Snap Lake Environmental Monitoring Agency

2014-2015

ANNUAL REPORT

Table of Contents

Message from the Chairperson

On behalf of the board and staff of the Snap Lake Environmental Monitoring Agency, I am very pleased once again to present the 2014-2015 annual report of activities of the agency. This report, together with the monthly environmental updates published by the Agency, contains a detailed snapshot of our activities and technical reviews undertaken by the agency throughout the year.

This year as in the past since its creation, SLEMA has demonstrated that it can continue to serve as an effective, independent third-party watchdog and provide its members and communities with an unbiased opinion and technical know-how required to monitor the activities of the Snap Lake Mine. The key to SLEMA' s steady performance is due for the most part to the stability of our membership and the diligence and professionalism of our staff who, for the most part, have been with SLEMA since its inception. Over the years, they have acquired an in-depth knowledge and understanding of the activities and operations of the Snap Lake Mine, and are an essential reference for our communities when it comes to obtaining unfiltered information and opinion, and to understand the complexity issues faced by the mine. This was particularly important this year, as the mine was facing important issues with respect to water quality at Snap Lake and applied for water licence amendments to lower some of the water quality requirements in its water licence.

I would like to conclude by saying SLEMA is generally satisfied with the performance of the mine and De Beers' effort to address important issues of concern to the community, but we hope that other critical issues such as pollutant emissions from solid waste incineration at the mine are not brushed aside and ignored because there are currently no regulatory instruments to deal with this very important issue. I also wish to stress the important role that community engagement plays in the success of the Snap Lake Mine and trust that De Beers will continue to be proactive and ensure SLEMA and the Aboriginal parties to the Snap Lake Environmental Agreement are meaningfully engaged as stakeholders and partners.

Johnny Weyallon
Chairman

Łets’eèhdı gha Dahchı k’è wheda, Wegodì

Snap Lake Ndè Hoìdı Nıhtł’èkǫ̀, Envıronmental Monitoring Agency gha board k’è dehkw’è dǫ eyıts’ǫ gogha eghàlaede dǫ, 2014 gots’ǫ 2015 gots’ǫ̀, ıłe xo edaànı eghàlagıı̨da wegodì hǫt’e. Sa tat’è edaànı ndè hoıdı wenıhtł’è hohłe eyıts’ǫ wenıhtł’è hazǫ k’achı wek’anaeta, xo ghàà haànı eghàlageèda dı nıhtł’è k’è dek’èhtł’è hǫt’e.

Dı xo, ıneę laànı, wexè hoıwo gots’ǫ SLEMA nıhtł’èkǫ̀ ıłaa hotì, kǫ̀ta dǫne gha t’ası hogıìhdı t’à dehkw’e eyıts’ǫ kǫ̀ta dǫne gha t’ası k’è hotì ehkw’ı hayageèhtı hǫt’e. Snap lake edagot’ı t’à eghàlageèda wenaàwo k’egeèzǫ t’à wek’è hayageèhtı ha dì le. SLEMA wenıhtł’èkǫ̀ wexè hoıwo gots’ǫ dǫ board k’è dehkw’e sıì hotì nezı ełexe eghàlageèda t’à hò?ǫ hǫt’e. Łǫǫ xo gots’ǫ Snap Lake sǫmbak’è edaànı ndè hoìdı t’à eghàlageèda t’à etłe wek’ègeèzǫ adza, eyıt’à kǫ̀ta gha sǫmbak’è wegodı whela wet’a?à hǫt’e. Dı xo wegodı whela sıì wet’a?à adza, dıdzę sǫmbak’è edaànı tı t’à eghàlageèda ładı agele ha gıı̨wǫ eyıt’à Snap Lake sǫmbak’è tı t’à eghàlageèda nıhtł’è ładı agele ha geèke hǫt’e.

SLEMA gha dehkw’è do dı hagadì, sǫmbak’è nezı eghàlageèda eyıts’ǫ De Beers, kǫ̀ta t’ası ghǫ nanıgede sıì sìgele ha edegeèhdza, haànıkò t’ası wehda wet’a?à hǫt’e, łòòzats’ì sǫmbak’è gots’ǫ t’asıch’ì wek’èk’ǫ̀ ası ts’eèhtsı ha dì, wegha weghàà eghàlats’eèda naàwo gòłı le t’à wek’è eghàlats’eèda gha wet’a?à hǫt’e. Eyıts’ǫ dı haìsı dehwhǫ, kǫ̀ta ełexè eghàlats’eèda t’à Snap Lake sǫmbak’è nezı etłe eyıts’ǫ De Beers hotì eghàlageèda, eyıts’o SLEMA wenıhtł’èkǫ̀ gha dehkw’è dǫ xè Snap Lake Ndè Hoìdı Naàwo k’è eghàlageèda ha ts’ıı̨wǫ hǫt’e.

Johnny Weyallon
Łets’eèhdı gha Dahchı k’è wheda

K'aldher beyatié

Ku dǫ ją nehél hásnı nadlį halu t'at'u hasıé hadı sı tsįdhu ch'á tsambá k'é naré bádı hél gháladá dené ʔała déltth'ı dırı Snap Lake Envıronmental Monıtorıng Agency yunį xaıyé ts'į dǫ dırı xaıyé ts'ęn t'at'u ʔasıé hadı hél ghálądá sı ghą hodı 2014-2015 xaıyé t'ą nadher sı.Ku dırı hanıé sı ʔéyílé dené sı tth'ı ʔasıé ts'ídhí ch'á badı héghálaná sı chu harélyǫ haneí ʔałá nılyá hél dené hél hadı sá kanélt'u t'at'u ʔasıé k'é ghálądá sı ts'į honıé tth'ı t'at'u ʔasıé hałní nezoįlé dé t'at'u sughá sı ts'én sélyé ku dırı ʔérıtł'ıs yé tth'ı dené norįtł'ıs nałtsį ʔaké dagharé dené hél had.

Ku dırı xaıyé sı ts'į t'o dırı SLEMA hasıé hadı ts'įdhí ch'á hųnįdher sı tsambá k'é ghálądá sı bádı ʔaké nézǫ ʔasıé hadı dené bá ʔaké dagharé dené hélʔanıʔá t'é.Ku dırı dené déłtth'ı ʔasıé ts'įdhí ch'abádı sı dené naką ʔat'é hılé hél tth'ı ʔáké t'at'u ʔasıé hadı hayorılá dené nadé sı behél hadı ʔasıé haʔǫ́zį ʔat'é hılé tth'ı ʔasıé hadı sı nezǫ lat'é hılé ʔedǫ nályé ʔat'é yuwé Snap laké tsambá k'é ghálądá sı.Ku ʔaké nezǫ dǫ ją la k'é ʔasıé hadı tsįdhı ch'á badı nezǫ ʔéghálądá ku t'ą dené nuwe hel ghálądá sı chu bet'á nezǫ haʔą́ tth'ı t'ą bebá ghálądá sı chu ʔat'é tth'ı t'ą dené nuwe bá ʔerıtł'ıs serįdhęn dené tth'ı sı SLEMA hunįdher tsį nuwé hel ghálaná.Ku hanélt'ı xaıyé dǫ tsmaba k'é la hunįdher sı Snap Lake ʔaké dagharé bets'į hanıé nałtsį bek'onetá gharé tth'ı ʔaké t'at'u nık'é ghálądá hasí hats'édı sı tth'ı ʔaké la benerédı ʔat'é, ʔaké t'at'u tsambá k'é naré ʔasıé hadı hunįdher sı bet'į hanıé náltsı sı hayorįlá k'eyaghé Dené nadé sı tth'ı behél hadı ʔát'é ʔaké t'at'u ʔasıé ghaladá tth'ı badı sı dagharé ʔaké lat'é hılé dé tth'ı nanet'į hułdǫ dené hél hadı t'at'u ʔasıé hadı ʔedǫ nál yá kodé chu nok'é ʔasıé hél ghálądá dé horénılé lat'é dé ʔaké t'at'u sugá nįdhęn sı ts'ęn selyé hułdǫ dené hél hadı.Ku ʔéyı hadé dǫ xaıyé sı ʔaké t'at'u ku hél ghálądá sı ʔédǫ nályé hoʔą snı t'á ku senalʔį sı beyé ʔasıé natser nılé sı dek'aʔǫ́ ʔályé hoʔą snı ku hél ghálądá sı bets'į ʔérıtł'ıs begharé gháladá sı ʔats'édı.ʔe ku ts'į ʔérıtł'ıs begharé ghálądá sı begharé t'at'u ku serįdhęn sı ʔédǫ́ nalye ku beyé ʔasıé ʔasıé ch'ęl hįlį hél kadzíl ch'á.

ʔéyı hel dǫ kut'á t'at'u ʔasıé hadı hél ghálą́adá hunįdher sı SLEMA sı bebá ʔaké nezǫ ʔéghálądá ʔát'é t'at'u tsambá k'é haʔą sı badı ʔéyer ghálądá sı De Beers sı t'á Dené nadé sı hayorįlá ʔasıé babá nezǫlat'é hulé dé kudęné t'u selyé hat'é.Ku begha thęné hadé dırı ʔası ch'ęlé bek'orek'ą sı setsąn k'ąn chogh yé sı naı bélé sı nezoįlé hél nık'é natł'í sı ʔałǫ t'at'u sughá sı ts'ęn sélyé hoʔą dǫ sı t'at'u bedı hası ts'į ʔérıtłıs begharé ghálądá hųlįlé ʔéyı sı ʔaké badı hunédı.Ku hasį horés ʔį́ Dené hayorįlá nadé sı ʔeké hubet'oré ʔa duwé ʔat'é nuwé hél ʔaıé hałnı sı tsambá k'é ghálądá naré Snap Lake,tth'ı De Beers sı tth'ı ʔaké nezǫ t'at'u SLEMA ʔasıé hałnı hél ghálaná sı nezǫ yets'enı ʔat'é hél tth'ı Dené hayorılá behel nadher Snap Lake sı Harelyǫ ʔasıé hadı ts'įdhı ch'á tsambá k'é ghálądá naré yatı halį gharé-u tth'ı t'ą behel nadher sı chu ʔats'édı.

Johnny Weyallon
Chairman

What Is SLEMA

The Snap Lake Environmental Monitoring Agency's (SLEMA) Board was created pursuant to the De Beers Snap Lake Diamond Project Environmental Agreement, established between De Beers, Government of Canada, Government of the Northwest Territories and the four affected Aboriginal Organizations: the Tlicho Government, the Yellowknives Dene First Nation, the North Slave Metis Alliance and the Lutsel K'e Dene First Nation. The mandate of SLEMA is to support the aboriginal parties in protecting the environment, support liaison and communication between the parties, support De Beers and Government in protecting the environment, review environmental performance, serve as a public watchdog for the regulatory process, and provide a public repository for reports and plans in relation to the Snap Lake Project.

What Are SLEMA's Responsibilities

SLEMA's mandate is established under Article IV Section 4.2 of the Environmental Agreement and is as follows.

(a) support the Aboriginal Parties' efforts to protect the environmental interests on which they rely;

(b) support collaborative and information-based liaison amongst all the Parties;

(c) support De Beers, Canada, and GNWT in their respective efforts to protect the environment;

(d) review and monitor the environmental performance of the Project using western science and traditional knowledge;

(e) work with De Beers to mitigate environmental impacts of the Project thereby mitigating the potential for socio-economic effects;

(f) serve as a public watchdog of the regulatory process and the implementation of this Agreement;

(g) make recommendations to any body having regulatory or management responsibility for a matter, for the achievement of the purposes and guiding principles in this Agreement;

(h) facilitate programs to provide information to and consult with the members of the Aboriginal Parties;

(i) report to the Parties and the public on the Monitoring Agency's activities and the achievement of its mandate; and

(j) provide an accessible and public repository of environmental data, studies and reports relevant to the Monitoring Agency's mandate.

How Is SLEMA Structured

SLEMA is directed by a board of eight, made up of two representatives each from the four signatory Aboriginal groups. The board also relies on two panels: a Science Panel and a Traditional Knowledge Panel. SLEMA has two full time employees, an Executive Director who administers the agency, and an Environmental Analyst who reviews documents from De Beers and also provides advice to the board.

Executive Board Members

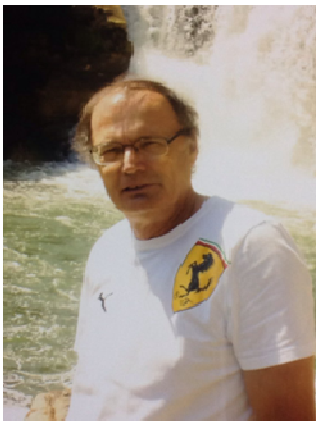
Johnny Weyallon
Chairperson
Tlicho Government

Rachel Crapeau
Vice Chairperson
Yellowknives Dene First Nation

Charlie Catholique
Secretary
Lutsel K'e Dene First Nation

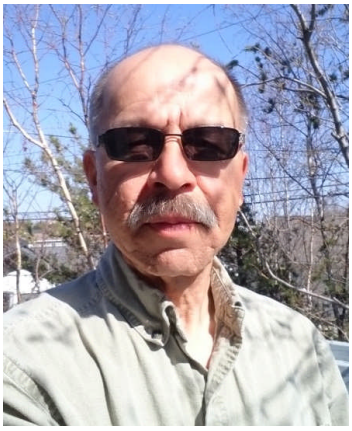
Arnold Enge
Treasurer
North Slave Metis Alliance

Board Members



Greg Empson

Yellowknives Dene First Nation



Adrian D'Hont

North Slave Metis Alliance

Noel Drybones

Tlicho Government

James Marlowe

Lutsel K'e Dene First Nation

Traditional Knowledge Panel

Eddie Camille and **the late Harry Apples**, *Tlicho Government*

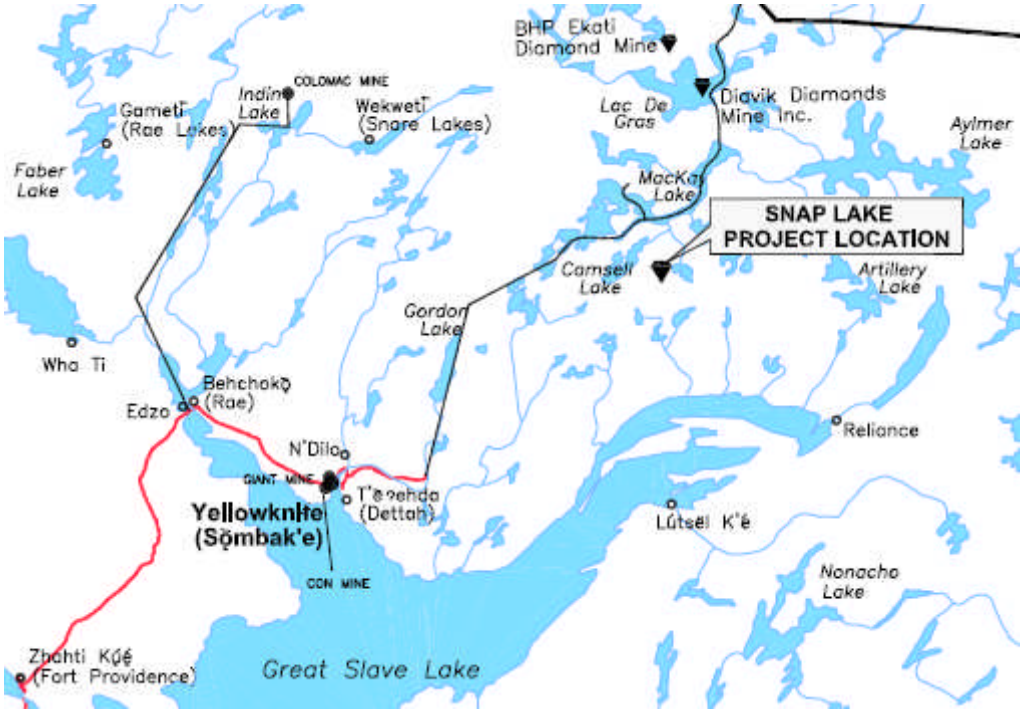
Eddie Jones and **Wayne Langenham**, North Slave Metis Alliance

Albert Boucher and **Madeline Drybones**, Lutsel K'e Dene First Nation

Mike Francis, **Alfred Baillargeon**, Yellowknives Dene First Nation

Snap Lake Diamond Mine

The Snap Lake Mine (Mine) is a diamond mine owned and operated by De Beers Canada Inc. (De Beers), and is located about 220 kilometers northeast of Yellowknife, Northwest Territories (NWT). De Beers received regulatory approval for the Mine in 2004, which included a Water Licence, a Land Use Permit, Land Lease, and a Fisheries Authorization, as well as specific obligations under an Environmental Agreement. Mining began in 2007 and is expected to continue for 22 years.



Map 1. Location of Snap Lake Diamond Mine

The Mine maintained production levels between 68.9% and 107.9% of full capacity through 2014. 1,079,531 tonnes of kimberlite were processed, and about 1.3 million carats of diamond were produced.

De Beers has committed to maintaining the highest environmental management standards. The Snap Lake Mine is the only diamond mine in the NWT that has certified its environmental management systems to the international standard ISO 14001, throughout advanced exploration, construction and operation.

Photo 1. Aerial View of the Mine Site

There were five Water Licence inspections and three Land Use Permit inspections conducted by the Inspector of the Department of Lands from in 2014.

Within 2014, approximately 920,409 tonnes of coarse reject of processed kimberlite (PK), 623,584 m^3 of slime were deposited into the North Pile, and 9,908 m^3 of paste were backfilled into the underground. 116,477 m^3 of fresh water were withdrawn from Snap Lake, and 16,086,436 m^3 of mine water, collected runoff and seepage water were treated in the Water Treatment Plant and discharged into Snap Lake. In addition, 1,096,599 m^3 of water were recycled in the Mine.

On November 12, 2014, De Beers filed a separate amendment application to the MVLWB requesting two limited duration, interim amendments with regards to Chloride and Total Dissolved Solids (TDS).

Agency Activities 2014-2015

- SLEMA, together with two other sister agencies (IEMA and EMAB), attended the 2014 Geo-Science Forum and presented itself in the Trade Show from November 25 to 27, 2014. SLEMA also hosted a Holiday Open House on December 3, 2014 together with IEMA and EMAB.
- The 2014 Annual General Meeting was held on December 17, 2014.
- The SLEMA Board met in Yellowknife on December 17, 2014.

- SLEMA's Executive Committee met in Yellowknife on November 17, 2014 and January 26, 2015.
- One workshop with the Board and elders from the Traditional Panel was held in Yellowknife on December 18, 2014. One Traditional Knowledge Workshop on Water Licence Amendment Applications was held in Yellowknife from January 29 to 30, 2015.
- SLEMA board members and staff attended the Public Hearing of Water Licence Amendment Applications in Dettah from March 11 to 12, 2015.
- SLEMA conducted the review of several reports, plans and studies and made numerous comments and recommendations throughout the year, which are described in the following sections.
- Monthly Environmental Updates are prepared and published on the SLEMA's website (www.slema.ca), and distributed to all stakeholders.

Photo 2. 2014 Geo-Science Forum, November 25 to 27, 2014

Photo 3. TK Workshop on December 18, 2014

Traditional Knowledge Panel

Traditional Knowledge Workshops

SLEMA held one Traditional Knowledge (TK) workshop on December 18, 2014. During the workshop, De Beers staff made a presentation about water quality issues related to Water Licence Amendment Applications, and TK panel members asked questions and made comments. GNWT-Lands Inspector also reported his recent inspection results to TK panel members.

SLEMA held two small workshops with TK Panel members, in two separate groups, on January 29 and 30, 2015. On Day 1, Mike Francis, Albert Boucher and Madeline Drybones were in attendance. Wayne Langenham and Eddie Jones were in attendance on Day 2. Alfred Baillargeon, Eddie Camille and Harry Apples were also invited but did not attend.

The purpose of the workshops was to provide TK Panel members with more hands-on information about the upcoming hearings planned by the Mackenzie Valley Land and

Water Board for March 10 and 11 to deal with Amendment Applications filed by De Beers with respect to changes to their water licence limits for TDS, Chlorides and other constituents of TDS.

The workshop included a outline of the amendment process and steps, background information on water management and water quality, and the tasting of six different samples of water (bottled and tap) to give Elders a practical understanding of various levels of mineral salts in water. Water Tasting results indicated that Elders appeared to prefer low TDS water (TDS concentrations are lower than 300 mg/L).

Overall, the workshop was well received and participants were very pleased with the discussion and particularly with the format of the workshops, which SLEMA staff kept very informal and open, giving Elders all the time they needed to ask question at their convenience, without following a set agenda. Elders also enjoyed the opportunity to meet in small groups and felt much more comfortable to ask questions and raise concerns than in a larger group. SLEMA staff was equally pleased with the format of the workshop and the active participation of all participants, who were very thankful for the opportunity to be involved and consulted about issues of concerns.

In the future, SLEMA would adopt this kind of format which proved to be conducive to a more active participation of Elders.

Photo 4. TK Workshop on TDS Issue on January 29, 2015

Photo 5. TK Workshop on TDS Issue on January 30, 2015

Environmental Agreement

2013 Environmental Agreement Annual Report

De Beers submitted the 2013 Environmental Agreement Annual Report (EAAR 2013) on October 14, 2014. It was then distributed by ENR to Parties of the Environmental Agreement and SLEMA for comments.

SLEMA commented on the EAAR 2013 on November 27, 2014.

- *De Beers adequately summarized the monitoring activities and results for 2013, and improved the report presentation by adding three photos of the North Pile, which show changes from 2011 to 2013. However, De Beers failed to acknowledge the non-compliance event that happened in 2013.*
- *De Beers reported the exceedance of Chloride, which occurred in September and October 2013, in Table 2-1 (page 7) and Section 4.1.10 (page 60), but did not mention it in Section 5 (Summary of Compliance), Section 7 (Summary of Mitigative Measures), and Section 9 (Summary of Public Concerns). SLEMA believes that the exceedance event is a non-compliance against the Water*

Licence, Part F, Item 9, and should be reported in detail in Sections 5, 7 and 9, even if De Beers was able to re-establish compliance in a timely fashion.

- *There is one statement about Mitigative Measures in the Executive Summary that*

    - *"The AEMP annual report demonstrates that the Snap Lake Mine's impact is similar to what was predicted in the Environmental Assessment. This demonstrates that the mitigative measures being used by De Beers are working effectively. Two response Framework levels were triggered in the 2013 AEMP. Response Plans were also submitted in 2013 for TDS, Strontium and Nitrogen. A Water License Amendment request was submitted in December 2013 to change water license effluent quality criteria for Total dissolved solids and its constituent ions."*

The two underlined sentences are contradictory. If mitigative measures were effective, De Beers would not have had to request to amend the water licence limits in December 2013.

The Department of Environment and Natural Resources (ENR) issued a letter about 2013 Environmental Agreement Annual Report on February 5, 2015, and requested De Beers to address related issues within sixty days of receiving the letter.

- *"The Annual Report can be deemed satisfactory once De Beers addresses the issues raised by the GNWT outlined below. The GNWT directs De Beers to provide a revised Annual Report or an addendum that:*

    - *More comprehensively compares the results predicted in the environmental assessment to the actual performance of the Project for all environmental components. A more thorough rolling summary and analysis of environmental effects data over the life of the Project is needed to illustrate trends as required under Article 10.1(b) of the EA.*

    - *Provides a determination of effectiveness of mitigation measures, as required under Article 10.1(c)(viii). A list of mitigation measures is included in the Annual Report (Section 7) but an evaluation of effectiveness is also required.*

    - *Provides a more comprehensive summary of public concerns and responses to public concerns, as required under Article 10.1(c)(x).*

    - *Provides a comprehensive summary of the new technologies investigated, as required under Article 10.1(c)(xi). A list of new technologies being researched is included in the Annual Report (Section 10) but a summary of the technology and outcome of the research are also required.*

    - *Includes the Minister's comments on the previous Annual Report as required under Article 10.1(c)(xii). Section 1.2 of the Annual Report*

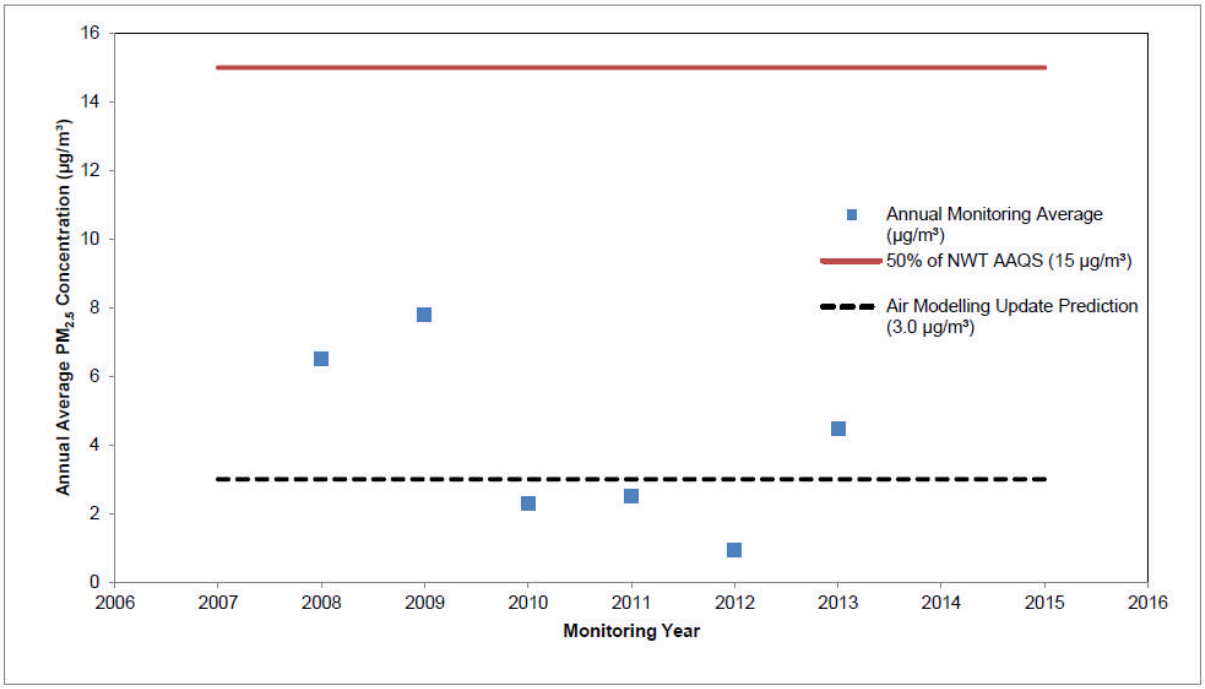
submitted by De Beers should describe how De Beers' responded to comments from the GNWT and Yellowknives Dene First Nation and reference the satisfactory determination from the Minister."

Air Quality Action Level III Exceedance External Review and Action Plan

De Beers submitted a Technical Memorandum prepared by Golder Associates on December 3, 2014.

- The observed percent increase of SO_2, NO_2, PM_{10} and $PM_{2.5}$ exceeded the allowable year-to-year percent increase defined in the Air Quality and Emissions Monitoring and Management Plan (AQEMMP) in 2013.
- The Technical Memorandum provides the plan to address the exceedances, including an evaluation of the data and further suggested actions.

Figure 1 Action Levels for Annual Ambient $PM_{2.5}$ Concentrations, 2013



µg/m³ = micrograms per cubic metre; $PM_{2.5}$= particulate matter nominally less than or equal to 2.5 microns (µm) aerodynamic diameter; NWT AAQS = Northwest Territories Ambient Air Quality Standard.

Figure 1. Annual Ambient $PM_{2.5}$ Concentrations and Action Levels

(Source: Technical Memorandum dated December 3, 2014)

The exceedances are not considered significant or of concern because the Northwest Territories Ambient Air Quality Standard (AAQS) were not exceeded for any of the compounds. De Beers proposed that:

- Given that the differences in concentrations year-to-year that triggered the Action Levels III response in 2013 were minor and that ambient concentrations never reached 15% of the respective AAQS, no additional emissions mitigation measures beyond the existing air quality management protocols are recommended in response to the observed changes in 2013.
- One action that will continue to be taken is to conduct a temporal review in the 2014 report to verify that there is no pattern of increase that is not obvious in the year-to-year comparisons.
- A second action will be to a review of the Action Level criteria. A modification should be made to the AQEMMP to set an appropriate level of sensitivity in the Action Level criteria.

SLEMA reviewed the Technical Memorandum in January 2015 and agreed that the proposed changes of Action Levels should only trigger when meaningful changes to air quality emissions are observed and there is potential for AAQS exceedance at the Mine. SLEMA did not have any other concerns.

Incinerator Stack Testing Summary

De Beers provided the Incinerator Stack Testing Summary on January 29, 2015.

- Two Ketek incinerators (model CY-100-CA) were installed in 2013.
- Incineration stack testing conducted was in 2014. Stack testing results indicate
    - Dioxin and furan emission above the CCME Canada Wide Standard (CWS) (80 pg/m^3), and
    - Mercury emissions below CWS (20 µg/m^3).

In response to the elevated Dioxins and Furans emissions, De Beers developed an adaptive management response plan, which consists of evaluation of results and adjustment of management practices to implement solutions.

- Both incinerators had undergone a routine inspection by the manufacturer one week prior to stack testing.
- The root cause was identified as “not following standardized work practice”.
- All site services staff with responsibilities for the camp incinerator were retrained, and detailed instructions were incorporated into the operators Safety Health and Environment Operating Procedure (SHEOP).

SLEMA reviewed the stack testing results in February 2015. The results of stack testing show that the average emissions of dioxins and furans are 6 to 65 times higher than the CWS.

Table 1. Stack Testing Results

Table 1: Stack Testing Results- Snap Lake Mine Camp Waste Incinerators									
		Incinerator 1				Incinerator 2			
Parameter	Units	Trial 1	Trial 2	Trial 3	Average	Trial 1	Trial 2	Trial 3	Average
Mercury (corrected to 11%O_2)	ug/m^3	0.02	0.03	0.07	**0.04**	0.04	0.04	0.04	**0.04**
Temperature (Secondary Unit)	°C	996	1003	980	**993**	997	994	1005	**999**
Dioxins and Furans TEQ (corrected to 11%O_2)	pg/m^3	84	580	902	**522**	1482	7921	6258	**5220**

(Source: Incinerator Stack Testing Summary dated January 29, 2015)

There is a requirement from the Land Use Permit MV2010D0053. The Item 54 reads:

- *The Permittee shall use a forced, fuel-fired incinerator to burn all combustible garbage except plastics. The Permittee shall select a unit that is **capable** of meeting an emission concentration limit on dioxins and furans of 80 pg TEQ/m^3.*

De Beers did install the two incinerators which, according to the manufacturer, are capable of meeting the emission concentration limit on dioxins and furans of 80 pg TEQ/m^3, as one testing result (84 pg TEQ/m^3) is very close to the CWS.

As De Beers pointed out in the Summary, there are currently no regulated emission standards, or enabling legislation in the Northwest Territories for incinerators. De Beers has not had any non-compliance issues for dioxins and furans so far.

SLEMA made inquiry on adaptive management response and stack testing via e-mail on February 10, 2015.

- Whether De Beers checked out the garbage sent to be burned in the incinerators – Is all of the garbage combustible? Is there plastics contained in the garbage?
- Does De Beers have a plan to make dioxins and furans emission meeting the CWS? Does De Beers have a plan for another stack testing to confirm the incinerators' capability?

De Beers Responded to SLEMA inquiry on February 11, 2015.

- *"We are currently working with EC and GNWT to develop a process for improving incinerator management, based on our review of the current operational practices as indicated in the letter. Since De Beers has a formal letter from Ketek that the incinerator is capable of meeting the emissions standards, we don't plan to undertake further testing – only to improve upon its operation. Following any discussions with EC and GNWT, we will submit a follow up letter discussing the findings and path forward. The distribution for this will include SLEMA"*

Water Licence

Snap Lake's Type "A" Water Licence MV2011L2-0004 was approved the Minister of AANDC on May 23, 2012 following recommendation of the MVLWB. The licence is valid from June 14, 2012 to June 13, 2020.

2014 Geotechnical Inspection of North Pile and WMP Dams

De Beers conducted the annual geotechnical field inspection through Golder and Associates Ltd. (Golder). Golder engineers performed the field inspection between September 8 and 11, 2014, and submitted the technical memorandum to De Beers on September 26.

Golder's observations are as follows.

- De Beers has fully formed its geotechnical team, which will oversee the North Pile development and WMP dams.
- De Beers' water management is in keeping with the design intent and operational requirements of the facilities.
    - All of the active ditches and sumps of the North Pile appeared to be in good condition and operated as per the design.
    - WMP water management, and dams 1 and 2 appear to be performing as per the design.
- In general, the North Pile is being developed and operated in general accordance with the design.
- The survey prism and piezometer data are, in general, collected, managed, and presented effectively for geotechnical interpretation; the thermistor data, however, are not.

Golder recommended that

- Documentation of the visual inspections of the North Pile sumps and the WMP should be generated and maintained on file.
- Further lowering the water levels of Perimeter Sump 1 (SP1), SP2, and Temporary Sump 4 (TS) to provide for additional storage capacity prior to and during the 2015 freshet, should be considered.
- The placement of the erosion protection layer should be placed to properly protect the completed embankments and coincidently with embankment construction.
- The North Pile operation, maintenance, and surveillance (OMS) manual should be updated immediately and reviewed and, if required, updated annually.
- De Beers investigate remote and/or automatic data collection for the thermistors to improve the efficiency and accuracy of data collection.

De Beers responded to the recommendations Golder made in both 2013 and 2014 on November 12, 2014.

SLEMA commented Golder's Technical Memorandum and De Beers' responses in the November 2014 Environmental Update.

- *No concerns are raised.*
- *All Golder's recommendations are supported.*

SLEMA Modeling Update

SLEMA developed a water quality model to predict whole lake average (SNP 02-18) of Total Dissolved Solids (TDS), Chloride and Calcium concentrations in Snap Lake in 2010, and updated the predictions in 2012 and 2013.

Again SLEMA updated the modeling in 2014 and provided De Beers with the modeling results on November 27, 2014.

Back test for modeling TDS was carried out with discharge data up to September 2014, and reasonable assumptions were applied in the prediction of water quality change in Snap Lake.

TDS modeling back test indicated that the correlation coefficient of the two data sets (observed values and modeling results) is 0.99, and confirmed the model capable of predicting future whole lake average of TDS concentrations in Snap Lake.

If the discharge amount and TDS concentration are 1,400,000 m^3/month and 650 mg/L, the whole lake average TDS level will be 376.8 mg/L in **January 2015**, which will

exceed the Water Licence limit (350 mg/L). The prediction is consistent with the one conducted in October 2013 (376.8 mg/L vs. 378.8 mg/L).

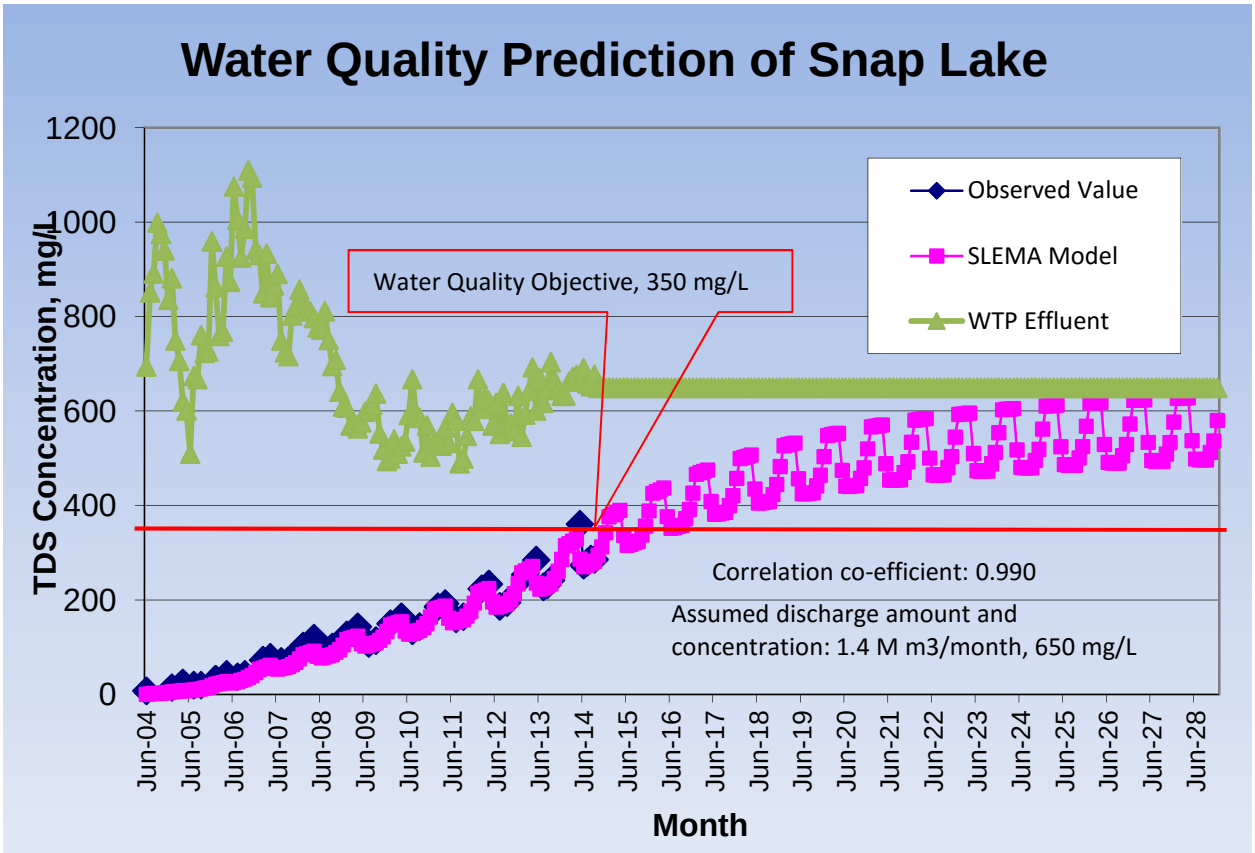


Figure 2. TDS Prediction

De Beers reported a TDS exceedance on June 24, 2014. The whole lake average concentration of TDS was 361 mg/L on May 6, 2014 (Figure 2).

Based the TDS prediction and the TDS exceedance in late winter of 2014, SLEMA believed that the whole lake average of TDS will exceed the water licence limit (350 mg/L) again in 2015 and in the ice-cover season of the following years.

If the TDS exceedance occurs in January 2015, it will be reoccurring till the end of ice cover season of 2015. That will be against the Water Licence MV2011L2-0004, Part F, Item 13.

- *The calculated whole lake average of total dissolved solids (TDS), (as described in the Surveillance Network Program) at sampling locations comprising Surveillance Network Program Station Number 02-18 shall remain below 350 mg/L* ***at all times****.*

In light of the timelines indicated in the MVLWB draft work plan regarding the November 2014 application for licence amendments, SLEMA kindly requested De Beers to demonstrate its compliance with the Water Licence MV2011L2-0004, Part F, Item 13 until these amendments are approved.

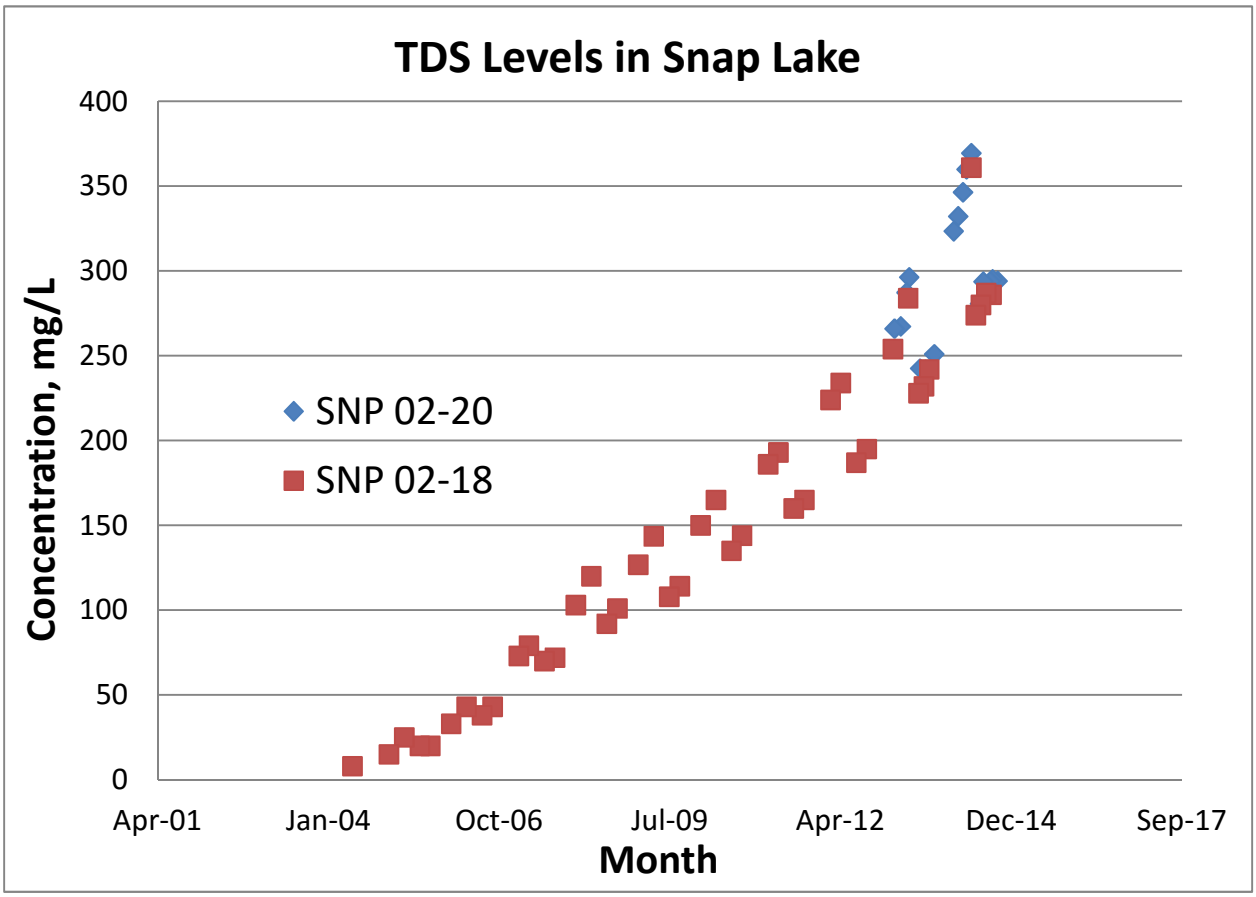


Figure 3. TDS Levels Measured in Snap Lake

De Beers responded to SLEMA request on December 15, 2014.

- *"De Beers acknowledges SLEMA's request, and will attempt to conduct a sampling program in early January to attempt to obtain relevant TDS data within Snap Lake, as it may address your request to obtain data for this time period. De Beers stresses that this program will only be undertaken in whole or in part, if ice, daylight and weather conditions are deemed safe for Snap Lake Mine workers, in accordance with De Beers' health and safety policies, the NWT Mines Health and Safety Act, and the Workers' Safety and Compensation Commission Code of Practice for Thermal Conditions."*

Thallium and Cesium in Fish Tissue Response Plan

The concentrations of metal in large-bodied fish were assessed in Snap Lake in 2013 as part of AEMP. Concentration of cesium and thallium, which are very low in Snap Lake surface waters and are not increasing in sediment, were found to be increasing in fish tissues. The Low Action Level was triggered. De Beers reported the exceedance on May 12, 2014, and developed an action plan to assess the exceedance. As a result, De Beers submitted the Thallium and Cesium in Fish Tissue Response Plan on December 1, 2014.

The Response Plan was developed to determine what the results mean and whether management action are required.

- Cesium and Thallium are non-essential metals that can leach from rocks as water runs off them
- Cesium and Thallium are not metals with high toxicity. Fish remain healthy in Snap Lake, and the fish taste will not be affected
- The observed concentrations will not harm humans eating fish
- The Mine's follow-up responses are focused on continued monitoring
- The Medium and High Action Levels will be set, if necessary, after the next fish tissue program in 2015 and 2016

SLEMA did not have concerns.

Emergency Response Plan

De Beers submitted the updated Emergency Response Plan on December 30, 2014. The Plan describes the emergency responses to fire, surface emergencies, underground emergencies, medical emergencies, accidental releases – spills, natural disasters, and loss of life.

De Beers confirmed that the only changes made to the Emergency Response Plan were administrative based.

SLEMA did not raise any concerns.

Exceedance of AEMP Action Low Levels for Toxicity in Snap Lake

De Beers submitted a notice about the exceedance of AEMP action low levels for toxicity on December 30, 2014.

- Persistent sub-lethal toxic effects to *Ceridaphnia* reproduction in mixing zone samples (SNP 02-20) occurred in 2014.
- However, there was no similar degree of toxicity in the effluent toxicity tests (SNP 02-17B), which suggests the effluent alone is not responsible for the observed toxicity in Snap Lake.
- De Beers planned to assess the toxicity data to determine what further actions should be undertaken to understand these counterintuitive results (toxicity in Snap Lake but not in the effluent).

De Beers also presented the Table of Content (TOC) "that will provide a framework for the Ceriodaphnia toxicity Low Action Level Response Plan and investigation", and stated that "pending comment and approval of the TOC, De Beers would undertake and complete the response plan follow-up testing and investigation for submission to the MVLWB on or before April 30, 2015."

SLEMA did not have any concerns with the Table of Content.

Water Management Plan

Water management is defined as the collection, storage, treatment, and recycling of water at the mine site, in a safe, efficient, and compliant manner. The water management system comprises of the infrastructure and practices that are designed to manage water quantity and quality.

De Beers first updated the Water Management Plan on October 1, 2013. After a few times of revision and public review, the MVLWB approved the Water Management Plan conditionally on November 20, 2014. SLEMA's comments were accepted by De Beers and the MVLWB.

De Beers proposed a change to the Water Management Plan section 2.1.3 (Raw Water Supply System) and 2.5 (Water Balance Estimates) on December 8, 2014. The planned water withdrawal from Snap Lake is expected to be approximately 100 to 800 m^3/day. Fresh water may be used for potable water supply, fire suppression, and water quality control.

The Inspector made comments on De Beers' proposal on January 12, 2015.

- "Section 2.1.3 of the revised Snap Lake Mine Water Management Plan states that raw water will be used for water quality control; however, it does not state how and when the water will be used. As mentioned in the December 10^{th}/11^{th} 2014 Water Licence MV2011L2-0004 Inspection report, the proposed setup is a direct dilution line running from the raw water supply system to the mine effluent prior to being sampled at SNP Station 02-17b."

- "The inspector is concerned that dilution of mine effluent directly before it is being sampled for compliance will be compromising the integrity of SNP Station 02-17b. Direct dilution in the proposed manner would allow the freedom to adjust pumping rates in order to sample diluted mine effluent, then discharge pure mine effluent during the periods between samples. The possibility would exist to manipulate the SNP so that samples may not be representative of continuous mine effluent."
- **"If the use of fresh water to directly dilute mine effluent is approved, this will be setting a precedent for water quality management in the mining industry in the NWT."**

On February 12, 2015, MVLWB approved the Water Management Plan as submitted, and provides the follow directive:

- *"The Board approves the use of freshwater as a mitigation measure until the regulatory processes for the December 2013 and November 2014 Amendment Applications have been completed and receive Ministerial approval. De Beers is still required to adhere to the maximum annual volume of freshwater use of 188,000 m3, as stated in Water Licence MV2011L2-0004."*

SLEMA noted that Board staff expressed caution in the staff report.

- *"Board staff believes that Snap Lake needs an updated WMP as part of their Licence. The majority of the WMP has been reviewed and accepted by reviewers. The outstanding issue regards whether or not De Beers can use their freshwater intake to directly dilute their effluent. Board staff recommends that the use of direct dilution of the effluent as a mitigation measure to enable De Beers to maintain compliance with current Licence limits be accepted. Board staff caution that De Beers' request to maintain this dilution as a potential life of mine mitigation, as pointed out by the Inspector in his comment above, does have the potential to set a precedence and thus requires due consideration by the Board."*

However, SLEMA is disappointed that the approval letter does not include the Inspector's recommendation:

- "*Recommend De Beers Canada demonstrate how sample integrity at SNP Station 02-17b will be maintained with the proposed water use to ensure that samples taken will be representative of continuous mine effluent.*"

2014 Plume Characterization Study

De Beers submitted the Plume Characterization Study on January 29, 2015.

The Mine discharges treated effluent from the Mine's water treatment plant to Snap Lake via two outfalls (diffuser 1 and diffuser 2). Diffuser 1 was installed in 2011 to replace the original permanent diffuser. Diffuser 2 was installed parallel to diffuser 1 in 2013 to accommodate increases in flows discharged from the Mine. The two diffusers are designed to maximize initial mixing of the treated effluent discharged to Snap Lake and to reduce effluent concentrations in the near-field mixing zone around the diffusers

The Plume Characterization Study was completed in 2014 to meet the MVLWB's requirement. The results show that

- The measured minimum dilution factor (16) during ice-covered conditions in 2014 was greater than the predicted dilution factor (12) for ice-covered conditions in the Environmental Assessment Report (EAR).
- The measured and modeled results of the Plume Characterization Study indicate that the dilution factor of 12 used for developing the EQC is, overall, an adequate estimate for both present and future mixing performance of the two diffusers in Snap Lake.

Low dilution factors during early open-water conditions were analyzed. The minimum measured dilution factors in 2014 were 5 during July. They are not expected to affect the development of the EQC, because they are expected to

- be limited to early open-water conditions;
- occur at a time when concentrations in Snap Lake are lower than the critical period of late ice-covered conditions; and,
- represent localized anomalies that occur only in deep locations near the diffuser

The Plume Characterization Study Report recommends that

- Dilution factors should continue to be calculated using the Snap Lake data collected quarterly during routine AEMP fieldwork
- Minimizing air in the effluent discharge should continue by maximizing air release through the air valves along the outfall and by maintaining full pressure in the outfall system whenever possible. Any additional potential sources of air entrainment should be eliminated where feasible

SLEMA reviewed the Report in February 2015.

- The justifications for low dilution factors during early open-water conditions not affecting the EQC development are reasonable.
- The report recommendations are supported.
- No concerns are raised.

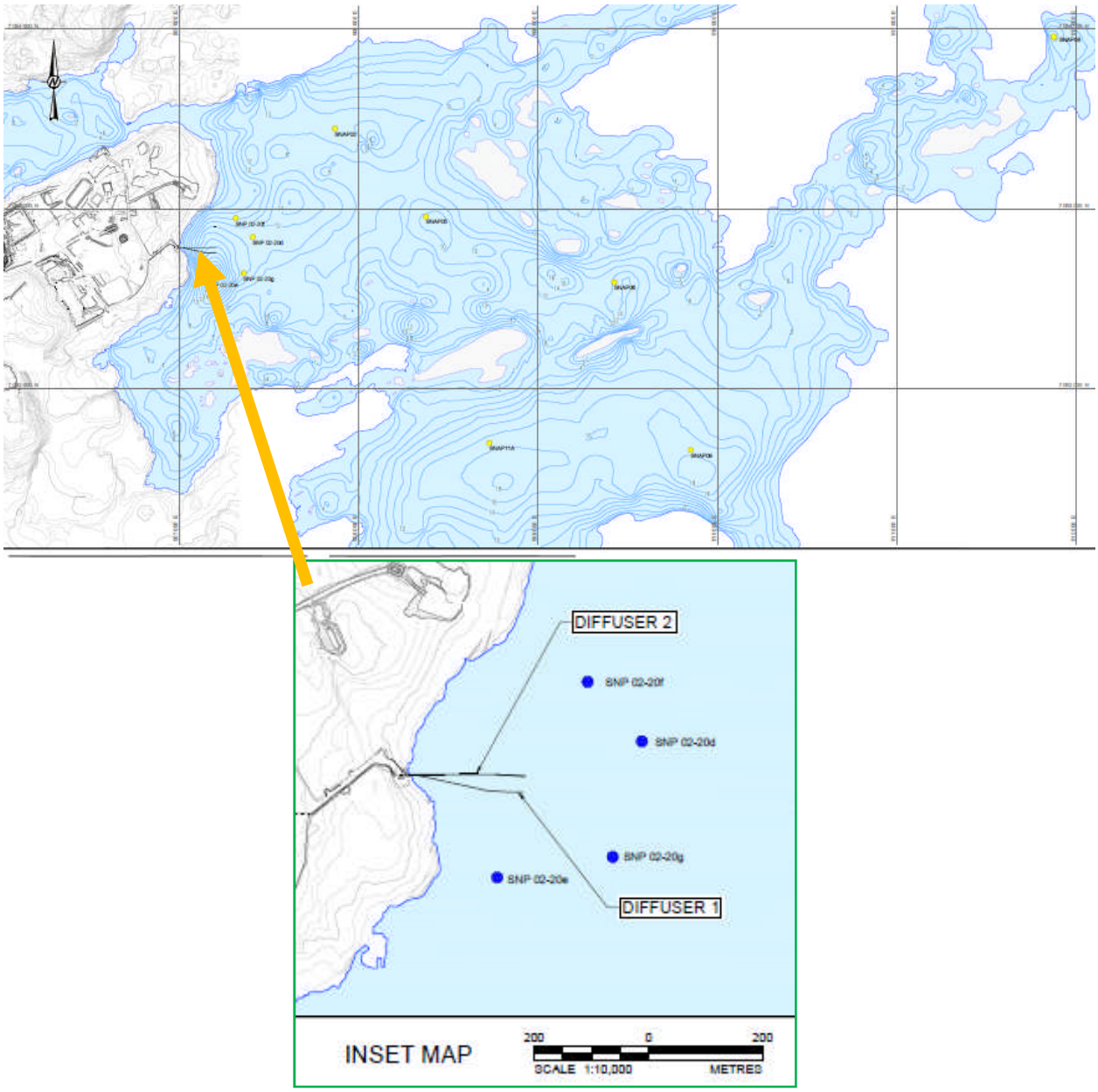


Figure 4. Plume Characterization Study Area in Snap Lake

Potential Exceedance at SNP 02-18 (Whole Lake Average)

De Beers stated in the notice, dated February 25, 2015, that TDS levels at SNP 02-20e and SNP 02-20f were above 75% of the Aesthetic Objective of 500 mg/L on January 18 and 20, 2015 and triggered the low action level in the AEMP. De Beers suggested that addition investigation as to the cause of the action level exceedance was unnecessary

due to no harmful effects to the aquatic environment or to human health, and the regulatory review of two amendment applications.

SLEMA reviewed the data provided by De Beers and identified the potential exceedance at SNP 02-18 (Whole Lake Average).

Table 2. TDS data at SNP 02-20 in January 2015

SNP Station	02-20d	02-20e	02-20f	02-20g	Average
Calculated TDS, mg/L	353	380	376	371	370

Based on what happened in SNP 02-20 and SNP 02-18 last May, SLEMA believed that TDS level at SNP 02-18 might exceed the current water licence limit of 350 mg/L (Table 2 and Figure 3).

Table 3. Potential Exceedance at SNP 02-18

TDS, mg/L	SNP 02-20	SNP 02-18
May 2014	369.5	361
January 2015	370	?

In light of the above, SLEMA requested an update on De Beers' attempt to conduct sampling in January and February 2015 to obtain relevant TDS data within Snap Lake, on March 2, 2015.

De Beers responded on March 5, 2015.

- De Beers did attempt to take samples at SNP 02-18 in January and February 2015, but failed due to the extreme cold weather.
- The next planned SNP 02-18 sampling would be conducted in May 2015 as required by Water Licence MC2011L2-0004.
- De Beers was of the opinion that no further action is required to investigate cause until the amended Water Licence had been received.

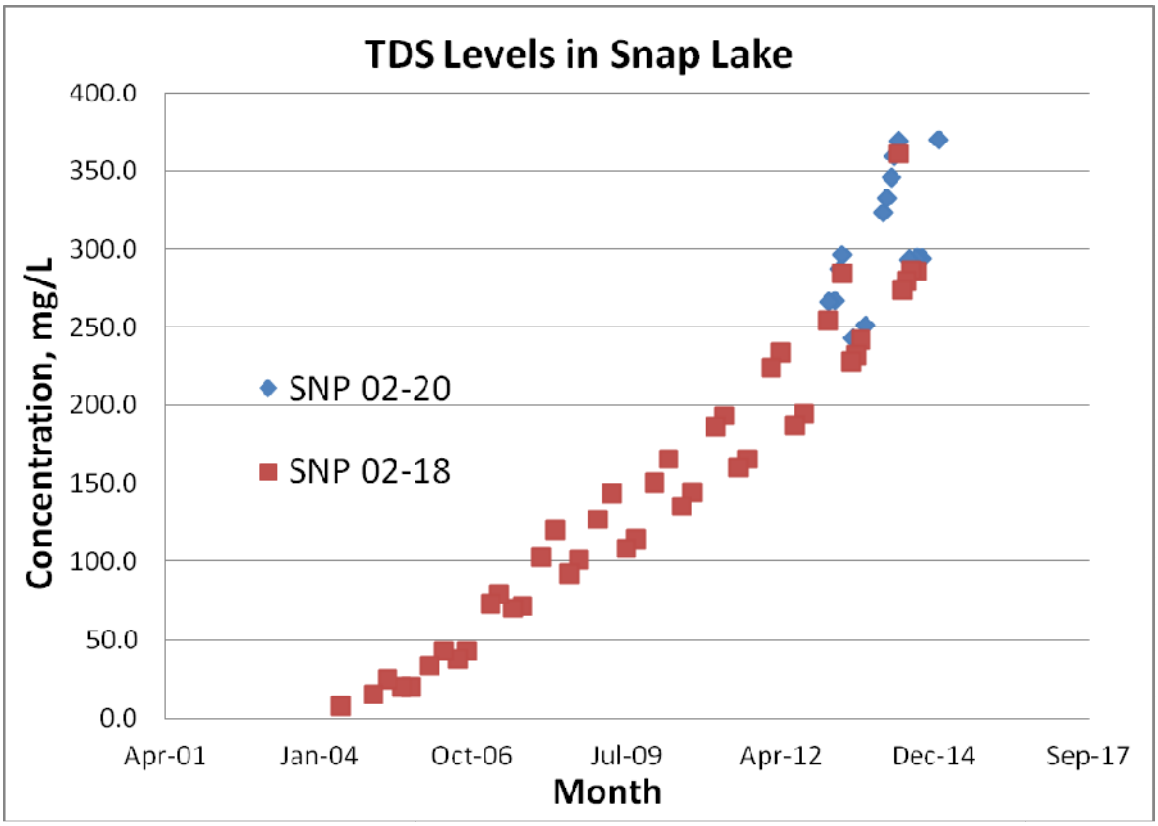


Figure 5. TDS Levels Measured in Snap Lake (updated in March 2015)

Nitrate Levels at SNP 02-02 Low Action Level Triggered

De Beers submitted a notice on March 19, 2015 and stated that Nitrate levels elevated at SNP 02-02 (North Pile drainage collection ditch) during November and December 2014, triggering response under the North Pile Management Plan.

Golder Associates, De Beers' consultant, reviewed the data and recommended six immediate actions, including reassessing thresholds for response.

SELMA also reviewed the data since 2008 and provided comments in March 2015 Environmental Update.

- The threshold for Nitrate at SNP 02-02 set in October 2014 is 44 mg/L.
- The Nitrate levels at SNP 02-02 (North Pile drainage collection ditch) has been above 44 mg/L most of the time since 2008.
- SLEMA agrees upon that the thresholds for response should be reassessed.

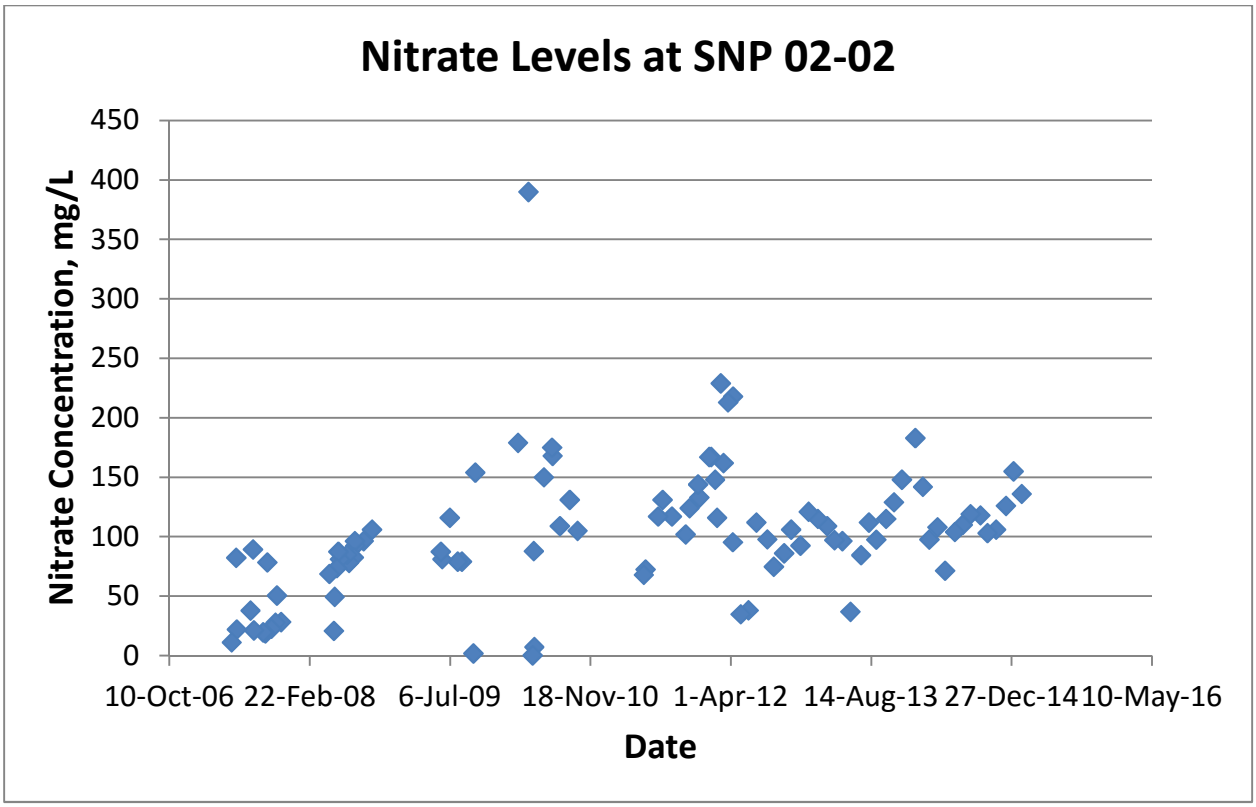


Figure 6. Nitrate Levels at SNP 02-02

North Pile West Cell Development

De Beers commenced the construction activities associated with the West Cell in November 2014.

Water Licence Amendment Applications

De Beers submitted an Amendment Application to the MVLWB requesting seventeen changes to the terms or conditions of water licence MV2011L2-0004 in December 2013. This is referred to as the December 2013 Amendment Application. In January 2014, the MVLWB referred the December 2013 Amendment Application to the MVEIRB for an environmental assessment because the Board determined the development proposal might have significant adverse impact on the environment and be of public concern, under paragraph 126(2)(a) of the MVRMA.

The MVEIRB held its public hearing on June 5 and 6, 2014, and on September 5, 2014, released its *Report of Environmental Assessment and Reasons for Decision on the De Beers Canada Inc. Snap Lake Amendment Project* (EA1314-02).

On October 31, 2014, under subparagraph 130(1)(b)(i) of the MVRMA, the Minister of Lands for the Government of the Northwest Territories (Minister - GNWT) distributed his decision approving Environmental Assessment EA1314-02, adopting the measures and recommended that the Snap Lake Project proceed through the regulatory process.

On October 31, 2014, the regulatory process for the December 2013 Amendment Application resumed as per subsection 72.22(2) of the MVRMA. The MVLWB sent a letter to De Beers outlining the timelines and requirements to recommence the licensing process, including submission of the post-EA information package, on November 5, 2015. De Beers submitted their Post-EA Information Package to support the December 2013 Amendment Application on November 28, 2014.

GNWT's Position on the Developer Enforcement and Compliance

The Minister of Lands responded to NWTMN, LKDFN and DKFN about EA1314-02 on November 4, 2014, and stated that full and fair consideration was given to the views expressed in their letters. With regards to developer enforcement and compliance, the Minister stated in the response letter to LKDFN that

- *"The Developer must comply with any terms and conditions of its licence, GNWT staff conduct inspections of the Snap Lake Diamond Mine to confirm compliance with water licence terms and conditions. GNWT provides inspection reports to MVLWB for posting to its public registry. Non-compliance is an offence and subject to penalty. Any offence that continues for more than one day constitutes a separate offence for each day where the Developer would be liable to fines and punishments. If the Developer contravenes a provision of a term or condition of its licence, MVLWB may suspend the licence."*
- *"Under the Snap Lake Environmental Agreement (the Environmental Agreement), the Developer must also be in compliance with all its regulatory instruments (including provision of the Environmental Agreement itself). If the minister, as defined in the Environmental Agreement, determines the Developer is in non-compliance, they can issue a minister's report."*

November 2014 Amendment Application

On November 12, 2014, De Beers submitted a second (additional) Application to amend Licence MV2011L2-0004. This is referred to as the November 2014 Amendment Application. The purpose of the November 2014 Amendment Application was to allow mining operations to continue while the MVLWB developed an interim water quality objective for TDS, which would be applied until the regulatory phase of the December 2013 Amendment Application was completed

The application proposed two limited duration, interim amendments:

- Part F Condition 9a: Remove the chloride effluent limit that comes into effect January 1, 2015 (160 mg/L) and effectuate a limit for TDS in effluent of 850 mg/L, inclusive of chloride, until December 31, 2015.
- Part F, Condition 13: Remove requirement to maintain whole-lake average TDS concentration below 350 mg/L at all times.

In response to the MVLWB's requests, De Beers provided the following information on November 14, 2015.

- Record of engagement specific to the amendment being sought;
- All evidence relevant to this application; and
- Evidence to support the removal of the chloride licence limit.

The Technical Meeting for the Water Licence Amendment Application was held on November 28, 2014. Staff from the MVLWB, GNWT (Lands, ENR, ITI), EC, CanNor, Tlicho, NSMA, NWTMN, SLEMA, Golder attended, and De Beers presented the proposed amendment application.

MVLWB's Comments on the November 2014 Amendment Application

The MVLWB commented De Beers November 2014 Amendment Application on November 19, 2014.

- *"The Board is concerned that De Beers has proposed a timeline for the regulatory process in the cover letter accompanying the November 2014 Amendment Application which is inconsistent with mandatory elements of the water licence amendment process set out in legislation. Under paragraph 43(2)(a) of the Waters Act, the Board is required to post an advertisement in a newspaper of general distribution announcing the Public Hearing date. The Public Hearing date must be a minimum of 35 days after the announcement in the newspaper. The Board considered the timeline proposed by De Beers and determined that it is **impossible** to allow for a reasonable and fair review process and make a decision by December 31, 2014."*

- *"Based on De Beers' own assessment of effluent quality trends and because the Board cannot legally make a decision in response to De Beers' request by December 31, 2014, it seems likely that De Beers could be out of compliance with the Water Licence after that date. The Board does not want to see De Beers, or any licence or permit holder, out of compliance with a water licence or land*

use permit. However we must ensure that our proceedings are carried out in a manner that is consistent with the law, and provide reasonable access to the review process by those who may be affected by the decision."

- *"On several occasions over the past several months, Board staff has advised De Beers that a request to change the compliance date for Effluent Quality Criteria that will come into effect on January 1, 2015 could be processed in a more timely manner than an amendment application. Board staff continues to be available to discuss a compliance date change with De Beers. In the interim, please be assured that Board staff will make all necessary efforts to expedite the review of your November 2014 Amendment Application."*

Request for the Compliance Date Change

De Beers requested to change effective dates for effluent limits (Part F; Condition 9a) on November 20, 2014.

- To remove the effective date of January 1, 2015 for EQCs of nitrate, chloride and fluoride.
- To extend the current EQCs of nitrate and chloride until the expiry date of the water licence, namely June 13, 2020.

The request was intended as a means of reducing (but not eliminating) the potential for non-compliance as of January 1, 2015.

The request was reviewed by the public. On December 15, 2014, the MVLWB extended the effective dates of nitrate, chloride and fluoride to January 1, 2017.

Combined Process for the Amendment Applications

In a letter dated December 9, 2014, the MVLWB decided to align the processes because of the interconnections between the December 2013 Amendment Application and the November 2014 Amendment Application. The MVLWB noted that a consolidated work plan would be most efficient because it would enable the Board to address parties' concerns and ensure that all evidence relevant to the decisions is reviewed and considered for each of the Amendment Applications.

Information requests regarding the Amendment Applications were submitted to the MVLWB from interested parties by December 23, 2014. De Beers, ENR, Health Canada

responded to related information requests in January 2015. Technical Sessions were held from January 22 to 23, 2015.

On February 12, 2015, the Board confirmed the December 2013 and November 2014 Amendment Applications were exempt from preliminary screening based on Part 1, Schedule 1, section 2.1 of the Exemption List Regulations to the MVRMA.

Interveners submitted their written interventions on by February 13, 2015. De Beers submitted a response to written interventions on February 23, 2015.

The Public Hearing was held on March 11 and 12, 2015, in Dettah, NT, at the Chief Drygeese Center, in accordance with subsection 41(2) of the *Waters Act*.

The MVLWB completed it regulatory process for the November 2014 Amendment Application of the Water Licence MV2011L2-0004 on March 30, 2015. A motion was passed by the MVLWB to forward the Water Licence and *Reasons for Decision* to the ENR Minister for approval.

The MVLWB also sent out the draft Water Licence for the December 2013 Amendment Application for review on March 30, 2015.

SLEMA Information Requests

SLEMA conducted a preliminary review of the Post-EA Information Package on December 19, 2014, and submitted six Information Requests on mine water predictions, intake water quality, downstream water quality, achievability of Suggestion 2 and Measure 1.d) from EA1314-02, and Snap Lake water quality predictions.

SLEMA also reviewed the combined workplan for the December 2013 and November 2014 Amendment Applications and was satisfied that the process would meet all legislated requirements and would allow for a thorough review by the stakeholders. However, SLEMA believed that more should be done to promote community engagement in the affected Aboriginal communities. In this regard, SLEMA recommended that the MVLWB consider taking additional steps to engage them and to promote meaningful public participation at all phases of the process, including at public hearings. This may mean, for example, ensuring the dissemination of plain-language information in the language in use in that community, holding information sessions and "community hearings", possibly holding culturally-appropriate hearings in those communities, and should the MVLWB only hold hearings in Yellowknife, assisting Elders and other community members to attend these hearings.

TDS Calculated vs. Measured

SLEMA conducted some analysis of the TDS data De Beers provided to ENR on January 15, 2015, and sent the findings to the MVLWB via e-mail on January 29. 2015. De Beers, on February 20, 2015, responded to SLEMA's comments with an in-depth analysis in a Technical Memorandum by Golder Associates. SLEMA further submitted a official Information Requests on March 6, 2015.

SLEMA analysis shows that there appears to be a linear correlation between TDS measured and TDS calculated with a slope of 1.23, an intercept of 29, and a correlation coefficient of 0.95 (Figure 5), at SNP 02-20 in Snap Lake.

To make the discussion simple, the intercept is ignored. SLEMA believes that, if the TDS aesthetic objective set by Health Canada is TDS measured, then there might have some issues with De Beers proposed SSWQO of 1000 mg/L.

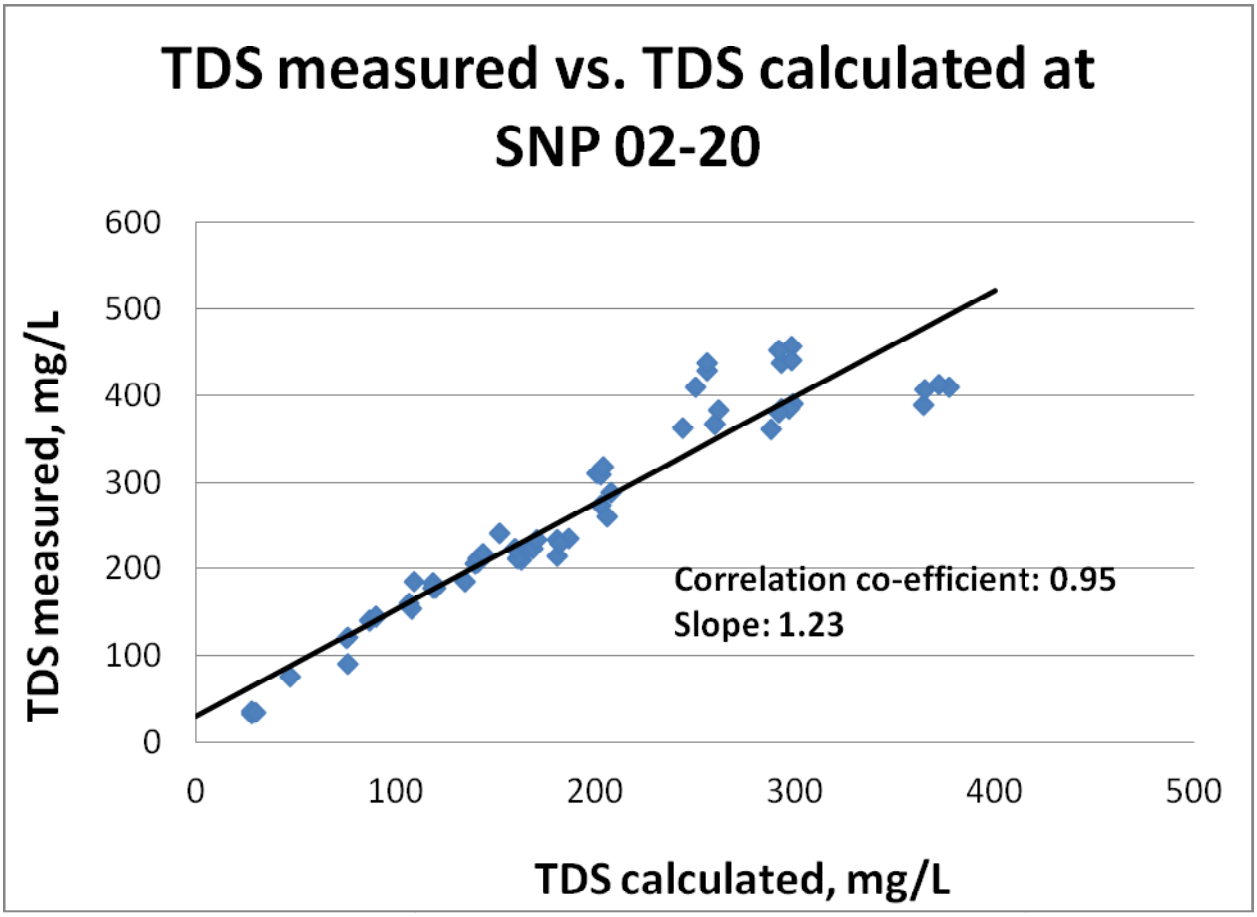


Figure 7. Linear Correlation between TDS measured and TDS calculated

There is a statement in Health Canada's drinking water guidelines. De Beers used it in some of its presentations.

- *"In an extensive, well-controlled mineral taste study conducted recently in California, the following relationship was developed between the perceived taste quality of a water supply and its TDS content: excellent, less than 300 mg/L; good, 301–600 mg/L; fair, 601–900 mg/L; poor, 901–1200 mg/L; and unacceptable, greater than 1200 mg/L."*
  (Source: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/taste-gout/taste-gout-eng.pdf)

De Beers has been using TDS calculated for its reports, and the Water Licence also set TDS limit of 350 mg/L with TDS calculated.

The measured TDS may be 1230 mg/L if TDS calculated is 1000 mg/L in Snap Lake. That will be in the range of unacceptable levels, based on the above statement.

SLEMA appreciated De Beers' responses on February 20, and understood that De Beers acknowledged that there was potentially inconsistent comparison to the Health Canada's Aesthetic Objective and Classifications, because "TDS concentrations in the panel study (Bruvold and Ongerth 1969) do appear to be measured rather than calculated TDS".

It was agreed that calculated TDS remains the appropriate indicator of TDS in Snap Lake. However, the comparison should be appropriate and consistent.

It was appreciated that, in De Beers' responses to Interveners' Recommendations related to Measure 1d (Table 2-3, page 46-47), De Beers appropriately compared the predictions with baseline data by using calculated TDS concentrations. However, clarification is still needed for potentially inconsistent comparison of De Beers predictions related to Suggestion 2 to the Health Canada's Aesthetic Objective (500 mg/L).

- The MVEIRB required that Snap Lake water quality be back to drinking water guideline (Aesthetic Objective, 500 mg/L) within 5 years. De Beers predicted that it would be within 4 (lower bound) to 7 years (upper bound), based on calculated TDS.
- The 500 mg/L of measured TDS is equivalent to 407 mg/L of calculated TDS, based on the linear correlation between them, which means the period of Snap Lake water quality back to the Aesthetic Objective will be a few more years longer than De Beers predicted.

No responses were received from De Beers yet.

MVLWB's Decision on the November 2014 Amendment Application

Overall, the MVLWB concluded that the evidence supports the adoption of a SSWQO of 684 mg/L as proposed by De Beers in the November 2014 Amendment Application and that this SSWQO meets the requirements of Measure 1 from EA1314-02. The MVLWB determined that Licence MV2011L2-0004 should be amended, subject to certain conditions.

- Part F, item 9 concerns the EQC for water and waste from the Snap Lake Project that enters the receiving environment. Maximum average and maximum grab EQC were added to the table for total dissolved solids equal to 850 and 1003mg/L, respectively. The EQC for chloride was removed.
- Part F, item 13 previously set out a compliance limit for the calculated whole lake average of TDS (350 mg/L). This condition was removed from the amended Licence because the EQC for TDS are now applicable at the final discharge point as noted above with regard to Part F, item 9.
- Part F, item 20 is a new condition that sets out the requirements for a quarterly Total Dissolved Solids Mitigation Implementation Report, with the first report due October 1, 2015.
- Part G, items 13, 14, and 15 are new conditions concerning a special study of the downstream watercourses, which will address existing information gaps, and ultimately inform the establishment of downstream monitoring locations and action levels within the AEMP.

SLEMA Comments on the Amended Water Licence

The MVLWB granted De Beers requests on EQCs and required quarterly Total Dissolved Solids Mitigation Implementation Report and special study of the downstream watercourses.

- Measures 1 and 2 of EA1314-02 are reflected in conditions set out in the Water Licence.
- Suggestions 1 and 3 of EA1314-02 are reflected in conditions set out in the Water Licence.
- **Suggestion 2 of EA1314-02 is not reflected in conditions set out in the Water Licence.**

Suggestion 2 of EA1314-02 reads:

> "The Mackenzie Valley Land and Water Board should set closure objectives and criteria that ensure drinking water quality in Snap Lake achieves the Health Canada *Guidelines for Canadian Drinking Water Quality aesthetic objective for TDS in drinking water within five years of the end of mining operations."*

SLEMA recommended that the MVLWB add related conditions into Part I. Conditions Applying to Closure and Reclamation.

TDS is not well defined in the Water Licence. SLEMA believed that:

- TDS calculated is great for management purpose, because it is directly related to the mine impacts.
- TDS measured may be better while compared with Drinking Water Guideline aesthetic objective (500 mg/L).

SLEMA recommended that the MVLWB clearly define TDS in Part A. Scope and Definitions, and require De Beers to report both TDS calculated and TDS measured for SNP 02-15, SNP 02-17B, SNP 02-18 and SNP 02-20.

Land Use Permit

The current Land Use Permit MV2010D0053 is effective from February 16, 2011 to February 15, 2016.

Amendment for Fuel Storage

On June 19, 2014, the MVLWB approved the Type A Land Use Permit (Fuel Storage) MV2014D0010 for a period commencing June 19, 2014 and expiring February 15, 2016.

De Beers completed the construction of the Bulk Fuel Storage12 million Liter Tank Farm in December 2014.

Fisheries Authorization

DFO provided a single Authorization with multiple components/ conditions for the Snap Lake project. All components fall under the Fisheries Act Authorization SC-00-196-2012A. The Authorization is for “Zone of Turbulence at the site of the treated effluent discharge”, and that remains valid until 2020. All of the conditions within it have been fulfilled.

Assessment of the Mine

De Beers generally ran the Snap Lake Diamond Mine in a way that upheld the vast majority of its environmental commitments during the reporting period of 2014-2015.

SLEMA is still concerned about the minewater treatment and processed kimberlite deposition in the North Pile and backfill in the underground. SLEMA encourages De Beers take more efforts in improving them. On the issue of dioxin and furan emissions from the Snap Lake Incinerators, which are well above CWS, SLEMA remains concerned about the impacts of these emissions on health and the environment and hopes this matter will be resolved by De Beers through improvements to its operational practices.

Assessment of Regulators

SLEMA not only monitors the environmental performance of De Beers Snap Lake Diamond Mine, but also the government agencies that regulate the Mine. In general, the regulators remain effective in making sure that De Beers runs the Mine in a way that maintains the majority of its environmental commitments.

Mackenzie Valley Land and Water Board (MVLWB): The MVLWB ran well managed processes for the review of updated management plans, annual reports, and De Beers' requests and applications during the period of November 2014 to March 2015. The MVLWB worked closely with De Beers and interested parties on the Water Licence Amendment Applications, and completed the regulatory process for the November 2014 Amendment Application at the end of March 2015**.** SLEMA is pleased that the MVLWB held hearings in Dettah, but remains concerned that it did not schedule hearings and other activities in other affected Aboriginal communities.

Environment Canada (EC): EC contributed to the review of related requests, study reports, annual reports and plans within its jurisdiction. EC also played an important role in the Water Licence Amendment Applications.

Department of Fisheries and Oceans (DFO): DFO contributed to the review of related requests, study reports, annual reports and plans within its jurisdiction.

Department of Lands: The Inspector, Jamie Steele, conducted two Water Licence inspections and three Land Use Permit Inspections during the period of November 2014 to March 2015. He also made comments on related management plans, De Beers' requests and applications. SLEMA is satisfied with his performance, and concludes that the inspectors showed diligence and initiative during inspection and investigation.

Department of Environment and Natural Resources (GNWT-ENR): ENR has been involved in the review of Environmental Agreement Annual Reports, wildlife issues, waste management issues, air quality issues, Water Licence and Land Use Permit related issues. ENR also played a very important role in the Water Licence Amendment Applications.

Overall SLEMA is pleased with the regulators' actions and responses in regards to their respective responsibilities for the Snap Lake Mine.

Table 4. Contributions to Documents Review, November 2014 to March 2015

Document Reviewed	Valuable Comments from	
	Regulators	**Aboriginal Parties**
AEMP Action Level Exceedance (C. dubia)	EC, ENR	
Water Management Plan	Lands (Inspector), ENR, DFO, EC	
AEMP Cesium and Thallium Response Plan	EC, ENR	YKDFN
November 2014 Amendment Application	GNWT, EC, Health Canada, NPMO-CANNOR	YKDFN, LKDFN, DKFN, NSMA
December 2013 Amendment Application	GNWT, EC, Health Canada, NPMO-CANNOR	YKDFN, LKDFN, DKFN, NSMA

Summary of SLEMA Comments from November 2014 to March 2015

The comments and recommendations for those documents reviewed by SLEMA from November 2014 to March 2015 are summarized as follow.

Table 5. Summary Table of SLEMA Comments from November 2014 to March 2015

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
03/06/ 2015	MVLWB	TDS	Amendment Applications	SLEMA analysis shows that there appears to be a linear correlation between TDS measured and TDS calculated. SLEMA sent the findings to the MVLWB via e-mail on January 29, 2015, and then officially submitted the Information Request on March 6, 2015. SLEMA believes that the period of Snap Lake water quality back to the Aesthetic Objective after mine closure will be a few more years longer than De Beers predicted.	Clarification is needed for potentially inconsistent comparison of De Beers predictions related to Suggestion 2 to the Health Canada's Aesthetic Objective (500 mg/L).	De Beers responded on February 20, 2015 to SLEMA comments via e-mail on January 29, 2015, and acknowledged that there was potentially inconsistent comparison to the Health Canada's Aesthetic Objective and Classifications.
03/02/ 2015	De Beers	TDS	SNP 02-18	SLEMA believes that TDS level at SNP 02-18 might exceed the current water licence limit of 350 mg/L in January 2015, based on TDS data at SNP 02-20.	SLEMA is requesting an update on De Beers' attempt to conduct sampling in January and February 2015 to obtain relevant TDS data within Snap Lake.	De Beers responded on March 5, 2015 that De Beers made attempts of sampling at SNP 02-18 in January and February 2015, and the next planned sampling at SNP 02-18 would be in May 2015.

Table 5. Summary Table of SLEMA Comments from November 2014 to March 2015 (continued)

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
12/19/ 2014	MVLWB		Amendment Applications	SLEMA submits six Information Requests on mine water predictions, intake water quality, downstream water quality, achievability of Suggestion 2 and Measure 1.d) from EA1314-02, and Snap Lake water quality predictions	SLEMA believes that more should be done to promote community engagement in the affected Aboriginal communities. In this regard, we recommend that the MVLWB consider taking additional steps to engage them and to promote meaningful public participation at all phases of the process, including at public hearings.	
11/27/ 2014	De Beers	TDS	Modeling	SLEMA modeling update indicates that the whole lake average of TDS will exceed the water licence limit (350 mg/L) in 2015 and in the ice-cover season of the following years.	In light of the timelines indicated in the MVLWB draft workplan regarding the November 2014 application for licence amendments, SLEMA kindly requests De Beers to demonstrate its compliance with the Water Licence MV2011L2-0004, Part F, Item 13 until these amendments are approved.	De Beers responded on December 15, 2014 that De Beers would attempt the conduct an sampling program un early January 2015.
11/27/ 2014	ENR		EAAR 2013	De Beers adequately summarized the monitoring activities and results for 2013, and improved the report presentation by adding three photos of the North Pile, which show changes from 2011 to 2013. However, De Beers failed to acknowledge the non-compliance event that happened in 2013.	The exceedance event of Chloride, which occurred in September and October 2013, is a non-compliance against the Water Licence, Part F, Item 9, and should be reported in detail in Sections 5, 7 and 9, even if De Beers was able to re-establish compliance in a timely fashion.	ENR issued a letter on February 5, 2015, and requested De Beers to address related issues.

Acronyms

AANDC – Aboriginal Affairs and Northern Development Canada
AN – Ammonia Nitrate
ARD – Acid Rock Drainage
AEMP – Aquatic Effects Monitoring Program
CCME – Canadian Council of Ministers of the Environment
DFO – Department of Fisheries and Oceans
DKFN – Deninu Kue First Nation
EAR – Environmental Assessment Report
EC – Environment Canada
EQC – Effluent Quality Criterion
EMS – Environmental Management System
ENR – Environment and Natural Resources (GNWT)
GNWT – Government of the Northwest Territories
INAC – India and Northern Affairs Canada (before May 2011)
LKDFN – Lutsel Ke Dene First Nations
MVEIRB – Mackenzie Valley Environmental Impact Review Board
MVLWB – Mackenzie Valley Land and Water Board
MVRMA – Mackenzie Valley Resource Management Act
NSMA – North Slave Metis Alliance
NWTMN – Northwest Territory Metis Nation
PK – Processed Kimberlite
SLEMA – Snap Lake Environmental Monitoring Agency
SNP – Surveillance Network Program

- SNP 02-17B – Final Combined Water Treatment Plant and Sewage Treatment Plant effluent that is discharged via a diffuser into Snap Lake. Under normal conditions 02-17B is used which measures the permanent water treatment plant. In conditions where greater capacity is needed, 02-17 can be used as it represents the effluent from the temporary water treatment plant.
- SNP 02-18 – 10 monitoring stations in the main basin of Snap Lake that are used to calculate a whole lake average concentration of Total Dissolved Solids.
- SNP 02-20 – Snap Lake on the edge of the mixing zone around the diffuser (4 stations, called SNP 02-20d, e, f and g, located in a radius of 120 degrees at 200 metres from the diffuser).

TDS – Total Dissolved Solids
TK – Traditional Knowledge
WMP – Water Management Pond
WQO – Water Quality Objective
WTP – Water Treatment Plant
YKDFN – Yellowknives Dene First Nations

Financial Statements

Snap Lake Environmental Monitoring Agency

Financial Statements

March 31, 2015

Snap Lake Environmental Monitoring Agency

Financial Statements

March 31, 2015

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Independent Auditors' Report

To the Directors of Snap Lake Environmental Monitoring Agency

We have audited the accompanying financial statements of Snap Lake Environmental Monitoring Agency, which comprise the statement of financial position as at March 31, 2015, and the statements of operations, changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility
Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditors consider internal control relevant to the Agency's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Agency's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Crowe MacKay™

Independent Auditors' Report (continued)

Opinion
In our opinion, the financial statements present fairly, in all material respects, the financial position of Snap Lake Environmental Monitoring Agency as at March 31, 2015, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Crowe MacKay LLP

Yellowknife, Canada
June 25, 2015

Chartered Accountants

Snap Lake Environmental Monitoring Agency

Statement of Operations

For the year ended March 31,	2015	2014
Revenues		
De Beers Canada Mining Inc.	**$ 1,048,551**	$ -
Miscellaneous income	**-**	283
Transferred from (to) deferred revenue	**(530,420)**	512,596
	518,131	512,879
Expenditures		
Accounting and legal	**12,249**	15,739
Amortization	**457**	1,242
Bookkeeping	**10,800**	10,778
Honorarium	**136,097**	137,959
Insurance	**1,892**	1,525
Interest and bank charges	**844**	1,012
Meetings - catering, translation, and rentals	**15,399**	18,555
Meetings - travel and accommodation	**34,299**	35,213
Office and administration	**13,636**	19,165
Professional fees	**-**	1,530
Rent	**36,540**	36,119
Wages and benefits	**250,475**	222,425
	512,688	501,262
Excess of revenues before other items	**5,443**	11,617
Other items		
Transfer to investment in tangible capital assets	**(457)**	(1,241)
Purchase of capital assets	**2,416**	-
	1,959	(1,241)
Excess of revenues	**$ 3,484**	$ 12,858

Snap Lake Environmental Monitoring Agency

Statement of Changes in Net Assets

For the year ended March 31, 2014

	Unrestricted net assets	Investment in tangible capital assets	**Total 2015**	Total 2014
Balance, beginning of year	$ (11,307)	$ 1,718	**$ (9,589)**	$ (21,206)
Excess of revenues over expenditures	3,484	-	**3,484**	12,858
Amortization	-	(457)	**(457)**	(1,241)
Additions	-	2,416	**2,416**	-
Balance, end of year	**$ (7,823)**	**$ 3,677**	**$ (4,146)**	$ (9,589)

Snap Lake Environmental Monitoring Agency

Statement of Financial Position

As at March 31,	2015	2014
Assets		
Current		
Cash	$ 561,443	$ 7,126
Prepaid expenses and deposits	7,026	6,742
	568,469	13,868
Tangible capital assets (note 3)	3,677	1,718
	$ 572,146	$ 15,586
Liabilities		
Current		
Accounts payable and accrued liabilities (note 4)	$ 45,872	$ 25,175
Unearned revenue	530,420	-
	576,292	25,175
Fund balances		
Unrestricted net liabilities	(7,823)	(11,307)
Investment in tangible capital assets	3,677	1,718
	(4,146)	(9,589)
	$ 572,146	$ 15,586

Approved on behalf of the board:

_____ Director _____ Director

Snap Lake Environmental Monitoring Agency

Statement of Cash Flows

For the year ended March 31,	2015	2014
Cash provided by (used for)		
Operating activities		
Excess of revenues (expenditures)	$ 5,443	$ 11,617
Items not affecting cash		
Amortization	457	1,242
	5,900	12,859
Change in non-cash working capital items		
Prepaid expenses and deposits	(284)	(1,166)
Accounts payable and accrued liabilities	20,697	(603)
Unearned revenue	530,420	(512,596)
	556,733	(501,506)
Investing activity		
Purchase of tangible capital assets	(2,416)	-
Increase (decrease) in cash	554,317	(501,506)
Cash, beginning of year	7,126	508,632
Cash, end of year	$ 561,443	$ 7,126

See accompanying notes

1. Nature of operations

Snap Lake Environmental Monitoring Agency ("the Agency") is a not-for-profit organization incorporated under the *Societies Act* of the Northwest Territories. It is exempt from income tax under Section 149(1)(l) of the *Income Tax Act*.

The mission of the Agency is to oversee environmental management of the De Beers Snap Lake Diamond Project.

The Agency was incorporated and commenced operations on December 10, 2004.

2. Significant accounting policies

These financial statements are prepared in accordance with Canadian accounting standards for not-for-profit organizations. The significant policies are detailed as follows:

(a) Financial instruments- recognition and measurement

(i) Measurement of financial instruments

The Agency initially measures its financial liabilities at fair value adjusted by, in the case of a financial instrument that will not be measured subsequently at fair value, the amount of transaction costs directly attributable to the instrument.

The Agency subsequently measures its financial assets and liabilities at amortized cost.

Financial assets measured at amortized cost includes cash.

Financial liabilities measured at amortized cost include accounts payable and accrued liabilities.

No financial assets or financial liabilities have been subsequently measured at fair value.

2. Significant accounting policies (continued)

(ii) Impairment

Financial assets measured at amortized cost are tested for impairment when there are indicators of possible impairment. When a significant adverse change has occurred during the period in the expected timing or amount of future cash flows from the financial asset or group of assets, a write-down is recognized in net income. The write down reflects the difference between the carrying amount and the higher of:

- the present value of the cash flows expected to be generated by the asset or group of assets;

- the amount that could be realized by selling the assets or group of assets;

- the net realizable value of any collateral held to secure repayment of the assets or group of assets.

When the events occurring after the impairment confirm that a reversal is necessary, the reversal is recognized in net income to a maximum of the accumulated impairment loss recorded in respect of the particular financial asset.

(b) Tangible capital assets

Tangible capital assets are recorded at original cost plus any costs of betterment less accumulated amortization and excludes any assets not in current use. Amortization is calculated by the declining balance method at the annual rates set out in note 3.

(c) Fund accounting

Unrestricted net assets reflect the revenue and expenses from operations. Investment in capital assets fund represents the accumulated cost of acquired capital assets net of disposals and amortization.

(d) Revenue recognition

The Agency follows the deferral method of accounting. The Agency recognizes unrestricted contributions when they are received or receivable if the amount receivable can be reasonably estimated and its collection is reasonably assured. Restricted contributions are recognized as revenue when the terms and conditions are met. The portion of revenue related to projects not completed at year end is deferred. This will be brought into income as the goods and services are acquired. Contributions for projects for which unexpended funds must be reimbursed at the end of the fiscal year are shown as contributions repayable.

2. Significant accounting policies (continued)

(e) Use of estimates

The preparation of these financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amount of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the current period. These estimates are reviewed periodically and adjustments are made to income as appropriate in the year they become known.

3. Tangible capital assets

				2015	2014
	Rate	Cost	Accumulated amortization	Net book value	Net book value
Furniture and fixtures	20%	$ 12,341	$ 8,664	$ 3,677	$ 1,718
Computer equipment	45/55%	7,298	7,298	-	-
Computer software	100%	15,334	15,334	-	-
		$ 34,973	$ 31,296	$ 3,677	$ 1,718

4. Accounts payable and accrued liabilities

	2015	2014
Accounts payable and accrued liabilities	$ 44,364	$ 21,723
Government remittances payable	1,508	3,452
	$ 45,872	$ 25,175

5. Economic dependence

The Agency receives all of its contribution funding from De Beers Canada Mining Inc. Management is of the opinion that operations would be significantly affected if the funding was substantially curtailed or ceased.

6. Commitments

The Agency has entered into a premise lease agreement commencing June 1, 2013 and expiring May 31, 2016 for $2,900 per month plus GST.

7. Comparative figures

The financial statements have been reclassified, where applicable, to conform to the presentation used in the current year.

8. Financial instruments

The following section describes the Agency's financial risk management objectives and policies and the Agency's financial risk exposures:

(a) Credit risk

Credit risk is the risk that one party to a transaction will fail to discharge an obligation and cause the other party to incur a financial loss. The Agency does have credit risk in cash of $561,443 (2014 - $ 7,126) as a result of having funds with a chartered bank in excess of the insurable limit. Furthermore, the Agency has a concentration risk as full balance of cash is held at one financial institution. This risk has increased from the prior year due to the increased cash balance.

(b) Liquidity risk

The Agency does have a liquidity risk in the accounts payable and accrued liabilities of $45,872 (2014 - $25,175). Liquidity risk is the risk that the Agency cannot repay its obligations when they become due to its creditors. This risk has not changed from the prior year.

There is a concentration of liquidity risk as there is 66% (2014 - 19%) of accounts payable and accrued liabilities due to employees.