, 2018 decision and 2018 Action Level exceedances.<sup>9</sup> In review of the submission, reviewer comments, and proponent responses, the Board has required two revisions to the Potassium Response Plan outlined below. The Board does not want to delay the implementation of the Potassium Response Plan and believes Revisions C through E to be straightforward.

- ***Decision #5: The Board has approved the Potassium Response Plan Version 2.0 with additional direction for Version 2.1.***
- ***Decision #6: Dominion is to submit Version 2.1 of the Potassium Response Plan to incorporate Revisions C through E within 30 days of communicating its decision.***

### **4.2.1 Sodium-Potassium Investigation**

During the potassium proceeding, the GNWT-ENR identified that sodium may have an ameliorating effect on potassium toxicity. At that time, Dominion stated that it would be willing to investigate this relationship as part of the Potassium Response Plan. The Potassium Response Plan Version 2.0 proposes an investigation to examine the toxicity of potassium under different sodium concentrations and water hardness utilizing three selected species (fish: Fathead Minnow; invertebrate: *Ceriodaphnia dubia*; and alga: *Pseudokirchneriella subcapitata*).

---

<sup>9</sup> See WLWB Online Registry for [W2012L2-0001 - Ekati - AEMP - 2018 Under-ice Action Level Exceedance Notification - Jun 29 18.pdf](#) and [W2012L2-0001 - Ekati - AEMP - 2018 Open-Water Action Level Exceedance Notification - Sep 26 18.pdf](#)



In review of the Potassium Response Plan Version 2.0, the GNWT-ENR suggested that a detailed design for the sodium-potassium investigation should be submitted for review prior to initiation of testing (GNWT-ENR comment 8). Dominion responded that the Board direction was to provide a description of the investigation, and that a description was provided in section 3.2.1 of the Potassium Response Plan, identifying the difference between this description and the detailed study design required for the Potassium Toxicity Study.<sup>10</sup> The Board believes the description provided is reflective of the Board's June 15, 2018 decision.

The GNWT-ENR indicated that section 3.2.1 of the Potassium Response Plan states: "The identification of sodium as potentially having an ameliorating effect on potassium toxicity was also questioned by the GNWT-ENR during the Water Licence Amendment process." The GNWT-ENR stated that this sentence does not reflect the position of the GNWT-ENR. The Board agrees that this statement could imply that the GNWT-ENR did not agree that an ameliorating effect of sodium on potassium toxicity may be present. Because a revised version will already be submitted, and the added value of this statement is unclear, the Board has determined that this sentence should be removed. The remainder of the paragraph correctly states the concern that prompted the sodium-potassium investigation (GNWT-ENR comment 6).

- **Revision C: Dominion is to remove the following sentence from section 3.2.1: "The identification of sodium as potentially having an ameliorating effect on potassium toxicity was also questioned by the GNWT-ENR during the Water Licence Amendment process".**

#### Investigation Methods

The GNWT-ENR recommended that the amphipod *H. azteca* be included in the sodium-potassium investigation (GNWT-ENR comment 7). Given that it was the most sensitive species in the toxicity studies underlying the SSWQO derivation, Dominion was asked to discuss the rationale for not including this species (WLWB staff comment 1). Dominion responded that the three selected species (fish: Fathead Minnows; invertebrate: *C. dubia*; and alga: *P. subcapitata*) represent a range of trophic levels and a wide taxonomic range, and that there is no requirement to include the most sensitive species when evaluating whether toxicity is affected by modifying factors. Dominion also noted that testing with *H. azteca* involves "significant time and resources, as compared to the selected invertebrate, *C. dubia*". In review of the CCME guidance (CCME, 2007), which includes 14-day tests using *H. azteca*; the Board acknowledges that the addition of *H. azteca* to the investigation would result in additional time and resources.

Dominion stated that it did not see any implications to excluding *H. azteca*:

Dominion does not see any valid reason to include, or any implications of excluding *Hyalella azteca* in the sodium-potassium testing investigation. As discussed above the study species for this test provide the necessary data to determine if there is a consistent

---

<sup>10</sup> See WLWB Online Registry for [W2012L2-0001 - Ekati - Water Licence - Amendment - Potassium EQC - RFD and Recommendation to Minister - Jun 15 18.pdf](#)

chemical or physiological mechanism by which sodium influences toxicity of potassium in a manner that would be expected to be applicable across the ecosystem as a whole.

The Board believes that inclusion of a fourth species is reasonable, notwithstanding the extra effort, since the objective is to determine if there is a general modifier effect that would be considered applicable across the ecosystem as a whole. *H. azteca* is of particular interest as a benthic invertebrate because it is the most sensitive species underlying the derived SSWQO. If an assumed modifier effect were to not hold for the most sensitive species, then it would be unclear whether the SSWQO would be protective of that species.

- ***Revision D: Dominion is to include the amphipod *H. azteca* as a fourth test species, using the ECCC protocol (ECCC, 2017), in the sodium-potassium investigation in section 3.2.1 of the Potassium Response Plan.***

#### Reporting of Results

The Potassium Response Plan Version 2.0 did not identify when the results of this investigation would be provided to the Board. Dominion was asked to provide a timeline for reporting of the results of the sodium-potassium investigation and stated that it planned to complete the investigation in 2019 and that the results would inform future versions of the Response Plan (WLWB staff comment 3). Section 4.0 of the Response Plan indicates that the need for future updates will be considered on a case-by-case basis, if an action level is exceeded in future AEMP monitoring. Dominion has therefore not provided a clear timeline of when this submission should be anticipated. The Board has determined that a timeline by which Dominion is required to submit the results of the sodium-potassium investigation, and the implications for potassium management is necessary. The Board believes submission of the results of the investigation with the 2019 AEMP Annual Report (March 31, 2020) will be sufficient time to document the results and address any implications of these results.

- ***Decision #7: Dominion is to provide the results of the sodium-potassium investigation and discuss the implications for potassium management, with the submission of the 2019 AEMP Annual Report.***

#### **4.2.2 Water Quality Model Update**

Section 3.1.4 of the Response Plan was updated to reflect Dominion's commitment to complete a water quality model update as part of the Water Licence renewal process (Licence expires in 2021). The GNWT-ENR suggested that a sensitivity analysis should be completed and added to the Response Plan, illustrating the effects on potassium concentration over time due to potential delays in the Jay Project (GNWT-ENR comment 2). Dominion responded that the modelling assumes the Life of Mine plan that was in place at the time, with ore from the Jay Project starting in 2023, and without the small amount of ore from the Misery Underground Project. Therefore, potential changes associated with the Jay Project timelines will not influence the modelled water quality predictions until 2023. The water quality model update currently planned for 2021 will be completed prior to the assumed timeline for processing Jay ore in the current model. Dominion stated that the 2021 model update will reflect any changes to the Life of Mine Plan.

Dominion noted that the model uses a conservative representation of process plant discharge, based on the calcium-potassium relationship for Misery ore (Response to GNWT-ENR comment 2). Dominion noted the next model update will incorporate the results of ongoing geochemistry testing. The Board accepts that the current model was completed based on the Life of Mine Plan and is scheduled for update in the near future, prior to the addition of Jay ore to the processing plant in the current model. As such, the Board has not required a sensitivity analysis of the model at this time.

In addition, the GNWT-ENR suggested that the next water quality model update should include predictions for sodium and water hardness, which have been suggested as possible modifiers of potassium toxicity (GNWT-ENR comment 5). Dominion responded that the model already provides predictions of sodium, and of calcium and magnesium (from which hardness is inferred). As such, these parameters will be available for calculation of the SSWQO over time, should it be found that either parameter affects potassium toxicity in a predictable way. The Board believes Dominion's response addresses the GNWT-ENR's suggestion.

#### **4.2.3 Mitigation Options**

Dominion updated the Plan to reflect the Board's June 15, 2018 direction to update the discussion of management/mitigation options available to the Company.<sup>11</sup> This included new text describing the potential mitigation option of an alternative water source. The Plan states that an alternate water source "would not provide any reduction in potassium concentrations in the [Long Lake Containment Facility (LLCF)] or downstream receiving environment." Dominion was asked to clarify the likely effectiveness and trigger for use of an alternative water source (WLWB staff comment 4). Dominion responded stating that this option is retained as a contingency and "could still be used to dilute the elevated potassium concentrations in the future". However, Dominion stated that the contingency is not expected to be needed because the option for operational water management, with use of Panda and Koala pits for additional water storage, will be effective in controlling future potassium concentrations. The Board accepts the response; however, it appears inconsistent with the text provided in Version 2.0.

- ***Revision E: Dominion is to revise section 3.2.2.1 of the Potassium Response Plan to align with Dominion's response to WLWB staff comment 4.***

In section 3.1.5 of the Potassium Response Plan, Dominion identified that to mitigate potential effects of potassium release to the receiving environment Dominion did not Discharge from the LLCF during the 2018 open-water season. Dominion was asked whether water storage capacity is sufficient to avoid discharge above EQC (WLWB staff comment 5). Dominion responded that the use of Panda and Koala pits for storage of fine processed kimberlite (FPK) and Process Plant water is the most appropriate mitigation option to address action level exceedances, if needed. Dominion noted its Operational Water

---

<sup>11</sup> See WLWB online Registry for [W2012L2-0001 - Ekati - Water Licence - Amendment - Potassium EQC - RFD and Recommendation to Minister - Jun 15 18.pdf](#)

Management strategy is to maximize release during freshet, and balance water storage, while maintaining compliance with the Water Licence. The Board understands from Dominion’s response that water storage capacity appears to be sufficient to manage water if non-compliant.

**4.2.4 Clarifications in the Potassium Response Plan**

The GNWT-ENR suggested that section 3.3.1 of the Response Plan should be updated to clarify how the results of follow-up toxicity testing may, or may not, influence the SSWQO for potassium, and/or the associated EQC for potassium (GNWT-ENR comment 4). Dominion responded by noting that, as per Water Licence Condition 38(b), the report on results of the Potassium Toxicity Study must include any implications to potassium management at the Ekati Diamond Mine, which would include any implications for the SSWQO for potassium. Section 3.2.1 of the Response Plan states that a review of the SSWQO may be warranted based on results of the sodium-potassium investigation. The Board acknowledges that a review of the SSWQO may be needed, depending on the results of this work, and does not believe that further elaboration on this point is required in the Response Plan.

The GNWT-ENR suggested that the Response Plan be revised to include a schematic of the water management system (GNWT-ENR comment 3). Dominion responded that schematics of the water management system can be found in the Wastewater and Processed Kimberlite Management Plan (WPKMP), Version 8.0, Figures 11 and 12. The Board accepts that the schematics are available, and although may be helpful, has not required any additions to the Response Plan.

**Signed the 10<sup>th</sup> day of February 2019, on behalf of the Wek’èzhii Land and Water Board**



\_\_\_\_\_  
Witness



\_\_\_\_\_  
Joe Mackenzie  
Chair, Wek’èzhii Land and Water Board