



Independent Environmental Monitoring Agency

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November 22, 2017

Violet Camsell-Blondin
Chair, Wek'eezhii Land and Water Board
#1-4905 48th St, Yellowknife, NT
X1A 3S3

Re: Aquatic Response Framework Response Plans – Selenium, Fish, Nitrogen and Potassium

Dear Mrs. Camsell-Blondin,

The Independent Environmental Monitoring Agency (Agency) has reviewed the following Dominion Diamond Ekati Corporation's (DDEC) Aquatic Response Framework Response Plans (RP): Selenium 1.1, Fish 1.1, Nitrogen 2.2, and Potassium 1.3 and provides the following comments.

Nitrogen and Selenium Response Plans

The Agency does not have any specific comments on these two plans.

Potassium Response Plan

Concurrent Potassium Amendment Application

A DDEC Potassium Amendment Application (Amendment Application) to raise the Potassium Effluent Quality Criteria (EQC) is currently under review by the WLWB. Since the Amendment Application did not include the Potassium RP 1.3 which contains information relevant to the Amendment Application, it is possible that not all reviewers were aware of the Potassium RP 1.3 and therefore were unable to consider it in their initial comments on the Amendment Application.

On October 11, 2017, the Agency submitted comments as part of the Amendment Application review process that included comments on relevant aspects of the Potassium RP 1.3, namely the proposed Investigation of Cause and Source Reduction Strategies (both discussed in the Potassium RP 1.3 but not in the Potassium Amendment Application). The Agency feels these aspects, and possibly others identified by other reviewers, have direct relevance to the current Amendment Application and should therefore be reviewed in conjunction with or as part of that larger process. The Agency is concerned that a decision on the Potassium RP which, as stated above, has information relevant to the Amendment Application, will be made before the Amendment process is completed.

Recommendation: The Potassium RP 1.3 be included as part of the Potassium Amendment Application review process.

Recommendation: The relevant aspects of the Potassium RP 1.3 be reviewed in conjunction with the current Amendment Application.

High Action Level

The Potassium RP 1.3 proposes to raise the high action level from the previous version's 90% of the Site Specific Water Quality Objective (SSWQO) benchmark to 100%. DDEC rationalizes this increase by stating that it would align the Potassium RP with other Ekati RPs. *The previous Potassium RP 1.2 stated that the 90% high action level is "considered to be protective of the aquatic ecosystem because they are more conservative than the protective SSWQO"* (p. 3-2). In the January 17, 2017 decision the WLWB supported DDEC's medium and high action levels for Potassium.

Recommendation: The high action level should remain at the previous level (90% of SSWQO) or DDEC should provide more detailed explanation why it should be increased.

Action 2

Wek'eezhii Land and Water Board's directive of January 17, 2017 states: *"DDEC is to include the results of Action 2 in Version 1.3 of the Potassium Response Plan, to be submitted by June 30, 2017."*. Action 2 is continued monitoring of water quality in both the releases of discharge water from effluent holding facilities (through the SNP) and the watersheds downstream of mine effluent release (through the AEMP). Results of the AEMP were presented within the Potassium RP 1.3 but results of the SNP were not. Inclusion of SNP data in the RP would indicate how effective DDEC has been at keeping its mine effluent within EQC limits which influences potassium concentrations in the downstream receiving environment.

Recommendation: DDEC should include the potassium concentration results of its SNP within the Potassium RP 1.3.

Fish Response Plan

The high action level for selenium in fish is proposed as *"...in large-bodied fish, selenium fish tissue concentrations in 100% of fish of a sampled fish species in a near-field lake exceed the US EPA Recommended Freshwater Selenium Ambient Chronic Water Quality Criterion for the Protection of Aquatic Life."* Selenium toxicity is known to affect primarily the reproductive endpoints (larval development and mortality) resulting from maternal transfer to eggs. Therefore an either/or approach may be preferable for this benchmark. The US EPA guideline, referenced above, recommends the female reproductive tissue concentration benchmark *"supersedes the whole body and muscle tissue criteria"* (Aquatic Response Plan for Fish Version 1.1, Appendix A, p. 5.10). Thus, for large-bodied (i.e., harvestable) fish, either 100% of all whole-body samples (11.3 mg/kg dw in muscle) OR 100% of all females reproductive tissue sampled (15.1 mg/kg dw in eggs/ovaries) should trigger the high action level. This would avoid a scenario where 100% of sexually mature females but a lesser percentage of males exceeding the benchmarks does not trigger the high action level. Such a scenario could have consequences for reproductive success. Since the toxic effect is primarily on the female reproduction organs, it would be prudent to prioritize sampling female reproductive organs when possible.

The Agency recognizes that ovarian tissue is not sampled for lake trout as this species is not lethally sampled in the AEMP; only muscle biopsy samples are taken before the captured fish is released. Therefore monitoring selenium content in trout reproductive tissue is not possible. But it should be possible to sample small amounts of eggs from gravid live-captured females in fall to determine if the 15.1 mg/kg benchmark is reached.

Also, whitefish have a higher death rate in live-capturing fish, so taking female ovarian tissue and eggs from them should be possible.

Finally, slimy sculpin should be included in the Fish RP for monitoring contaminants in fish. As small, bottom feeding fish that is often prey for harvestable species of fish, slimy sculpin is a sentinel species that can provide an early warning of potential future selenium contamination further up the food chain (since selenium is a biomagnifying metal). The benchmark for selenium for sculpin could be set at US EPA guideline of 8.5 mg/kg (dry weight) for whole-body concentration.

Recommendation: Given that female reproductive tissue is the most sensitive biological endpoint for selenium effects on fish, the Fish RP for selenium tissue content high action level should be modified to: Either 100% of all whole-body samples (11.3 mg/kg dw in muscle) or 100% of all female reproductive tissue sampled (15.1 mg/kg dw in eggs/ovaries) exceed the US EPA guideline in large-bodied fish.

Recommendation: Slimy sculpin should be included in the monitoring of fish body burdens of contaminants to serve as an early warning of potential future contamination of the harvestable fish further up the food chain.

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 Ekati Corporation – April Hayward
Tlicho Government – Jessica Hum
Yellowknives Dene First Nation – Alex Power
Lutsel K'e Dene First Nation – Shonto Catholique
North Slave Metis Alliance – Nicole Goodman
Kitikmeot Inuit Association – Geoff Clark
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