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File: Water Licence Annual Report (WLAR)

Comments – 2006 WLAR  
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### **Reports Reviewed**

- 2006 Water Licence Annual Report
- Appendix I 2006 Acid/Alkaline Rock Drainage (ARD) and Geochemistry Monitoring Report
- Appendix II 2006 Dam Inspection Report
- Appendix III Detailed Tabular Summaries of the 2006 Water Quality Data for the Surveillance Network Program (SNP) Stations
- Appendix IV Snap Lake Project Emergency Response Team Lesson Plan
- Appendix V 2006 Annual Report for the Aquatic Effects Monitoring Program (excluding the sections related to sediment quality, phytoplankton and zooplankton, benthic invertebrate, and juvenile fish special study)

### **General Comments**

The 2006 WLAP presented adequate and reasonable details on water related activities with good quality. It fulfills the Water Licence MV2001L2-0002 requirements. There are a few review comments and questions regarding this submission.

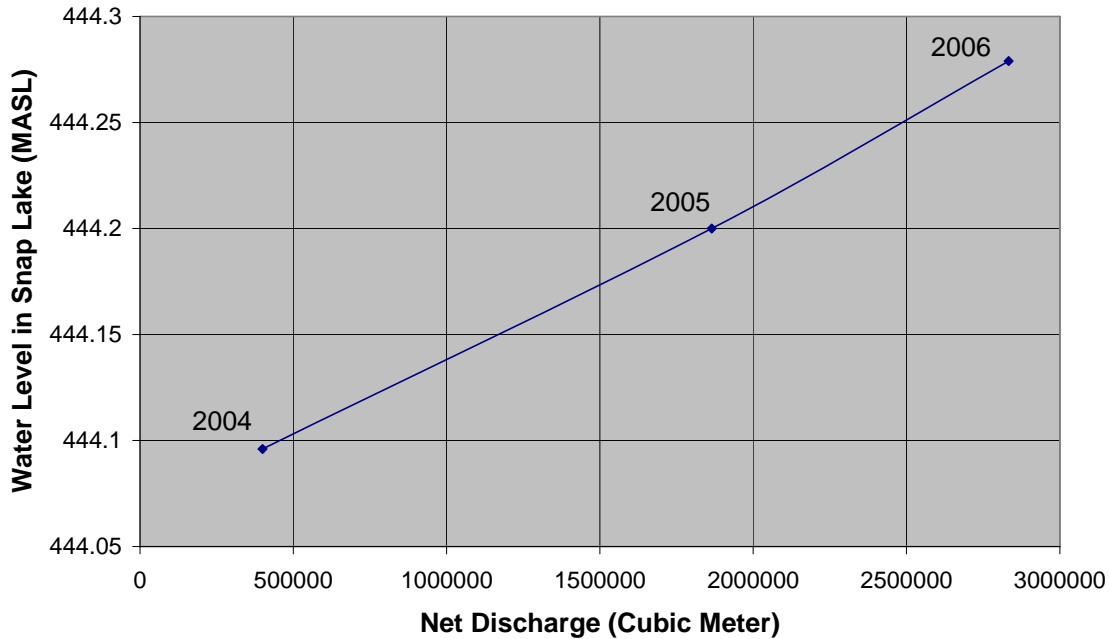
### **Comments on 2006 WLAR**

- Section 5 (Part B, Item 5a, ii), p5, Table 3-1: The values in the row of maximum discharge do not match with the ones in each month.
- Section 10 (Part B, Item 5a, ix), p15: no measurements of snowfall precipitation at Snap Lake were received for 2006 due to the difficulties with the snow meter in cold winter conditions. No runoff data were provided, either. What will be done to improve snow and runoff monitoring?
- Section 11 (Part B, Item 5b), p17: It is noticed that the seasonal mean elevation of water in Snap Lake during the ice-free conditions increased from 444.096 meters above sea level (MASL) in 2004, to 444.200 MASL in 2005, then to 444.279 MASL in 2006. Is it a natural trend or related to the Project development? The following chart indicates an association between the net discharge (discharge from Water Treatment Plant and Sewage Treatment Plants minus water intake) and the water level in Snap Lake. Further investigation is recommended.



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### Water Level vs. Project Development



- Section 12 (Part B, Item 5c), p15, Table 12: The storage capacity of the Water Management Pond (WMP) decreased 5% from 185703.7 m<sup>3</sup> in 2002 to 176439 m<sup>3</sup> in 2005. The decline may have impacts on the site water management, i.e. the retention time, and the operation of Water Treatment Plant. What adaptive management measures will be taken? Regular bathymetric surveys of the WMP are recommended.
- Section 23 (Part B, Item 5n), p36: It is not clear in the summary of the SNP program which ones of “the remaining nine (SNP) stations were either not active, unavailable for sampling or were only required for construction”. The list of all SNP stations with status (active, inactive, etc.) and the map with the locations of all SNP stations are to be provided.
- Section 23 (Part B, Item 5n), p37: The summary of activities at each active SNP stations was provided. Even though Appendix III presents detailed tabular summaries of the 2006 water quality data for the SNP stations, it would be great to have a Conformity Summary Tables/Figures for related SNP stations, especially for SNP 02-16, 02-17, 02-18, and 02-19, within this Section.
  - Key parameters against the discharge criteria of maximum concentration and average monthly;
  - Calculation of annual loadings for ammonia, nitrate and total phosphorus against the annual mass loading criteria.



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- Section 28 (Part B, Item 5s), p44: It is understood that the hydrological model is in a continual state of evolution. However, the quantity of water flowing into the underground mine at Snap Lake has important ramification to the Snap Lake Project. What adaptive management measures are taken or being taken associated with the ramification? There is a typo in page 52. The first sentence of Sub-section 28.5 repeats twice.

#### **Comments on Appendix I (ARD and Geochemistry Monitoring)**

- SLEMA concerns about the elevated mine water amount and the accumulative impacts on the lake-wide concentration of Total Dissolved Solids (TDS). Once the mine water balance and the mass loading predictions are updated, the report is requested for review by SLEMA.

#### **Comments on Appendix II (Dam Inspection)**

No comments.

#### **Comments on Appendix III (SNP Tabular Summaries)**

- Table 02-16: According to Part F, Item 15 of the Water Licence, the maximum concentration of any grab sample is 20 CFU/100 mL for Faecal Coliforms, then the sample results on Oct. 19, Nov.1, and De. 20 did not exceed Water Licence criterion, thus they should not be highlighted in red. In addition, for SNP 02-16, there seems to be no limit for TSS in Part F, Item 15. De Beers appeared to use 35 mg/L as the criterion, which is for SNP 02-19.
- Table 02-17: The discharge criteria were not listed in the Table as were done in Table 02-16 and Table 02-19. No calculation for average monthly values of related parameters appeared to be done, neither for annual loading calculation of ammonia, nitrate and total phosphorus.
- Table 02-19, Table 02-19B, Table MBR#1, and Table MNR#2: There seems to be a typo for pH limits in these four tables, 6-9 rather than 5.0-9.5.
- Table 02-19, Table 02-19B, Table MBR#1, and Table MNR#2: SNP Program defines SNP02-16 as sewage discharge from Sewage Treatment Plant, prior to mixing with Water Treatment Plant effluent, and Part F, Item 13 and 15 of the Water Licence prescribe the discharge limits for the “existing” and “new” sewage treatment plants (STPs), respectively. However, the Water Licence did not seem to clearly define the “existing” and “new” STPs. For STP #1 and #2, MBR #1 and #2, which ones are “existing” STPs, and which are “new” STPs? De Beers seemed to treat all of them as “existing” ones with SNP02-19, except the criterion for Faecal Coliforms (with SNP02-16).
- Table MBR #2: The BOD<sub>5</sub> value (47 mg/L) on May 9, 2006 should be highlighted in red bold indicating it exceeded the discharge limit (30 mg/L).
- For SNP 02-16, there are discharge criteria for both maximum concentration limits for any grab sample and average monthly limit, but for SNP 02-19, there are only average monthly limits and no maximum limits in the Water Licence.



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De Beers did not seem to calculate monthly average values for TSS, BOD<sub>5</sub>, Oil and Grease, and Faecal Coliforms.

- Table 1735-11: There seems to be no discharge limits for SNP 1735-11 in the Water Licence MV2001L2-0002. De Beers seemed to use the same discharge limits in Table 1735-11 as used in Table 02-19, Table 02-19B, Table MBR#1, and Table MNR#2. Will SNP 1735-11 be integrated into the Water Licence?
- General comments: There are a few problems with the application of the Water Licence discharge criteria.
  - Maximum concentration of any grab sample vs. average monthly limit.
  - Discharge criteria for SNP 02-16 vs. SNP 02-19.
  - In Table 02-19, De Beers put 30 mg/L as the BOD<sub>5</sub> discharge limit for any grab sample, but that value is the average monthly limit; in the same table, De Beers put 10 CFU/100 mL as the Faecal Coliforms discharge limit for any grab sample, but that is for the average monthly limit of SNP 02-16.
- Recommendations: The difference of the maximum concentration limits for grab samples and the monthly average limits should be noticed.
  - The application of discharge limits should be consistent. If De Beers wants to adopt a set of tougher discharge limits for sewage treatment plant effluent, all the limits could be from SNP 02-16, i.e. 25 mg BOD<sub>5</sub>/L, 5 mg Oil and Grease/L, and 20 CFU Faecal Coliforms /100mL for any grab sample, and 15 mg BOD<sub>5</sub>/L, 3 mg Oil and Grease/L, and 10 CFU Faecal Coliforms/100mL for average monthly thresholds.
  - The sewage treatment plant effluent discharge limits of SNP Program should be streamlined, i.e. the clear definition of “new” and “existing” sewage treatment plants, and the integration of SNP 1735-11.

#### **Comments on Appendix IV (Emergency Response Lesson Plan)**

No comments.

#### **Comments on Appendix V (AEMP)**

- Section 2.3.2.1, p2-42, Table 2-7: How was the annual net precipitation (582,830 m<sup>3</sup>) was considered into the calculation of TDS? How was the total input loads to Snap Lake in 2006 (2,338,553 kg) calculated? From this number, the calculated TDS could not be 48 mg/L.
- Section 2.3.2.7, p2-60: There might be a typo in the first line of the second paragraph (“above nine” rather than “below nine”), and the typo again in p2-64 (line 2, paragraph 1).
- Section 2.3.3, p2-63, Table 2-10: Two mercury results (out of 293 samples) were above the Canadian Council of Ministers of the Environment (CCME) water quality guideline of 0.026 µg/L. Both samples were collected at diffuser



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stations and may be related to the water treatment plant discharge. What might be the mercury sources, natural or project related?

- Section 2.3.4.1, p2-68, Table 2-12: In 2006, four parameters (chloride, sodium, sulphate, and total strontium) had mean concentrations above the maximum average annual concentration predicted in the Environmental Assessment Report (EAR). The chloride might be a major concern, even though the 2006 maximum observed concentration in Snap Lake (78mg/L) was well below the CCME guideline (230mg/L for aquatic life and 250 mg/L for drinking water). However, for the long run, it may be different. If the flow-weighted annual mean concentration of chloride in the Water Treatment Plant (WTP) effluent is 482 mg/L (p2-68, Table 2-12) and the annual WTP discharge is 2,684,203 m<sup>3</sup> (p2-66, Table 2-11), and all the mass loading of chloride (25,875.72 tonnes) will be accumulated in the Snap Lake (87,021,961 m<sup>3</sup>, p2-42, Table 2-7) for the next 20 years, the chloride concentration in the Snap Lake will be at least 297 mg/L (the baseline concentration not considered) at the end of Year 20. Then the chloride concentration might be well ABOVE the guideline. It is recommended that De Beers take further step to investigate the chloride issue.
- Section 2.3.4.2, p2-70, Table 2-14 and p2-71, Table 2-15: The Class A licence limits seem to refer to SNP 02-16, but the compliance in Table 2-15 refers to SNP 02-19. The inconsistency is to be clarified.
- Section 2.3.4.2, p2-72: The estimated mass loading of total phosphorus is in the range of 176 to 344 kg/yr. The upper end is greater than the Water Licence loading limit. If most of the sewage treatment plant effluent was not discharged into the wetland, there is a possibility of non-compliance. Further investigation is recommended. In addition, the annual mass loading values for ammonia and nitrate are to be provided.