Wek’èezhii Land and Water Board  
1-4905 48th St.  
Yellowknife, NT X1A 3S3  
Attention: Sarah Elsasser, Regulatory Specialist

Dear Ms. Elsasser,

Subject: Fisheries and Oceans Canada Intervention - W2015L2-0001 Type A Water Licence TSS Amendment

The Fisheries Protection Program of Fisheries and Oceans Canada (DFO) has conducted a technical review of the Water Licence Amendment Application - TSS (the Application) submitted by Diavik Diamond Mines (2012) Inc. (DDMI) to the Wek’èezhii Land and Water Board on October 21, 2015.

DFO comments are based on our departmental mandate under the Fisheries Act, specifically the management and protection of fish and their habitat.

DFO will be attending the Public Hearing scheduled in Yellowknife on February 12, 2016, and will be available to answer questions regarding our intervention at this time.

If you have any questions or comments related to the technical review submission please contact Julie Marentette at 867-669-4934 or by email at Julie.Marentette@dfo-mpo.gc.ca.

Sincerely,

Original signed by

Julie Dahl  
Regional Manager, Fisheries Protection Program  
Fisheries and Oceans Canada

ATTACHMENT: INTERVENTION
FISHERIES AND OCEANS CANADA


Submitted to:
Wek’eezhii Land and Water Board (WLWB)
January 20, 2016
DFO File No.: 98-HCAA-CA6-00021
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**Executive Summary**

The Diavik Diamond Mine Project (The Project) is an existing open pit diamond mine operated by Diavik Diamond Mines (2012) Inc. (DDMI). The Project consists of several dikes and pits previously constructed (A154, A418) or in the process of construction (A21) in Lac de Gras, mine infrastructure, waste rock piles and roads.

The Fisheries Protection Program of Fisheries and Oceans Canada (DFO) is responsible on behalf of the department for regulatory review of proposed developments occurring in or near Canadian fisheries waters. The Program has reviewed DDMI’s Type A Water Licence Amendment Application for the Diavik Project and is providing DFO’s comments based on our mandate to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. DFO’s primary focus in reviewing proposed developments in and around fisheries waters is to ensure that works, undertakings and activities are conducted in such a manner that is in compliance with the applicable provisions of the *Fisheries Act*.

The fisheries protection provisions of the *Fisheries Act (2013)*, specifically subsection 35(1), state that “No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery or to fish that support such a fishery.” However, under paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans may issue an Authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish. *Serious harm to fish* is defined in Section 2 of this Act as the death of fish, or permanent alteration to or destruction of fish habitat.

DFO is providing the following Intervention submission to the Wek’èezhii Land and Water Board. In summary:

**Change to Water Licence W2015L2-0001, Part H, Item 31**

DFO has provided comments on DDMI’s request to amend the total suspended solids (TSS ) limit in the Water Licence from 25 mg/L in any grab sample to 25 mg/L over a 30-day averaging period in daily grab samples.

**Suggested TSS Trigger Levels**

DFO recommends that DDMI clarify the rationale for their suggested TSS trigger levels in a revised version of the Construction Environmental Management Plan.
1.0 Introduction

This technical review submission summarizes Fisheries and Oceans Canada’s (DFO) assessment and recommendations concerning the proposed Type A Water Licence Amendment for the Diavik Project. The purpose of this submission is to provide expert advice to the Wek’eezhii Land and Water Board (WLWB) to assist in their assessment of this Application.

As directed by the WLWB, this submission focuses on detailed analysis of the Developer’s Assessment Report (DAR) documentation, with the objective of assessing the quality of the supplemental and/or revised information presented by the Developer in support of the Project proposal, and reflects DFO’s mandate.

2.0 Mandate, Relevant Legislation and Policy

The Constitution Act (1982) provides the federal government with exclusive authority for coastal and inland fisheries within Canada’s territorial boundaries. DFO exercises this power through, the administration of the Fisheries Act and some aspects of the Species at Risk Act. Under the Fisheries Act, DFO is responsible for the management, protection and conservation of fish (which include marine mammals as defined by the Fisheries Act) and their habitats. The Minister of Fisheries and Oceans is one of the competent ministers under the Species at Risk Act (SARA).

In general, the Fisheries Protection Program of DFO undertakes the review of proposed developments in and around fisheries waters to ensure that works, undertakings and activities are conducted in such a way that the proponents are in compliance with the applicable provisions of the Fisheries Act.

The mandate of the Fisheries Protection Program is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. Subsection 35 (1) of the fisheries protection provisions of the Fisheries Act states that “No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational, or Aboriginal fishery or to fish that support such a fishery.

Fisheries and Oceans Canada interprets serious harm to fish as:

- the death of fish;
- a permanent alteration to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;
- the destruction of fish habitat of a spatial scale, duration, or intensity that fish can no
longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of these life processes.

However, under paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in *serious harm to fish*, subject to the consideration of the four factors in Section 6 of the *Fisheries Act*:

1. The contribution of the relevant fish to the ongoing productivity of commercial, recreational or Aboriginal fisheries;
2. Fisheries management objectives;
3. Whether there are measures and standards to avoid, mitigate or offset *serious harm to fish* that are part of a commercial, recreational or Aboriginal fishery, or that support such a fishery; and
4. The public interest.

The Fisheries Protection Program is guided by the “Fisheries Protection Policy Statement,” the intent of which is to provide guidance to Canadians to ensure that they are complying with the *Fisheries Act*. It strengthens the Government’s ability to address key threats to the productivity and sustainability of our fisheries, through standards and guidelines to avoid, mitigate and offset impacts to fisheries and to ensure compliance with these requirements.
## 3.0 Technical Review Comments

### 3.1 Changes to Water Licence, Part H, Item 31

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<th>3.1 Change to Water Licence W2015L2-0001, Part H, Item 31</th>
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<td>Subject / Topic</td>
<td>TSS Limit and Monitoring</td>
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#### Developer’s Conclusion

As stated in the Water Licence Amendment Application dated October 20, 2015 (p. 1), DDMI is requesting:

- **a)** the removal of “and at a 200 metre distance in any direction from the centerline of the dike footprint”, regarding placement of SNP Stations #1645-82 to 84
- **b)** the alteration of the total suspended solids (TSS) limit from 25 mg/L to “a 30-day moving average of 25 mg/L” over background concentrations
- **c)** the alteration of TSS sample description, from “in any grab sample” to “as calculated from daily grab samples.”

Regarding (a) above, DDMI clarified on p. 3 of their Application that the removal of the specification of placements of Surveillance Network Program (SNP) stations 200-m from the centerline of the dike would allow changes to be made to the location with the approval of the WLWB rather than with an Amendment to the Water Licence. Locations of SNP Stations during construction of previous dikes A154 and A418 were also not in line with Part H, Item 31 of the Water Licence as there was a conflict between the Water Licence and other management or monitoring plans that specified the location of SNP Stations (SNPs and CEMPs). DDMI is concerned that Station 1645-84 will be too close to the turbidity barrier during the 2016 construction season.

Regarding (b) above, DDMI has stated on p. 2 of their Application that activities such as dike construction are subject to highly variable conditions with limited control in the short-term and therefore a time averaged TSS limit is more appropriate. DDMI notes they previously suggested a 30-day averaging period during a September 2000 plan submitted for then Water Licence N7L2-1645 for A154 dike construction (p. 2).

In their responses to reviewers provided on January 4, 2016, DDMI proposed a tentative 4-step set of trigger levels and associated actions that could be put in place for the monitoring of TSS during A21 dike construction, pending approval of the Water Licence amendment. This is discussed in more depth in Section 3.2 below.

Regarding (c) above, DFO understands that the change in wording from “any” to “daily” grab samples would bring the Water Licence more in
<table>
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<tr>
<th>Fisheries and Oceans Canada’s Conclusion</th>
<th>line with the description of TSS sampling in the SNP document (email correspondence from DDMI cc’d to DFO, November 23, 2015).</th>
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<td><strong>Potential impacts to fish and fish habitat:</strong></td>
<td>DFO recognizes in general that activities such as dike construction have the potential to cause <strong>serious harm to fish</strong> in locations outside of the immediate area subjected to dredging and infilling, as a consequence of deposition of any resuspended sediments (i.e., TSS) settling out on fish habitat, including spawning habitat where embryos may be smothered. Fish embryos and larvae are very susceptible to settled TSS, in part because they cannot move to avoid it (CCME, 1999). Measures to avoid and mitigate <strong>serious harm to fish</strong> as a result of this specific potential impact include the development and implementation of a sediment control plan, including the use of site isolation measures such as a turbidity curtain, regular inspection and maintenance of sediment control measures and structures, and repairs as needed (DFO, 2013).</td>
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<td>Past studies conducted by DDMI in Lac de Gras that aimed to determine the degree to which sediments settled out on spawning shoals during construction of dikes A154 and A418, and verify that such shoals were washed clean of sediment within one year as a condition of DDMI’s <em>Fisheries Act</em> Authorization, were inconclusive because tiles set out for the study were dislodged (DFO correspondence to DDMI, August 22, 2013). At the time, DFO concluded that currents strong enough to dislodge tiles were also sufficient to wash any sediments deposited from dike construction. DFO no longer requires the relevant condition (12.4) of DDMI’s <em>Fisheries Act</em> Authorization SC98001 and has not required similar studies to be performed during A21 dike construction.</td>
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<td>According to information presented by DDMI during the environmental assessment phase of the Diavik project (Golder, 1997), few ‘good’ or ‘fair’-quality spawning shoals for either Lake Trout, Round Whitefish or Cisco were detected in the immediate vicinity of the planned A21 dike. DFO notes that the construction season as outlined by DDMI (beginning in July) is partially outside the spawning season for fall-spawning fish (Lake Trout) which is expected from late August to late September. Mitigation may include ensuring that incidences of elevated TSS are avoided prior to the onset of fall spawning activities.</td>
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<td>DFO does not anticipate impacts to fish in Lac de Gras if TSS limits of 25 mg/L are not exceeded over a period of 30 days during dike construction as proposed by DDMI. DFO agrees that a greater level of protection would be provided with variant TSS limits proposed by other reviewers, e.g., averaging TSS over a period of 7 days, 14 days, or 15 days, or a maximum TSS concentration of 5 mg/L over 30 days.</td>
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| DFO reminds DDMI and notes for the information of the WLWB that any exceedances of TSS limits established in the Water Licence or
based on monitoring of fish and fish habitat in the vicinity of the dike construction may be evaluated as an occurrence, and the potential **serious harm to fish** may be determined, by DFO on a case-by-case basis.

**Regarding change specified under (a) above:**

DFO has no concerns regarding the alteration of Part H, Item 31 to remove details regarding the specification of locations of SNP stations relative to the centerline of the dike, as this change is made for logistical reasons in both the field (proximity to the turbidity barrier) and in management plans, and also to more properly align past and present construction management plans, such as the Construction Environmental Management Plan (CEMP), with the Water Licence.

DFO understands that future versions of the CEMP will be provided for review and that this document will contain information on the new location of SNP stations.

**Regarding change specified under (b) above:**

From the perspective of avoiding and mitigating impacts to fish and fish habitat from settled TSS, DFO does not have concerns regarding the proposal to change the TSS limit from 25 mg/L to a moving average of 25 mg/L over 30 days, as proposed by DDMI. Either the Water Licence or the associated CEMP should make clear whether this limit is absolute or an elevation above background TSS levels.

A number of other suggestions have been provided by other reviewers and Intervenors via the Online Review System by December 18, 2015. These include a 7-day, 14-day or 15-day averaging period, or a maximum of 5 mg/L TSS over a 30-day averaging period comparable to CCME (1999) guidelines. All of these are more conservative than the TSS limit proposed by DDMI. DFO also has no concerns regarding these proposals, but would like to support Environment Canada’s assessment (ORS comments, December 17, 2015) that longer averaging periods (i.e., 30 days) coupled with a moderate, but brief spikes in TSS may result, in practice, in an exceedance of the TSS Water Licence limit and cessation of construction after TSS levels have already fallen and no further action by DDMI would be warranted.

As mentioned above, DFO understands that future versions of the CEMP will be provided for review. This document will contain a series of newly proposed TSS trigger values at time periods of less than 30 days, associated with various actions to be taken by DDMI to rectify occurrences of high TSS during dike construction in Lac de Gras.

**Regarding change specified under (c) above:**

DFO has no concerns regarding the change from “any” to “daily” TSS grab samples.
3.1.1 Recommendation: DFO recommends that the WLWB consider amending Part H, Item 31 as suggested by either DDMI or other reviewers.

3.1.2 Recommendation: DFO recommends that the averaging period of the TSS limit should be chosen to maximize efficiency of corrective action levels, ensuring that DDMI is able to modify construction practices to quickly and effectively mitigate elevated TSS occurrences as a result of dike construction.

3.2 Suggested TSS Trigger Levels

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<td>TSS Limit and Trigger Levels</td>
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**Developer’s Conclusion**

In DDMI’s response to Environment Canada (January 4, 2016), DDMI suggested a four-step set of TSS triggers that would be used in practice during A21 dike construction. These include:

**Trigger Level 1** – 50 mg/L grab sample
- identify likely primary TSS source, correct BMP deficiencies, report

**Trigger Level 2** – 50 mg/L over 3 days
- verify likely primary TSS source, evaluate options to modify activities and/or turbidity barrier, report

**Trigger Level 3** – 50 mg/L over 5 days
- implement modifications to activities and/or turbidity barrier, report

**Trigger Level 4** – 22 mg/L over 30 days
- stop in-lake activities until TSS 30-day average falls below 22 mg/L TSS, report

DDMI noted during the Pre-Hearing Conference that these numbers are not included with the formal Water Licence Amendment Application (January 8, 2016).

**Fisheries and Oceans Canada’s Conclusion**

DFO understands that formal review of the proposed Trigger Levels was not part of the Water Licence Amendment Application and will likely come through a revised CEMP to be submitted by DDMI at a later date (DDMI statements during Pre-Hearing Conference, January 8, 2016). DFO agrees that a series of trigger levels will be a useful management tool for avoiding and mitigating *serious harm to fish* in
Lac de Gras as a result of TSS attributed to A21 dike construction.

The rationale behind the proposed triggers (which DFO understands to be a draft) is unclear. Neither 50 mg/L nor 22 mg/L TSS have been brought forward as potential quantitative TSS targets through the course of the Water Licence Amendment Application review, and DFO would like to request clarification as to why these numbers should be used. We note that the TSS exceedance reported on August 8, 2015 (32 mg/L) would not have met the criteria for Trigger Level 1, although it was associated with a malfunction of the turbidity barrier and required corrective action.

DFO is also unclear as to how the actions to be taken by DDMI at each trigger level are distinguished. For example, the distinction between “correct any BMP deficiencies” and “implement modifications to activities and/or turbidity barrier” is uncertain.

In comments to the WLWB and DDMI on December 15, 2015, DFO suggested a trigger based on the Water Licence TSS Limit (to be established) on a daily basis, as opposed to a moving average. For example, if the Water Licence limit becomes 25 mg/L TSS over 30 days, trigger level 1 would be 25 mg/L TSS on a single day. We suggest this is a more sensitive and appropriate trigger level than the proposed trigger of 50 mg/L TSS.

**Fisheries and Oceans Canada’s Recommendations**

3.2.1 Recommendation: DFO recommends that DDMI clarify the rationale for the use of 50 mg/L TSS for the first three trigger levels, and 22 mg/L TSS for the final trigger level, as well as the associated actions to be taken, as these are not the values proposed by DDMI during the initial Water Licence Amendment Application, nor have they been specifically proposed by reviewers. DFO recommends that the trigger levels be integrated in a revised version of the A21 Construction Environmental Management Plan (CEMP) to be submitted by DDMI for later review before construction in 2016.

**3.3 Additional References**


4.0 Summary of Recommendations

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