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December 3, 2018 W2012L2-0001

Mr. Harry O'Keefe
Dominion Diamond Ekati ULC (Dominion)
900-604 4 Street SW
Calgary, AB T2P 1T1

Dear Mr. O'Keefe

Re: Dominion's 2017 AEMP Annual Report

The Wek'èezhìi Land and Water Board met on November 19, 2018 to consider Dominion Diamond Ekati ULC's (Dominion's) 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report for Water Licence W2012L2-0001.[1]

As described in the attached Reasons for Decision, the Board has approved the AEMP Annual Report with additional direction. The Reasons for Decision describe the Board's additional direction for the 2018 AEMP Annual Report, 2019 Aquatic Effect Re-evaluation Report, and future Surveillance Network Program (SNP) reporting.

Sincerely,

Joe Mackenzie
Chair, Wek'èezhìi Land and Water Board

Copied: Ekati Distribution List

[1] See WLWB Online Registry at www.wlwb.ca for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Summary Report - Mar 31_18; W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 1 Evaluation of Effects - Mar 31_18; W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 2 Data Report - Mar 31_18; and W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 3 Statistical Report - Mar 31_18

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Reasons for Decision

Reference/File Number:	W2012L2-0001 (Type "A" Water Licence)
Licensee:	Dominion Diamond Ekati ULC (Dominion)
Subject:	Ekati 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report

Decision from the Wek'èezhìi Land and Water Board
Meeting of November 19, 2018

1.0 Decision

On November 19, 2018, the Wek'èezhìi Land and Water Board (WLWB or the Board) met to consider Dominion Diamond Ekati ULC's (Dominion's) 2017 Aquatic Effects Monitoring Program (AEMP) Annual Report,[2] submitted in accordance with Part J, Condition 6 of Water Licence W2012L2-0001 (the Licence).[3]

In consideration of the submission, reviewer comments, and proponent responses, the Board has determined the following:

1. Approved the 2017 AEMP Annual Report;
2. Dominion is to consider the inclusion of dissolved organic carbon in the AEMP Design Plan in submission of the 2019 Aquatic Effects Re-evaluation Report;
3. Dominion is to discuss/evaluate the inclusion of selenium sediment quality in the Response Framework as part of the 2018 AEMP Annual Report. This should include, but not be limited to, the following:
    a) Investigation of the relationship between sediment quality, water quality, and fish tissue concentration for selenium;

[2] See WLWB Online Registry at www.wlwb.ca for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Summary Report - Mar 31_18; W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 1 Evaluation of Effects - Mar 31_18; W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 2 Data Report - Mar 31_18; and W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 3 Statistical Report - Mar 31_18

[3] See WLWB Online Registry for W2012L2-0001 - Ekati - Water Licence - Amendment - Misery UG - Aug 24_18

b) Investigation of difference in the timing of changes to selenium concentrations in sediment quality, water quality, and fish tissue;
c) A review and discussion of applicable literature and guidance available; and
d) If the results of a-c indicate the need for an action level, propose low, medium, and high action levels for selenium sediment quality. If not, provide rationale based on the evidence provided in a-c.

4. Dominion is to revisit the inclusion of action levels for sediment quality in the Response Framework, in submission of the 2019 Aquatic Effects Re-evaluation Report. This should include:
    a) Investigation of the relationship between sediment and water quality concentration for evaluated sediment quality variables;
    b) Investigation of the ability for water quality to accurately predict potential for effects of sediment quality for evaluated sediment quality variables;
    c) A review of literature and guidance available; and
    d) As appropriate, propose sediment quality action levels. Please provide appropriate rationale.
5. Moving forward, Dominion is to highlight any concentrations that exceed EQC in the covering letter that accompanies the Surveillance Network Program (SNP) reports required by Part D, Condition 1 of the SNP.
6. Dominion is to include a discussion of the missed 2018 AEMP sampling, in the 2018 AEMP Annual Report including:
    a) Further explanation of the reason samples were missed in 2017; and
    b) A corrective action plan.

2.0 Background

The Aquatic Effects Monitoring Program (AEMP) represents an extensive monitoring program, which includes the monitoring of water, sediment, and several types of living organisms around the Ekati site. The purpose of the AEMP is to measure and evaluate potential effects of the mine on the Receiving Environment. The AEMP Design Plan outlines the details for the sampling program (e.g., sampling locations, field and laboratory methods, and data analysis methods). Part J, Condition 6 of the Licence requires that Dominion submit an AEMP Annual Report annually before March 31st to present the results from the previous year of monitoring.

Every three years, a summary of results since inception of the mine is to be completed as a part of the Aquatic Effects Re-evaluation Report (required by Part J, Condition 5 of the Licence). The current AEMP Design for the Ekati mine underwent a re-evaluation and extensive review process in late 2016/early 2017 as part of the 2015 Aquatic Effects Re-evaluation Report,[4] and was approved through the WLWB February 27, 2017 Reasons for Decision.[5] In its covering letter, Dominion confirmed that 2017 AEMP sampling was

[4] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2015 3yr Re-evaluation and Design Plan - Report and Appendices - Jun 30_16.pdf

[5] See WLWB Online Registry for W2012L2-0001 - Ekati - 2015 AEMP Re-evaluation and Proposed Design - Board Directive and RFD - Feb 27_17.pdf

completed in accordance with the approved 2017-2019 AEMP Plan.[6] The next Aquatic Effects Re-evaluation Report will be submitted in 2019.[7]

On March 31, 2017, Dominion submitted its 2017 AEMP Annual Report (the Report) for the Board's consideration. The Report was distributed for public review on July 30, 2018. Comments were received by the deadline of September 11, 2018 by Environment and Climate Change Canada (ECCC), the Department of Environment and Natural Resources of the Government of the Northwest Territories (GNWT-ENR). The Independent Environmental Monitoring Agency (IEMA) stated that its only comments on the AEMP Annual Report involve the Response Framework and therefore comments would be submitted in the separate review process for the Response Framework. The relevant comments received by IEMA in review of the Response Framework Version 3.0 are discussed in this Staff Report (see section 3.2). Board staff also submitted comments. Dominion provided responses to reviewer comments by the deadline of October 12, 2018. The Review Summary Table is available on the WLWB Online Registry.[8]

3.0 Reasons for Decision

Schedule 7, Condition 3 of the Licence requires that the AEMP Annual Report include the following information:

a) A summary of activities conducted under the Aquatic Effects Monitoring Program;
b) Tabular summaries of all data and information generated under the Aquatic Effects Monitoring Program in an electronic and printed format acceptable to the Board; and
c) An assessment of any identified environmental changes relative to baseline conditions that occurred as a result of the Project.

The Annual Report consists of four separate documents: Summary Report,[9] Evaluation of Effects (Part 1),[10] Data Report (Part 2),[11] and Statistical Report (Part 3).[12] In addition, DDEC has provided tabular data in spreadsheet[13] format in response to the Board's February 27, 2017 direction.[14] In consideration of Dominion's submission, reviewer comments, and proponent responses, the Board has approved the 2017 AEMP Annual Report because:

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[6] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017-2019 Design Plan - Version 6.1 - May 23_18.pdf
[7] See WLWB Online Registry for W2012L2-0001 - Ekati - 2015 AEMP Re-evaluation and Proposed Design - Board Directive and RFD - Feb 27_17.pdf
[8] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Review Summary and Attachments - Oct 12_18.pdf
[9] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Summary Report - Mar 31_18.pdf
[10] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 1 Evaluation of Effects - Mar 31_18.pdf
[11] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 2 Data Report - Mar 31_18.pdf
[12] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 3 Statistical Report - Mar 31_18.pdf
[13] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Data Files - Mar 31_18.zip
[14] See WLWB Online Registry for W2012L2-0001 - Ekati - 2015 AEMP Re-evaluation and Proposed Design - Board Directive and RFD - Feb 27_17.pdf

1. The Report satisfies the relevant terms and conditions set out in the Licence; and
2. As discussed in more detail below, issues raised through the review of this Report can be addressed through the 2018 AEMP Annual Report and the 2019 Aquatic Effects Re-evaluation Report.

- ***Decision #1: The Board has approved the 2017 AEMP Annual Report.***

3.1 AEMP Design

The AEMP Annual Report is an opportunity to review the previous year's monitoring results, while the Aquatic Effects Re-evaluation Report provides an opportunity for a more extensive review of the program, including a consideration of changes to the AEMP Design Plan. In review of the 2017 AEMP Annual Report, several suggestions were made with implications to the approved AEMP Design Plan. As discussed below, The Board believes that the next Aquatic Effects Re-evaluation Report will give an opportunity to consider changes if necessary and encourages reviewers to raise recommendations with implications for the AEMP Design in review of the 2019 Aquatic Effects Re-evaluation Report.

3.1.1 *Analyzed Variables*

The 2017 AEMP Annual Report identifies changes in total organic carbon (TOC) downstream of Long Lake Containment Facility (LLCF) and King Pond Settling Facility (KPSF), and determined that elevated TOC concentrations in Cujo Lake, Cujo Outflow, and Christine-Lac du Sauvage Stream are indicative of a potential mine effect. The GNWT-ENR recommended that dissolved organic carbon (DOC) be evaluated, because "organic carbon is an energy source and in conjunction with an estimate of dissolved metals is useful in assessing effects of mine effluent on aquatic receptors." The GNWT-ENR recommended that because of "the expected changes in this watershed due to the Misery Underground Development", DOC should be added to the list of measured variables (GNWT-ENR comment 5). The GNWT-ENR did not specify why it believes the Misery Underground Development would influence DOC concentrations. The Board is not aware of a discussion of DOC through the Misery Underground amendment proceeding.

In response, Dominion explained that DOC is captured as part of the measurement of TOC which is an evaluated variable.[15] In addition, Dominion stated that a lack of baseline data for DOC suggests it is "unlikely that an investigation of current DOC levels in Cujo Lake would provide clarity regarding the source of increasing TOC concentrations in Cujo Lake".

The 2017 AEMP identifies that "TOC concentrations were not measured during baseline years, making it difficult to discern whether the observed patterns result from mine effects or represent natural concentrations in the King-Cujo Watershed." The Board agrees that this same challenge would exist when analyzing DOC results. At this time, the Board does not believe that sufficient rationale has been provided for the measurement of DOC in addition to TOC. The Board believes this can be revisited in review of the next Aquatic Effects Re-evaluation Report.

[15] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017-2019 Design Plan - Version 6.1 - May 23_18.pdf

- ***Decision #2: Dominion is to consider the inclusion of dissolved organic carbon in the AEMP Design Plan in submission of the 2019 Aquatic Effects Re-evaluation Report.***

3.1.2 *Evaluated Variables*

The water quality monitoring program for the Ekati AEMP includes the laboratory analysis of water quality variables (i.e., analyzed variables). Analytical results for these variables are presented annually through the AEMP Data Report (i.e., Part 2 of the AEMP Annual Report),[16] with temporal trends presented graphically in the AEMP Evaluation of Effects (i.e., Part 1 of the AEMP Annual Report).[17] Of these analyzed water quality variables, a subset is selected for statistical evaluation (i.e., evaluated variables).

The GNWT-ENR recommended conductivity, total dissolved solids, and total suspended solids should be evaluated for the King-Cujo Watershed and Lac du Sauvage in future AEMP Reports (GNWT-ENR comment 4). The GNWT-ENR provided the following explanation for this recommendation:

> The integrative measurements such as conductivity and total dissolved solids are indicative of effluent and the strength of effluent. However, other integrative measurements like total suspended solids and turbidity are measures of waters quality which can be indicative of a variety of processes such as eutrophication, sediment or bank perturbation, etc. As such, changes in these integrative variables serve as a general warning of change that should trigger an investigation.

In response, Dominion stated that specific conductivity and TDS are included indirectly as other variables such as chloride and sulphate (response to GNWT-ENR comment 4). Dominion stated that the same rationale had previously been included in the 2015 Aquatic Effects Re-evaluation Report (Section 5.3.5) and was approved by the Board. Dominion identified that there is no increasing trend for TSS, TSS is addressed in the Response Framework, and the inclusion of these variables as evaluated variables will be considered in the 2019 Aquatic Effects Re-evaluation Report

In addition, the GNWT-ENR stated that DOC should be evaluated (GNWT-ENR comment 5). As discussed above, DOC is not currently measured (i.e., analyzed in the laboratory) as part of the Ekati AEMP. The Board believes Dominion has provided a reasonable response to concerns raised. The Board does not believe sufficient rationale has been provided for the addition of DOC at this time. If necessary, this may be revisited in review of the next Aquatic Effects Re-evaluation Report.

3.1.3 *Benthic Invertebrate Survey*

Lake benthos are a group of organisms that live in association with lake sediments. They provide an important source of food for many species of fish. The 2017 AEMP Annual Report notes that three

[16] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 2 Data Report - Mar 31_18.pdf
[17] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 1 Evaluation of Effects - Mar 31_18.pdf

subsamples are collected per replicate for the benthic invertebrate survey. Lake benthos samples are collected in triplicate in late July or early August of each year. ECCC recommended Dominion discuss if this level of effort (i.e., triplicate sampling) provides sufficient precision for the measurement of benthic density at each station (e.g., <20% standard error as a percentage of the mean, ECCC comment 11).

Dominion stated that the collection of three subsamples for benthic invertebrates in the Ekati AEMP aligns with Environmental Effects Monitoring (EEM) Technical Guidance document (EC 2012) and recommended no changes to the AEMP are warranted. Dominion did not discuss the precision provided by the current sampling design in its response; however, ECCC did not make a specific recommendation for changes to the AEMP Design. The Board has not considered changes to the benthic surveys at this time. If ECCC believes a different level of effort is required, a recommendation should be provided in review of the 2019 Aquatic Effects Re-evaluation Report.

3.1.4 *Phytoplankton Sampling*

ECCC recommended that Dominion consider an evaluation of seasonal phytoplankton cycles in selected lakes, if not previously conducted (ECCC comment 8). In response Dominion described July, August, and September sampling that occurred until 2003. The Board believes Dominion's response identifies that seasonal sampling has been previously conducted.

3.2 Evaluation of Effects

3.2.1 *Sediment Quality*

In accordance with the approved 2017-2019 AEMP Design Plan, sediment sampling occurs every three years, with sampling occurring in 2017. In the 2017 AEMP Annual Report, antimony, molybdenum, strontium, selenium, and uranium sediment quality showed signs of change and/or the potential for mine-related effects in some AEMP-monitored lakes. In the Koala Watershed, mine-related changes in sediment quality were concluded to have occurred for molybdenum and selenium and in the King-Cujo Watershed, mine-related changes in sediment quality were concluded to have occurred for molybdenum and uranium. This is not the first-time changes in sediment quality have been identified. In the 2014 AEMP Annual Report,[18] Dominion concluded that changes in sediment concentrations indicating a potential mine effect were observed in the Koala (i.e. strontium, antimony, and molybdenum) and King-Cujo (i.e., total nitrogen, molybdenum, and strontium) Watersheds.

A literature review for sediment quality variables exhibiting mine effects or potential mine effects was completed as part of the 2017 AEMP Annual Report. Dominion stated that this review "demonstrates the limited availability of guidelines and toxicological studies applicable to freshwater sediment quality for many variables" (response to WLWB staff comment 1). Dominion compared monitoring data to toxicity thresholds in the literature and found the following:

[18] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2014 Annual Report - Part 1 Evaluation of Effects - Mar 31_15.pdf

- Antimony sediment concentrations did not exceed the identified literature value (11.2 mg/kg dry weight, European Union, 2008) in 2017;
- Molybdenum and uranium sediment concentrations were "well below the most relevant toxicity thresholds representing low risk to aquatic life" (response to WLWB staff comment 1).
- The literature review found no appropriate test results for strontium sediment toxicity; however, when compared to average literature values, Dominion concluded that it is unlikely that observed increases of sediment strontium concentrations would result in adverse effects to aquatic life.
- Selenium concentrations in Leslie Lake exceeded the British Columbia Ministry of Environment and Climate Change (BC MOECCS) alert concentration of 2.0 mg/kg (dry weight).

The 2017 AEMP Annual Report stated that "[b]ecause the observed mean selenium concentrations in Leslie Lake sediments exceed 2.0 mg/kg, there may be a potential for adverse effects to aquatic life in this lake." As discussed above, no action level exists for selenium sediment quality. Dominion exceeded its selenium water quality low action level in the King-Cujo Watershed for the 2016 and 2017 open-water seasons and the Board has since approved the Selenium Response Plan Version 1.2.[19] Although an approved water quality selenium response plan exists, it was submitted in response to action level exceedances the King-Cujo Watershed, not the Koala watershed where the mine effect was identified in sediments. IEMA and ECCC both questioned whether additional action was required in response to the observed selenium concentrations (ECCC comment 7; IEMA comment 10 raised during the review of the Response Framework[20]). The Board believes that the identification of potential for adverse effects to aquatic life, in an area where no response plan has been triggered, to be an indication that changes in sediment quality may not be accurately reflected by changes in water quality. The Board believes this to be an indication that an action level for selenium sediment quality is likely necessary.

Figure 4.1-a in the 2017 AEMP Annual Report identifies an exceedance of the CCME selenium water quality guideline in the Leslie-Moose Stream. In response to ECCC comment 4, Dominion clarified that the identified exceedance was included in error and no CCME exceedance of selenium had occurred in the Leslie-Moose Stream, Dominion provided an updated Figure (see Review Summary and Attachments[21]).

The Ekati AEMP monitors large-bodied fish every six years and small-bodied fish every three years. The 2012 AEMP Annual Report identified increasing levels of selenium in liver and muscle tissue of large bodied fish in both the Koala and King-Cujo watersheds[22] and the 2015 AEMP reported increasing selenium levels in Slimy Sculpin tissue in both the Koala and King-Cujo.[23] Both 2012 and 2015 AEMP Annual

[19] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - Selenium Response Plan - Version 1.2 - Apr 27_18.pdf

[20] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - Response Framework - Version 3.0 - Review Summary and Attachments - Oct 18_18.pdf

[21] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Review Summary and Attachments - Oct 12_18.pdf, pg. 25

[22] See WLWB Online Registry for W2009L2-0001 - Ekati - AEMP - 2012 Annual Report V1.0 - Part 1 Evaluation of Effects - Apr 2_13.pdf pg. 4-190

[23] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2015 Annual Report - Part 1 Evaluation of Effects - Mar 31_16.pdf Table 3.3-35 and Table 4.3-36

Reports indicate that selenium levels are increasing in small and large-bodied fish. Dominion identified that a detailed review of the environmental fate and toxicological effects of selenium to fish is provided in Appendix A of the Response Plan for Fish.[24]

Dominion identified that if the BC MOECCS alert concentration is exceeded, the BC MOECCS recommends that tissue concentrations in fish are measured to ensure that bioaccumulation and trophic transfer are not occurring in aquatic food webs (response to WLWB comment 2).[25] The 2018 fish sampling results will be reported in the 2018 AEMP Annual Report. Dominion committed to provide a discussion of linkages between selenium concentrations in water, sediment, and fish tissue if mine effects in fish are identified for selenium in the 2018 AEMP Annual Report.

As stated in the 2014 AEMP Board's Reasons for Decision:[26]

> The Board questions whether changes in sediment which may be occurring at a rate that is different than water quality, or remains undetected/not triggered in analysis of water quality results, could result in impacts to biological organisms. Waiting for a change in biology to further investigate the toxicity of sediment concentrations may be problematic.

The Board believes that it is unclear whether a time lag would exist between effects in sediment and effects in fish tissue. Therefore, given the potential for adverse effects to aquatic life identified due to selenium sediment concentrations, a discussion of linkages between selenium concentrations in water, sediment, and fish tissue is necessary regardless of the 2018 results. However, since additional fish tissue data will be available in the 2018 AEMP Annual Report, the Board agrees it would be a good opportunity to discuss these linkages.

The Board recognizes that three separate response plans to address selenium-related action levels exceedances (i.e., water quality, sediment quality, and fish tissue) may result in additional administrative effort. If Dominion believes it would be more appropriate to propose a single response plan for selenium that is updated in response to any selenium action level exceedance, it should propose so in the 2018 AEMP Annual Report.

- ***Decision #3: Dominion is to discuss/evaluate the inclusion of selenium sediment quality in the Response Framework as part of the 2018 AEMP Annual Report. This should include, but not be limited to, the following:***
    - ***a) Investigation of the relationship between sediment quality, water quality, and fish tissue concentration for selenium;***

[24] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - Fish Response Plan - Version 1.1 - May 31_17.pdf

[25] BC MOE 2014. Companion Document to: Ambient Water Quality Guidelines for Selenium Update. British Columbia Ministry of Environment, Water Protection and Sustainability Branch, Environmental Sustainability and Strategic Policy Division: Victoria, BC.

[26] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2014 Annual Report - Board Directive and Reasons for Decision - Sep 30_15.pdf

b) Investigation of difference in the timing of changes to selenium concentrations in sediment quality, water quality, and fish tissue;

c) A review and discussion of applicable literature and guidance available; and

d) If the results of a-c indicate the need for an action level, propose low, medium, and high action levels for selenium sediment quality. If not, provide rationale based on the evidence provided in a-c.

The approved Response Framework Version 2.0 does not include any action levels for sediment quality. Dominion has previously stated that concentrations measured in sediment "follow the same pattern observed for concentrations in water quality concentrations,"[27] and proposed that action levels for sediment not be included in its Response Framework. The Response Framework states that water quality variables are considered to be more appropriate than sediment for the following reasons:

1. Water quality in the receiving environment is (appropriately) monitored more frequently than sediment quality. Sediment quality is monitored every three years whereas water quality is monitored multiple times annually. Thus, changes in the quality of water can be detected more quickly (on an annual or seasonal basis).
2. Few changes in sediment quality in the receiving environment at the Ekati Diamond Mine have been observed and generally, corresponding changes in water quality variables also exist…
3. Sediment quality variables that have changed as a result of mine operations to date are assessed in the [Response Framework] as part of the water quality component.
4. Sediment quality was not identified as a VEC in the 1995 EIS or 2000 EA.
5. Sediment quality was not identified as a key environmental risk in the 2016 EIR.
6. Few relevant sediment quality benchmarks are available.

Dominion was asked to describe whether it believes the inclusion of sediment quality variables in the Response Framework should be revisited (WLWB staff comment 1). In response, Dominion stated that the rationale presented in the approved Response Framework Version 2.0 still applies, arguing that each of the sediment quality variables that exhibited a mine effect or potential mine effect in the 2017 AEMP also exhibited a change in water quality in the same watershed (response to WLWB comment 1). The Board notes that although a change was exhibited in water quality, a low action level was only exceeded for selenium, therefore water quality response plans and associated actions have not been required for antimony, molybdenum, strontium, or uranium. As discussed above, the water quality response plan submitted for selenium is for King-Cujo Watershed, while a mine-effect for sediment was identified in the Koala Watershed.

Antimony, molybdenum, strontium, and uranium water quality concentrations did not exceed the respective water quality low action levels in 2017, and therefore no response plans were submitted for

[27] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2014 Annual Report - Summary Report - Mar 31_15.pdf pg. 4-5.

these variables. The Board believes the five changes and/or the potential for mine-related effects observed in 2017 indicate that the Response Framework assumption that "few changes in sediment quality in the receiving environment at the Ekati Diamond Mine have been observed" may no longer be the case. The Board notes that a fish response plan was submitted in response to exceedances of antimony, molybdenum, and selenium in the Koala Watershed and selenium and uranium exceedances in the King-Cujo Watershed. The Board believes it is unclear whether changes in sediment quality and potential effect on fish are adequately represented by observed changes in water quality variables.

The Board acknowledges that limited guidance exists for sediment toxicity compared to water quality toxicity; however, acknowledge that sediment quality action levels exist for other mines in the NWT.[28] The Board believes that incorporation of sediment quality action levels in the Response Framework may be warranted. Because sediment sampling occurs every three years, it will be monitored next in 2020. The Board believes that Dominion should investigate this further in the 2019 Aquatic Effects Re-evaluation Report to allow a decision to be made prior to reporting of 2020 sediment monitoring.

- ***Decision #4: In submission of the 2019 Aquatic Effects Re-evaluation Report, Dominion is to revisit the inclusion of action levels for sediment quality in the Response Framework. This should include but not be limited to:***
    - ***a) Investigation of the relationship between sediment and water quality concentration for evaluated sediment quality variables;***
    - ***b) Investigation of the ability for water quality to accurately predict potential for effects of sediment quality for evaluated sediment quality variables;***
    - ***c) A review of literature and guidance available; and***
    - ***d) As appropriate, propose sediment quality action levels. Please provide appropriate rationale.***

3.2.2 *Biology*

The GNWT-ENR recommended Dominion provide details on the implications of biological composition shifts due to the changes in available nitrogen in the Receiving Environment (e.g., short- and medium-term implications of nitrogen status based on changes in biological assemblages; the GNWT-ENR comment 1). The GNWT-ENR acknowledged that this recommendation has been made before; however, the discussion was intended to provide insight on whether Dominion maintains the position that a low-level action level for eutrophication status should not include total nitrogen.

In summary, Dominion stated that the results of the Aquatic Ecology Synthesis (AES) study[29] and the 2017 AEMP Annual Report demonstrate that both functional composition and taxonomic composition of phytoplankton assemblages are returning to conditions similar to baseline. Dominion states that that no changes are required at this time. The GNWT-ENR did not make a specific recommendation for changes

[28] See WLWB Online Registry for Diavik - AEMP Design Version 5.0 - Apr 23_18.pdf

[29] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2015 3yr Re-evaluation and Design Plan - Report and Appendices - Jun 30_16.pdf pg. 4-27

to the AEMP Design or Response Framework for consideration. The Board notes that recommendations can be provided in review of the 2019 Aquatic Effects Re-evaluation Report.

ECCC identified an increase in phytoplankton density for most reference and exposure lakes monitored in the Koala watershed in 2016, followed by a decrease in 2017 (ECCC comment 10). Dominion stated that it is unclear whether the current conditions are a continuation of the return to historical functional composition first identified in the 2015 Aquatic Effects Re-evaluation Report, or whether changes in the phytoplankton community observed in 2016 were due to regional conditions since similar changes were observed in the reference lakes. ECCC did not make any specific recommendations regarding this change.

3.3 Non-Compliance

Review of the 2017 AEMP Annual Report identified two issues of non-compliance that do not appear to have been reported in accordance with Part B, Condition 18:

> The Licensee shall notify the Inspector and the Board immediately of any non-compliance with the conditions of this Licence or any direction provided by the Board.

In section 1.5.1 of the 2017 Evaluation of Effects, Dominion identifies that water Discharged from Cell E to the Receiving Environment met Effluent Quality Criteria (EQC) defined in Water Licence W2012L2-0001 except for a short time period in July when TSS exceeded the maximum EQC (25 mg/L).[30] Dominion attributed the high TSS concentrations to persistent strong north-west winds. Dominion described that the non-compliant Discharge sample was collected on July 19 (28 mg/L TSS) and Discharge was immediately stopped when this result was received from the analytical laboratory on July 27.

The Board notes that the July 19 (28 mg/L TSS) results were included in the July 2017 SNP Report;[31] however, an EQC exceedance was not explicitly identified or flagged. In accordance with Part B, Condition 18, formal notification should have been provided to the Board and Inspector immediately. This will be included in Dominion's Record of Compliance. The Board believes that moving forward any non-compliance should also be identified in submission of SNP results.

- ***Decision #5: Moving forward, Dominion is to highlight any concentrations that exceed EQC in the covering letter that accompanies the Surveillance Network Program (SNP) reports required by Part D, Condition 1 of the SNP.***

Part J, Condition 2 of the Licence requires Dominion to "operate in accordance with the approved AEMP Design Plan". ECCC identified that the AEMP Annual Report's Summary Report,[32] states that "complications resulted in the July sampling not being completed and the September Sampling being

[30] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Part 1 Evaluation of Effects - Mar 31_18.pdf pg. 1-5

[31] See WLWB Online Registry for W2012L2-0001 - Ekati - SNP Report - July 2017 - Aug 30_17.pdf

[32] See WLWB Online Registry for W2012L2-0001 - Ekati - AEMP - 2017 Annual Report - Summary Report - Mar 31_18.pdf

delayed until early October" for the Pigeon-Fay and Upper Exeter Watershed (ECCC comment 3); however, no details on the nature of the complications are provided. Dominion responded stating that sample collection from the Pigeon-Fay and Upper Exeter Watershed was not scheduled for July due to an "operational error". Samples were collected from these locations as required in August 2017. In addition, due to adverse weather Dominion explained that the sample collection scheduled for September 30, 2017 was collected one day late October 1, 2017.

- ***Decision #6: Dominion is to include in the 2018 AEMP Annual Report a discussion of the missed 2018 AEMP sampling, including:***
  - ***a) Further explanation of the reason samples were missed in 2017; and***
  - ***b) A corrective action plan.***

The Board notes that the missed sampling in July represents non-compliance with the requirement to "operate in accordance with the approved AEMP Design Plan" and should have been reported to the Board and an Inspector as per Part B, Condition 18. This will be included in Dominion's Record of Compliance.

3.4 Reporting Details

Several recommendations were made regarding the communication and presentation of AEMP results (ECCC comment 1, 2, 9, 12 and 13). The Board notes that these comments reflect potential suggestions, rather than identifying incorrect information; therefore, the Board does not require any changes at this time. The Board encourages Dominion to incorporate reviewer feedback where beneficial and reasonable.

Respectfully submitted,

Signed the 3rd Day of December 2018, on behalf of the Wek'èezhìi Land and Water Board

Witness

Joseph Mackenzie
Acting Chair, Wek'èezhìi Land and Water Board