



Snap Lake Environmental Monitoring Agency
Main Floor, Lahm Ridge Tower
4501 Franklin Avenue
P.O. Box 95, Yellowknife, NT X1A 2N1
Phone: 867-765-0961 FAX: 867-765-0963
Website: www.slema.ca

Shannon Hayden
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O.Box 2130
Yellowknife, NT X1A 2P6

File: MV2001L2-0002

May 27, 2011

RE: WLAR 2010 and AEMP 2010

Dear Ms. Hayden,

Snap Lake Environmental Monitoring Agency (SLEMA) is pleased to provide Mackenzie Valley Land and Water Board (MVLWB) with the comments related to the following reports.

- 2010 Water Licence Annual Report (WLAR 2010)
 - Appendix I 2010 Acid Rock Drainage and Geochemistry Monitoring Report (ARD 2010),
 - Appendix II 2010 Dam Inspection Report (Summary of August 2010 Geotechnical and Geochemical Site Inspection, Site Inspection 2010), and
- 2010 Aquatic Effects Monitoring Program Report (AEMP 2010, Section 2 Water Quality).

WLAR 2010

Overall, WLAR 2010 is of good quality, and presents reasonable details on water related activities.

There are a few editorial problems identified.

- The number in Section 12 ANNUAL QUANTITIES OF PROCESSED KIMBERLITE (PART B, CONDITION 5D) may not be correct. On April 27 the Environmental Analyst of SLEMA pointed out to De Beers staff via e-mail, and De Beers staff replied and committed to resubmitting the section. No update of this section has been received until now.
- Section 22.2 (page 37): The date of elevated Total Suspended Solids (TSS) in SNP 02-17B should be June 14 rather than January 14.



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- Section 27 (page 47): The hydrogeological model is said to have been applied through to the end of mining in 2022. Will the mining be completed in 2022 or 2030? Clarification is requested.

ARD 2010

In general, the submission is adequate and meets the annual ARD reporting requirement of the Water Licence (MV2001L2-0002).

Monitoring of the North Pile Seepage

Seepage from the North Pile could be resulting in elevated concentrations of Total Dissolved Solids (TDS), nitrate, nitrite, and ammonia measured in bogs downstream of the Starter Cell of the North Pile. 2010 monitoring results show that at least two stations (Bog TS1 North and Bog TS2 Northeast) were impacted by the Starter Cell.

In order to evaluate the composition of runoff and/or seepage originating from the East Cell, De Beers has established five bog monitoring stations near the East Cell development. Ongoing monitoring of North Pile East Cell bog water is recommended in ARD 2010 to evaluate possible changes over time as processed kimberlite (PK) deposition in the East Cell begins.

SLEMA recommends that De Beers make greater efforts in monitoring these recently established stations, due to the proximity of their locations to Snap Lake, e.g. increasing sampling frequency.

Effects of Ammonia Nitrate (AN) Residuals from the Former AN Pad

There have been occurrences of concentrations of either ammonia or nitrate in the monitoring stations of SNP 02-07 (uncontrolled surface runoff at the Road to Bulk Emulsion Plant) and SNP 02-09 (uncontrolled surface runoff at Emulsion Plant Area) exceeding the discharge criteria (20 mg/L for ammonia or 56 mg/L for nitrate, any grab samples) from 2006 to 2009. Thus, the effects of AN residuals from the former AN pad have been a concern for SLEMA.

The monitoring results in SNP 02-07.1 to SNP 02-07.3 (along the Road to Bulk Emulsion Plant) and SNP 02-07.04 to SNP 02-07.6 (around the new AN Storage Building) during the 2010 monitoring period (Appendix III of WJAR 2010) show that concentrations of both ammonia and nitrate were consistently lower than the discharge criteria. The concern regarding SNP 02-07 has subsided but monitoring should continue.



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However, the concern on SNP 02-09 remains. There was one occurrence of exceeding nitrate discharge criterion (August 13, 2010). Furthermore, INAC Inspector also took samples on August 19, 2010 at the base of the sump at the former AN pad. The ammonia concentration was 559 mg/L, well over the discharge criterion (20 mg/L). Subsequent sampling by De Beers at the same spot on September 13, 2010 also found highly elevated ammonia concentrations (401, 406 and 435 mg/L). De Beers was directed to complete cleaning by August 31, 2011.

There is no mention and discussion about INAC Inspector's sampling and De Beers subsequent sampling in ARD 2010 (Section 5.3.5.5). SLEMA requests detailed discussion about the issue, especially the explanation of the elevated ammonia concentrations at the base of the sump at the former AN pad.

Editorial Problems

- The results of monitoring of the North Pile bogs and the North Pile piezometers (groundwater) in 2010 are presented in Appendix B-1. Appendix B-3a (page 30 and 31) and Appendix B-3b (page 32) do not exist in the report.
- It is stated in Section 5.3.5.5 (page 34) that no samples were collected from SNP 02-07 during the 2010 monitoring period. The statement is not true. The tabulated data for SNP 02-07 during the 2010 monitoring period could be found in Appendix III of WLAR 2010.

Site Inspection 2010

In general, this submission is adequate and meets the reporting requirement of geotechnical and geochemical inspection for the Mine site (Water Licence MV2001L2-0002).

North Pile Development

There are good comments and recommendations on the North Pile development made by Golder Associates Ltd. (Golder), De Beers consultant, in the Report.

- "To date, De Beers had performed limited monitoring of the North Pile development. It is recommended that De Beers fully initiate and implement the monitoring program described by Golder in 2008."
- "De Beers stated that the production of paste is scheduled to occur; however, no specific timing or production rates could be provided. It is strongly recommended that all De Beers' stakeholders in the North Pile, including Golder, participate in a focused discussion/workshop regarding the development of the North Pile using its design basis — *"the Waste*



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Management System can never interrupt or cause a shutdown of the mine or process plant operations” — as the theme.”

SLEMA supports the above recommendations.

Spill #2010-458

It is stated that the water control structures (ditches and sumps) of the Starter Cell appear to be performing and operating as per the design (Section 3.3.1, page 9).

However, one spill occurred on December 10, 2010 indicated a problem in the water control structures of the Starter Cell. 110 m³ of water was observed on the access road north of Temporary Sump 4 (TS4), beyond the ditch collection system of the Starter Cell. In the Spill Follow-up Report of Spill #2010-458, rerouting the road in the summer was proposed as a possible longer term solution to increase the continuity of the ditches.

SLEMA requests further details about the spill investigation and related future mitigation measures.

Replacement of SNP 02-03

Golder also made good comments and recommendations on monitoring of site runoff reporting to the Water Management Pond (WMP) at SNP 02-03.

“The water license requires monitoring of site runoff reporting to the WMP at SNP 02-03. SNP 02-03 was formerly located on the eastern perimeter of the WMP. In 2009, temporary kimberlite ore stockpiles placed on the northeastern perimeter of the WMP covered the former location of SNP 02-03. No suitable locations were identified for the relocation of SNP 02-03 during the September 2009 site inspection, owing to the proximity of the kimberlite stockpile relative to the WMP. Given the inability of this station to monitor site runoff the MVLWB approved De Beers’ request to permanently suspend the Station on December 3, 2009.”

Since December 2009, the kimberlite ore stockpiles located on the northeastern perimeter of the WMP have been removed. During the WMP inspection, a potential location for monitoring site runoff to the WMP was identified on the east side of the WMP (12V 0506477 7052531). Water quality samples should be collected from this location, if possible, through 2011 to determine if the composition of the water at this location is representative of site runoff. Such data provides valuable information about the geochemical stability / rate of weathering of the rock used for construction at the site.”



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SLEMA supports the recommendation of the above location as monitoring station for site runoff reporting to the WMP and recommends that MVLWB resume SNP 02-03 monitoring station.

Effects of AN Residuals

Golder collected a total of five rock samples from the former AN storage pad, and would evaluated the presence of soluble AN residuals through short-term leach testing (Section 5, page 14). The results are said to be compared to the results of down-gradient bogs water monitoring in a stand-alone technical memorandum.

SLEMA requests one copy of the aforementioned technical memorandum and would like to know the effects of AN residuals in the former AN storage pad.

AEMP 2010

Only Section 2 Water Quality was reviewed. Overall, the Water Quality Section is of good quality, and presents reasonable details.

Fluoride

Water quality results from Snap Lake were better than water quality guidelines and Environmental Assessment Report (EAR) benchmarks with a number of exceptions.

- In 2009, the exceptions are a number (approximately one third) of fluoride results, one iron results and three manganese results; and
- In 2010, the exceptions are a number (approximately half) of fluoride results, and four manganese results.

De Beers promised a review of the application of the CCME guideline concentration for Snap Lake, and considered a new benchmark for fluoride, which would be consistent with the EAR site specific benchmark developed for copper, cadmium, and hexavalent chromium.

The data in 2010 show more fluoride results exceeding the CCME guideline. The concern on elevated fluoride levels in Snap Lake, raised by SLEMA last year, will remain until De Beers provide further evidence.

- What will be the maximum levels of fluoride and distribution in Snap Lake?
- Will that level of fluoride in water have any negative effects on aquatic life in Snap Lake?



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Fish Tasting

Section 6 Fish Tasting refers to the 2010 Annual Water License Report (WLAR 2010) for the results of the 2010 Fish Tasting Program. However, there is no such a section or appendix in WLAR 2010. It is requested that De Beers provide a report for the results of the 2010 Fish Tasting Program.

If you have any questions whatsoever please feel free to contact the undersigned or David White at 867-765-0961 / dwhite@slema.ca.

Sincerely,

(original signed by)

Johnny Weyallon
Chairperson

cc: Indian and Northern Affairs Canada
Environment and Natural Resources, GNWT
Environmental Canada
De Beers Canada Inc.