

September 25, 2008

Chairperson, Johnny Weyallon  
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*via email*

Dear Mr. Weyallon

RE: Snap Lake Environmental Monitoring Agency 2006 Annual Reporting Reviews  
– DeBeers Canada Reponses

Thank you for the Snap Lake Monitoring Agencies 2006 Reporting Reviews. DeBeers Canada received a number of different reviews from SLEMA and will be addressing them with the following letter and subsequent attachments.

As you are aware DeBeers has made a commitment to update and amend monitoring plans and reporting on an annual basis and in some circumstances, as directed otherwise the various Snap Lake water licenses, permits and agreements. This communiqué will address some of the outstanding commitments and will work towards accepting and improving upon some of the many recommendations addressed in the various review documents. Some of the recommendations made will be addressed in future plans, others adopted or noted within this response. DeBeers Canada takes all recommendations seriously and where there is confirmation of a written discrepancy within DeBeers reports as highlighted by SLEMA will concede and commit to a resolution to clarify or correct errors in future reports.

For this response exercise, the following documents have been forwarded to DeBeers and will be addressed in this communiqué:

- *2007 Spill Contingency Plan and Emergency Response Plan (Jul, 2007)*
- *2006 Wildlife Effects Monitoring Program (Anne Gunn, Jan 16 2008)*



- *2006 Vegetation Monitoring Program (Jan 18, 2008 – Anne Gunn)*
- *2007 Air Quality and Emissions Monitoring and Management Plan (Nov, 16 )*
- *2007 Water Licence Annual Report (Jun 17, 2008)*
- *2006 Hydrology Monitoring Program Annual Report (Nov 27, 2007)*
- *2006 Environmental Agreement Annual Report (Feb 6, 2008)*
- *2006 Air Quality, Meteorological Monitoring and Emissions Summary(Dec 17)*

## **1.0 2007 Spill Contingency Plan and Emergency Response Plan (Jul, 2007)**

### General

SLEMA makes a correct assessment that the Emergency Response Preparedness plan may be out of the scope of the monitoring agencies mandate. However as always DeBeers is open to suggestion and is grateful for any ideas that may lead to the development of strategies toward improving the many plans that DeBeers has authored. The lack of environmentally related emergency preparedness planning is not lost on DeBeers; many of the environmental related actions are described in the SHE Ops documents that DeBeers provides for internal operational procedures, but may not be communicated effectively through the Emergency Preparedness Planning as written. Where SLEMA will see a link between the Spill contingency planning and the environment is through the DeBeers environmental protection planning (currently being updated).

DeBeers has been working on strategies to provide training to specific number of ERT members to acquire training in wildlife and firearms training. There are staff members who hold firearms safety training and a single member on staff who is a qualified fire arms safety trainer. Shotguns used in wildlife control activities were chosen as the problem wildlife dispatch method. This was done because of their ballistic performance. At close range a shotgun can provide sufficient power to dispatch a problem animal, but not provide so much power that the projectile will jeopardise human safety at a distance. The preferred method of dealing with wildlife occurrences at a distance are non-lethal (whizz bangs and bear bangers). In most circumstances the close quarters of the infrastructure of the mine do not provide enough space for the safe discharge of a rifle.

### **Section 2.1 Emergency/ Spill Response Contact Information**

In most cases a handful members (2-5) of the DeBeers on-site staff are on-call designated ERT members that are accessible by hand-held two way radio. Site

contact officers and acting managers are appointed marshals on an as needed/daily basis. The site officers are delegated their duties through the DeBeers crisis management planning strategy. This plan appoints response managers, coordinators, information officers, administration officers and sets a protocol external and internal for any given emergency.

### **Mobile Environmental Response Unit (Off-site)**

Emergency response communications are relayed through dispatchers on-site and through the radio communications system aboard any given vehicle. In addition to the emergency response group, there are cooperative efforts between the mines to solve spills and accidents through the use of equipment operated by the few contractors servicing the winter roads. In the summer season, most activities take place on land and are therefore on-site.

### **Section 2.3.1, First Responders**

The suggested bullet as written will be adopted into the Spill response plan

### **Section 2.5.1, Training – Introduction**

Annual trainers may vary from year to year; training exercises and reporting those training exercises are a requirement under the Snap Lake Mine water license.

### **Section 2.5.2, Spill Response Training**

Instrumentation such as photo-ionization detectors are set in place as detection meters where required. Mobile units are not carried by DeBeers personnel off site, but they may be carried by the winter road contractors.

Summaries of the DeBeers training initiatives will be available in the upcoming water license annual report as DeBeers is required to do so under its water license. The list of qualified individuals will remain available on site and the number of individuals trained will be published.

The training programs referred to in section 2.5.2 are sanctioned under the transportation of *Dangerous Goods Act* (Transport Canada) and the *Workplace Hazardous Materials Information System Regulations (Workers Compensation Act)*

## **Section 3 Clean Up Strategies**

Most spills created associated with the Snap Lake Mine are small fuel spills that are easily scooped into 45 gallon drums. It is the land farm that is the contingency to larger spills. The very purpose for the land farm is to deal with large scale petroleum spill that are most likely to happen during transport on the winter road. Snow

contaminated with petroleum will be scoped into a transport bin and placed into the land farm. Any large scale spill are transported of site to a treatment facility by contractors

DeBeers has a copy on file of the *Generic Plan and Operating Procedures of a Remediation Facility for Hydrocarbon Contaminated Material in the NWT*. It is accessible through the DeBeers hard copy library.

## **Section 4, Site Information**

DeBeers will include geographic coordinates and a general site description in future submissions of the *Emergency Response Plan and Spill Response Plans*. The map will illustrate infrastructure, buildings and other improvement within close proximity to spill potential areas.

### **Section 4.2 Fuel Storage and Transfer Systems**

**Drums** – Through various Snap Lake permits, authorizations and commitments, DeBeers is compelled to store drums for clean up and disposal in a manor acceptable to the inspector. It is necessary to mark drums for these purposes. All fuel containment locations must be approved by the inspector and fuel caches. DeBeers policy dictates the need to be 50m away from the high water mark.

Many of the suggestions in this section are addressed in the *Snap Lake Waste Management Plan*. The plan includes inspection frequency, processes for logging incidents and methods (including storage on pallets).

**Heating Fuel Tanks** - Any of the piped tanks on site were installed by qualified people and licensed journeymen. Tanks are set up as specified in the water licenses and land use permits. To not follow the conditions and sections of these authorizations would place DeBeers out of compliance.

#### **4.2.1 Fuel Storage and Transfer System Spill Preventative Measures**

References to spill handling procedures will be included in future ERP and SCP documents to highlight the protocols in place for environmental and human protection.

### **4.3 Chemical and Explosive storage and transfer systems**

There are kits on site to deal with caustic substances. These kits are built to cover the WHIMIS conditions of the specified chemical. An inventory of these hazardous chemicals is maintained on the Snap Lake site

### **Section 4.5.1 Water treatment Plant**

The permanent water treatment plan is now in full operation. This update was overlooked during the revision of this plan; changes will be included in future planning.

### **Section 4.5.3 Water treatment Pond**

Diagrams of the water treatment pond will be included in future submissions

### **Section 4.5.4 WTP System Failure Response Actions**

This section refers to the “Emergency” raising of the dam. To be clear, the berm of the dam would be raised to act as a levee holding back excessive water should this type of emergency be encountered. At this point no maximum height has been calculated. A maximum height would allow DeBeers to determine the maximum capacity used in emergency. This clarification will be included within the next ERP/SCP submission.

The notes made by SLEMA regarding the responses to catastrophic failure are duly noted and the suggestions are very well thought out. DeBeers will undertake a planning exercise at an upcoming SHE meeting to discuss the response to such an event.

### **Section 4.6.1 Sewage Treatment Systems**

A raw sewage discharge to the wetland would not likely make the distance to Snap Lake. The gross volume of the MBR and STP system would not create enough overland flow to travel the distance of the wetland. Having said that, a siltation fence would be installed prior to the discharge, consistent with all drainage control systems at Snap Lake Mine. This would hold back effluent long enough for it to freeze and be treated through the wetland in spring.

### **Section 5.1.2 Basic Procedures**

The suggestion “Secure the area, keep all unnecessary persons away until the hazards can be assessed’ will be added.

### **Section 5.2 Spill response Actions Plans**

A section addressing the care and maintenance of personal protection equipment will be added with specialized equipment updates.

### **Section 5.2.1 Liquid Spills on Land**

The squeegee device noted by SLEMA in this section has been researched by DeBeers Snap Lake Mine and is currently being assessed for suitability for use. The Snap Lake Mine project must factor in the performance of this device in arctic temperatures prior to purchasing

#### **Section 5.2.4 Action Plan for Spills on Ice**

DeBeers would like to reiterate that the “land farm” on site was built to specifically address hydrocarbon spills. Hydrocarbon spill in soil and/or water ice can be placed in the land farm “as a contingency”. Snow and fuels placed in the farm will remain absorbed in the snow and some will eventually evaporate in sunlight. Hydrocarbons remaining would be treated in-situ through land farm management. Diesel fuel has been identified as the greatest potential threat with regards to off-site (60,00kg B-trains in motion) and large fuel capacity tanks on site (100, 000 litre). The land farm is lined and bermed and supported by a drainage system and sump

#### **Section 6 equipment available on site**

SLEMA is correct in noting under ice spills as a potential hazard. This notation is not lost on DeBeers and strategies to address this potential hazard will be included in future planning

### **Appendix A**

#### **1.2 Gasoline**

The correct flash point of gasoline is minus - 43 to - 45 degrees Celsius as noted by SLEMA, this typo will be corrected

Gasoline spills, as with spills of any kind are regulated by water licenses and land use permits. “The permittee will not allow fuels to spread to ground” as per DeBeers license conditions

#### **1.3 Jet A-1**

As with gasoline Jet A-1 has an octane (and other compounds) that result in a flash point gradient. The lowest common denominator for Jet A-1 in commercial uses for aviation is minus 38 degrees Celsius

#### **1.4 Jet B**

The data used to support the notion of Jet B freezing or “gelling” as noted by SLEMA, established a freezing point of -47. DeBeers will confirm this value

#### **1.5 Diesel**

The flash point of diesel has been confirmed to be – 45 degrees Celsius. This has been corrected.

## **2.4 Waste Oil**

The figure for flash point of waste oil is generally 100 to 200 degrees Fahrenheit. This is another typo. The flash point is higher and variable due to the contaminants dissolved into waste oil.

### **General Comments on Appendix A**

DeBeers will take SLEMA contaminated substance list expansion into consideration when developing future plans

SLEMA makes notes that the boiling point of propane is – 42 degrees. This is a correct statement. The reference to propane floating on water is made with the premise that a spill is possible in water should a propane filled truck with compressed propane (liquefied) be ruptured in or underwater, these properties are taken into consideration. DeBeers remains cognisant of the possibility of a propane truck breaking through the winter road.

### **General Comments on Appendix B**

DeBeers is aware of the interactive electronic spill report form. It is currently being used and is attached with the spill report submissions made by DeBeers on a monthly basis.

### **Suggested Reference Material**

DeBeers is in possession of the first four of the recommended reference documents, highlighted by SLEMA and will review the following:

- *Spill Containment and Clean Up Course*
- *The Basics of Oil Spill Clean Up*
- *DEW line Cleanup Barrel Protocol*

DeBeers recognizes the value of all Spill related documents and guides associated with spill mitigations and contingency planning. DeBeers will also make the commitment to continue to seek other literature and advice to help improve the ERP and SCP documents and guidebooks developed internally to improve on and off site capacity to deal with emergencies and spills

### **Advice Appreciated**

DeBeers takes all advice submitted by SLEMA and their professional reviewers seriously. Although some of the advice would be difficult to apply to the Snap Lake Mine contingency and mitigation planning effort, DeBeers would like to note that sound advice can and will be incorporated to the extent that it improves the exiting DeBeers Snap Lake plans.

## **2.0 Wildlife Effects Monitoring Program 2006 (Anne Gunn, Jan 16 2008)**

### **Summary**

The 2006 Wildlife Effects Monitoring report effectively communicates the results of the Annual monitoring plan as its main function is to report data compiled over the course of the year. DeBeers Canada is maintaining a consistent format from year to year. The issue of clarity is in the eye of the beholder. DeBeers believes the data presented is effective and achieves the intention of the Environmental Agreement and that is to report on programs on an annual basis. While SLEMA has raised some ideas worth considering, the presentation of data is not misleading or misguiding, it's simply presented in a format consistent with prior years reporting.

Attached to this communiqué is the "*Snap Lake Mine: Analysis of Environmental Effects on Wildlife 1999 – 2007*". It is consistent with a previously submitted Snap Lake Mine December 2005: Wildlife Baseline Studies 1999-2004. In addition to these studies, DeBeers had produced a 2002 baseline and Interim Wildlife Monitoring Study in anticipation of three year data analysis review. DeBeers Canada submits that these documents and their subsequent reports satisfy the obligation to analyse effects to wildlife report and monitoring. The monitoring programs have taken place since before the issuance of the Snap Lake Water licence in 2001 and the analysis reports (beginning with baseline reporting) produced three different reports evaluating intervals since the Environmental Agreement was ratified in May 31, 2004. It is the position of DeBeers Canada that these milestones are being achieved and work toward temporal analysis continues to improve and provide meaningful data.

Environmental variability remains a challenge. Since the changes that may impact the environment can not be forecasted, the Wildlife Effects Analysis must be reviewed retrospectively. If environmental trends are detected through the Air Quality and Meteorological and Emissions reporting, the wildlife data can be used to draw conclusions with regard to cumulative effects on caribou population living in close proximity to the mine. What the collective wildlife analysis and meteorological data can not achieve is confirmation that the presumption that changes in wildlife behaviour/health is attributed to mine operations. Those answers may only be achieved with a broad spectrum study that extends to other factors (other developments, territorial climate trends, global air quality, and non-snap lake water sources) that impact wildlife. A study better suited to this scope should be undertaken by responsible government agencies. DeBeers is contributing to the amount of data suitable for large scale analyses and cumulative effects



management, but assessing regional impacts can not be determined under the Snap Lake environmental agreement.

### **Specific comments**

- 1 Measureable endpoints and/or indicator variables may or may not be effective in separating project related effects from naturally occurring ones. What they will achieve is reference information to compare data should a trend become noticeable in long term monitoring. DeBeers will consider increasing the number of sample transects as recommended. The comments the reviewer has made in regards to changes not being made are noted and will be reviewed with the monitoring team prior to the next wildlife effects monitoring program annual report. The reviewer refers to “other two mines” and their studies showing distributional changes at 20-25 km. DeBeers suggests the reviewer provide advice on the modifications that may be required the current aerial surveys conducted.
- 2 Triggers for when survey are conducted are set by camp sightings and caribou movements monitored by contracted DeBeers biologists, these points will be summarized in future reporting.
- 3 The comment that reducing transects width will reduce visibility bias, not increase precision is noted. DeBeers agrees with this assessment.
- 4 DeBeers will commit to standardizing aircraft altitude where weather and visibility conditions permit.
- 5 The number of tracks, reflect the presence of animals and does not make any assumptions about the snow conditions
- 6 Reporting on the mean numbers of animals leans toward population surveys, DeBeers is focussed on the “monitoring the wildlife effects.” The government of the NWT holds data on populations.
- 7 DeBeers monitors the effect of the Snap Lake Mine on wildlife, while the reviewer’s questions are inquisitive and interesting, DeBeers Snap Lake would have to assemble data on the effect of Snap Lake Mine on the insect population in order to determine a correlation between insect harassment, Snap Lake Mine operations and animal populations.
- 8 Variation between the data collected specifically can be reviewed in the Wildlife Analysis report, produced every three years by DeBeers. This report is designed to address cumulative information about studies with regard to wildlife. The latest version of this report is for the period 1997-2007 and is attached to this document.

- 9 The time of day and weather conditions will be published in future Wildlife Monitoring Program Annual Reporting.

### **Additional Comments for 2006**

The Ahiak herd of caribou will be included in annual reporting should the herd cross into the 32 kilometre radius of the DeBeers Snap Lake study area.

#### Section 2.8

Reasons as to why incidents regarding foxes are higher include a number of environmental and human based influences. There is some belief that foxes are avoiding wolverines by positioning themselves closer to the camp compound. Another theory is that the mine related supplies and equipment in the lay down areas offer refuge to small rodents and hares providing a 'hunting ground' for foxes. While DeBeers is increasing the communication and education effort on site to instruct workers not to feed the animals, sadly some do not take the message seriously. For this DeBeers must investigate creative ways to compel workers to cooperate with wildlife management initiatives. Most of these incidents happen over the course of the winter.

#### Page 20

Non comments regarding the variation in trends between the snow track survey and aerial sighting were offered in this report. The report simply illustrates the results of the surveys.

#### Page 32

The reduction in bear sightings at this point is in-explicable. Statistical inferences were not made with regard to the effects of weather on bears. As always, avoidance is a possibility. However, the wildlife analysis report is defined to answer these questions (see attachments)

#### Page 42

Table 7-1 was established with the premise that the monitoring design is sound and will demonstrate predictions and the accuracy of those predictions.

<b>3.0 2006 Vegetation Monitoring Program (Jan 18, 2008 – Anne Gunn)</b>
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### **General Comments**

The observation of the first objective by the reviewer is correct. The area of impact is to confirm predictions related to loss or alterations of native vegetation communities. Native vegetation communities are those species of plants clustered in groups as a single species or cohabitating in an area consistent with the ecological land classification to which they have been assigned, using NWT data defining habitat areas for NWT native plants.

### **Specific Comments**

The issue of dust fall and its impacts on vegetation are diagrammed in the flowchart to demonstrate that dust fall impacts to vegetation would be monitored only if dust fall monitoring levels are exceeded under the air monitoring program. It should not be the intension of the vegetation monitoring program to measure dust fall within Air Quality and Quantity Measuring limits.

### **Area of Impact**

The changes in the vegetation within the local study area are the values that are necessary to measure. Specifically changes in comparison to native plant communities within the region. The regional study area is defined as a circle with a radius of 31km centred on the project site.

Future monitoring of the esker will be investigated should EAR predictions be exceeded by greater than 10%. It will be necessary to capture any expected changes through updated adaptive management planning. The esker has been reclaimed and no future use is anticipated, however it has not been ruled out for future use (as noted in the consolidated project description). Restoration measures will be developed through closure and reclamation planning

The reviewers comments with regard to dust being an indirect cause of change are noted, the ability of this study to determine the level of dust being an indirect cause of change is limited.

The mine entered full production in the summer of 2008. At that time of this report (October 2007) approximately 60% of the surface area planned for development had reached its completion. The 2002 optimization study shows the general footprint of the mine and the planned extent of development, and the expected disturbance to the surface of the land. The Snap Mine still has the East and West Cells of the North Pile to develop. These two areas will represent the remaining 40% of the planned area of development.

### **Reclamation**

Details of the number and location of permanent sample plots should be available in the original Vegetation Monitoring Plan, as opposed to the Vegetation monitoring annual report. In 2001 the use of the esker as a gravel source was completed, the

reclamation measures follow those directed in the land use permit, which normally state that sloping of perimeters are not greater than a 3:1 ratio, etc. If the land use permit for quarry use in 2001 was closed by the regulators, the reclamation measures would have had to have been acceptable to the MVLWB and INAC inspector.

### **The Triggered Monitoring Programs**

The air quality and emissions monitoring plan data can be used to establish the area of influence for dust fall as it pertains to monitoring dust fall effects on wildlife. This data can be reviewed to screen for triggers that will dictate monitoring. The control plot at the esker is unlikely to have measureable dust particles since the esker quarry had been deactivated in 2001.

### **Dust fall monitoring**

Dust fall monitoring ambient air quality objectives outlines in Alberta guidelines are the best available data available for design comparing. While it is a correct statement that perhaps, dust fall monitoring should extend to values beyond aesthetics, the NWT does not have guidelines developed for dust fall in arctic conditions. Follow up criterion will be established through future study reviews.

It should be noted that the vegetation monitoring report is designed to summarize the data collected during the previous years monitoring programs. Many of the answer to the inquiries made by the reviewer can be found in the vegetation plan and vegetation monitoring plans submitted by DeBeers in prior years.

<b>4.0 2007 Air Quality and Emissions Monitoring and Management Plan (Nov, 16 2007)</b>
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### **General**

DeBeers Canada has recently updated the AQEMMP Plan as of August 2008. Within the plan is a section of emission mitigation strategies (section 3.4) describing mitigations, objectives, methods, watering surfaces, wind protection, managing activity intensity and other measures. The DeBeers water license requires DeBeers to submit an adaptive management plan, DeBeers is currently reviewing the documents with the intention of making improvements on the suggestion of SLEMA, ENR and other regulators. Currently a number of emission reduction strategies have been through the specification drawing stages and emission reducing equipment has been activated (including, but not limited to Kubota 800cc utility vehicles, sky power measurement windmills.) These methods within themselves will reduce the dependency on diesel and will by virtue of their use, reduce SO2 emissions.

## **Chapter one**

The active mine area is depicted in figure 2-1 of the august 2008 AEMP. It shows an area delineated in orange described in the legend as "Snap lake mine footprint". While this represents the area that emissions are produced, the reviewer will notice Passive air quality stations that are, in some cases, hundreds of meters away from the active mine site. However, these passive stations are located in strategic places (near a return air raise, at easterly end of the airport) to monitoring emissions that may be present in the ambient air flow.

## **Chapter two**

The communications building is located about 200m southwest of the #1 intake vent raise. The location is plotted on the attached Figure: 3 Snap lake Diamond Project Overall Site Plan 1:17500 as a yellow dot with a linear label description. Monitoring methods are consistent with the meteorological station shown as a red dot (see legend) in figure 2-1 in the august 2008 AQEMMP. This station will be plotted in figure 2-1 in future plans.

The offsite areas described in the 2007 AQEMMP can be viewed as established in figure 2-1 of the August 2008 AQEMMP. As you will see, the airport partisol is located just to the south of the airport (TSP partisol 1.) and the area south of the explosives emulsion plant is located just meters out of the Snap Lake Footprint (TSP partisol 2.) These two locations were selected to allow for the efficient collection of samples and allow for calculation of ambient secondary particulate (sulphates and nitrates) concentration.

Monitoring stations for any new or existing hydro-meteorological stations will be plotted on future AQEMMP site plans in the future

The two particulate monitoring stations located off-site are PM2.5/10 Partisol 2 and PM2.5/10 partisol 1.as plotted on the 2-1 map provided in the August 2008 AQEMMP. With regard to QA/QC procedures, the QA/QC procedures for S02 and N02 will be consistent with the DeBeers 2008 QA/QC Plan recently updated by DeBeers Snap Lake Mine Environmental department.

## **Chapter Three**

Measurement of air quality criterion for TSP referred to in table 3-1 will continue to be measured on an hourly basis. Twenty four hour summaries can be calculated when and if required. DeBeers does not view this point as a deficiency. Information regarding the Initial investigations as to whether or not low sulphur diesel has the same heating capacity as regular sulphur diesel showed that RSD has a higher btu heating value (British thermal units) because of the higher sulphur content. DeBeers

is aware of this fact and continues to work towards economically viable diesel consumption alternatives.

DeBeers will include estimates of all emission factors included in future studies to represent the spectrum of TSP contributors. Equations to calculate dioxins, furans and mercury are difficult to formulate. The proposed approach for estimating these emissions from the incinerator is to use intermittent stack sampling data for the incinerator and compare this data to the Canada-Wide standards in the annual reports.

At this point there is not an action plan or strategy for the use of low, super-low or ultra low diesel emissions. DeBeers won't rule out the possibility for these plans to eventually exist, however it is sufficient to state that currently there is no action plan.

DeBeers does have a general commitment to investigate cost effective alternative energy solutions. Latest advancement in environmental engineering and green solutions are constantly being monitored by planning engineers at Snap Lake Mine and have led to some major operational changes to the way DeBeers operates its Snap Lake facilities. DeBeers is currently in the process of installing wind power measuring devices. Essentially wind mills with the capacity to power a small home. These are not for power generation however, but designed to measure the prevailing wind speed and consistency. These structures will help DeBeers determine the viability of wind power. DeBeers Snap Lake Permanent Camp complex will incorporate a number of design features that will reduce heating costs and increase energy savings, supporting the movement toward energy efficient solutions.

#### **Chapter Four**

Action levels for annual ambient SO<sub>2</sub> concentrations are measured in micrograms/cubic meters. It is unclear what deficiency the review has identified. The figure represents 50% U.S. EPA primary as a reference value and compares it to the updated air modelling forecast from 2007 to 2015.

#### **Chapter Five**

SLEMA is correct in its observation that there is no obligation for DeBeers to submit Air Quality and Emissions Reporting with the Snap Lake Water License Annual Report. AQEMMP reporting will be submitted with the Environmental Agreement Annual Report which is generally accepted as June 30<sup>th</sup> of any given year. This commitment was made to develop harmonization with all the annual reporting through the Environmental Annual Agreement

#### **Additional Comments on Authorship**

SLEMA is correct in noticing the author page being absent in the 2007 AQEMMP. The August 2008 AQEMMP does not have an author page as approved by DeBeers.

However, It should be noted that DeBeers the owner of the AQEMMP regardless of who the writer may be. In this case, the writer was Chris Madland from Golder Associates

## **5.0 2007 Water Licence Annual Report (Jun 17, 2008)**

### **General Comments**

Nutrient loadings limits are in the forefront of DeBeers Snap Lake Environmental concerns and are monitored with diligence and care as water license limits are approached. The current changes to sewage management facilities and water treatment plant improvement should reduce this concern as the project progresses. The non-compliances with zinc limits through the temporary water treatment plant were actively investigated, reason for these anomalies are still inconclusive. The belief is that the unreasonably high levels were contaminated external to the source. TDS is, on a whole lake basis, on the rise the TDS maximum of 350 mg/L appears to be a milestone that may be achieved sooner than expected. DeBeers is investigating additional monitoring strategies to confirm these trends and this may help gain insight to the causes. Toxicity testing failures should be reduced with the updated QA/AC plan changes and DeBeers is working towards lessening these occurrences, through streamlining field sampling methods and handling techniques.

### **Comments on the 2007 WLAR**

SLEMA is correct in noting that figure 22-1 is inconsistent with the description on page 33. The correct description is that non-compliant sewage is directed to the Water Treatment Pond. This flow chart was configured earlier in the year and represents the operational sequence of an earlier dated operational sequence. This was an operational change that DeBeers made as a preferable option to the officially sanctioned use of the wetland would be an acceptable contingency for treated effluent deposition.

DeBeers will commit to summarizing SNP activities against water license compliance in future water licence annual reports for more effective presentation. The details of calculating ammonia and nitrate loading limits are calculated in the same manor as phosphorus.

DeBeers is developing a work plan that will rerun the Goldsim Ammonia Nitrates modelling. The newest and most up-to-date model will include parameters identified through actual production impacts. The current model was based on presumptions by AMEC dating back to 2002. An up-to-date model will enable DeBeers to make predictions of AN loadings with actual parameters associated with production. This model will be available prior to February 2009. Mitigations will be proposed once the results are calculated.

DeBeers has made notes of the typos with regard to the maximum values measured at the Temporary Water Treatment Plant. Snap Lake Mine will unfortunately have to revisit this problem as identified and make an effort to fix them in the future.

### **Comments on the Appendix I (Dam Inspection)**

The absence of a complete and final field report in the appendix is an oversight on DeBeers Canada's part. A full 2007 DAM INSPECTION REPORT is available and will be attached with this communiqué.

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

The possibilities as to why zinc was out of compliance in 2007 as a result of tested effluent in June and July 2007 were investigated. The investigation into the zinc anomaly was inconclusive. Speculation is that the tests were tainted after sampling the discharge. On site environmental assistants were briefed on the handling of sampling bottles and instructed to be aware of the possibility of contaminating samples by handling, and if necessary instructed to discard potentially tainted samples. The non-compliance of (pH) highlighted by SLEMA is noted and section (22) had not referenced this fact. Non-compliances will be summarized in the future.

### **Comments of Appendix III**

Fish tasting is clearly a subjective monitoring technique that uses TK from elders because it was not intended to be based on western science, no fish tissue samples are taken. There are other programs for fish related concerns that are science based and the techniques are authorized by DFO .

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

DeBeers has had difficulties completing field surveys due to unsafe ice conditions. The safety of the workers is paramount in DeBeers decision to cancel program. The decision to cancel is not taken lightly from a safety perspective. Under the circumstances, DeBeers sent a notice to the MVLWB since the decision to cancel was not rooted in environmental program changes, but due to the reality that operations would put workers at risk. DeBeers informed the MVLWB through a letter from Sarah Gagne in November of 2006. A ruling from the MVLWB can not override DeBeers commitment to safety of workers or put them at risk. DeBeers chose to address these problems by applying to the MVLWB to amend the AEMP to summer conditions. This resulted in resistance by some regulators. During the SLWG sessions regarding these challenges, DeBeers sought advice prior to applying for an amendment to the AEMP and solicited comments, and ultimately chose to amend the study to take place in "open water" conditions. A special study will not be required, as we advised SLEMA and others that the safety related issues and the data inconsistency issues could be addressed via an open water sampling program.



SLEMA was clearly apprised of the safety issues at the recent September 11, 2008 AGM and we will not entertain sampling during unsafe months and weather conditions. From the perspective of data inconsistency, due to weather and safety issues, we were surprised that there was no support for the open water program from SLEMA

SNP station 02-20e was not sampled during the winter SNP sampling period because conditions on the ice in front of the diffuser were too hazardous for the consultants to sample. Thin ice created a danger to human safety; therefore that SNP station could not be sampled. SLEMA is correct in identifying SNAP09 as a midfield and not a far field station; it is in-fact a midfield station. The method for calculating parameter loads for phosphorus is consistent with those of ammonia and nitrate parameters.

Field blank samples were detected to be higher than those of previous years. DeBeers is aware that the CCME updated guidelines are available regularly. September 2007 updates were not accessible at the time of the production of this report. DeBeers chose to use the most current version in its environmental library.

DeBeers is well aware of the increasing trends in TDS overtime. While SLEMA is correct in noting that they are well below the EAR benchmarks and CCME guidelines, DeBeers has been investigating strategies to address mitigations to TDS. The forecast would suggest that TDS maximums would inevitably be exceeded and DeBeers is hoping to formulate a plan to address this problem.

### **Plume Characterization Study**

DeBeers has taken note of the inconsistency in the number of deep-water stations in Table 7-1 showing eight stations being sampled in August and 7-8 describing nine stations. DeBeers submits that the best way to solve this inconsistency is through figure 7-3 that plots DE7, DE8, DE11, DE12, DE14, DE19, DE21, and DE17 AND DE25. Nine is the correct number of deep water monitoring stations.

### **Section 8.**

DeBeers had commissioned a wetland study by Golder and received results in February 2008. It determined that no treated effluent was discharged from the wetland into Snap Lake. Please be aware that the wetland in question is within the sump for the North Pile expansion that is planned of construction this winter

### **AEMP Update**

The AEMP is scheduled for an update and resubmission as per the DeBeers Snap Lake Water License and Department of Fisheries and Oceans commitments. The updates are an essential part of DeBeers commitment to managing aquatic effects

monitoring and stakeholders can provide feedback in input during the review process

## **6.0 2006 Hydrology Monitoring Program Annual Report (Nov 27, 2007)**

### **General Comments**

It would assist DeBeers to review the SLEMA recommendations on how the water balance analysis could be improved.

### **Comments on Chapter 2.**

Data quality difference between the use of a staff gauge and the level loggers is fairly easy to describe. A level logger records open water levels at 30 minutes interval while a staff gauge is monitored and recorded three times per year. The description between the two methods and their purposes are described in 2.2.3 and 2.2.4 in the Hydrology report respectively.

The reference to Golder 2007 may be in-fact a report not shown in the appendix. However the 2007 DeBeers water license annual report (2006 & 2007) both refer to measurement of stream discharge levels.

The Annual Hydrology program is designed to measure water while it is in flow. The use of snow data would help calculate the potential volume of water migration during the freshet, it is not useful to collect during the winter months when no flow can be calculated. Snow cover data will be used as a reference point for this study in the future.

For the purposes of this 2006 Hydrology Monitoring Annual Report the net gain to Snap Lake is reported as 582'830 CUM, suggesting that no measurable gain could be detected in the 2005, 2006 and 2007 hydrology monitoring program years. This is the best available data to date. DeBeers has to concede that perhaps the 14.25KM2 surface area of Snap Lake was and underestimate of the actual lakes size based on the most recent reported volumes.

The difference between the table 2-6 and table 2-5 appear to be routed in mathematics. 2-5 refers to the "calculated seasonal" mean, while the table 2-6 refers to the "annual surveyed" average.

The water levels read from the staff gauge both show water being measured at the outflow. With regards to recharge loss, there is no discharge/recharge loss analysis available at this time. Continued monitoring of the volumes of groundwater and hydrology flow will be continued to be analysed and more accurate predictions of water flow will be included in future groundwater management plans.

## **Comments from the traditional knowledge panel**

DeBeers Canada takes the comments of the traditional knowledge panel very seriously. DeBeers is pleased to know that the affected traditional users of Snap Lake do not see any observable changes. Future commitments to providing a visual survey and open water reconnaissance are planned to help community representatives visit the lake, in the hopes that they continue to supply traditional feedback. The Elders did view Stream 27 and Inland Lake 10 at its headwaters. They have been on Inland lake 6, and Snap Lake during the past fish tasting event; especially the fishers. Most of these elders are on the TK panel and/or the Board of Directors of SLEMA

Strategies to incorporate snowfall, site runoff and groundwater will be investigated for future hydrological plans. DeBeers would like to invite the traditional knowledge panel to participate in strategies to incorporate traditional information into the studies by providing feedback through the SLEMA board in addition to any workshops or planned site visits. Its one of many ways the TK Panel can contribute.

DeBeers has air quality emissions and monitoring management plans, wildlife management plans and vegetation management plans in addition to the hydrological studies. Information gathered from these plans will help form a cumulative assessment of the impact of the Snap Lake Mine and other development in the NWT. Once this data is collected, links may be made between all the combined studies. This being stated, DeBeers is committed to limiting the impact of the Snap Lake Mine on the surrounding environment and will consider all advice provided by the TK panel.

### **7.0 2006 Environmental Agreement Annual Report (Feb 6, 2008)**

The inconsistency with noted by SLEMA is correct, there is in-fact 22 annual reporting submissions that DeBeers must make as part of its Environmental Commitments. There were small to moderate increases in TDS, a fact not lost on DeBeers, or their environmental planners. Strategies to deal with TDS predictions are currently being developed through various modelling and planning efforts (Goldsim, Aquatic Effects). DeBeers will make an effort to harmonize the plain language summary with the text body of the report. TDS data is consistently available through Monthly SNP reporting. DeBeers can commit to sending SNP directly to the SLEMA staff when it becomes available.

The presentation of results referenced in table 2-1 is, in the opinion of DeBeers the most effective way to summarize five major components of the purpose of monitoring programs and providing an Environmental Agreement Annual Report. The information requested by the Environmental Agreement, and the data presentations and discussion is by nature very scientific and detailed. The

assumption is that the reports are submitted to agencies that have appropriate skills to review these detailed scientific reports requested.

The purpose of the monitoring program, key activities, environmental assessment report predictions and key results are presented in such way that the rationale is explained with the highlights of each program. The individual program annual report is where specific programming results can be found in greater detail, often in descriptive tables, figures, graph and flowchart formats. The Environmental Summary achieves its purpose of summarizing the details of the years programs. It acts as an index to a more intensive level of reporting, should the individual reviewer find a topic of interest and requires more information.

In addition to the annual reporting DeBeers provides mandatory monthly reports to various regulators that can be used to build these graphs that SLEMA is requesting. The raw data is provided and can be manipulated to construct graphs that are visually pleasing based on the reviewer needs. Excessive reporting is not the intention of the environmental annual report, summarizing the annual findings is the goal.

Section 3 and 4 of the Environmental Agreement Annual report follow the intention the Environmental Agreement. The Environmental Agreement requires DeBeers to provide planning and monitoring programs for the Snap Lake Project,

It is stakeholder reviews of these reports that DeBeers refutes, incorporates and/or accepts opinions of expert regulators, monitoring agencies, first nations and all other reviewing parties privy to the Environmental Agreements.

The abstracts make up the infrastructure of the report and provide a means to communicate the key finding of the environmental programs quickly and effectively.

SLEMA is correct in noting that not all of the monitoring programs, management plans and annual submissions and related documents have not all been submitted for review. DeBeers is steadily working on upgrades, new submissions and revised additions to all reports as Snap Lake is compelled to do so under its many agreements and licenses. DeBeers has every intention of making hard copy and electronic copies of information available to SLEMA if the information requested is part of DeBeers normal reporting. Spontaneous requests are often difficult to facilitate as environmental staff take time out of regularly scheduled activities to try to facilitate SLEMA inquiries, but often do not have the extra capacity.

DeBeers environmental staff will assist whenever time permits and is willing to work with SLEMA However it is DeBeers responsibility to bare the burden of being the "hub of information" for Snap Lake Mine.

The adaptive management plan referred to in table 3-1 would be the 2004 version, still yet to be updated. Compliance reporting tabled in 3-1 does not only report the dates of acceptance or submissions, but included anticipated revised submissions to regulatory agencies. In this case DeBeers was hoping to re-draft an adaptive management plan by March 31, 2008. To date the work on this revised edition is ongoing.

SLEMA is correct in noting that compliance reports only refer to INAC inspection. DeBeers will include compliance information with regard to other compliance milestones such as fisheries authorization compensation projects achieved and MVLWB compliance objectives in the 2009 annual reporting. Mitigation measures with regard to operations other than those associated with sewage treatment plants will form part of this submission in the 2009 Environmental Agreement Annual Reporting.

The summary of adaptation measures reflect the few circumstances in which Snap Lake Mine needed to correct. There was increase in mine generated water; however the capacity to deal with this water was much higher than the increased flow. The water treatment plant has a capacity to deal with 35'000 CUM of water, and day-to-day averages remain steady at 13'000 CUM. The adaptive measure was to optimize the treatment plants ability to handle the volume.

<b>8.0 2006 Air Quality, Meteorological Monitoring and Emissions Summary (Dec 17, 2007)</b>
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***General Comments***

Equipment failure and field accessibility in cold weather have been a problem for DeBeers in the winter months. DeBeers is currently building strategies to help reduce the amount of equipment failure, one of which is to have the air quality instrument technicians available on site with a greater frequency. This will lessen the time of lost data between repairs and hopefully identify the causes of these failures (snow accumulation, faulty battery systems etc.).

***Comments on Chapter 3***

It is noted in the report that the LCD display does not function below -30 degrees Celsius, making it difficult to view measurements. It should be noted that partisol units are being installed that are climate controlled enclosures; this should reduce the amount of equipment failures. The loss of data in warm weather conditions was noted by SLEMA, however it should be noted that the conclusion states that "all of the meteorological data were collected with a greater than 90% retrieval rate".

***Comments on Chapter 5***

The total amount of diesel consumption for 2006 is correct in table 5-1; the summary in page ii is a typo (most likely from an earlier draft) and should be disregarded. S02 emission rates for LSD and RSD were calculated separately for each type of fuel and then summed together to give a total S02 emission rate. The variation in the number between tables 5-1 and 5-2 may be due to the fact that table 5-2 breaks down mine heaters/incinerators into mine heater and incinerators as separate items. If the reviewer takes NOx emissions from table 5-2 and adds Mine heaters (0.010) and incinerators (0.002), the reviewer will notice NOx tabled in 5-1 as Mine heater/incinerators as 0.012 representing a total of both values. This could explain the variation. Corrections will be made to the total emissions table as needed.

The typos in section 5.2 by SLEMA are noted, the change from 2005 is 20.31kt. Fugitive dust resulting from vehicular traffic within facility road estimates is not available at this time. Currently the passive collection stations can provide data on dust emissions associated with vehicular travel over time, however the number of variables associated with fugitive dust is difficult to calculate to form estimates. For example, a rock crusher is located near the apron quarry, placing it in close proximity to one of the airport TSP and partisol stations, therefore any fugitive dust estimates specifically related to vehicle travel can not be separated from emissions associated with the rock quarry. Estimates for these emissions must include sources of other fugitive dust. A change in monitoring is needed to effectively measure vehicular related fugitive dust that is not impacted by other sources of dust emissions.

## Summary

DeBeers would like to thank SLEMA for their time and effort spent thoroughly reviewing the numerous plans and report submitted by DeBeers and is looking forward to soliciting advice and working with the Snap Lake Working Group in the future

Should you have any questions or comments feel free to contact John Bartlett at 867- 767-8763 or email [John.Bartlett@ca.debeersgroup.com](mailto:John.Bartlett@ca.debeersgroup.com). We look forward to your feedback and comments.

Yours very truly,



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