



Independent Environmental Monitoring Agency

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July 10, 2018

Ms. Laurie McGregor  
Environmental Assessment Analyst  
Environment and Natural Resources  
Government of the Northwest Territories  
P.O. Box 1320, Yellowknife NT  
X1A 2L9

**Re: 2017 Environmental Agreement and Water Licence Annual Report and Summary Report**

Dear Ms. McGregor,

The Agency has had an opportunity to review Dominion Diamond's 2017 Annual Environmental Report and the plain language summary.

The Agency is of the view that the 2017 Annual Environmental Report is satisfactory as it has met the requirements described in the Environmental Agreement and Water Licence. However, the Agency believes it could be improved by addressing some of the concerns raised and clarifications requested below.

The Agency makes the following general observations with a view to improving future Annual Reports. The Agency was pleased to see that last year's comments and responses were included at the end of the 2017 report, although it was unclear why only 3 of the Agency's comments were addressed. For clarity, the Agency has broken down its review into two parts: technical report and the plain language summary. Also, for each part comments have been further separated into issues of concern and clarification. The issues of concern represent issues the Agency has with a section of the report that we feel is not appropriate or could be improved. The clarification section has general clarification questions, corrections or suggestions on how best to ensure the document is clear and consistent.

# **Technical Report: 2016 Environmental Agreement and Water Licence Annual Environmental Report**

## **ISSUES OF CONCERN**

### **Technical Report – Main Body**

#### **Section 3.2(n)(VI) – Updated results of ongoing Acid/Alkaline Rock Drainage and related geochemical test work**

Section 3.2 VI) refers to results of ongoing geochemical test work that is provided in the Waste Rock and Overburden Storage Management Plan (WROMP), but the Annual Report does not include any detailed information.

**Recommendation 1:** The annual report should include the geochemical test work collected.

Section 3.2(n)(VI) states that “... *The majority of rock types mined at the Ekati Diamond Mine are not potentially acid generating (PAG) or have low potential to generate acidity.*” The methodology used by Dominion Diamond to determine acid neutralizing potential of waste rock has resulted in much discussion amongst the Wekheezii Land and Water Board, the company, regulators and IEMA during the past couple of years. Despite all efforts to date, the question of whether to use ‘total neutralizing potential’ or ‘effective neutralizing potential’ remains unresolved.

**Recommendation 2:** Clarify which methodology is used to determine acid generating potential of waste rock when referring to rock types being not potentially acid generating or having low potential to generate acidity.

Section 3.2 VI) states "*The Misery WRSA is probably of sufficient age that the effects of acidification ought to be apparent if the schist were becoming acidic. The Misery WRSA seepage is currently not acidic.*" Given that mining occurred in approximately 2000-2005, it is possible that acid rock drainage and metal leaching may not yet be measurable in seepage flows even if they are occurring. Presence of acidification products in seepage flows requires both development of acidic conditions and transport of oxidation products through the seepage pathways, processes that can both take many years.

**Recommendation 3:** Dominion Diamond should remove this misleading statement.

#### **Section 3.4(v) Summary of results of the annual Closure and Reclamation Plan Progress Report**

With only a few exceptions, the Annual Report summarizes results and finding of monitoring conducted by Dominion Diamond. Section 3.4(v) however, refers the reader to Appendix F of the Report for summaries of amendments to the ICRP, reclamation work and reclamation security estimates. No summary is provided in section 3.4(v) itself. It would be informative if a summary of annual closure and reclamation amendments, work and securities were to be provided within the body of the Report.

This comment is also relevant to sections 4.2.1 (p. 4-6), 4.3.1 (p. 4-9) and 4.3.5 (p. 4-16).

**Recommendation 4:** Provide summaries of major findings in sections 3.4, 4.2.1, 4.3.1 and 4.3.5 instead of referring the reader solely to an Appendix of the Report. This would be consistent with most other sections and the overall purpose of the report

#### **Section 4.3.2 – Stationary Emission Sources**

Section 4.3.2 states Dominion Diamond reports greenhouse gas emissions to the federal Greenhouse Gas Emissions Reporting Program each year based on diesel consumption from their mobile fleet, aviation activities, power generation, heating, blasting, incineration, crushers, compressors and pumps along with estimated emissions from the sewage treatment plant, in-vessel composter and used oil consumption. The total GHG annual emission is reported in tonnes CO<sub>2</sub>e along with notable variations from the previous reporting period. It would be informative if Dominion Diamond was to provide a summary table of GHG emissions by source, as such calculations would have been undertaken as part of federal reporting requirements and in order to provide the reported annual emissions total.

**Recommendation 5:** Include a table that quantifies greenhouse gas emissions by source.

#### **Section 4.3.3 – Wildlife, including caribou and bears**

Zone of Influence Monitoring - This paragraph concludes with the statement *“Preliminary results are consistent with several studies on boreal and barren-ground caribou that estimate a ZOI of 1-5 km.”* This statement is actually referring to studies that have observed a zone of effect or effect size of 1–5 km for visibility of mining activities, noise levels, dust on vegetation, PM<sub>2.5</sub>, soil pH, and percent vegetation cover along transects radiating out from the Ekati Diamond Mine. This is not the caribou Zone of Influence (ZOI) which is the change in relative distribution and abundance of caribou as a result of disturbance. This same comment applies to Appendix H - 2017 Wildlife Effects Monitoring Program Summary.

**Recommendation 6:** The report should clarify in the technical report and Appendix H that this is the detectable effect size or zone of effect for many of these parameters, not the caribou ZOI.

#### **Section 4.3.4 – Traditional Knowledge Projects and Community Outreach**

In Dominion Diamond’s reporting on Traditional Knowledge Projects and Community Outreach it appears that some long standing TK programs have not been reported on this year. It is unclear whether these projects have been discontinued.

**Recommendation 7:** Dominion Diamond report on the status of all TK projects in its Annual Report and identify those, if any, that have been discontinued.

### **Section 4.3.7 – Vegetation, Including the Loss of Habitat**

Annual changes in, and the total length of, linear developments (roads, power lines, etc.) should be reported in the annual report together with currently reported additional annual surface area of habitat disturbed due to mine development and total amount of habitat loss caused by the project footprint since commencement of the Ekati project in 1997. With construction of a portion of the Jay road in 2017, a significant previously undisturbed region of habitat is now being accessed for mine development. While the additional disturbed surface area represented by haul and access roads is small compared to the overall project footprint, their overall length represents a significant potential semi-permeable barrier to wildlife movement and migration which should be reported as a contributing factor to loss of habitat.

**Recommendation 8:** Include annual changes in, and the total length of, linear developments along with direct loss of habitat. <sup>1</sup>

### **Appendix A: 2017 Surveillance Network Program Summary**

For discharge locations, it would be useful if the tables in Appendix A provided shading or notes to identify whether samples have exceeded any effluent criteria. Perhaps Dominion has done this and there were no exceedances. If so, then this should be noted. Nitrite at 1616-30b appears to exceed the maximum average concentration criterion.

**Recommendation 9:** For discharge locations where criteria apply, Dominion Diamond should include a column that identifies the effluent criterion. Reporting of hardness used for calculation of effluent criteria that rely on hardness would also be beneficial.

### **Appendix C: Summary of Ground Temperature Conditions in Waste Rock Storage Areas**

The TetraTech memo on ground temperature includes some recommendations (e.g., survey of volumes of waste rock removed from Panda/Koala Waste Rock Storage Area, installation of additional ground temperature cables (GTCs) in specific areas).

**Recommendation 10:** Dominion Diamond clarify if they intend to carry out TetraTech's recommendations.

Section 2.3 of the TetraTech memo makes statements about the thickness of the active layer and the temperature of the waste rock (e.g., "*the thickness of the active layer remains quite variable*"). However, there is no recent information about variability in active layer thickness because there is only one functional GTC - we do not know if the thickness remains variable.

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<sup>1</sup> This Recommendation is similar to one provided by IEMA on the 2016 Environmental Agreement and Water Licence Annual Report (letter to K. Witherly from IEMA, July 7, 2017).

Similarly, in Section 2.4, TetraTech describes current conditions in the Coarse Processed Kimberlite Storage Pile (CPKSP), e.g., "Ground temperatures in the CPKSP continued to stay warm compared", "Temperatures in the CPKSP are slightly warmer in the upper 4 m compared with 2009" and "The current temperature of the CPK remains slightly below 0°C." There have been no functional GTCs in the CPKSP since 2014, so there are no data to support statements about current conditions.

**Recommendation 11:** Dominion Diamond explain how statements regarding active layer thickness and ground temperatures can be made with limited to no data to support them.

## **Appendix H: 2017 Wildlife Effects Monitoring Program Summary**

### **Wildlife-Power Line Interactions**

The document states "*the power line does not impede caribou movement or change caribou behaviour*" based on "*observations of caribou near the power line and crossing the power line*". Incidental observations of caribou near or crossing the power line do not constitute evidence for the power line having no effect on caribou crossing behaviour and deflection rates. This comment also pertains to the Annual Report Summary 2017 (p- 28).

**Recommendation 12:** Dominion Diamond should remove this conclusion from the technical report and Annual Report Summary 2017.

### **CLARIFICATION**

#### **Section 3.1 a) Measuring and Reporting Water and Waste, to Section 3.1 j)**

Figure 1 indicates 70,956 m<sup>3</sup> of water was discharged from Misery Open Pit to King Pond Settling Facility, while a volume of 129,483 m<sup>3</sup> is given for Misery to King Pond mine pumping in Table 6. Which amount is correct, or are the amounts from different sources?

Figure 1, shows a total of 40,240 m<sup>3</sup> of fresh water used for road watering from Grizzly Lake (12,000 m<sup>3</sup>), King Pond SF (3,040 m<sup>3</sup>), and LLCF (25,200 m<sup>3</sup>), while the text in Section 3.1 (P. 3-7) and Table 1, indicates water for road dewatering came from Lac de Gras and Pigeon Pond (35,280 m<sup>3</sup> + 880 m<sup>3</sup>= 36,160 m<sup>3</sup>). Was the total amount used for road watering 40,240 m<sup>3</sup>, or the total of the two amounts 40,240 m<sup>3</sup> + 36,160 m<sup>3</sup> = 76,400 m<sup>3</sup>?

**Recommendation 13:** The differences in these figures should be clarified, and details or the source provided.

#### **Section 3.2(n)(III) and (IV)– The quantity of Coarse and Fine Processed Kimberlite deposited in each deposition location**

Sections 3.2(n)(III) and (IV) describe the quantity of coarse and fine processed kimberlite deposited in the respective disposition locations in 2017. This information is also depicted graphically in Figure 2. Sections 3.2(n)(III) and (IV) do not describe the source of the processed kimberlite while Figure 2 describes the source as being the Process Plant. The result is that the readers who may be unfamiliar

with the milling process at the Ekati mine would need to know to refer to Table 2 in order to identify the source of the kimberlite waste.

**Recommendation 14:** Identify the source of coarse and fine processed kimberlite waste described in sections 3.2(n)(III) and (IV).

### **Section 4.2.3 – Reclamation Research**

Section 4.2.3 refers the updated water quality models for freshwater caps in pits that contain processed kimberlite (Beartooth, Panda, Koala) and states that these are addressed in a technical memorandum that is in "*Appendix F of the 2017 Closure and Reclamation Progress Report.*" The Progress Report is included as Appendix F of the Annual Report, but the Appendix re: water quality models is not included. The Agency is assuming that they are in the actual Closure and Reclamation Report on the registry.

**Recommendation 15:** The wording should either be included as described or changed to more accurately describe where the information can be found.

## **Plain Language Summary: 2016 Environmental Agreement and Water Licence Annual Environmental Report Summary**

We also reviewed the Summary Report of the Annual Report. The Agency is pleased to report that the Summary Report overall was very well written, easy to understand, had excellent useful graphics and photos and provides a good synopsis of the overall mine operations and monitoring programs.

A significant omission is apparent in discussion of AEMP results. Page 21 states "*Despite increases in some...sediment quality variables in 2017, concentrations [of variables] were generally below benchmark values, and would not be expected to have toxic effects to aquatic life.*" This ignores a new finding in 2017 that, according to the AEMP report authors there may be potential for harmful effects to aquatic life in Leslie Lake due to higher-than-guidelines levels of selenium in its sediments. This is a significant omission from the Summary Report, as selenium toxicity is expressed in reproductive failure and embryo deformities in fish, and next year (2018) will see fish tissue contaminants being monitored for the first time in 6 years.

**Recommendation 16:** The Summary Report should mention the significant new AEMP result that selenium in Leslie Lake immediately downstream of the LLCF contains sediments that have selenium concentrations above BC provincial and USEPA guidelines for protection of aquatic life.

A good explanation of what benthic invertebrates are is given in a text box on p. 24. This descriptive explanation would have benefitted by adding some examples of the type of organisms the term "benthic invertebrates" refers to (insect larva, worms, snails and crustaceans living on lake bottom).

Figure 4 and 5 provide flow charts summarizing waste management and water/liquid waste transfers for the Ekati mine. They are simpler and notably easier to understand than corresponding Figures 2

and 1 flow charts in the full Annual Report for 2017. However some inconsistencies between figures in the two documents have been identified:

- Summary 2017 Figure 4 p. 8 leaves out smaller waste flows presented in Figure 2 p. 1-3 of the full report.
- Misery Pit to KPSF water/liquid waste transfers in Figure 5, p. 9 of Summary 2017 are different, at 25,666 m<sup>3</sup> vs 79,956 m<sup>3</sup> in Figure 1 of the full report, and the 129,483 m<sup>3</sup> noted in Table 6, of the full report.
- Figure 1 from the full report lists 17,075 m<sup>3</sup> from Desperation Pond to the King Pond Settling Facility, while the 2017 Summary does not include this connection at all.

**Recommendation 17:** These differences should be explained or resolved.

Should you have any questions concerning these comments, the Agency is pleased to discuss these at your convenience.

Sincerely,



Jaida Ohokannoak

Chairperson

Cc: Dominion Diamond– April Hayward  
Tłı̨chǫ Government – Jessica Hum  
Yellowknives Dene First Nation – Johanne Black  
Łutsel K'e Dene First Nation – Ray Griffith  
North Slave Metis Alliance – Nicole Goodman  
Kitikmeot Inuit Association – Geoff Clark  
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