Snap Lake Environmental Monitoring Agency

2013-2014

ANNUAL REPORT

Table of Contents

Message from the Chairperson

On behalf of the SLEMA Board of Directors and staff, I am pleased to present this annual report of activities for the 2013-14 fiscal year. This year was filled with change, a strong focus on our mission and mandate and the realization of new opportunities to serve our audiences. In October 2013, SLEMA experienced a change in leadership with the appointment of Philippe di Pizzo, when David White stepped down as Executive Director. Philippe brings almost thirty years of environmental management experience to the organization, most of which were spent in the Canadian Arctic. I would like to take this opportunity to acknowledge the important contribution of David White in the past seven years in helping SLEMA build its competencies and processes to fulfill the mandates entrusted to it in accordance with the Environmental Agreement.

Reflecting our commitment to public transparency, we continued to post monthly reports of activities and summary of our reviews on the agency website.

The accomplishments noted in this report are a very good summary of SLEMA's activities in the year. These couldn't have been realized without the dedication, focus and hard work of SLEMA staff and Board members, under the guidance of our Traditional Knowledge Panel. We also would like to acknowledge our partners and De Beers Canada for working diligently to the implementation of the Snap Lake Environmental Agreement despite challenges due to issues regarding water quality and the requirement to have its water licence amendment application go through an environmental review by the Mackenzie Valley Environmental Impact Review Board. I would also like to congratulate the Government of the Northwest Territories (GNWT) for taking on the huge challenge of devolution, a task that seemed huge at first but which has taken place almost seamlessly before our eyes. With a new team in place, and new relationships at the staff level, SLEMA is confident that the GNWT is in a good position to fulfill its obligations with respect to the surveillance and monitoring of the Snap Lake Mine.

We look forward to many shared successes in the future. I look forward to working with members, staff, stakeholders and the broader community throughout the 2014-2015 fiscal year and beyond to refine and enhance the services provided by SLEMA.

Johnny Weyallon

Chairman

Bétł’ás natí Dené yatí Dené bá níʔą

T’ą Dené SLEMA Board chu dené t’ą ghalaná sı bebá sı dırı xaıyé k’é t’at’u ʔasıé hél gháládá sı 2013-14 xaıyé ghą nuwé hél hasnı.Dırı xaıyé k’é ʔasıé t’at’u begháládá nı sí ʔedǫ ʔályá,t’at’u ʔasıé badı hél gháládá sı ʔałǫ ʔazį́ nezǫ nuwe lá t’át’u nuwél ʔası lá benerıdí ʔajá hél tth’í ʔasıé t’at’u gháládá nılé sí ʔedǫ nályá t’at’u Dené hél nezǫ ʔasıé hadı k’é gháládá ʔat’é. ʔéyun Dzį Zá 2013 ku SLEMA t’ą k’aldher nılé sı Dave Whıte hulyé Phılıppe dı Pızzo yenaįyá. Phılıppe sı k’ajené kǫná xaıyé kuk’é dırı ʔasıé tsįdhı ch’á badı hél gháladá sı hél ghálaįná ʔat’é hel lá ghą nıyá,t’ok’é ghálaná sı Canadıan Arctıc naré.Ku dǫ hąsédęné Davıd Whıte t’at’u nuwé helghálána sı dırı la k’é gháládá sı ʔasıé hadı sı bet’oré ʔá ʔat’é łaįsdį xaıyé kuts’į ʔasıé hadı tsįdhí ch’á hel gháládá hunįdher sı harélyǫ ʔasıé badı hasnı yatı neth lálį gharé.

Harélyǫ dené behel gháládá ʔat’é ,hat’é ʔá sá kanélt’u t’at’u ʔasıé k’é gháládá deko ʔasıé ʔedǫ nalyá dé dené hél hadı xá websıte hulyé yé yatı nılyé net’į há.

Ku t’at’u lá hałé xá sehulyá sı lá ʔaké nezǫ SLEMA yek’é ghálaná dırı xaıyé k’é yeghą halnı sı.Dırı hat’u ʔasıé ke’ gháládá sı ʔaké benerdı ʔat’é ʔaké t’ą hųtł’adhé la nechá théltsį sı t’ą SLEMA bá ghálaná chu t’ą Board k’é dełtth’ı sı bet’a nezǫ la halį tth’ı dıdı ʔąłneth dółtth’ı dené chanıé hel gháladá chu.T’ą ʔyılé dené nuwe hel ghálaná sı De Beers Canada tth’ı ması hets’dı t’at’u Snap Lake ʔasıé thįdhí ch’á badı hel gháládá sı nezǫ hųtł’adhé dené hél sehųlá sı ʔasıe tsįdhı ch’á ts’į yatı halı ne sı beghą thené dırı t’at’u tu t’at’į ts’į ʔérıtł’ís gharé gháladá sı ʔedǫ nalyá Mackenzıe Valley Envoronment Impact Revıew Board bedagharé harelyǫ nánet’į gharé ʔedǫ nalyá ʔat’é.Dǫ sı tth’ı marsı cho desį horés ʔį Government of the Northwest terrıtorıes(GNWT) sı béhél nadher dırı ʔedzá nené thené ʔasıé ts’én k’aldé ʔané sı ghą GNWT k’aldher ʔané xá natı ʔasıé nechá ʔats’édı nįdhęn nılé ʔaké benédí hat’é húlát’é hılé k’é ʔaké nuwé nalé selyé tth’ı hanadher hudher.Harelyǫ Dené kodhé lá ʔółnaįdél ts’į ʔasıé senǫdher ʔake nezǫ ʔałá gháládá ʔájá GNWT sı ʔaké nezǫ senǫʔą ʔat’é t’at’u Snap Lake tsambá k’é naré ʔasıé ts’įdhí ch’a bádí hel gháladá já sı.

Ją ts’į yunedhé haʔsí ʔasıé ʔałá nezǫ selyá sı bet’oré ʔáʔát’é.ʔáłǫ nezǫ members hel nezǫ ghálásná nįdé nethęn,t’ą harélyǫ Dené behélnadher-u tth’ı hayorįlá dené behél ghaladá sı chu dırı xaıyé 2014-2015 tth’ı t’at’u ʔaké nezǫ SLEMA dené ba la helтsı xá.

Johnny Weyallon

Bétł’ás natı Dené

Chaırperson Wegodı

Ndè wehoìdı gha SLEMA k'è dǫ dehkw'e eyıts'ǫ wenįhtł'è kǫ̀ dǫ eghàlaede xè, 2013 eyıts'ǫ 2014. įłè xo edaànı eghàlagıı̨̀da wegodı hòlı̨ hòt'e. Dı xo goxè t'ası łǫǫ ładı̨ adza, ayıì gha ełexè eghàlats'eèda eyıts'ǫ edaànı wek'è eghàlats'eèda ha sıì deʔǫ natso adza, eyıts'ǫ t'ası wego ładı̨ wek'è eghàlats'eèda ha. Ezhǫǫ̀dzęę̀ Zaà 2013, SLEMA wenįhtł'èkǫ̀ gha k'aowoh ładı̨ adza t'à, Phılıppe dı Pızzo k'aowoh elı̨ adza Davıd Whıte la ghǫ nǫt'e kò. Phılıppe, taınǫ xo ndè hoìdı la k'è eghàlaı̨da hǫt'e, Canadıan Arctıc hòzì k'è. Davıd Whıte t'ası wet'àʔa k'è gogha eghàlaı̨da t'à mahsı wets'edı ha hǫt'e. Įnęę łǫ̀hdı xo gogha eghàlaı̨da t'à SLEMA wenįhtł'èkǫ̀ hotì etłè adza eyıts'ǫ Envıronmental Agreement ndè wehoìdı gha yatı ts'ehʔǫ ghàà nı̨htł'è wehoìdı hǫt'e.

Edaànı eghàlats'eèda sıì nezı̨ wek'èhodzǫ gha, sa tat'e edàgot'ı̨ eyıts'ǫ weghǫ edàts'ı̨ı̨̀wo wegodı satsǫ̀ t'à ets'eètł'è k'è dek'èhtł'è ats'ehʔı̨ hǫt'e.

Ayıì k'è eghàlats'ı̨ı̨̀da sıì nı̨htł'è k'è dek'ehtł'è, eyı ghàà SLEMA wenįhtł'èkǫ̀ įłè xo edaànı eghàlagıı̨̀da sıì nezı̨ wek'èhodzǫ hǫt'e. SLEMA gha eghàlaede dǫ eyıts'ò Board k'è dǫ dehkw'e t'ası ghǫ hòtł'o agı̨ı̨̀wǫ t'à hòtł'o eghàlagıı̨̀da hǫt'e, Dǫne Naàwo k'è ǫhda dehkw'e weyatı ghàà eghàlagıı̨̀da hǫt'e. Eyıts'ǫ dǫ xè eghàlats'ıìde sıì wek'èhodzǫ ha hǫt'e, De Beers Canada goxè eghàlageèda t'à Snap Lake Envıronmental Agreement ndè wehoìdı gha yatı ts'ehʔǫ hòlı̨, tı xè edagǫht'è ghǫ ełexè sìgots'ehʔı̨ kò eyıts'ǫ tı t'à eghàlats'eèda nı̨htł'è ładı̨ agele ha, Mackenzıe Valley Envıronmental Impact Revıew Board gha nı̨htł'è edexè sìgehʔı̨ hǫt'e. Eyıts'ǫ, Edzane gha Ndets'ǫ̀ K'aowoh devolutıon naàwo ełetǫze la necha kò, gonadą dıì le laànı wek'è eghàlagıı̨̀da t'à wek'èhodzǫ ha hǫt'e. Dǫ wego ełexè eghàlaeda ha dehkw'e adza eyıt'à, SLEMA gha eghàlaede dǫ, ndè ts'ǫ̀ k'aowoh xè Snap Lake sǫmbak'è hotì wehoìdı t'à ełexè eghàłageèda ha gı̨ı̨̀wǫ.

Įdaa gots'ǫ̀ t'ası łǫǫ ełexè wek'è eghàlats'eèda ha hǫt'e, eyıt'à hotì nezı̨ sìghà Board k'è dehkw'e dǫ, nı̨htł'èkǫ̀ gogha eghàlaede dǫ, kǫ̀ta dǫne Stakeholders gha eghàlaehda ha dehwhǫ, 2014 – 2015 xo k'è.

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

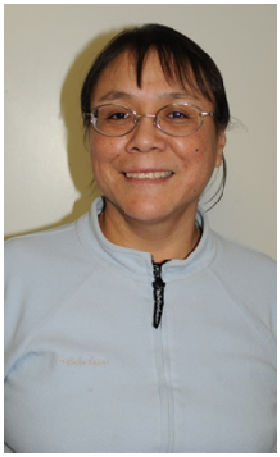
(j) provide an accessible and public repository of environmental data, studies and reports relevant to the Monitoring Agency's mandate.

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

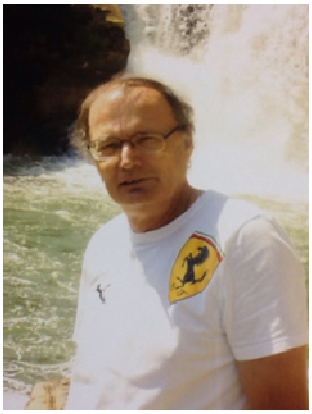


Rachel Crapeau
Vice Chairperson
Yellowknives Dene First Nation

Charlie Catholique
Secretary
Lutsel K'e Dene First Nation

Arnold Enge
Treasurer
North Slave Metis Alliance

Board Members



Greg Empson

Yellowknives Dene First Nation

Matt Hoover

North Slave Metis Alliance

Noel Drybones

Tlicho Government

James Marlowe

Lutsel K'e Dene First Nation

Traditional Knowledge Panel

Eddie Camille and **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 86% and 106.5% of full capacity through 2013. 1,130,285 tonnes of kimberlite were processed, and about 1.4 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 in March 2014

There were six Water Licence inspections and one Land Use Permit inspection conducted by the Inspector of the Aboriginal Affairs and Northern Development Canada (AANDC) in 2013.

Within 2013, approximately 977,476 tonnes of coarse reject of processed kimberlite (PK), 738,592 m^3 of slime were deposited into the North Pile, and 19,260 m^3 of paste were backfilled into the underground. 42,289 m^3 of fresh water were withdrawn from Snap Lake, and 13,626,780 m^3 of mine water, collected runoff and seepage water were treated in the Water Treatment Plant and discharged into Snap Lake. In addition, 1,188,585 m^3 of water were recycled in the Mine.

On December 16, 2013, De Beers submitted an amendment application to the MVLWB requesting seventeen changes to its water licence (MV2011L2-0004). De Beers' proposed amendment is to replace the Water Licence limit – whole lake average concentration of 350 mg/L TDS with a different value based on site specific toxicity testing.

Agency Activities 2013-2014*

- SLEMA, together with two other sister agencies (IEMA and EMAB), attended the 2013 Geo-Science Forum and presented itself in the Trade Show from November 19 to 21, 2013. SLEMA also hosted a Holiday Open House on December 5, 2013 together with IEMA and EMAB.
- The 2013 Annual General Meeting was held on December 5, 2013.
- The SLEMA Board met in Yellowknife on June 20, 2013, September 20, 2013, and December 5, 2013.
- SLEMA's Executive Committee met in Yellowknife on April 26, 2013, August 21, 2013, October 25, 2013, and February 27, 2014.
- Two workshops with the Board and elders from the Traditional Panel as well as various technical experts involved in with the Snap Lake Mine, were held in Yellowknife on June 18 & 19, 2013 and December 6, 2013.
- SLEMA staff has been participating in the MVLWB Snap Lake Working Group meetings and preparation meetings for the Snap Lake Liaison Committee.
- SLEMA Environmental Analyst toured the mine site in March 2014.
- SLEMA attended the Public Hearing of Environmental Assessment EA1314-02: Snap Lake Diamond Mine Amendment Project from June 5 to 6, 2014, and asked questions and made comments during the public comment period.
- SLEMA Executive Director observed the fish tasting at Snap Lake in September 2014.
- SLEMA Board members and staff visited the Mine site on October, 28, 2014.
- SLEMA staff attended a variety of meetings and workshops, such as Bathurst Range Planning Meeting (November 12 to 13, 2013), Regional Wildlife Monitoring Workshop (November 26 to 28, 2013), and NWT Environmental Monitoring Results Workshop (December 10 to 12, 2013).
- 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.

* Note: this annual report includes some of SLEMA's reviews up to October 2014.

Photo 2. 2013 Geo-Science Forum, November 19 to 21, 2013

Photo 3. Regional Wildlife Monitoring Workshop, November 26 to 28, 2013

Traditional Knowledge Panel

Traditional Knowledge Workshop

SLEMA held one Traditional Knowledge (TK) workshop on December 6, 2013. During the workshop, TK panel members raised a few concerns. SLEMA communicated these concerns with the AANDC Inspector and De Beers staff immediately after the workshop, and the AANDC Inspector and De Beers replied on December 9, 2013.

1. Albert Boucher' concern on animal attraction near the incinerators

De Beers' responses:

- "*For the incinerator, we currently have procedures in place to prevent wildlife interaction with food including using sealed barrels, sole accountability for loading and storage of incinerator ash. Should these procedures no longer be sufficient we will investigate the possibility of fencing in that area.*"

2. Albert Boucher' concern on monitoring dustfall, vegetation, and wildlife beyond the mine footprint

De Beers' responses:

- "*For dust fall monitoring and vegetation work currently data is collected 0 m, 50 m, 150 m, 500 m, 1 km, 5 km, 10 km, 15 km and 20 km from site to evaluate dust fall. For wildlife monitoring we do caribou monitoring within the ZOI (approximately 31 km radius from site) as identified in the project EA. Grizzly and wolverine monitoring are done jointly between the mines with a very large regional study area split between the 4 sites.*"

3. Wayne Langenham's concern on leaking from parked trailers along winter road

AANDC Inspector's responses:

- "*I have zero objection at looking at anything on site for you however I have to ask for some clarification on your request. When you mention "haul trucks" are you referring to the semi tractor trailers? If so, this is a matter that could apply to all mine sites along the Tibbit to Contwoyto Winter Road and you may want to also involve the Joint Venture who maintains and operates the road. As far as Snap Lake is concerned, their spur road is quite small and I don't remember seeing trucks stopped along its stretch. I will definitely keep an eye on my part of the pie (Snap and Kennady Lakes) for this concern. As you know, our inspections regularly inspect under site vehicles parked along the road for leaks on hydraulic oil and diesel but these parked vehicles are usually maintenance based (snow cats/loaders) and hot the transport trailers.*"

4. Board Members' concern (James Marlowe and Rachel Crapeau) on vegetation during reclamation

De Beers' responses:

- "*Vegetation research is currently in the feasibility stage to determine the best methods for ensuring the virility of the soil harvested in grubbed areas. Additional work is focused on literature reviews as the mine site is quite compact with no available areas for progressive reclamation. Results of the Passive regeneration plots will be reported on in the 2013 Vegetation Plan as per the design plan.*"
- "*I would love to participate in the elders workshop and can prepare the results of the vegetation work for discussion. It is entered in the calendar but can you also please send a reminder in May?*"

Fish Tasting 2014

The fish tasting event has been a component of the Aquatic Effects Monitoring Program (AEMP) since 2005 and is enshrined in the Environmental Agreement and the Water License. It is the only traditional knowledge-driven program in the environmental monitoring at Snap Lake. It takes place every year in September.

The fish tasting event for 2014 was held on September 11. The participants were:

- Elders
    - Madeleine Drybones, Lutselk'E (LKDFN)
    - Ernest Boucher, Lutselk'E (LKDFN, fisherman)
    - Wayne Langenham, Yellowknife (NSMA, fisherman)
    - Joy Dragon, Yellowknife (NSMA)
    - Michel Rabesca, Behchoko (Tlicho)
    - Alphonse Apples, Gameti (Tlicho)
    - Andrew Crapeau, Dettah (YKDFN)
    - Mike Francis, Ndilo (YKDFN)
- Observers
    - James Marlowe, Interpreter, Lutselk'E
    - Jonas Lafferty , Interpreter, Behchoko
    - Philippe di Pizzo, SLEMA
    - Eddie Fabien, Fort Resolution
    - Donald Beaulieu, Hay River
    - Harvey Mandeville, Fort Resolution

Thirty lake trout were caught. The Elders commented on the fish surface, tissues and taste. They thought the fish generally looked healthy and tasted good.

Final Report for the fish tasting event will be submitted by De Beers in the Aquatic Effects Monitoring Program Annual Report.

Photo 4. Ernest Boucher and Madeline Drybones Inspecting Fish

Photo 5. Madeline Drybones Sampling Boiled Fish

Mine Site Tour in 2014

De Beers invited community members and SLEMA board members to visit the mine site in 2014 to have a first-hand look at its facilities, mining progress, and environmental management facilities. A number of community visits took place in August and September, with members of various communities touring the site with De Beers staff.

SLEMA site visit took place on October 28, 2014. The participants were:

- SLEMA board members: Johnny Weyallon (Tlicho), Rachel Crapeau and Greg Empson (YKDFN).
- SLEMA staff: Philippe di Pizzo and Zhong Liu.

The mine site visit included a surface tour and an underground tour:

- Surface tour – general site overview and water management system.
    - Water management infrastructure (sumps, Water Management Pond),
    - North Pile (surface deposition of processed kimberlite and proposed future expansions),
    - Waste Management Area, Laydowns, and Tank farms.
- Underground tour – water management system and ore development.

Photo 6. Underground Tour

Environmental Agreement

Devolution

SLEMA, together with IEMA and EMAB, sent a letter to the GNWT and AANDC on November 25, 2013, and stated that

> *"We understand that Devolution of lands and resources management to the Government of the Northwest Territories is to take place on April 1, 2014. This has the potential to change the roles and responsibilities of the federal and territorial governments in our respective Environmental Agreements.*
>
> *We are curious to know whether there has been any consideration of whether our Environmental Agreements may need to be amended in light of Devolution."*

In response to the joint letter, the AANDC sent a letter to the Parties to the Snap Lake Environmental Agreement and SLEMA on December 16, 2013 and stated that

> *"This is letter is to notify the Parties to the Agreement that AANSC and GNWT have initiated a review of the Agreement with a view to proposing amendments to it necessitated by devolution….*
>
> *It is intended that **all proposed changed will be administrative in nature only and will not alter the intent or substance of the Agreement**. AADNC and the GNWT will provide a draft of s formal agreement detailing the proposed amendments to the Parties to the Agreement early in the new year for their review and comment."*

Further on January 30, 2014, the AANDC distributed to the Parties to the Snap Lake Environmental Agreement a draft Environmental Agreement detailing proposed amendments for review. The letter stated that

> *"As you are aware, the Government of Canada (Canada) will transfer administration and control of Public Lands and rights in respect of water to the Government of the Northwest Territories (GNWT) effective April 1st, 2014. As part of this transfer, the roles of Canada currently undertaken by Aboriginal Affairs and Northern Development (AANDC) and its Minister under the Environmental Agreement will, as a result of legislative changes, be assumed by the GNWT and its responsible Ministers. In order to reflect this assumption of roles by the GNWT, the Environmental Agreement will need to be amended. Further, in connection with the assumption of those roles by the GNWT, **Canada will be requesting a mutual release of Canada from all future rights and obligations it may have had under the Environmental Agreement starting from April 1, 2014**."*

The Minister of the AANDC delegated powers, duties, and functions with respect to securities for land use permits on non-federal lands and the designation of inspectors for use of land on non-federal lands to the Minister of Lands of the Government of the Northwest Territories through the Delegation Instrument, on March 27, 2014.

2012 Environmental Agreement Annual Report

De Beers drafted the 2012 Environmental Agreement Annual Report (EAAR 2012) in August 2013, and submitted the draft version for initial review. SLEMA made comments on the draft report on October 25. De Beers responded to SLEMA comments on November 21 and officially submitted the EAAR 2012 on December 2.

SLEMA commented on January 20, 2014 and concluded that, in general, the EAAR 2012 fulfilled the criteria established within the Environmental Agreement. SLEMA provided specific examples for improving presentation:

> *"The following items, but not limited to, may be helpful for readers to understand the mine operation, and environmental monitoring, management and performance:*
>
> - *Photos of the mine site showing the change from previous years to current year, especially the North Pile*
> - *Photos of the wildlife at or near the mine site from wildlife monitoring,*
> - *Figures of water quality of the effluent, the lake and downstream, and figure of air quality and emission over years showing the trend of environmental quality change, etc."*

AANDC issued a letter on February 18, 2014 stating that it was satisfied with the Annual Report and deemed the Report to be satisfactory. However, AANDC requested De Beers respond to issues raised by SLEMA, YKDFN, and GNWT.

2013 Annual Reports for Wildlife Effect Monitoring Program (WEMP) and Wildlife and Wildlife Habitat Protection Plan

The Annual Reports was submitted on March 31, 2014. SLEMA did not review the Annual Reports this year due to capacity issues, but will review the submissions for the 2014 reporting year.

In May 2013, the Government of the Northwest Territories (GNWT) circulated draft guidelines and proposed a change as to how wildlife monitoring should be reported. The guidelines proposed dividing wildlife monitoring results into Wildlife and Wildlife Habitat Protection Plan (WWHPP) and WEMP reports. The WWHPP reports on wildlife monitoring occurring at and immediately adjacent to the Mine, whereas the WEMP reports on wildlife monitoring occurring at spatial scales beyond the Mine footprint. Previous reporting by De Beers had included both scales of monitoring in the WEMP. To comply with the reporting guidelines proposed by the GNWT, De Beers prepared separate WWHPP and WEMP reports for 2013. Below is a brief summary of the two reports.

Wildlife Effects Monitoring Program 2013 Annual Report

Consistent with other mining developments in the NWT, wildlife studies in 2013 were focused on Valued Ecosystem Components (VECs). Criteria for choosing VECs were based on the ecological, social, cultural, and economic aspects of the ecosystem. The VECs used in the WEMP are wildlife habitat, barren-ground caribou, grizzly bear and black bear, and, wolverine.

In addition to VECs, all wildlife observed at the Mine are monitored and reported in the WWHPP. Wildlife studies were completed in the regional study area (RSA), defined by a circle with a radius of 31 km, centered on the Mine, and equivalent to 3,019 square kilometres (km^2). Data collected from 1999 to 2004 were used to provide estimates of the range (variation) of baseline values in species presence, abundance, distribution, and habitat use in the RSA.

Through 2013, the effects of the Mine to wildlife have been within the range predicted in the Environmental Assessment Report. In 2013, the monitoring of caribou and bears indicated low levels of interaction with the Mine by these species compared to other operating mines in the NWT.

Caribou pass through the regional study area, and have been occasionally observed at the Mine. They are monitored through the movements of satellite-collared caribou, observations by employees at the Mine, and with aerial surveys by helicopter. The number of caribou observed has been very different from year to year since monitoring began in 1999 and likely reflects the reduced herd size of Bathurst caribou.

In 2013, De Beers (on behalf of the Mine and the Gahcho Kué Project) participated in a regional grizzly bear program and regional wolverine program that will provide demographic information for the conservation and management of grizzly bears and wolverines in the NWT. Participation in the regional hair snagging programs by De Beers was scheduled to continue in 2014.

Wildlife and Wildlife Habitat Protection Plan 2013 Annual Report

Wildlife habitat loss due to the expanding Mine footprint has occurred as expected, and the Mine is currently about 89 percent (%) of the total predicted size. Further habitat loss will occur as the waste rock storage at the North Pile expands.

Incidents are any wildlife interaction that requires a response by Mine personnel, and may range from simple deterrent actions to the injury or death of an animal. De Beers environmental staff record and report all wildlife incidents (De Beers 2013). Eighteen wildlife incidents, eight of them mortalities, were recorded at the Mine in 2013. These incidents included responding to a male caribou at the Mine. Wildlife mortalities have

been rare at the Mine. In 2013, wildlife mortalities recorded at the Mine were six songbirds, one falcon, and one caribou. Worker education, effective mitigation and good waste management have been considered essential in limiting wildlife incidents and mortalities since the initiation of Mine operations.

The number and duration of caribou observed at the Mine has been generally low and very different from year to year since monitoring began in 2005. In 2013, caribou were observed at or near the Mine on 39 occasions between January 23 to April 20 and in groups of 8 to 300 animals.

The Mine began regular inspections by the environmental department, in addition to historically entrenched recording of wildlife by all employees and contractors, for the presence of wildlife, wildlife sign, and food waste around the exterior of the airstrip, North Pile, accommodation complex, and waste management areas in 2013. The results of inspections indicated that 41.5% of surveys recorded presence of wildlife, 38.3% wildlife sign, and 3.2% food waste at these Mine areas. Over time, the results of these surveys will provide a standardized measure of wildlife presence at the Mine and the effectiveness of the waste management system.

Regular monitoring for wildlife presence, wildlife-traffic collisions, public use, and wildlife harvest along the winter access road began in 2013. Wildlife detected near the winter access road were caribou, fox, and ptarmigan. Evidence of wildlife-vehicle collisions was not observed nor were any reported to the Mine. The YKDFN undertook a community hunt at Snap Lake from 22 to 25 March, 2013, no other public use or wildlife harvest was observed in 2013, consistent with results of winter access road monitoring completed in 2008.

Vegetation and Vegetation Dustfall Monitoring Program

The Vegetation Monitoring Program (VMP) is a requirement of the Mine's Environmental Agreement (Article VII, 7.2b). A draft VMP was prepared for the Mine in 2008, and must be updated every five years.

De Beers has implemented and maintained the VMP for the Snap Lake Mine, which includes annual and interval monitoring including Area of Impact, Ecological Land Classification (ELC) area, and reclamation monitoring programs. The VMP also includes triggered vegetation monitoring of detailed ELC, and effects of dustfall on vegetation.

On October 25, 2013 SLEMA inquired about the submission of the updated VMP. De Beers responded on December 19, 2013 that

- *"The changes are still ongoing to the plan, so there won't be a final to review" in the near future.*
- *De Beers plans to initiate the plan next summer."*

De Beers submitted the document on March 6, 2014. This document provides updated methods to enhance the collection of vegetation data for the VMP, which includes the Reclamation Monitoring Program and the Vegetation Dustfall Monitoring Program.

SLEMA reviewed the VMP in March 2014 and did not raise any concerns.

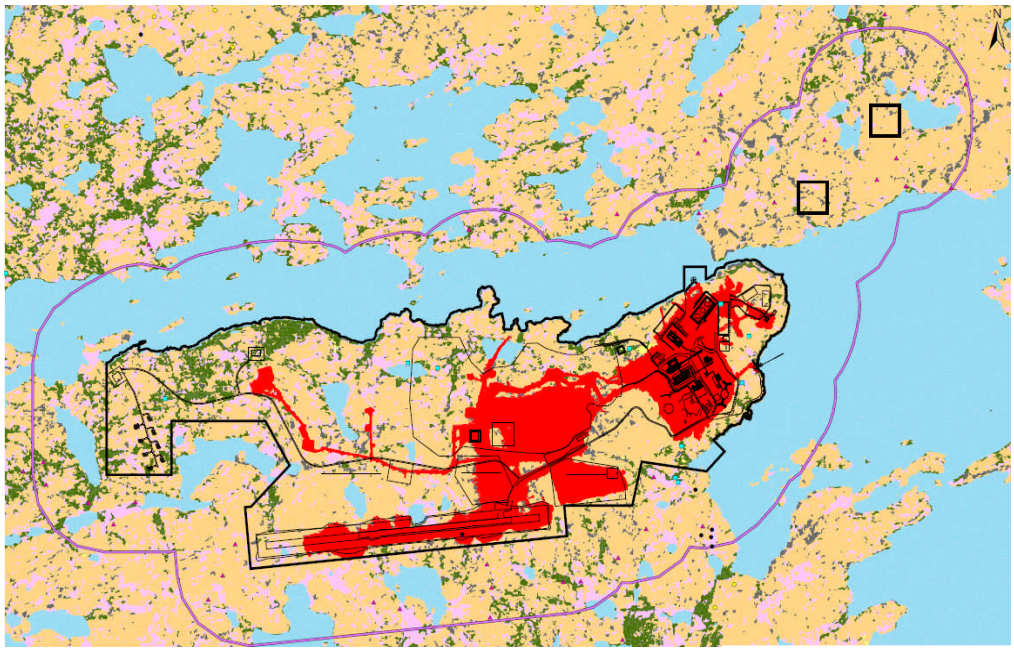


Figure 1. Local Study Area of the Vegetation Monitoring Program

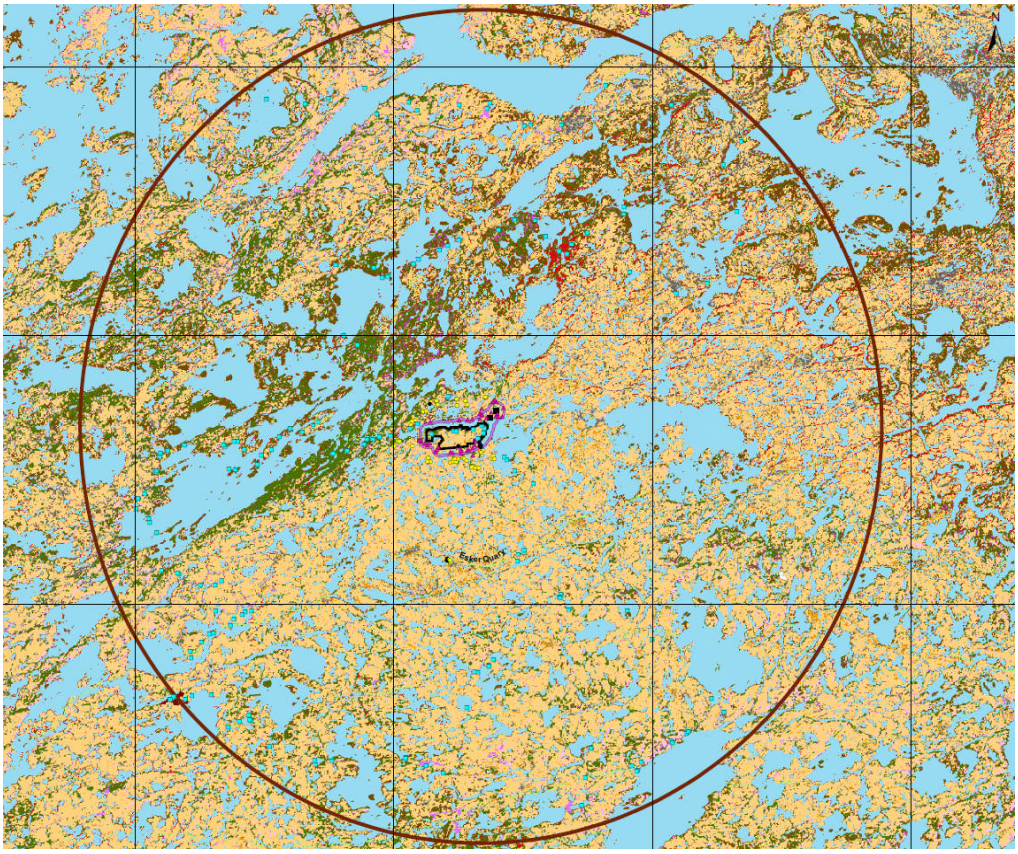


Figure 2. Regional Study Area of the Vegetation Monitoring Program

Vegetation Monitoring Program 2013 Annual Report

The Annual Report was submitted on June 11, 2011. Annual/Interval monitoring criteria were assessed in 2013 and are scheduled to be assessed again in 2018.

- As of July 5, 2013,194.9 hectares (ha) of the Local Study Area (LSA) and esker complex has been disturbed, which represents13% of the LSA and is below the predicted 15%.

Reclamation Monitoring Program

- The established 11 passive regeneration permanent sample plots (PSPs) were assessed in 2013 and a total of 74 plant species had naturally colonized the passive regeneration PSPs; an increase of 30 additional species from the first survey in 2008. These plant species were similar to the plant species observed in the reference and exposure PSPs for the Triggered Monitoring Programs.

Vegetation Dustfall Monitoring Program

- There were no signs of dust accumulation or impacts to vegetation in surveyed reference or exposure permanent sample plots (PSPs) in 2013 or any other survey to date. Dust accumulation was observed around the airstrip, particularly on the west end due to airplane traffic. However, signs or symptoms of stress were not observed on vegetation during qualitative assessments. Efforts are being made to reduce dust deposition around the airstrip through the application of water to the airstrip and surrounding area. De Beers is investigating the potential use of other approved dust suppressants.

SLEMA review the Annual Report in June 2014 and did not raise any concerns.

Air Quality, Meteorological Monitoring and Emissions Reporting 2013 Annual Report

The Report was submitted on June 10, 2014, and provides the results of the air quality and meteorological monitoring programs that were active at Snap Lake during 2013.

Particulate Monitoring in 2013

- No ground level concentrations exceeding the GNWT Ambient Air Quality Standard (AAQS) for all particulate monitoring in 2013.
- Year by year percentage increase (PM_{10} and $PM_{2.5}$) is large enough to trigger a brief external review and action plan.

Passive Gas Monitoring in 2013

- Peak concentrations of NO_2 and SO_2 falls below the maximum annual average objectives regulated by the GNWT.

Emissions in 2013

- Emission rates were higher in 2013 than 2012 due to an increase in fuel and waste oil consumption, but remained below emissions predicted in the 2007 Air Modeling Update.
- Increased pumping capacity for site water and the expansion in the underground mine are the main causes of increased fuel consumption.

Incinerator Emissions

- The older incinerators were removed from service in December 2012 and January 2013. Two new incinerators began operation in June and August 2013. Waste was transported off-site for disposal to an accredited facility between the decommissioning of the old incinerators and the commissioning of the new

incinerators. The new incinerators are designed to meet the CCME guideline. Stack testing was scheduled for the summer of 2014.

SLEMA reviewed the Annual Report in June 2014 and did not raise any concerns.

On July 9, 2014 De Beers asked how to differentiate the anthropogenic and natural sources of particulate matter at the mine during the forest fire season, which was particularly severe in 2014. In a reply dated July 16, 2014 ENR suggested the following:

- *"Make sure you keep a good record of days when forest fire smoke is present and you are seeing elevated levels of particulate matter (TSP, PM10 & PM2.5).*
- *In the annual AQ report, make reference to the days forest fire smoke was observed in the area when elevated levels of PM were observed.*
- *Remove the PM data points that are elevated as a result of forest fire smoke from the analysis, when you are comparing to the relevant standards as well as the year to year changes for TSP, PM10 & PM2.5. This way action levels will not be triggered as a result of forest fire activity. It is important that the AQ report clearly explains why the elevated PM readings have been removed from the analysis."*

2013 Environmental Agreement Annual Report

De Beers submitted the 2013 Environmental Agreement Annual Report on October 14, 2014. It was then distributed by ENR to Parties of the Environmental Agreement and SLEMA for comments, with a submission deadline of November 27, 2014.

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 valid from June 14, 2012 to June 13, 2020.

2013 Geotechnical Inspection of North Pile and WMP Dams

Golder conducted an inspection of the North Pile and Water Management Pond (WMP) dams from September 9 to 12, 2013, and submitted a Technical Memorandum on findings and recommendations on November 12. Golder observed efforts De Beers made in water management and North Pile development coordination, and recommended improvements to internal technical communication and monitoring program. They pointed out that

- Mine Plan, Deposition Sequencing Plan and Operation, Maintenance, and Surveillance Manuals were not well-communicated to the various mine departments within De Beers, and this was a key risk to the operations at the Mine, although the operation and development of the North Pile had been acceptable to date.
- There were major deficiencies in data collection, interpretation and use of the North Pile monitoring program, and there were not quality assurance program for the monitoring program.

On November 13, De Beers responded that it had accepeted and implemented some of Golder's recommendations, but some were not.

SLEMA supported all of Golder's recommendations contained in the Technical Memorandum, and noted, at the beginning of December 2013, that the two problems reported in Golder's 2012 Field Report and SLEMA had been not followed up by De Beers. De Beers replied that the new Operation, Maintenance, and Surveillance Manuals were being developed, and data interpretation for monitoring program would be improved in the first half year of 2014.

Embryo-Alevin Early Life Stages (ELS) Testing

De Beers initiated the ELS testing in July 2013, but the test failed. De Beers requested MVLWB's guidance in October 2013.

The MVLWB provided directions to De Beers request on November 14, 2013.

> *"De Beers will initiate the 30 day egg/alevin ELS test under ice at edge of the mixing zone when conditions allow (De Beers proposed option 2). In order to minimize the risk of more test invalidations De Beers should implement the following precautions:*
>
> > *As the window approaches, De Beers should be in close contact with the lab to get feedback of when the eggs and milt will be available.*
> >
> > *Ideally try and avoid use of eggs and milt that will need to be shipped long distances or overnight.*
>
> *De Beers also requested clarity on the number of attempts to complete the work that would be deemed acceptable. There is no finite number of what is acceptable it is a matter of timing. Tests should be initiated at the first opportunity to use high quality eggs and milt. They should be run until a successful test is*

conducted or the window for high quality eggs closes. The intent is not for De Beers to conduct a test that is unlikely to succeed."

Due to the continued difficulties experienced with the ELS test in 2013 and 2014 and the need to find an appropriate surrogate, De Beers requested that the MVLWB replace the ESL Rainbow Trout by Fathead Minnow larval test.

De Beers provided additional evidence for not conducting 30-d ELS testing, as detailed in a July 8, 2014 letter to the MVLWB.

- *"De Beers urges the Board to consider the 7 day Fathead Minnow Test which requires smaller sample volumes to be collected and shipped as well as using test organisms that are readily available and of reliable quality as well as more widely performed by commercial Canadian testing laboratories."*

The MVLWB changed the Surveillance Network Program on July 17, 2014 and requested De Beers to conduct both 7 day tests for Rainbow Trout and Fathead Minnow for a minimum one year period.

- *"Following the one year period, De Beers could request to eliminate one of the tests if they have evidence to support the request."*

De Beers collected a composite sample from four diffuser locations for the required tests on August 4, 2014. The testing for Fathead Minnows commenced on August 7, 2014. By Day 4 of the lab test with lake water, there was noted toxicity, and by Day 7, the lab test had failed.

De Beers initiated a complete investigation of cause, and provided an investigation report on October 21, 2014.

- The Report of the Final Fish Early Life Stage Toxicity Test Follow Up Investigation (by Golder Associates) concludes that there was no clear cause identified that can account for the toxicity observed in the August 4 sample.
- Fathead Minnow, Rainbow Trout, Ceriodaphnia and water quality testing was re-initiated as test species were available. The re-initiated test passed and all test species survived.

Water Management Plan

De Beers submitted the Water Management Plan on October 1, 2013. The plan describes water management activities during the operational phase, which

commenced in 2007 and will continue through to closure. The Plan applies to all operations.

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.

The water management system can be divided into two parts:

- The water and wastewater facilities system contains infrastructure for water supply, potable water treatment and distribution, sewage collection and treatment, and return of treated effluent to Snap Lake; and
- The mine water system contains facilities for collection and conveyance of surface water runoff and of groundwater seepage into the underground mine workings, for storage and treatment of this water and for the return of treated effluent to Snap Lake.

SLEMA identified a few inconsistencies of data and description in the Plan in a communication sent to De Beers on November 4, 2013. On November 18, De Beers responded that De Beers would include SLEMA comments when updating this Plan for re-submission.

De Beers re-submitted the Plan on December 5, 2013, January 16, 2014, and January 21, 2014.

SLEMA commented on the Plan on January 23, 2014.

- *"The Plan provides enough information for surface water management, but is lack in the information of the underground mine water management. It is recommended that De Beers provide related information for review.*
- *12 specific comments are provided for water streams, water balance, and SNP. "*

The MVLWB rejected the Water Management Plan on April 2, 2014, and requested De Beers re-submit the Plan by July 2. 2014.

The Plan was revised and resubmitted on July 2, 2014. Some of SLEMA's comments earlier comments appeared not to have been addressed.

De Beers submitted the revised Water Management Plan on October 1, 2014. SLEMA commented on October 23, 2014.

Spill Contingency Plan

De Beers submitted the Spill Contingency Plan on December 5, 2013. This plan is an update from the previously approved June 2009 Spill Contingency Plan.

The Spill Contingency Plan applies to activities including construction and mining. Its purpose is to:

- Facilitate the prompt, efficient and safe clean-up of materials used during the construction and operation of the Snap Lake Mine;
- Identify the members, responsibilities and reporting procedures of the Snap Lake Emergency Response Team (ERT) in the event of an emergency or spill; and,
- Provide support and information on available resources, facilities and trained personnel in the event that a spill or an emergency occurs.

SLEMA reviewed the Plan in December 2013 and did not identify any concerns. The Plan was approved by the MVLWB on January 30, 2014

De Beers re-submitted the Plan on April 23, 2014. This submission is an update from the November 2013 version, as part of the Application for New Land Use Permit (MV2014D0010) – Addition of Two Fuel Storage Tanks.

SLEMA reviewed the updated Plan and did not raise any concerns.

The MVLWB approved the Spill Contingency Plan on June 19, 2014.

Waste Management Plan

Historically, De Beers submitted both a Hazardous Materials Management Plan and a Domestic Waste and Sewage Management Plan under separate cover. Since the issuance of the Snap Lake new Water Licence (MV2011L2-0004) in 2012, all waste-related information pertaining to hazardous materials and sewage is captured under the Waste Management Plan, which was submitted to the MVLWB on January 31, 2014. De Beers is required to update the Plan every 3 years following approval of the Plan.

Waste Management Strategies described in the Plan are:

- The primary focus to the wise use of resources is the conservation of raw materials. This is the “reduce” component of the “Reduce, Reuse, Recycle” philosophy.
- The secondary focus is the proper disposal of waste. This includes the implementation of “reuse and recycle” which minimizes waste. It also includes final disposal in the appropriate facility.

SLEMA commented on the Plan on February 27, 2014.

- The strategies and practices for the collection, storage, transportation, and disposal of all wastes generated throughout the duration of the mine life are generally appropriate.
- 10 specific comments are provided for waste oil disposal, combustion ash disposal, use of landfarm, sewage sludge disposal, etc.

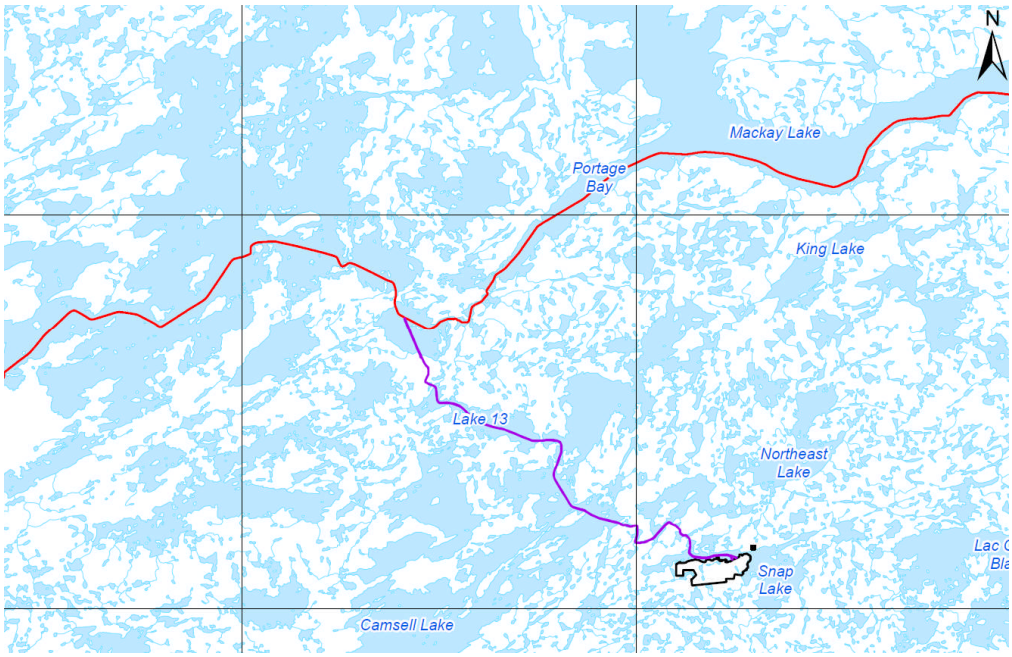
The MVLWB approved the Waste Management Plan conditionally on the incorporation of the commitments by reviewers, on April 24, 2014.

De Beers revised the Plan for increased fuel storage (LUP MV2014D0010) and re-submitted. The MVLWB approved the Plan as submitted on October 9, 2014.

AEMP Winter Road Design Plan

The MVLWB approved Lake 13 as the second reference lake in March 2013, with the condition that additional monitoring be completed in Lake 13.

A winter road exists along the length of Lake 13. Concerns were raised by regulators and communities about the potential for environmental changes to occur in Lake 13 due to dust, vehicle exhaust, or spills from the winter road, which could reduce the suitability of Lake 13 as a reference lake.



Map 2. Lake 13 and Winter Road to Snap Lake

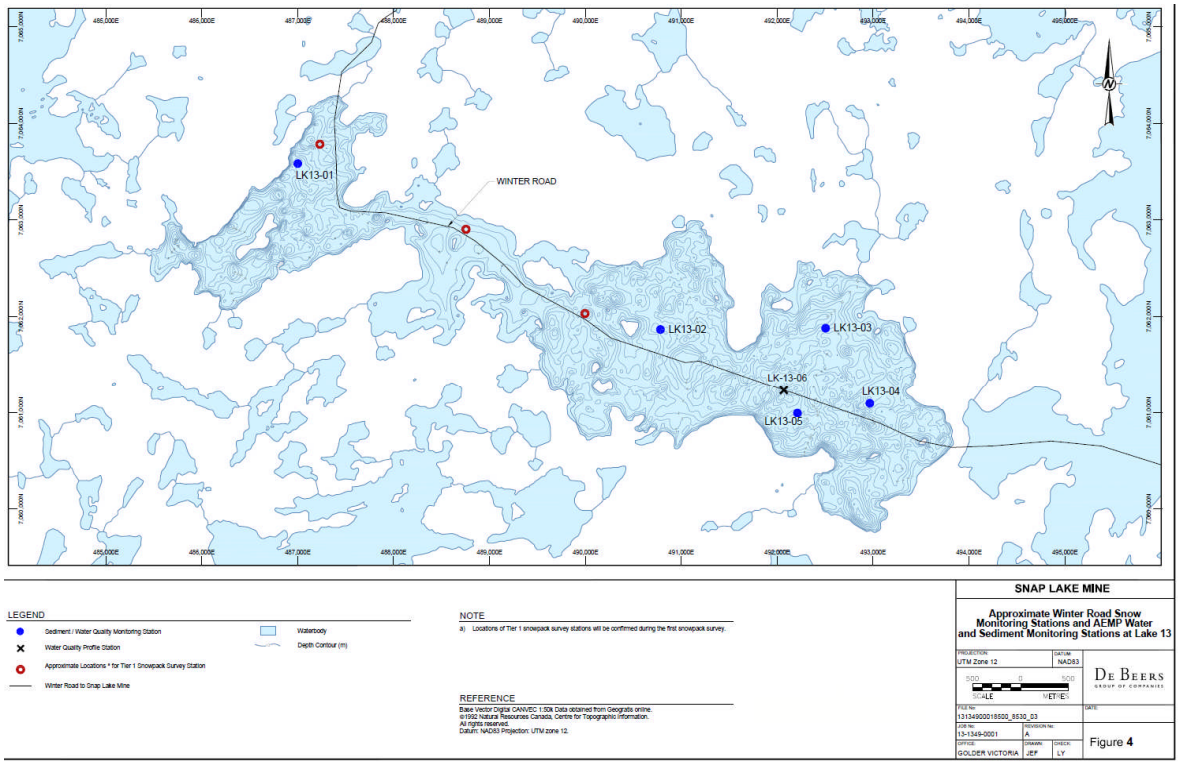


Figure 3. Monitoring Stations in Lake 13

De Beers developed a detailed monitoring program for Lake 13 and submitted the AEMP Winter Road Design Plan on February 20, 2014.

SLEMA reviewed the Plan in March 2014 and did not raise any concerns.

Water Licence 2013 Annual Report

De Beers submitted the Water License 2013 Annual Report (WLAR 2013) with four appendices on March 31, 2014.

SLEMA reviewed the Report and its appendices, and submitted its comments in one comment table to the MVLWB on May 21, 2014. The following are SLEMA's comments:

Water License 2013 Annual Report

- *"It is stated in Section 17 that "(N)ote that all red values indicate exceedences based on the discharge criteria. These values and an explanation of cause were reported under the monthly SNP report the month after they were exceeded". However, only the discharge criteria for grab samples are compared against the measured ones, no monthly criteria are compared. As a result, the exceedances of Chloride monthly criterion in SNP 02-17B in September/October 2013 are covered. It is recommended that De Beers provide rolling average values for*

important parameters and make a note in Section 17 to describe this important event.

- *In Section 24, it is stated that "(T)here have been no exceedances to date". However, there were exceedances of Chloride monthly criterion in SNP 02-17B in September/October 2013. There appear no descriptions about the non-compliance events in the Annual Report. It is recommended that the MVLWB and De Beers work together and solve the missing reporting problem."*

Appendix I Summary of Paste Backfill Work conducted at Snap Lake

- *"Higher pile, bigger footprint or both will be necessary, if the percentage of PK deposition in the North Pile is up from 50% to 70%.*
- *The Summary will be presented to next SLEMA TK Workshop in June 2014. The information will be helpful for SLEMA TK Panel to understand the current and future North Pile development and assess the related impacts."*

Appendix II Summary of September 2013 Geotechnical Site Inspection of North Pile Facility and Water Management Pond dams

- *"It is stated in Section 5 (page 24) that the water levels of the piezometers between the East Cell and the shoreline of Snap Lake (SP08-04, 05, and 07 to 14, inclusive) are generally below that of Snap Lake (El. 444.1 m±). This indicates a slight hydraulic (groundwater) gradient from Snap Lake towards the East Cell. This indicates that De Beers managed the North Pile Water Control Structures as the design requires. SLEMA encourages De Beers to continue their efforts in water management in the North Pile."*

Appendix III Geotechnical Monitoring Program Summary for the Period 1999-2013

- *"The Report is satisfactory, and all recommendations in the Report are supported."*

Appendix IV 2013 Acid/Alkaline Rock Drainage (ARD) and Geochemistry Monitoring Report

- *"The data range of TDS and Chloride in Bog Water between the East Cell and Snap Lake (as showed in Section 6.3.4.3) is much lower than that in process water within the North Pile. The monitoring results of piezometers between the East Cell and the shoreline of Snap Lake indicate that the design and operation of the East Cell perimeter water control structures are promoting a hydraulic gradient towards the North Pile from Snap Lake as per the design (Section 5, Appendix III). These two lines of evidence demonstrate that the design and operation of the East Cell perimeter water control structures function well.*
- *The Report is satisfactory, and all recommendations in the Report are supported."*

Update on Paste Backfill Work at Snap Lake

Appendix I - Summary of Paste Backfill Work conducted at Snap Lake of WLAR 2013 provides an overview of paste tailings disposal and status update for the North Pile development.

The orientation and complexity of the underground ore body, as well as mine configuration will preclude the design concept of 50% PK paste underground. De Beers estimated that less than 30% PK by volume will be deposited underground as paste. Currently, less than 1% of PK has been deposited. Two technical challenges in creating sustainable paste tailings are the nature of PK as a paste and the layout of the ore body and underground mine workings.

The Starter Cell has undergone three phased raises in the height since the original design, and it was expected to reach capacity as early as in May 2014. East Cell will reach capacity as early as in June 2015. De Beers planned to expand the North Pile. The conceptual options are:

- Raising the height of the current Starter and East Cells by changing angle of embankment slopes from currently permitted 3:1 slope to 2:1 to facilitate a downstream embankment build; or
- Expanding the current North Pile footprint; or
- A combination of both.

De Beers recognized that the above options would constitute an expansion to the existing approved facility, and would require an application to amend its current authorization(s). De Beers will complete its evaluation of the feasibility of the options to increase capacity of the North Pile by March 2015.

De Beers intends to commence construction of the West Cell by late 2014 or early 2015.

2013 Annual Closure and Reclamation Plan Progress Report

The Report was submitted on April 28, 2014. The main components are:

- Project schedule and activities
- Progressive reclamation
- Reclamation research status
- Interim Closure and Reclamation Plan Status
- Financial security and reclamation liability

SLEMA reviewed the Report in May 2014 and found it to be satisfactory.

Aquatic Effects Monitoring Program 2013 Annual Report (Water Quality)

The Annual Report was submitted on May 1, 2014. The core of the AEMP is monitoring of water quality, plankton, sediment quality, benthic invertebrates, and fish health. All monitoring components, with the exception of fish health, are currently undertaken annually. Fish health monitoring occurs on a three- to five-year cycle. The fish tasting component conducted in 2013 is included in this Report. Special studies conducted in 2013 are the Littoral Zone Special Study, Picoplankton Special Study, Downstream Lakes Special Study, Lake Trout Population Estimate Special Study, and Stable Isotope Food Web Analysis Special Study.

The following sub-sections present the brief summary for the aquatic effects monitoring in Snap Lake.

Water Quality

Treated effluent discharge from the Mine is increasing and, as a result, water quality is changing in Snap Lake as predicted. However, based on the 2013 data, including toxicity testing, the changes to water quality in Snap Lake are unlikely to result in adverse effects to resident aquatic life, nor to affect the drinkability of Snap Lake water.

- The daily volume of effluent discharged to Snap Lake from the Mine has increased since 2004, when treated effluent discharge began, with consequent increased loadings to the lake. In 2013, the annual treated effluent volume was approximately 31% higher than in the 2012 AEMP reporting year.
- Concentrations of total dissolved solids (dissolved salts in the water), nutrients (specifically nitrogen), and some metals have increased in Snap Lake related to treated effluent discharged from the Mine.
- Concentrations of nitrate, chloride, and fluoride were above an AEMP benchmark on at least one occasion in 2013. However, increases in these parameters were accompanied by increased hardness, which is a parameter that reduces the toxicity of those parameters.
- Treated effluent and receiving waters were not toxic based on laboratory toxicity testing.
- The observed chloride/nitrate/fluoride concentrations are not expected to cause adverse effects to aquatic biota in Snap Lake. The toxicity of chloride/nitrate/fluoride decreases with increases in hardness. Total hardness concentrations increased from 37 mg/L in 2004 to 164 mg/L in 2013 at the outlet of Snap Lake.
- Concentrations of most water quality parameters in Snap Lake were below health-based drinking water guidelines, with the exception of *Escherichia coli (E. coli) and total coliforms. Microbiological parameters* can naturally exist in the aquatic environment. Drinking water at the Mine is filtered and chlorinated prior to consumption (as required by Health Canada of any surface waters in Canada);

treated drinking water quality was acceptable from a microbiological perspective (*E. coli and coliforms).* Drinking water at the Mine will continue to be tested regularly and the results reported to the local Health Authority.

- The Mine's initial environmental assessment predicted that concentrations of water quality parameters associated with the treated effluent discharge would reach near background concentrations within 44 kilometres (km) downstream of Snap Lake. In 2013, concentrations of Mine-related parameters reached background concentrations approximately 11 km downstream of Snap Lake.
- The maximum TDS concentration at KING01 increased from 12 mg/L in 2005 to 20 mg/L in 2013, still considered to be within baseline levels for KING01. Because station KING01 is located 25 km downstream of Snap Lake, additional volumes of low TDS concentration waters from the downstream watershed provide substantial dilution to inflows sourced from Snap Lake.

SLEMA reviewed the Water Quality Section in June 2014 and found out it to be satisfactory. SLEMA furthermore supported all the recommendations in this Section.

Sediment Quality

- Sediment quality in Snap Lake was only assessed at the diffuser station in 2013; trends over space and time in the main basin of the lake were not evaluated.
- The results indicated that concentrations of available sulphate, calcium, mercury, sodium, and strontium at the diffuser stations are potentially being influenced by Snap Lake Mine (Mine) operations.
- However, these changes are unlikely to have resulted in adverse environmental effects.

Plankton

- Nitrogen and silica concentrations are increasing in the lake but phosphorus concentrations have not changed.
- There were similar amounts of small plants in Snap Lake, Northeast Lake, and Lake 13 in 2013, so nutrients did not have a large effect on the amount of small plants. However, the types of small plants in Snap Lake may be affected by the nutrients in the lake, because the different types of small plants have changed since 2004.
- The small animals in Snap Lake have decreased in numbers from 2004 to 2013, and the different types of small animals within Snap Lake have changed. Small changes are happening in Snap Lake. These changes may become greater with continued input of nutrients from the Mine.
- At present, both the small plant and animal communities in Snap Lake are healthy.

Benthic Invertebrate Community

- The benthic invertebrate community in Snap Lake remains healthy. Community variables remain within ranges that are considered normal, based on data from baseline studies and monitoring in Northeast Lake, except for the fingernail clams, which were slightly more abundant than this range.
- The overall effect of Mine discharge on the benthic invertebrate community has to date been low and within the range predicted in the initial environmental assessment for the Mine.

Fish Community Monitoring

In 2013, De Beers conducted the second standard fish population monitoring program to collect data necessary to monitor potential changes in fish populations associated with the Snap Lake Mine.

- Fish appeared healthy and abundant in Snap Lake.
- There have been no changes to the fish community composition of Snap Lake that could be attributed to Mine-related changes in water quality.

Fish Tissue Chemistry

- Results showed that two metals were increasing in muscle tissue in Snap Lake: thallium and cesium. These metals were elevated relative to the baseline in Snap Lake, the reference lakes, and were also above the range of natural variability in the region, known as the 'normal range'. These increases in metal concentrations were observed in all tissue types, including liver, kidney, and muscle tissues. However, it was uncertain how these increased metal concentrations were connected to the Snap Lake Mine.
- Five additional metals were detected in higher concentrations in fish tissues from Snap Lake in 2013 compared to the reference lakes and were above the range of natural variability in the region in either liver, kidney or muscle tissue: iron, mercury, molybdenum, potassium, and strontium.
- There were no fish tissue samples above Canadian Food Inspection Agency commercial consumption guidelines for arsenic or lead in Lake Trout or Round Whitefish tissues in 2013.
- Some Lake Trout from each of Snap Lake, Northeast Lake, and Lake 13 had kidney, liver, and muscle mercury concentrations above the commercial consumption guideline for mercury, which was also seen in fish prior to the start of Mine operations.
- Only one Round Whitefish had a liver tissue mercury concentration above the commercial consumption guideline; such exceedances occur naturally and were determined to not be connected to the Mine.

Fish Tasting

- In 2013, 17 fish were captured and one was released. Sixteen fish were prepared, and evaluated. Overall, Aboriginal community members agreed that the health, and taste of the fish from Snap Lake ranged from good to excellent. Community members commented that there were ‘good fish in these lakes’.

Littoral Zone Special Study

- The littoral zone is the shallow near-shore area of lakes. Snap Lake and Northeast Lake have large littoral zones, accounting for close to half of the total areas of these lakes.
- Unlike the deeper open-water area of a lake, the littoral zone provides habitat for small plants (algae), animals without backbones (invertebrates; e.g., snails, worms, insects), and fish to live. When nutrients are added to the lake water, algae can grow faster and provide more food for invertebrates and fish in the littoral zone.
- Food quality for littoral invertebrates was poorer in Northeast Lake compared to Snap Lake, and nutrient concentrations in the littoral zone of Snap Lake were higher in 2012 and 2013 compared to 2004.

Picoplankton Special Study

- The Study evaluates whether there were any changes happening in certain bacteria and small plants that are part of the “microbial loop”, which is a model of pathways for nutrient and carbon cycling by microbial components in the open-water community.
- The data suggest Mine-related nutrient enrichment within Snap Lake, although other factors (e.g., increasing total dissolved solids) may also be affecting the picoplankton. The changes observed are subtle and may not affect the food chain upon which fish rely.

Downstream Lakes Special Study

- In 2013, treated effluent was evident in DSL1, DSL2, and Lac Capot Blanc. Concentrations of dissolved salts and nutrients decreased with distance downstream. The extent of the effluent plume was observed approximately five kilometers (km) from the inlet of Lac Capot Blanc, which is farther from the inlet than in 2012.

Lake Trout Population Estimate Special Study

- The abundance of Lake Trout in Snap Lake on a unit area basis (e.g., Lake Trout per hectare) was lower than reported for other lakes in the published literature

and may be related to the limited amount of suitable Lake Trout habitat available during summer. The median estimate of 1,589 fishable Lake Trout in Snap Lake.

Stable Isotope Food Web Analysis Special Study

- Lake Trout were the top predator based on trophic position. Round Whitefish, Longnose Sucker, and Lake Chub consumed mixtures of pelagic, profundal, and littoral organisms.
- The Snap Lake food web was benthically driven in 2013 with 75 percent of the carbon estimated to be derived from benthic sources.
- The trophic structure of the Snap Lake food web has been maintained.

Weight of Evidence

- For 2013 there appeared to be a clear link between nutrient releases to Snap Lake as a result of Mine activities, stimulation of phytoplankton, and a resulting moderate-level shift in the phytoplankton community.
- There was also evidence of this nutrient enrichment transferring through the food chain (i.e., as increased food supply) to benthic invertebrates with higher densities of some dominant taxa in Snap Lake.
- There was no evidence of enrichment transferring to the fish community.
- There was evidence, albeit weaker, of possible toxicological impairment of zooplankton (small animals without backbones living in the lake waters) and benthic invertebrates (lower density of one taxonomic group), resulting from increases in the concentrations of some substances in water and sediment.
- The evidence for toxicological impairment was considered uncertain because the observed responses were very mild and could also have been caused by increased predation (fish eating higher numbers of zooplankton and benthic invertebrates) or a change in food supply (phytoplankton).
- There was no evidence of adverse effects to the structure and function of the Snap Lake ecosystem.

Action Levels

- In the 2013 AEMP, some items were found to be increasing: cesium and thallium in fish tissue and chloride, fluoride, and nitrate in water. De Beers will be required to submit a plan to address the fish tissue changes. De Beers submitted a Water Licence amendment request for the water quality changes, specifically related to total dissolved solids and its constituent ions, to the Mackenzie Valley Land and Water Board in December 2013.

Exceedance of AEMP Action Levels for Cesium and Thallium

De Beers reported on May 12, 2014 that both cesium and thallium were exceeded in fish tissue in 2013 at the low action level.

- These metals were elevated relative to the baseline in Snap Lake, the reference lakes, and were also above the range of natural variability in the region, known as the 'normal range'.
- It is uncertain how these increased metal concentrations may be connected to Mine activities.

An action plan was triggered to assess the exceedance. The scope and Table of Contents (ToC) for the Cesium and Thallium Response Plan was submitted to the MVLWB on July 15, 2014.

SLEMA reviewed the ToC in July 2014 and did not have any concerns.

The MVLWB reviewed the ToC on September 11, 2014 and requested De Beers to submit the complete AEMP Response Plan by December 1, 2014.

Acid/Alkaline Rock Drainage and Geochemical Characterization Plan

The Plan was submitted on June 6, 2014. The objective of the ARD and Geochemistry Plan is to provide the information that will allow De Beers to continue to assess and manage ARD and metal leaching at the Snap Lake mine during mine operations.

The Plan was an update from the January 2013 version. The changes include simplified geochemical classification criteria for granite and addition of a few figures explaining the rock types, TDS loading rate, ore and waste flows.

Based on the test results, small amounts of kimberlite/metavolcanic rock within other rock are not expected to materially change the leachate characteristics or acid generation potential of those materials. As a result, De Beers proposed that granite diluted with minor amounts of kimberlite, PK, or metavolcanic rock may be used for general site construction if material is non-AG (<0.17% Sulphur), otherwise should be placed underground or internal structure construction in North Pile.

SLEMA reviewed the Plan and submitted comments on July 22, 2014. SLEMA noted that

- *"The simplified geochemical classification criteria for granite will simplify the mine rock management, however, granite diluted with minor amounts of kimberlite, PK, or metavolcanic rock used for general site construction may have potential acid*

leachate issues. Instead of for general site construction, diluted granite is preferred for the North Pile construction."

The MVLWB approved the Plan conditionally on August 28, 2014.

- De Beers cannot use granite diluted with metavolcanics until the additional information has been received and notification of approval has been provided.
- De Beers to submit the additional information and updates by October 13, 2014.

De Beers provided clarification and updated the Plan on October 8, 2014.

- Any amount of metavolcanic rock that is not mixed with kimberlite will be classified with as PAG and will follow the same process path as pure metavolcanic material.
- During ore development, in the event of metavolvanic/kimberlite mixtures, all material reports to the process plant where it is the deposited as PK within the North Pile interior.

North Pile Management Plan

The Plan was submitted on June 6, 2014. Previous versions were included within the Ore Storage Waste Rock and Processed Kimberlite Management Plan. The change was made after the issuance of a new Water Licence (MV2011L2-0004) in 2012. The Plan shall be updated every 3 years.

The North Pile is being developed in three cells in the following order:

- Starter Cell (construction in 2005, PK deposition from 2007 to 2014).
- East Cell (construction in 2010, PK deposition from 2014 to 2016).
- West Cell (construction in 2014, PK deposition from 2016 to 2021).

Each of these cells is considered a separate phase of the North Pile development.

De Beers has an Operations, Maintenance, and Surveillance Plan Manual for proper installation, maintenance and monitoring of effective sediment control measures for the North Pile.

Emergency response measures available on site include: the establishment of retaining berms utilizing heavy earthmoving equipment available on site; installation of mobile pumps; and, the diversion of overflow to sumps with availability capacity.

As a proactive management initiative, sumps have been fitted with both visual elevation poles and pressure transducers to assist in standardizing daily monitoring, which will allow for a more timely response when sump levels are reaching freeboard.

SLEMA reviewed the Plan and submitted a number of comments on July 22, 2014. SLEMA identified inconsistencies or inaccuracies in the Plan, and requested De Beers revise the Plan.

De Beers revised the Plan to align with the West Cell design on September 1, 2014. Most of SLEMA comments were addressed. SLEMA reviewed the revised Plan and identified numbering issues in the Revision History in a letter dated September 18, 2014.

On October 9, 2014, the MVLWB approved the North Pile Management Plan but requested De Beers to resubmit a corrected plan.

De Beers submitted the revised Plan on October 21, 2014.

North Pile West Cell Design

De Beers submitted the West Cell Design package for approval on August 12, 2014.

There will be two phases for the development of the West Cell.

- The designed size of Phase I development of the West Cell will allow processed kimberlite to be placed in this area until 2021. The current planned Life of Mine is until 2028.
- Phase II development is required as there will be less PK in “paste” form placed into mined-out areas underground than originally planned. De Beers expects that placement of the underground backfill will be reduced from 50% to less than 30% due to the geometry of the orebody and layout of the underground development.

The West Cell will be developed using the centreline raise construction method to optimize construction materials and deposition storage, as showed in the following figure.

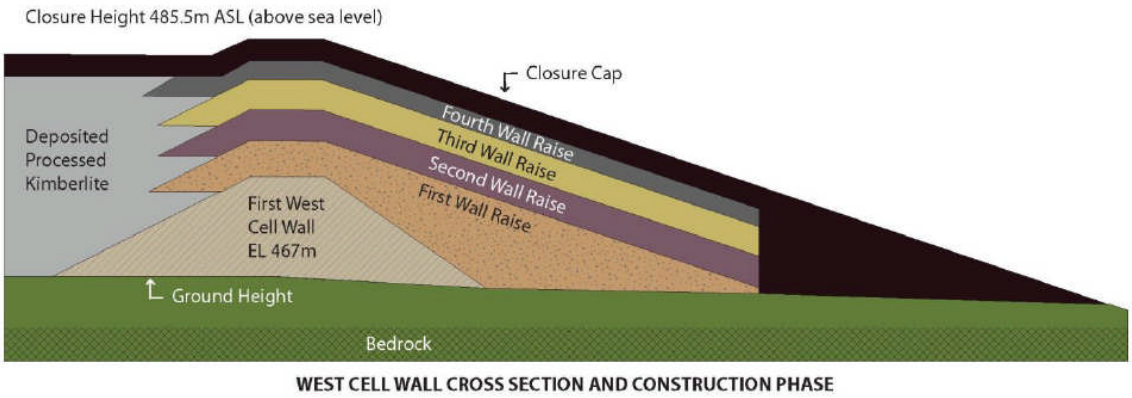


Figure 4. Phase I Development of the West Cell

The existing water containment and runoff control structures for the Starter Cell and East Cell will be extended around the West Cell. The design of the West Cell Perimeter Water Control Structures is within the scope of the current Environmental Assessment.

The West Cell perimeter water control structures include collection ditches (1.6 km and 550 m), Perimeter Sump #5 (SP5, 220,000 m^3), grout curtain and an access road.

SLEMA reviewed the West Cell Phase I Design Report and made the following comments in a September 18, 2014 letter:

- It is stated in Section 10.14 of the Specification for the West Cell Perimeter Water Control Structures that "(T)he Contractor shall comply with De Beers' Environmental Management Plan on the disposal of drill cuttings and drill water. Waste water from grouting operations shall be directed to locations approved by the Owner". No specific information is provided about where drill cuttings and drill water be directed and how they will be disposed of. Clarification is requested.

- The staged PK deposition in Cell 1 and Cell 2 of the West Cell appears to be applicable for the coarse and grits fractions of PK, but not for PK slurry. Past experience in the Starter Cell and East indicates that slurry deposition requires special design. Clarification is requested.

The MVLWB approved De Beers' request to begin construction of the West Cell on October 9, 2014.

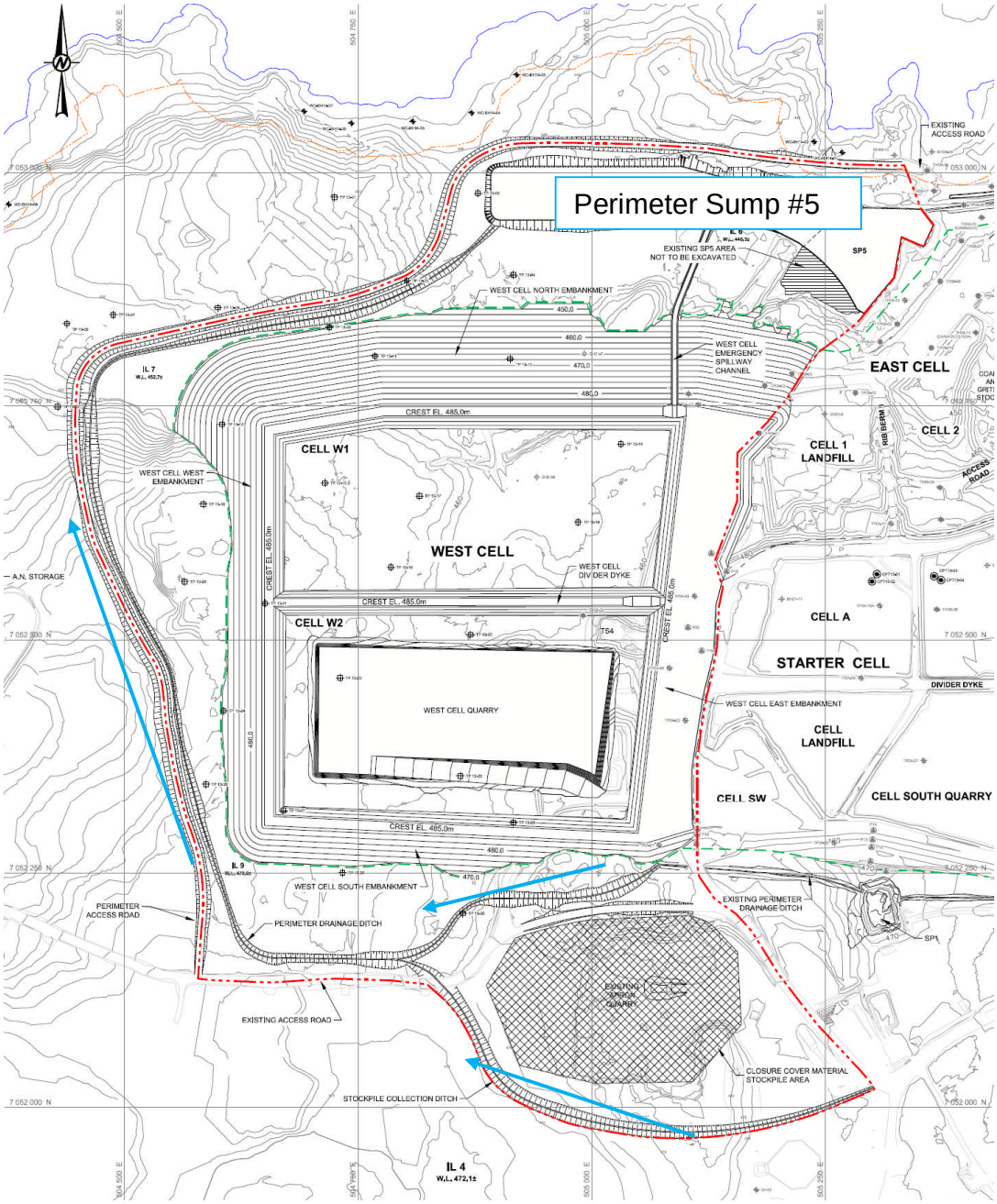


Figure 5. West Cell Perimeter Water Control Structures Layout Plan

2013 Hydrology Report

The Report was submitted on July 3, 2014. The Snap Lake outflow was measured and flow data summarized. Snap Lake surface water elevations were also measured. The results suggest that Snap Lake water elevation trends were similar to other lakes.

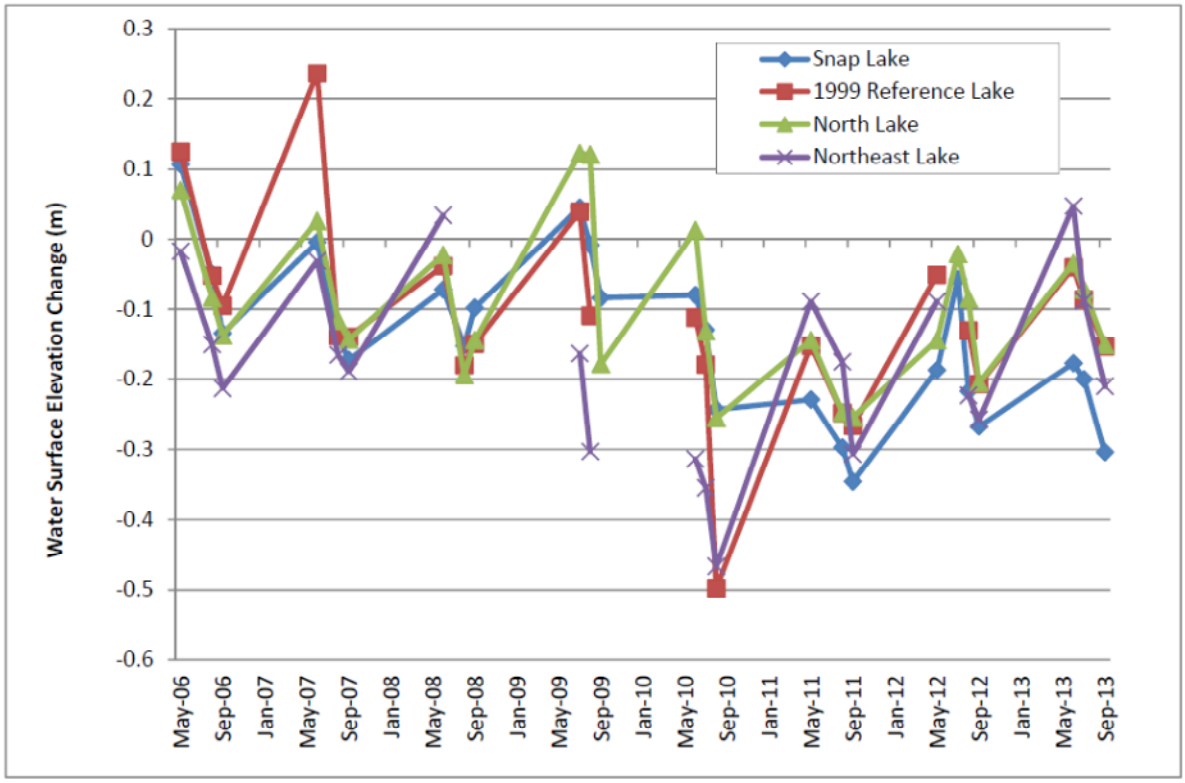


Figure 6. Surveyed Water Elevations for 1999 Reference Lake, North Lake, Northeast Lake, and Snap Lake, Relative to September 2002 Elevation Surveys

SLEMA reviewed the Report in July 2014 and did not have any concerns.

2014 North Pile Life-of-Mine Plan

The Plan was submitted on July 8, 2014. The document is intended for information purposes and does not require regulatory approval.

The objective of the Plan is to describe current and future options and conceptual plans for design, construction, operation, and closure of the North Pile.

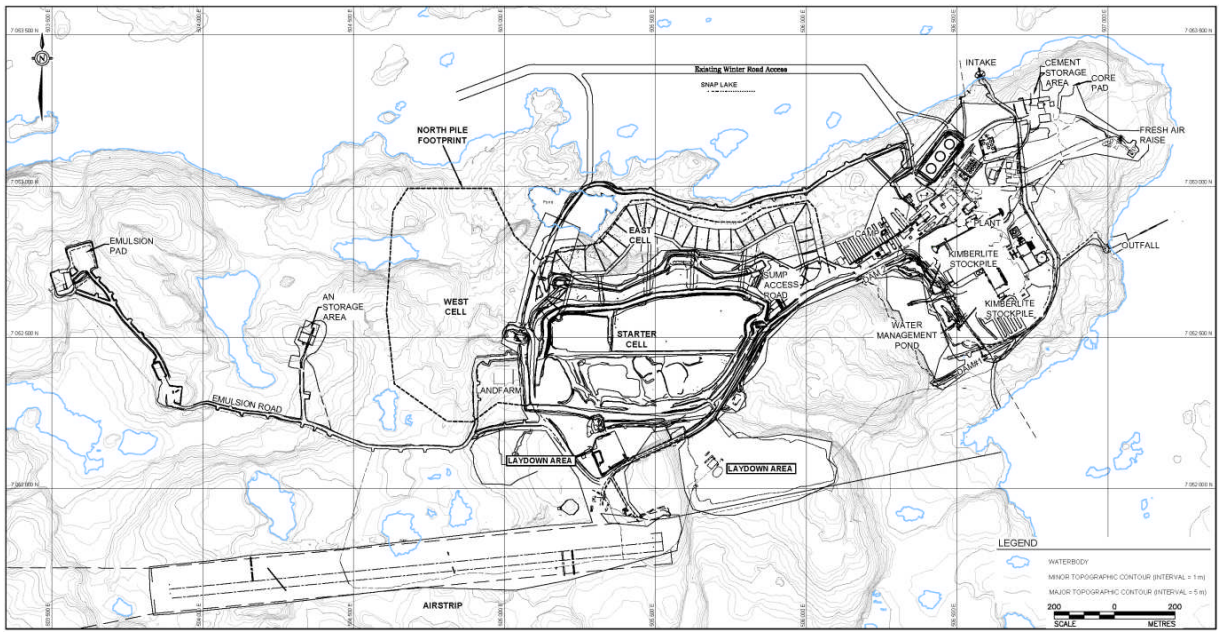


Figure 7. Layout of the Mine

SLEMA welcomed the document because it was helpful for stakeholders to understand the current design and operation of the North Pile, and the alternatives for construction of a new West Cell, expansion of the Starter and East Cells, and scenarios for closure of the North Pile.

Record of Non-compliance against Water Licence

De Beers has a clear record of non-compliance against the current Water Licence – Four exceedance events within a one-year period.

- Three exceedances of the monthly average Chloride concentration (310 mg/L) at SNP 02-17B (Water Treatment Plant Effluent) on
    - o September 13, 19 and 25, and October 7, 2013
    - o April 23 and 29, and May 5, 2014
    - o July 10 and 16, 2014
- One exceedance of whole lake average TDS concentration (350 mg/L) at SNP 02-18 on May 6, 2014.

SLEMA made comments on all four exceedance events in its Monthly Environmental Updates.

Exceedances of Chloride at SNP 02-17B

First Exceedance

De Beers reported on October 30, 2013 that the monthly average for September 2013 was 314 mg/L, exceeding the Maximum Average Monthly Limit (AML, 310 mg/L) for Chloride.

De Beers followed up the event on November 26, 2013.

- A review of the Chloride sample results over the past several months indicates that the exceedance to the monthly average was an anomalous spike and not a permanent increase.
- Additional sampling efforts were made, such as in-house sample testing and inline Chloride meters to be installed in the WTP.
- De Beers will submit a Water Licence Amendment Application on December 16, 2013 focused on amending EQCs for Chloride and Nitrogen and the in lake TDS limit.
- The current management method is source control and dilution, and De Beers has committed to researching other engineering solutions to assist in TDS management.

AANDC Inspector concluded on November 26 that SNP 02-17B continual non-compliance was not occurring.

In response to the exceedance event, SLEMA commented in the November 2013 Environmental Update.

- Chloride exceedance in September 2013 may not be accidental.
- Current Chloride levels in the WTP effluent are still marginally lower than the Water Licence limit, and it is possible that another exceedance(s) will occur.
- Water Licence Limits for Chloride will be more stringent from January 1, 2015 (EQC – Grab Sample = 320 mg/L and EQC – Average = 160 mg/L). Non-compliance will definitely take place in January 2015 if De Beers could not have the current Water Licence limits changed via amendment application or De Beers could not install TDS removal facility in the WTP.

Second Exceedance

SLEMA conducted a data analysis for Chloride after receiving the March 2013 SNP Monthly Report in April 2014, and noted that Chloride levels in the Water Treatment Plant effluent (SNP 02-17B) were approaching the monthly average limit (310 mg/L) in March 2014:

- The monthly rolling average was as high as 306.5 mg/L.
- Chloride concentration on March 30, 2014 is 369 mg/L, and if Chloride concentration on April 4 was above 333 mg/L, exceedance would occur.

Therefore, SLEMA recommended in the April 2014 Environmental Update that De Beers increase the sampling frequency at SNP 02-17B, and take necessary mitigation measures, and the inspector of the Department of Lands inspect the Mine in a more frequent manner and begin taking legal samples at SNP 02-17B.

Unfortunately, De Beers reported on May 12, 2014 that the Maximum Average Monthly Limit (AML, 310 mg/L) for Chloride was exceeded on April 23 and April 29, and likely on May 5 (based on preliminary result).

In its May 28, 2014 response to the Inspector's letter of May 10, 2014 regarding the Chloride exceedances, De Beers provided a summary of actions undertaken since September 2013, and an action plan intended to prevent future non-compliance.

De Beers' responses of May 28 states that "the three non-compliant monthly average values are due to a single high grab sample result on March 30, of 369 mg/L", and "De Beers attributes this to the unforeseen intersection of an area of connate water high in total dissolved solids (including chloride), during regular mining operations".

SLEMA made comments in May 2014 Environmental Update:

- De Beers' statement on the reason of non-compliance was incorrect. Table 1 of the Letter clearly indicates that the average monthly value for May 5 does not result from the "single high grab sample result on March 30, of 369 mg/L", and in fact, it comes from six results which were close to the AML (310 mg/L), (310+316+314+309+307+307)/6=310.5.
- This was not the first time of non-compliance, and this was a reoccurring event. Last non-compliance took place in September/October 2013.
- De Beers' approach to Chloride management was like "to walk a tightrope". There appeared no effective mitigation measures in place at the mine site to prevent from reoccurring. De Beers appears to rely on the luck.

Third Exceedance

De Beers reported a Monthly Average Chloride Exceedance at SNP 02-17B on July 31, 2014, the third exceedance of monthly average Chloride concentration at SNP 02-17B within one year period.

SLEMA made comments in July 2014 Environmental Update and recommended that De Beers must take effective actions to stop the trend.

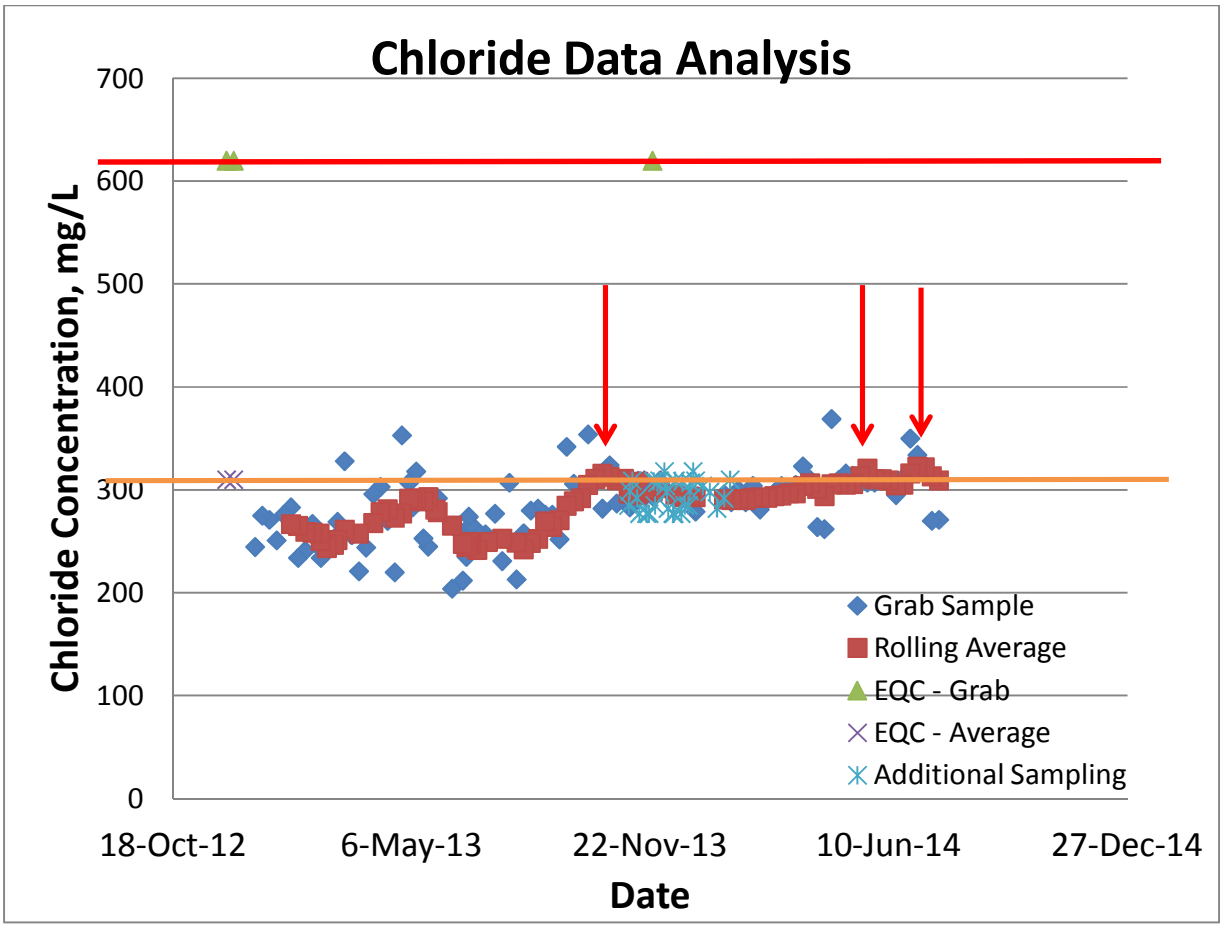


Figure 8. Three Exceedances of Chloride at SNP 02-17B

Exceedance of Whole Lake Average TDS at SNP 02-18

SLEMA conducted a data analysis of TDS after receiving the March 2013 SNP Monthly Report in April 2014 and concluded that

- TDS levels at the edge of the mixing zone of Snap Lake were approaching the Water Licence limit (350 mg/L) on March 18, 2014. The average of four stations was 346.5 mg/L, and the TDS concentration at SNP 02-20e was 350 mg/L.
- Based on the experience in the past, TDS levels will be higher in late winter. As a result, the exceedance at SNP 02-20 is very likely in April and May 2014. The exceedance of whole lake average (SNP 02-18) is also possible in April and May 2014.

Therefore, SLEMA recommended in the April 2014 Environmental Update that the inspector of the Department of Lands inspect the Mine in a more frequent manner and begin to take legal samples at SNP 02-20.

De Beers reported on June 24, 2014 that the whole lake average concentration of total dissolved solids (TDS) was 361 mg/L, a breach of the water licence limit (350 mg/L), on May 6, 2014.

- *"De Beers notes that based on historical SNP results, the TDS concentration in Snap Lake is highest prior to ice-out, and is lower during ice-free conditions. De Beers will complete sampling at stations comprising SNP 02-18 once the lake is ice-free to confirm these predictions. This is supplemental to the next regularly scheduled SNP 02-18 sampling usually conducted in July."*

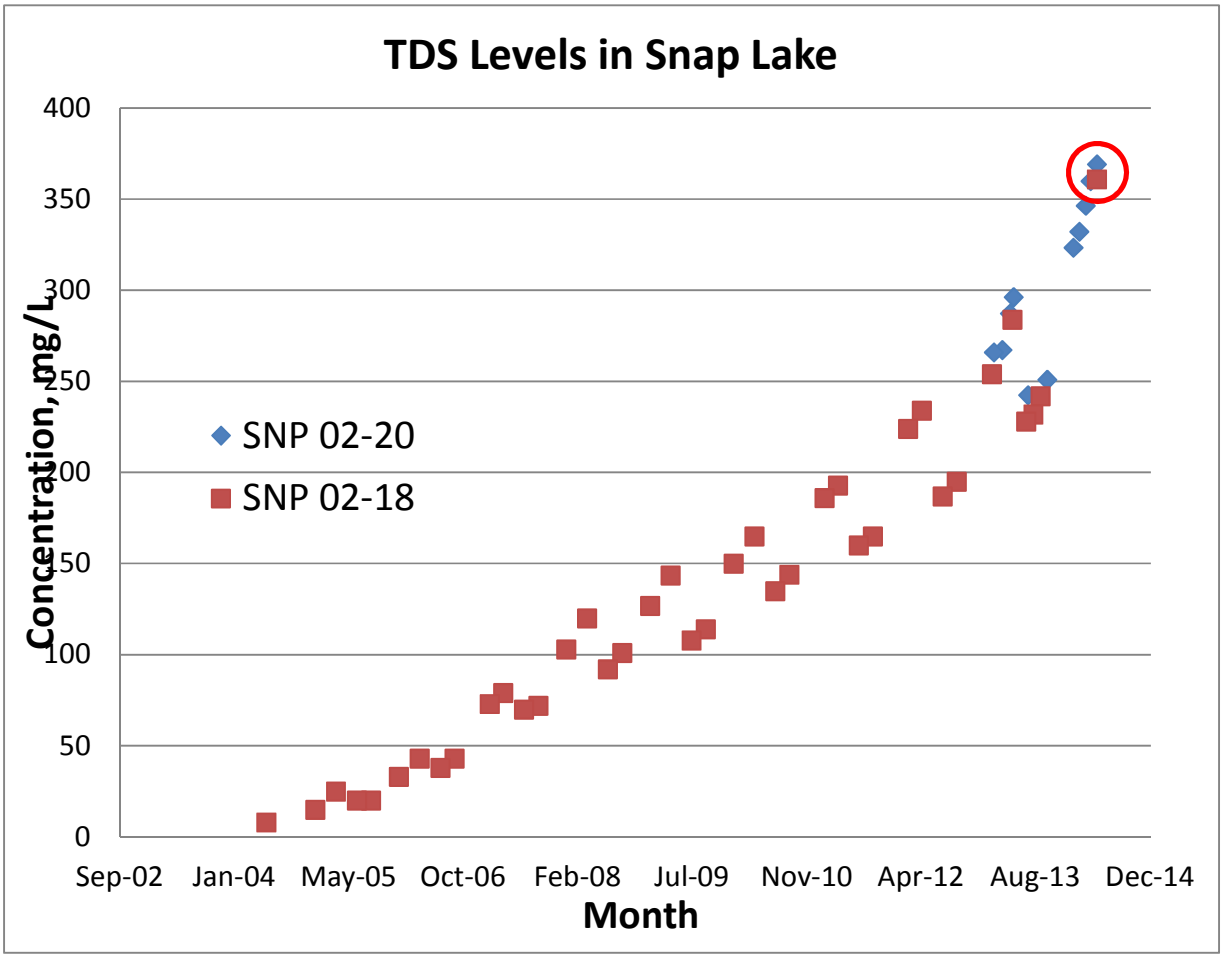


Figure 9. Exceedances of TDS at SNP 02-18 and SNP 02-20

Water Licence Amendment Application

On December 16, 2013, as a response to the increasing TDS concentrations in Snap Lake and impending exceedances of water licence conditions and other regulatory matters, De Beers submitted an Amendment Application to the MVLWB requesting seventeen changes to the terms or conditions of water licence MV2011L2-0004. De Beers' proposes to replace the Water Licence limit for whole lake average concentration of 350 mg/L TDS with a different value based on site specific toxicity testing.

De Beers developed a Site Specific Water Quality Objective (SSWQO, 684 mg/L) for TDS, and proposed a change of approach for managing TDS, namely to remove the in-lake compliance limit (350 mg/L) from the Water Licence, and replace it with the end-of-pipe limits (Effluent Quality Criteria):

- The average TDS concentrations from samples collected over a 30-day period in treated effluent should remain below 684 mg/L (the Average Monthly Limit, AML) and
- The maximum concentration in any grab sample should remain below 1,003 mg/L (the Maximum Daily Limit, MDL).

Preliminary Review on De Beers Proposed TDS Limits

SLEMA conducted a preliminary review on De Beers proposed TDS limits on January 16, 2014. Effluent TDS data in the past few years (2009 to 2013) indicate that there are no TDS values above the proposed MDL, but there are a few TDS values above the proposed AML (as shown in Figure 10).

The existing Water Treatment Plant (WTP) was designed to remove particulates through flocculation, sedimentation, and filtration, and does not remove TDS. A cost-benefit analysis of best available technologies to reduce TDS loadings to minewater is provided in the TDS Response Plan submitted by De Beers.

De Beers planned to reduce inflows of water with high TDS concentrations (connate groundwater) with a portable modular water treatment system. However, it is confirmed in the information session for the Amendment Application, dated January 6, 2014, that no TDS removal facility will be installed in 2014. As a result, TDS levels in the treated effluent will remain high.

Therefore, it is very possible that there will be exceedances of the proposed AML until the TDS removal facility is in place and is functioning properly. SLEMA recommended that De Beers resubmit an appropriate AML with a feasible timeline.

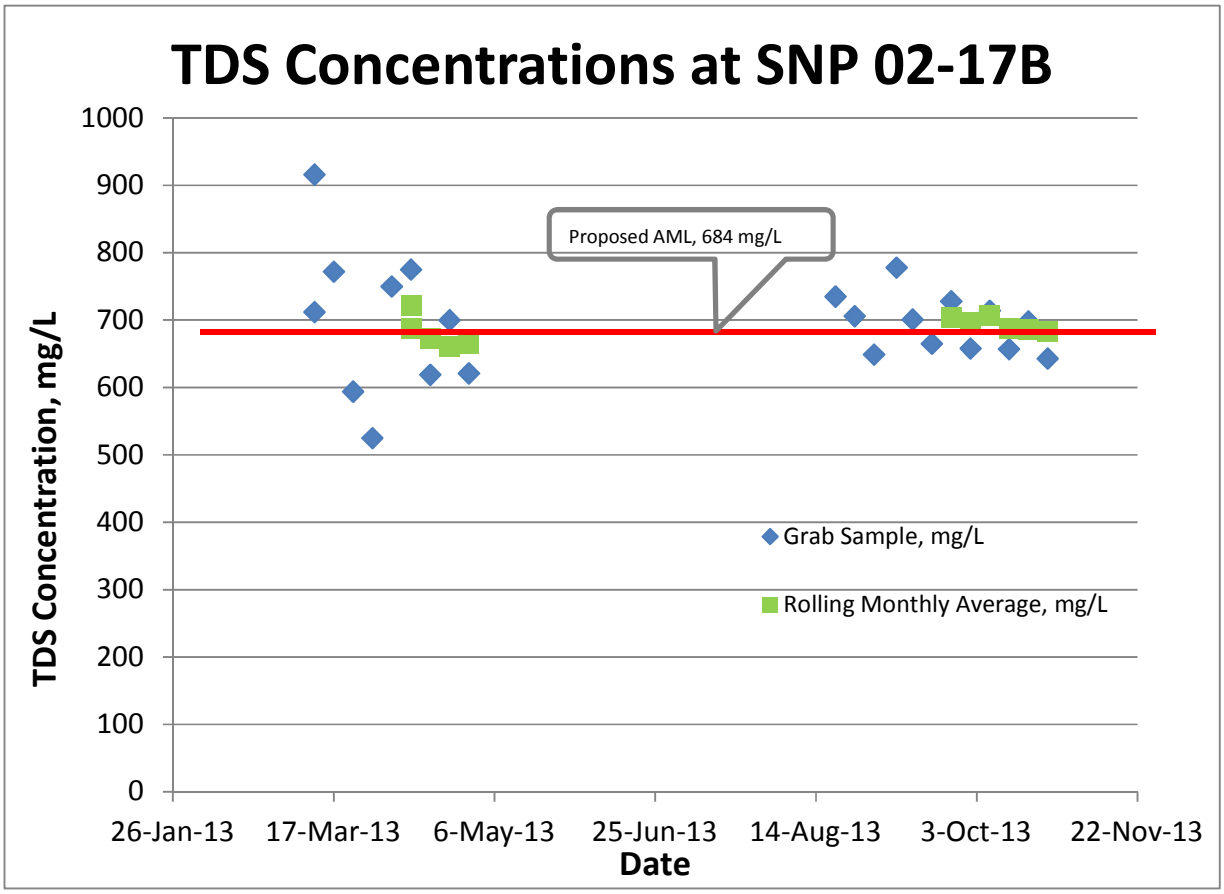


Figure 10. Effluent TDS Data Analysis

During the information request period in April 2014, De Beers proposed an interim protective TDS AML of 850 mg/L which would apply between January 2015 and January 2016.

Joint Review

The MVLWB referred the Amendment Application for TDS limits to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) for an Environmental Assessment (EA), on January 22, 2014, and stated that

- *"Based on this authority and on the number of changes proposed to the licence by the De Beers application, the Board decided that this amendment proposal is a development. In addition, the list of licence changes proposed in the amendment will, in the Board's opinion, result in modifications to the development. Thus the Board held that the development proposed in the Amendment Application is not exempt from screening.*
- *Considering the unusual nature of the issues involved in this matter, the concerns expressed by the YKDFN and especially the submissions made about*

jurisdiction and process by AANDC, the Board decided to expedite this process and exercised its authority under paragraph 126(2)(a) of the MVRMA to make a referral decision, without taking the time to conduct a preliminary screening.

- *The Board's decision is based on jurisdictional questions related to the proposed change of the TDS limit set out in Recommendations 5 and 10 of the 2003 Snap Lake Report of EA and concerns about this proposed change.*
- *The Board would be supportive of a coordinated process inclusive of scoping to allow for the efficient and effective review of the TDS measure and the Application."*

The MVLWB announced, together with the MVEIRB, the release of their coordinated draft Workplan for De Beers Amendment Application for Water Licence MV2011L2-0004 and related Environmental Assessment EA201314-02 for the Snap Lake Diamond Mine, respectively, on February 24.

- *"As set out in the Workplan, the MVLWB and Review Board will run concurrent processes until the completion of the Technical Session phase. All evidence up until this point will be used by both boards for their individual processes and will ultimately be posted on both public registries. At the completion of the Technical Session phase, the Review Board will run an independent public hearing phase prior to releasing its Report of Environmental Assessment. Once the Report of Environmental Assessment is approved by the responsible Minister, the MVLWB will begin its Public Hearing phase."*

In response to the Workplan, SLEMA requested via e-mail on February 26, 2014 that the MVEIRB clarify who the Minister is (AANDC Minister or ENR Minister), and whether the Minister is the same for the EA Decision Phase and Regulatory Phase.

The MVEIRB responded on February 27, 2014 that both the federal and territorial governments were aware that one or both Minister's will have to sign off and that they need to figure out who will very soon. Later the Minister for the EA Decision Phase was determined to be the Minister of Lands, and the Minister for the Regulatory Phase was determined to be the Minister of Environmental and Natural Resources (ENR). Both Ministers are from the Government of Northwest Territories due to the devolution on April 1, 2014.

Table 1. Combined Workplan for the Environmental Assessment (EA1314-002) and Water Licence Amendment (MV2011L2-0004)

Process Step	Activities	Due/Completion Date
Start-up Phase	Referral of the water licence amendment application by the MVLWB to environmental assessment	January 22, 2014
EA Scoping and Joint Application Review	Application and draft EA Scoping Document issued for comment, and EA Scoping Reasons for Decision	March 28, 2014
Joint Analytical Phase	Technical session, information requests and responses	April 30, 2014
EA Hearing Phase	Submission of Technical Reports (Parties Interventions), Developer' response to Technical Reports, Public Hearing, Hearing undertakings, closing arguments from Parties and Developer	June 23, 2014 (Public Hearing on June 5 and 6)
EA Decision Phase	Decision and Report of EA	July 18, 2014
Minister's Response		120 days
Regulatory Phase	Intervention and Proponent response, LWB Public Hearing, Hearing undertakings, Draft Water Licence issued and commented, closing arguments from Reviewers and Proponent, Board decision and reasons Issued	Day 116 after Minister's Response (Public Hearing on the Days 45 and 46)
Minister's Decision		45-90 days

After reviewing the Workplan, SLEMA also questioned the timeline of the process on February 26, 2014.

- *"The MVEIRB will issue Decision and Report of EA on July 18, 2014 and it will take 116 days for the regulatory process. That may leave no more than one month and half for the Minister's Response of EA Decision Phase and the Minister's Decision of the Regulatory Phase. If the Water Licence cannot be amended by the end of the year, non-compliant discharge (chloride exceedance) will definitely take place in January 2015 in case of no TDS removal facility installed and operated in 2014."*

The MVLWB responded on February 27, 2014 that

- *"The timeline does allow for the completion of the Regulatory Phase before the end of the year, however, this will be dependent on the issues that arise, the Minister's decision, and on the time it takes the Minister to approve both the EA and Regulatory phases."*

TDS Response Plan

A TDS Response Plan is part of the Water Licence Amendment Application package. The TDS Response Plan describes the tasks that De Beers has completed and is in the process of completing in response to increasing TDS, chloride, and fluoride concentrations in Snap Lake:

- determine sources of TDS, chloride, and fluoride loadings to Snap Lake;
- provide current and ongoing management practices to reduce TDS, chloride, and fluoride loadings to Snap Lake;
- recommend TDS, chloride, and fluoride site-specific water quality objectives (SSWQO) in Snap Lake that are protective of aquatic life and consider factors that reduce exposure to and toxicity of the salts;
- propose concentrations of TDS, chloride, and fluoride that are not to be exceeded in the discharge to Snap Lake (i.e., effluent quality criteria applied at the last point of discharge);
- update modeling predictions; and,
- provide a water management strategy for the life of the Mine.

SLEMA reviewed the Plan in February 2014 and provided comments during the Information Request period of the Joint Analytical Phase.

Regulatory Mine Site Visit

On Tuesday March 11, 2014 staff from the MVEIRB, MVLWB, SLEMA, Environment Canada, DFO, GNWT and Golder Associates went on a site visit of the Snap Lake Diamond Mine.

The site visit was led by Erica Bonhomme and Alexandra Hood on behalf of De Beers and consisted of a surface and underground tour. The surface tour included the water treatment plant, fuel storage areas, waste management areas, and waste rock areas. The underground tour consisted of visiting water management facilities and several stopes.

Photo 7. Participants of the Regulatory Mine Site Visit

Photo 8. Raw Minewater vs. Treated Effluent

Information Request on TDS Removal

During the Technical Sessions from April 15 to 16, 2014, De Beers presented options for reducing TDS in effluent, and indicated that the treatment of all mine effluent was not cost-effective.

SLEMA investigated the impacts of TDS level in mine water and TDS removal efficiency of mitigations such as reverse osmosis on the ratio of mine water which must be treated to meet the proposed Effluent Quality Criterion (EQC) for TDS.

$$R>100(C-EQC)/(\eta C)$$

Where, R – Ratio of mine water to be treated, %;

C – TDS concentration in mine water, mg/L;

EQC - Effluent Quality Criterion for TDS, mg/L;

η – TDS removal efficiency, %.

If EQC for TDS is 684 mg/L, the percentage of mine water to be treated is calculated and illustrated as Figure 11.

It is clear that, if EQC is set, the more TDS removal efficiency could be achieved, the less mine water has to be treated; the more TDS is in mine water, the more mine water has to be treated. SLEMA, on April 22, 2014, requested that De Beers review the equation and results provided below and confirm whether they are justifiable.

During the information request period in April 2014, De Beers responded that "(T)he equation provided by SLEMA is a valid approximation of the volume of water that will require treatment. It is important to keep in mind that the type of technologies under consideration and being pilot tested are well understood and are capable of TDS removal efficiencies greater than 90%".

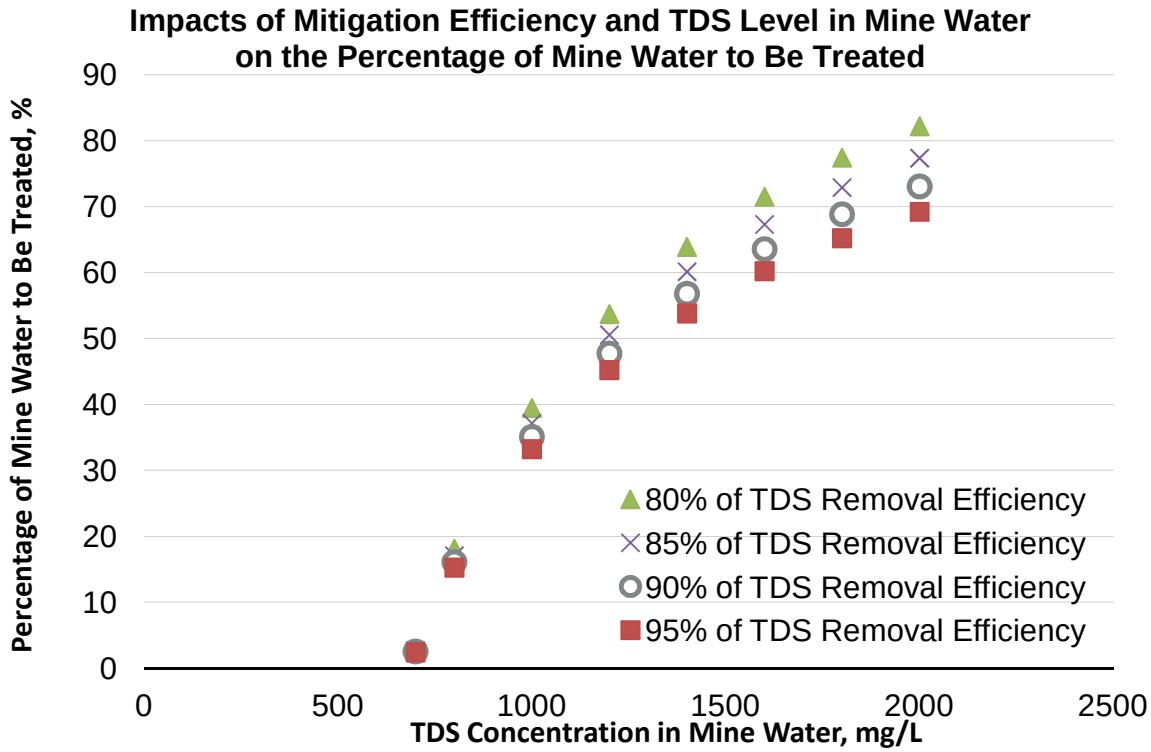


Figure 11. Ratios of Mine Water to Be Treated If EQC for TDS is 684 mg/L

In two letters dated May 21, 2014, the YKDFN and the LKDFN stated that the TDS limit should not be higher than the Canadian Drinking Water Quality Guidelines of 500 mg/L for the protection of the way of life of the aboriginal people of the north. In its Technical Report, ENR also stated that "(A)s a step towards minimizing the perception of risk to traditional land users, the GNWT suggests that **drinking water quality be maintained within Snap Lake** and downstream including Old Lady of the Falls", which is consistent with the proposals from the YKDFN and LKDFN.

SLEMA revisited the issue of the ratio of mine water to be treated in May 2014. The results are illustrated in Figure 12 and Figure 13.

It is clear that if EQC is more stringent (lower value), the more mine water has to be treated.

If the TDS levels in mine water remain high, and if Snap Lake water is required to be drinkable, at least more than 30% of mine water has to be treated.

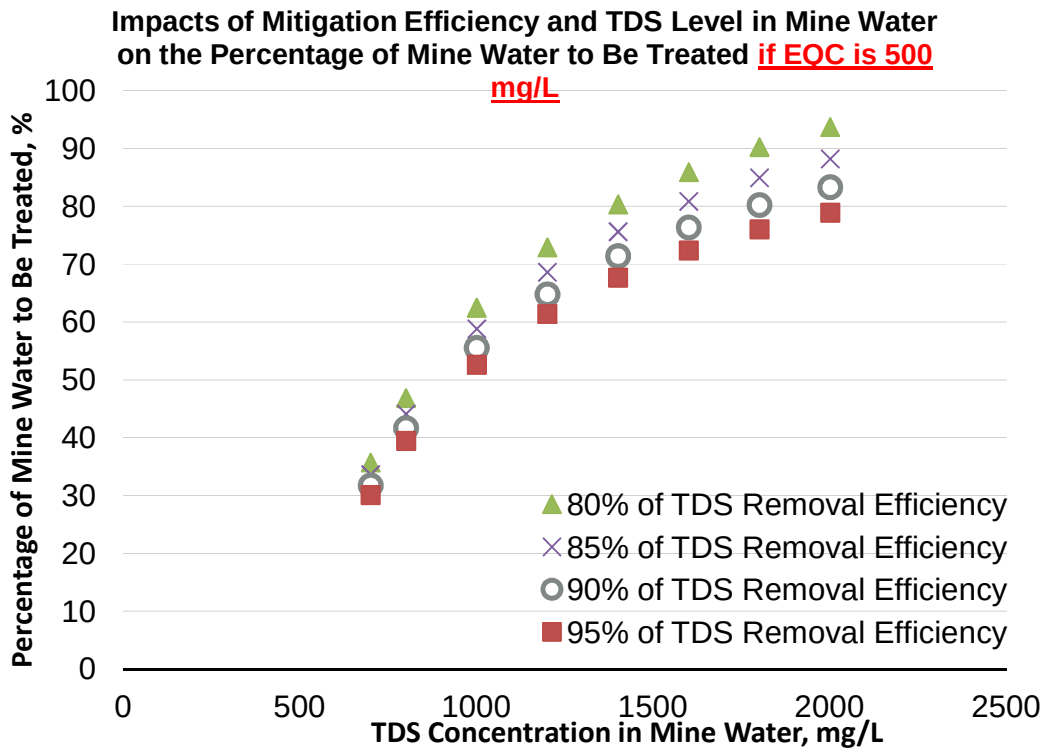


Figure 12. Ratios of Mine Water to Be Treated If EQC for TDS is 500 mg/L

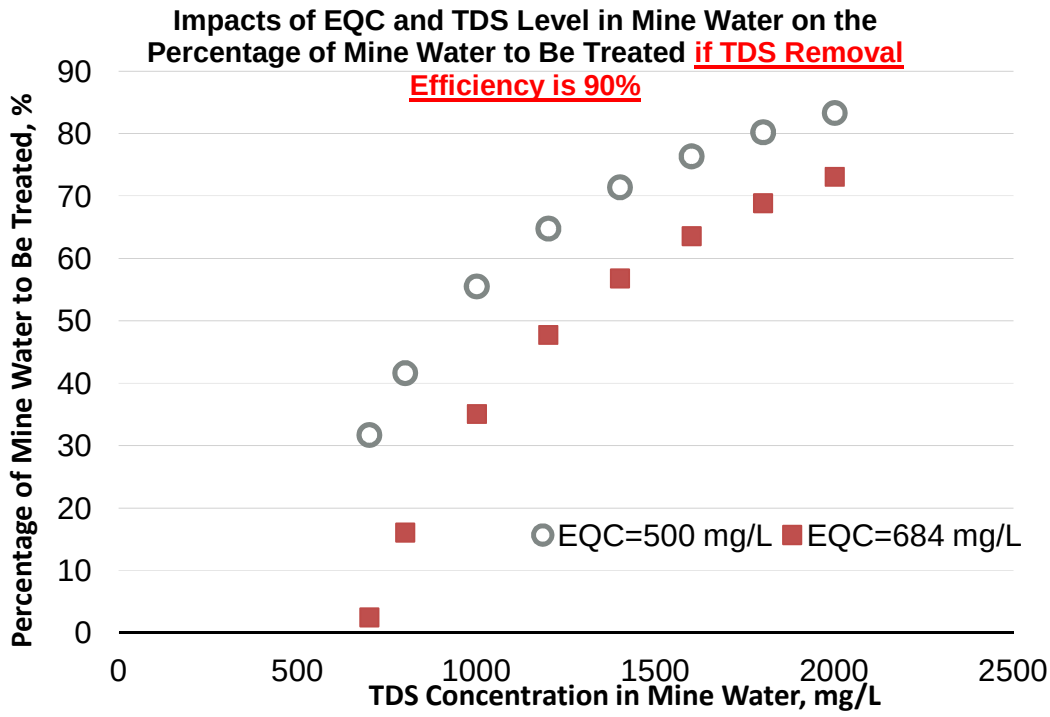


Figure 13. Ratios of Mine Water to Be Treated If TDS Removal Efficiency is 90%

Environmental Assessment Public Hearing

The Public Hearing for the Environmental Assessment was held on June 5 and 6, 2014.

Public Hearing on June 5

- Opening remarks by Review Board Chair.
- Opening statements by De Beers, the Parties (NSMA, YKDFN, LKDFN, EC, GNWT, and DKFN), and Ecometrix.
- De Beers presentation followed by questions from the Parties, Board staff, counsel and Board members.
- Ecometrix presentation followed by questions from the Parties, De Beers, Board staff, counsel and Board members.
- Public comments in the evening (SLEMA only).

Public Hearing on June 6

- GNWT presentation followed by questions from the Parties, De Beers, Board staff, counsel and Board members.
- EC presentation followed by questions.
- YKDFN presentation followed by questions.
- LKDFN presentation followed by questions.
- NSMA presentation followed by questions.
- DKFN presentation followed by questions.
- Closing.

SLEMA Vice Chair, Rachael Crapeau, and SLEMA staff, Philippe di Pizzo and Zhong Liu, attended the Public Hearing. During the period for public comments, Zhong Liu, on behalf of SLEMA, intervened and provided follow-up information via e-mail. He concluded:

- SLEMA recommended De Beers plan the site environmental management from a longer term perspective, and improve its proactive responding mechanism.

Water Licence Compliance Date

Part F, Item 9 of the Water Licence MV2011L2-0004 sets the Effluent Quality Criteria (EQCs) for SNP 02-17B. In light of past water quality data, De Beers may not be able to comply with the EQCs for Nitrate, Chloride, and Fluoride after January 1, 2015, if

proposed new EQCs in the Water Licence Amendment Application are not approved by December 31, 2014.

Table 2. EQC of Nitrate, Chloride, and Fluoride for SNP 02-17B at MV2011L2-0004

Parameter	EQC in mg/L	
	Maximum Average	**Maximum Grab**
Nitrate as N (up to December 31, 2014)	22	44
Nitrate as N (from January 1, 2015)	4	8
Chloride (up to December 31, 2014)	310	620
Chloride (from January 1, 2015)	160	320
Fluoride (from January 1, 2015)	0.15	0.3

MVLWB staff stated, in a July 21, 2014 meeting with De Beers, that the MVLWB Board had the ability to change dates within a Water Licence. SLEMA requested clarification of the issue from the MVLWB.

In a August 12, 2014 reply, the MVLWB referred to Part B, Item 11 of the Water Licence.

- *"The Schedules, the Surveillance Network Program, and any compliance dates specified in this Licence may be modified at the discretion of the Board."*

SLEMA further asked what procedure the MVLWB would follow for modifying the compliance dates, to which the MVLWB responded:

- *"As Rosanna indicated Part B Item 11 of the licence authorizes the Board to change compliance dates within the licence. The process to do so would depend on the situation. In some cases a simple extension of a report deadline might be done by Board motion. In other cases a public review of the proposed compliance date change may be warranted, prior to a Board decision.*
- *So in response the process – it depends on the nature of the date change."*

SLEMA commented in August 2014 Environmental Update.

- There have been three exceedances of Chloride since October 2013.
- Based on the nature of the compliance issues about Nitrate, Chloride, and Fluoride after January 1, 2015, a public review of the potential compliance date change may be warranted.

Report of Environmental Assessment

The MVEIRB sent out the Reasons for Decision and Report of Environmental Assessment (REA) to the Minister of Lands on September 5, 2014.

- *"Based on the evidence and information on the public record, the Review Board finds that the Snap Lake Diamond Mine Amendment Project proposed by De Beers Canada Inc. (De Beers) is likely to cause significant adverse impacts to the environment, including impacts to the aquatic ecosystem, drinking water, and traditional uses.*
- *The Review Board has set out measures that will mitigate the predicted impacts so that they are no longer significant. A summary of the measures include the following:*

    1. The Mackenzie Valley Land and Water Board will set water licence conditions that protect the aquatic ecosystem and, traditional uses and drinking water, and will ensure that no TDS originating from the mine is detectable by the time water from Snap Lake enters Mackay Lake, 44 km downstream.

    2. De Beers will implement additional water treatment or other mitigations to reduce TDS inputs into Snap Lake, to achieve the levels resulting from the requirements of Measure 1 above.

- *The Review Board therefore recommends, under subparagraph 128 (1)(b)(ii) of the Mackenzie Valley Resource Management Act, that this Project be approved, subject to the implementation of the measures and commitments set out in this Report."*

The Department of Lands invited stakeholders to advise whether potential adverse impacts of the development have been fully addressed in the REA on September 5, 2014.

Lutsel K'e Dene First Nation (LKDFN) and Deninu Kue First Nation (DKFN) responded to the Department of Lands on September 22, 2014. De Beers responded to the Department of Lands on September 25, 2014.

The Department of Lands, on October 6, 2014, confirmed it has not received any correspondence from YKDFN, Tlicho Government, NWTMN, and NSMA in relation to the invitation dated September 6, and it has received correspondence from LKDFN and DKFN.

The Minister of Lands adopted the MVEIRB Decision on the Report of Environmental Assessment and Reasons for Decision for the De Beers Canada Inc. Snap Lake Water Licence Amendment Project (MVEIRB file number EA1314-02), on October 31, 2014.

- *"The Responsible Ministers have given full and fair consideration to the views expressed by the Aboriginal governments and organizations during the environmental assessment and in recent correspondence. We have concluded that all points raised relating to potential adverse impacts from the proposed Project on asserted or established Aboriginal and/or treaty rights have been fully consulted on and will be accommodated, as appropriate, through the implementation of the recommended measures and the developer's commitments, as well as through processes established following the original Snap Lake environmental assessment in 2003. The implementation of the measures and commitments will be discussed in detail during the Mackenzie Valley Land and Water Board's (MVLWB) water licensing process, the developer's implementation of the Project, and continuing management and monitoring processes during Project operations. Concurrent with this decision letter, GNWT is sending responses to the letters received from Aboriginal governments and organizations.*
- *The Minister of Environment and Natural Resources and I have agreed, under sub-paragraph 130(1)(b)(i) of the MVRMA, to adopt MVEIRB's recommendation that the development be approved subject to the implementation of the measures and developer's commitments contained in the Report. I confirm that in making this decision, the Responsible Ministers have considered the importance of the conservation of the lands, waters and wildlife of the Mackenzie Valley on which the Snap Lake water licence amendment might have an impact, as required under section 131.2 of the MVRMA."*

On October 31, 2014, the MVLWB required that De Beers submit an Updated Project Description (UPD) and the additional information (Post-EA information Package).

- *"Once the Post-EA Information Package is received by the Board and is deemed sufficient, the Board will prepare and circulate a work plan."*
- *"Please note that the nine-month timeline for the Board to process the Application (subsection 77.18(1) of the Mackenzie Valley Resource Management Act (MVRMA) and subsection 47(1) of the Waters Act) will not commence until the Post-EA Information Package is received by the Board and deemed to satisfy the information request (subsection 72.22(1) of the MVRMA and section 50 of the Waters Act)."*

Land Use Permit

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

Amendment for Fuel Storage

De Beers requested an amendment to the volume of the fuel storage on site authorized under Land Use Permit MV2010D0053 on April 2, 2014.

Due to increased fuel demands from ongoing underground mine expansion, as well as the increase in water management infrastructure Construction commence in summer 2014, the Mine fuel (diesel) consumption is projected to increase from 42,795,512 L in 2014 to 52,567,314 L in 2027 under the current mine plan.. However, the Mine only has a total gross fuel storage capacity of 42,998,800 L, consisting of three 12 ML main tanks, plus 18 smaller tanks of 330,000 to 500,000 L capacity. As s result, additional diesel fuel storage capacity is required.

One 10 M L (10,000,000L) fuel tank was proposed to be built to the East of the existing 12 ML fuel tank farm, while a second tank may be required at a later date. The environmental impacts and effects as a result of the project were predicted to be minimal, and De Beers promised to follow its environmental protection measures and mitigation plans in order to address any potential concerns.

SLEMA reviewed the Application for New Land Use Permit – Addition of Two Fuel Storage Tanks and concluded on May 21, 2014 that it did not have concerns.

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.

Photo 9. Proposed Location for the New Fuel Tank

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.

Regulatory Inspection

SLEMA is of the opinion that regulatory inspections are critical to ensure compliance of a project with acts, regulations, licences and permits, and believes that inspections of a project like the Snap Lake Mine should take place monthly.

In July 2012, SLEMA wrote to AANC to express concerns regarding the diminishing frequency of inspections of the Snap Lake Mine and the increased burden on the mine inspector. AANDC responded in August 2012 that staffing efforts were underway for

some time to fill the void that was created. Later on, inspection of the Mine gradually resumed to an acceptable level.

Again at the beginning of 2014, SLEMA noted the diminishing frequency of inspections of the Snap Lake Mine. Water Licence Inspections were conducted in December 2013 and January and February 2014, but no Inspection reports were submitted. There were no regulatory inspections conducted in March and April 2014. The dedicated inspector (Patrick Kramers) left his position in April 2014, and the position was left unoccupied for some time, a big concern of SLEMA.

Due to the devolution of federal responsibility to the Government of the Northwest Territories on April 1, 2014, the responsibility for regulatory inspection has been transferred from AANDC to the Department of Lands, GNWT. SLEMA followed up on the issue of inspection and wrote to the Department of Lands on May 2, 2014, noting:

- the lack of communication with SLEMA and other parties,
- not a dedicated inspector allocated for the Snap Lake Mine as it was the case in the past when inspection was the responsibility of the Government of Canada, and
- not any official inspection reports received between November 2013 and April 2014.

The Department responded on May 5, 2014 that

- another inspector (Marty Sanderson) had taken over responsibility for inspections of the Snap Lake Mine since the previous inspector left,
- a competition to staff a vacant Resource Management Officer Position was initiated early in 2014, and
- the Department would make up for the reduced number of inspections in the coming months.

From May to September 2014, three Water Licence inspections and three Land Use Permit inspections were conducted, and inspection reports were delivered to SLEMA. The inspector, Jamie Steele, was assigned as the dedicated inspector for Snap Lake Mine in September 2014.

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 2013-2014.

De Beers took efforts in long term planning and community engagement.

- Hired a dedicated Environmental Manager and a regulatory coordinator,
- Organized community mine site tours,

- Ensured continuous and effective communication with SLEMA and stakeholders,
- Applied for an amendment for the Water Licence limits,
- Conducted extra AEMP studies and toxicity testing,
- Implemented pilot studies for TDS mitigation measures,
- Developed life of mine plan,
- Prepared for the expansions of the North Pile in response to the decrease paste backfill to the underground

However, SLEMA is disappointed in De Beers' water management performance. De Beers has a clear record of non-compliance against the current Water Licence – four exceedance events within a twelve-month period. They are three exceedances of monthly average Chloride concentration (310 mg/L) at SNP 02-17B in September and October 2013, in April 2014 and May 2014, and in July 2014, as well as one exceedance of whole lake average TDS concentration (350 mg/L) at SNP 02-18 in May 2014.

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.

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 Environmental Impact Review Board (MVEIRB): The MVEIRB ran well managed and timely processes for the Environmental Assessment EA1314-02: Snap Lake Diamond Mine Amendment Project. The MVEIRB submitted detailed and well written Reasons for Decision and Report of Environmental Assessment to the Minister of Lands on September 5, 2014. However, SLEMA is of the opinion that **the MVEIRB must take steps to hold meetings and hearings in affected communities outside of Yellowknife, and urge the review board to include a proposal to that effect in future reviews.**

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 2013 to October 2014. The MVLWB also established the Snap Lake Working Group and held meetings on a quarterly basis in order to facilitate the review and approval process, which appears to meet its objectives.

The MVLWB worked closely with the MVEIRB, De Beers and stakeholders on the Water Licence Amendment Application De Beers submitted on December 20, 2013. The Regulatory Phase of the Amendment Application will begin after the Minister of Lands makes his decision on MVEIRB's Reasons for Decision and Report of Environmental Assessment. As noted above in our comments on the MVEIRB, **SLEMA urges the MVLWB to hold meetings and hearings in the affected communities outside of Yellowknife, and to explore ways to encourage meaningful public participation in these communities at all phases of the regulatory process.**

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 Environmental Assessment EA1314-02: Snap Lake Diamond Mine Amendment Project.

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

Aboriginal Affairs and Northern Development Canada (AANDC):

The AANDC inspector, Patrick Kramers conducted three inspections between November 2013 and March 2014. Although no Inspection reports were submitted for the December 2013, January 2014 and February 2014 inspections, Mr. Kramers took time to brief and update SLEMA staff twice, on February 6 and March 5, respectively. Mr. Kramers also initiated one legal sampling program at the Snap Lake Mine from October 25 to November 24, 2013, in response to an exceedance of the average monthly limit for Chloride at SNP 02-17B. The AANDC inspector showed diligence and initiative during inspection and investigation and informed SLEMA of his findings on a timely fashion.

Since April 1, 2013, the Department of Lands of GNWT has taken over the responsibility of mine inspection from AANDC.

AANDC Water Resources Division (AANDC-WRD) contributed to the review of related requests, study reports, annual reports and plans within its jurisdiction till March 31, 2014. Since April 1, 2014, ENR has taken over the responsibility of related review by AANDC-WRD.

Department of Lands:

The Inspector, Marty Sanderson conducted Water Licence Inspections in May, July and August 2014, respectively, and one Land Use Permit Inspection in July 2014. Mr. Sanderson initiated two legal sampling programs at the Snap Lake Mine from May 11 to June 10 and August 3 to September 2, 2014, in response to two exceedances of the average monthly limit for Chloride at SNP 02-17B. Mr. Sanderson also initiated one legal sampling program at the Snap Lake Mine on June 25, 2014, in response to an exceedance of the whole lake average limit for TDS at SNP 02-18.

The Inspector, Jamie Steele conducted two Land Use Permit Inspections on September 2 and 10, 2014, respectively.

SLEMA met with Mr. Sanderson and Steele and is satisfied that the Department of Lands is taking steps to ensure monthly inspections of the mine site, and timely reporting to stakeholders. SLEMA is happy that the Department has appointed a dedicated Inspector for the Snap Lake Mine, and concludes 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 and air quality issues for several years. Since the Devolution in April 2014, ENR has actively participated in the review of the Water Licence and Land Use Permit related issues as its jurisdiction expanded. ENR also played an important role in the Environmental Assessment EA1314-02: Snap Lake Diamond Mine Amendment Project, on behalf of GNWT.

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

Table 3. Contributions to Documents Review, November 2013 to October 2014

Document Reviewed	Valuable Comments from	
	Regulators	Aboriginal Parties
30-Day ELS Test – Invalidations	EC, ENR, AANDC	
Amending TDS Limit	ENR, AANDC	YKDFN
Spill Contingency Plan	AANDC, EC	NSMA
Water Management Plan	EC, ENR, AANDC	NSMA
2012 Environmental Agreement Annual Report	DFO, ENR	YKDFN
Waste Management Plan	EC. ENR	
Scope for the Environmental Assessment (EA1314-002)	GNWT, AANDC, EC	YKDFN
Wildlife Effects Monitoring Program (WEMP) and Wildlife and Wildlife Habitat Protection Plan		DKFN
Proposed Amendments to the Environmental Agreement		YKDFN
2013 Water Licence Annual Report	ENR	
Added Diesel Fuel Storage Capacity	ENR	
2013 Annual Closure and Reclamation Plan Progress Report	ENR	
De Beers Request to Amend ELS Chronic Toxicity Test	ENR	
2013 Aquatic Effects Monitoring Program Annual Report	DFO, EC, ENR	
Air Quality Monitoring during Forest Fire Season	ENR	
Table of Contents for the Thallium and Cesium in Fish Tissue Response Plan (AEMP)	ENR, EC	YKFN, DKFN
North Pile Management Plan	ENR, EC	
ARD and Geochemical Plan Resubmission	ENR, EC	
Waste Management Plan revised for increased fuel storage (MV2014D0010)	EC	
West Cell Phase I Design Report and updated North Pile Management Plan (MV2011L2-0004)	EC, ENR, MVLWB	

Summary of SLEMA Comments from 2013 to 2014

The comments and recommendations for those documents reviewed by SLEMA from November 2013 to October 2014 are summarized as follow.

Table 4. Summary Table of SLEMA Comments from 2013 to 2014

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
10/23/ 2014	MVLWB		Water Management Plan	Two SLEMA comment made on January 23, 2014 were reiterated: addition of SNP 02-18 into Table 2-4 and addition of description for the inter-lock system within the Water Treatment Plant.		
09/18/ 2014	MVLWB		West Cell Phase I Design	The staged PK deposition in Cell 1 and Cell 2 of the West Cell appears to be applicable for the coarse and grits fractions of Processed Kimberlite (PK), but not for PK slurry. Past experience in the Starter Cell and East indicates that slurry deposition requires special design. No specific information is provided about where drill cuttings and drill water be directed and how they will be disposed of.	Clarification is requested.	The MVLWB approved De Beers' request to begin construction of the West Cell on October 9, 2014.

Table 4. Summary Table of SLEMA Comments from 2013 to 2014 (continued)

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
07/22/ 2014	MVLWB		North Pile Management Plan	Raise North Pile Facility by Up to 501m is not approved by the MVLWB. The MVLWB only approved the Phase IV Raise of the Starter Cell up to 489.5m (plus 4m of non acid generating cover material) on September 25, 2013. Specific comments are provided for data consistency.	Clarification is requested. Further raise of the North Pile must be reviewed by stakeholders. Without proper consultation and public review, it is not appropriate to approve the maximum height of 501m De Beers proposed in this Plan.	The MVLWB approved the North Pile Management Plan conditionally on the minor changes on October 9, 2014.
07/22/ 2014	MVLWB		ARD Plan	The simplified geochemical classification criteria for granite will simplify the mine rock management, however, granite diluted with minor amounts of kimberlite, PK, or metavolcanic rock used for general site construction may have potential acid leachate issues.	Instead of for general site construction, diluted granite is preferred for the North Pile construction.	The MVLWB approved the Plan conditionally on August 28, 2014. De Beers provided clarification and updated the Plan on October 8, 2014.
06/11/ 2014	MVLWB		AEMP 2013	There are inconsistent descriptions about the effect of spills on the aquatic environment in the Plain Language Summary (page i) and Section 2.4.1.1 (page 2-12). Clarification is requested. Water Quality Section is satisfactory, and no concerns are raised. All recommendations in this Section are supported.		The MVLWB approved the 2013 Annual Aquatic Effects Monitoring Plan Report on July 17, 2014.

Table 4. Summary Table of SLEMA Comments from 2013 to 2014 (continued)

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
05/26/ 2014	MVLWB		Reclamation	SLEMA has reviewed the 2013 Annual Closure and Reclamation Plan Progress Report. The Report is satisfactory, and no concerns are raised.		The MVLWB accepted the Progress Report as submitted on July 17, 2014 and directed De Beers to adhere to the commitments De Beers made.
05/21/ 2014	MVLWB		LUP	SLEMA has reviewed the Application for New Land Use Permit - Addition of Two Fuel Storage Tanks, and the updated Spill Contingency Plan (2014). SLEMA does not have concerns about the Application and the updated Plan.		The MVLWB approved the LUP MV2014D0010 on June 19, 2014.
05/21/ 2014	MVLWB		WLAR 2013	Only the discharge criteria for grab samples are compared against the measured ones, no monthly criteria are compared. As a result, the exceedances of Chloride monthly criterion in SNP 02 17B in September/October 2013 are covered. De Beers' improvements and efforts in the North Pile were acknowledged by the Engineer, such as water management, mine plan and operation, maintenance, and surveillance manuals, North Pile development coordination, but there are still some issues with the geotechnical monitoring program.	De Beers to provide rolling average values for important parameters and make a note in Section 17 to describe this important event. SLEMA encourages De Beers to continue their efforts in the North Pile management and improve the geotechnical monitoring program.	The MVLWB accepted the 2013 Water License Annual as submitted on July 17, 2014 and directed De Beers to adhere to the commitments De Beers made as part of their responses to the reviewer Comment Tables.

Table 4. Summary Table of SLEMA Comments from 2013 to 2014 (continued)

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
05/02/2014	GNWT		Mine Inspection	SLEMA wishes to formally express its concerns regarding the lack of communication with SLEMA and other parties regarding the departure of the dedicated inspector for the Snap Lake Mine. We are also very concerned that we have not received any official inspection report since November 2013.	We are therefore seeking assurances that communication channels with SLEMA will remain open and transparent as they were in the past. We also would like a confirmation from the Department of Lands that a qualified inspector will be in place without delay, and that monthly inspections and timely reporting will resume quickly.	The Department of Lands responded on May 5, 2014 that a competition to staff a vacant Resource Management Officer Position was initiated early in 2014 and is nearing completion.
04/22/2014	MVEIRB, MVLWB		Amendment Application	SLEMA investigated the impacts of TDS level in mine water and TDS removal efficiency of mitigations such as reverse osmosis on the ratio of mine water which must be treated to meet the proposed Effluent Quality Criterion (EQC) for TDS, and requested De Beers to review the equation and results SLEMA developed and confirm whether they are justifiable.		During the information request period in April 2014, De Beers responded that “(T)he equation provided by SLEMA is a valid approximation of the volume of water that will require treatment”.

Table 4. Summary Table of SLEMA Comments from 2013 to 2014 (continued)

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
02/27/ 2014	MVLWB		Waste Management Plan	The strategies and practices for the collection, storage, transportation, and disposal of all wastes generated throughout the duration of the mine life are generally appropriate. Specific comments are provided for waste oil disposal, combustion ash, landfarm, sewage sludge, and fuel tanks.		The MVLWB conditionally approved the Waste Management Plan on April 24, 2014, and then approved the revised Plan on October 9, 2014.
01/23/ 2014	MVLWB		Water Management Plan	The Plan provides enough information for surface water management, but it is lacking information on underground mine water management. It is recommended that De Beers provide related information for review. Specific comments are provided for data consistency.		The MVLWB denied the Water Management Plan on April 2, 2014, and requested De Beers re-submit the Plan. De Beers re-submitted it on July 2 and October 1, 2014
01/20/ 2014	AANDC		EAAR 2012	In general, the EAAR 2012 fulfills the criteria established within the Environmental Agreement.	SLEMA staff provided specific examples for improving EAAR reporting. SLEMA would like to see improvements in future submissions of the EAARs.	De Beers responded on May 7, 2014 that De Beers only agree to provide additional visuals of wildlife in subsequent reports, and disagreed with other two recommendations.

Table 4. Summary Table of SLEMA Comments from 2013 to 2014 (continued)

Date	Addressee	Concern	Subject	Comment	Recommendation	Feedback/Response
01/26/2014	MVLWB	TDS limit	Amendment Application	De Beers proposed 684 mg/L as the Average Monthly Limit (AML) and 1,003 mg/L as the Maximum Daily Limit (MDL). Effluent TDS data in the past few years (2009 to 2013) indicate that there are no TDS values above the proposed MDL, but there are a few TDS values above the proposed AML.	De Beers to resubmit an appropriate AML with a feasible timeline.	De Beers proposed an interim protective TDS AML of 850 mg/L which would apply between January 2015 and January 2016, in De Beers Information Request Response #10 (April 2014)
11/25 2013	GNWT, AANDC	Devolution	Environmental Agreement	Joint letter with IEMA and EMAB: We understand that Devolution of lands and resources management to the Government of the Northwest Territories is to take place on April 1, 2014. This has the potential to change the roles and responsibilities of the federal and territorial governments in our respective Environmental Agreement. We are curious to know whether there has been any consideration of whether our Environmental Agreement may need to be amended in light of Devolution.		AANDC responded on December 16, 2013 and January 30, 2014.

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
EA – Environmental Agreement
EAAR – Environmental Assessment Annual Report
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
WLAR – Water Licence Annual Report
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, 2014

Snap Lake Environmental Monitoring Agency

Financial Statements

March 31, 2014

Crowe MacKay LLP
Member Crowe Horwath International
PO Box 727, 5103-51st Street
Yellowknife, NT X1A 2N5
+1.867.920.4404 Tel
+1.867.920.4135 Fax
+1.866.920.4404 Toll Free
www.crowemackay.ca

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, 2014, 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, 2014, 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
October 28, 2014

Chartered Accountants

Snap Lake Environmental Monitoring Agency

Statement of Operations

For the year ended March 31,	2014	2013 (Restated - note 5)
Revenues		
De Beers Canada Mining Inc.	$ -	$ 512,596
Miscellaneous income	283	-
Transferred from deferred revenue	512,596	505,000
Transferred to deferred revenue	-	(512,596)
	512,879	505,000
Expenditures		
Accounting and legal	15,739	10,976
Amortization	1,241	2,569
Bookkeeping	10,778	9,450
Honorarium	137,959	154,330
Insurance	1,525	2,421
Interest and bank charges	1,012	1,633
Meetings - catering, translation, and rentals	18,555	15,861
Meetings - travel and accommodation	35,213	44,697
Office and administration	19,165	22,235
Professional fees	1,530	10,461
Rent	36,119	33,894
Wages and benefits	222,425	194,385
	501,262	502,913
Excess of revenues before other items	11,617	2,087
Other items		
Transfer to investment in tangible capital assets	1,241	2,569
Loss on sale of capital assets	-	(812)
	1,241	1,757
Excess of revenues	$ 12,858	$ 3,844

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 2014**	Total 2013 (Restated - note 5)
Balance, beginning of year				
As previously reported	$ -	$ 2,959	**$ 2,959**	$ 5,528
Correction of accounting policy (note 5)	(24,165)	-	**(24,165)**	(28,009)
As restated	(24,165)	2,959	**(21,206)**	(22,481)
Excess of revenues over expenditures	12,858	-	**12,858**	3,844
Amortization	-	(1,241)	**(1,241)**	(2,569)
Balance, end of year	**$ (11,307)**	**$ 1,718**	**$ (9,589)**	$ (21,206)

Snap Lake Environmental Monitoring Agency

Statement of Financial Position

As at March 31,	2014	2013
Assets		
Current		
Cash	$ 7,126	$ 508,632
Prepaid expenses and deposits	6,742	5,576
	13,868	514,208
Tangible capital assets (note 3)	1,718	2,148
	$ 15,586	$ 516,356
Liabilities		
Current		
Accounts payable and accrued liabilities (note 4)	$ 25,175	$ 24,966
Unearned revenue	-	512,596
	25,175	537,562
Fund balances		
Unrestricted net assets (deficiency)	(11,307)	(24,167)
Investment in tangible capital assets	1,718	2,961
	(9,589)	(21,206)
	$ 15,586	$ 516,356

Approved on behalf of the board:

_____ Director _____ Director

Snap Lake Environmental Monitoring Agency

Statement of Cash Flows

For the year ended March 31,	2014	2013 (Restated - note 5)
Cash provided by (used for)		
Operating activities		
Excess of revenues (expenditures)	**$ 11,617**	$ 812
Items not affecting cash		
Amortization	**1,242**	-
	12,859	812
Change in non-cash working capital items		
Prepaid expenses and deposits	**(1,166)**	395
Accounts payable and accrued liabilities	**(603)**	(16,147)
Unearned revenue	**(512,596)**	11,440
Decrease in cash	**(501,506)**	(3,500)
Cash, beginning of year	**508,632**	512,132
Cash, end of year	**$ 7,126**	$ 508,632

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

				2014	2013
	Rate	Cost	Accumulated amortization	Net book value	Net book value
Furniture and fixtures	20%	$ 9,925	$ 8,207	$ 1,718	$ 2,148
Computer equipment	45/55%	7,298	7,298	-	-
Computer software	100%	15,334	15,334	-	-
		$ 32,557	$ 30,839	$ 1,718	$ 2,148

4. Accounts payable and accrued liabilities

	2014	2013
Accounts payable and accrued liabilities	$ 13,847	$ 21,615
Government remittances payable	11,328	3,351
	$ 25,175	$ 24,966

5. Correction of accounting policy

During the year it was determined that the contributions recognized in prior years was not adjusted to present the annual surplus or deficit for each year without considering funding received for the subsequent year. DeBeers provided annual funding to the Agency which was brought into revenue as expenses were incurred.

Since the Agency recognized revenues as expenses were incurred, there was an overstatement of revenues for the years ended March 31, 2011 and 2012, and an understatement of revenues for the year ended March 31, 2013. The effect of the correction of these errors on excess of revenues (expenditures), deferred revenue and retained earnings is as follows:

	2014	2013
Decrease in unrestricted net assets (deficiency), beginning of year	$ 24,165	$ 28,009
Increase in deferred revenue, beginning of year	24,165	28,009
Increase in deferred revenue, end of year	-	24,165
Increase in excess of revenues (expenditures)	-	3,844

6. 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.

7. 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.

8. Comparative figures

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

9. Financial instruments

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

(a) Liquidity risk

The Agency does have a liquidity risk in the accounts payable and accrued liabilities of $25,175 (2013 - $24,966). Liquidity risk is the risk that the Agency cannot repay its obligations when they become due to its creditors.