



May 2014 Environmental Update for SLEMA Board

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May 31, 2014

Outline

1. Mine Update
2. Inspection Update
3. Regulators' Update
4. Aboriginal Update
5. Stakeholders' Update
6. Agency's Activities
7. SLEMA Reviews
8. Water Licence Amendment Application



Acronyms

- AANDC – Aboriginal Affairs and Northern Development Canada (previous INAC – India and Northern Affairs Canada)
- AEMP – Aquatic Effects Monitoring Program
- ARD – Acid Rock Drainage
- DFO – Fisheries and Oceans Canada
- EC – Environment Canada
- ENR – Department of Environment and Natural Resources, GNWT
- GNWT – Government of the Northwest Territories
- MVLWB – Mackenzie Valley Land and Water Board
- PK – Processed Kimberlite
- SLEMA – Snap Lake Environmental Monitoring Agency
- SNP – Surveillance Network Program
- TDS – Total Dissolved Solids
- WEMP – Wildlife Effects Monitoring Program
- WTP – Water Treatment Plant
- WMP – Water Management Pond

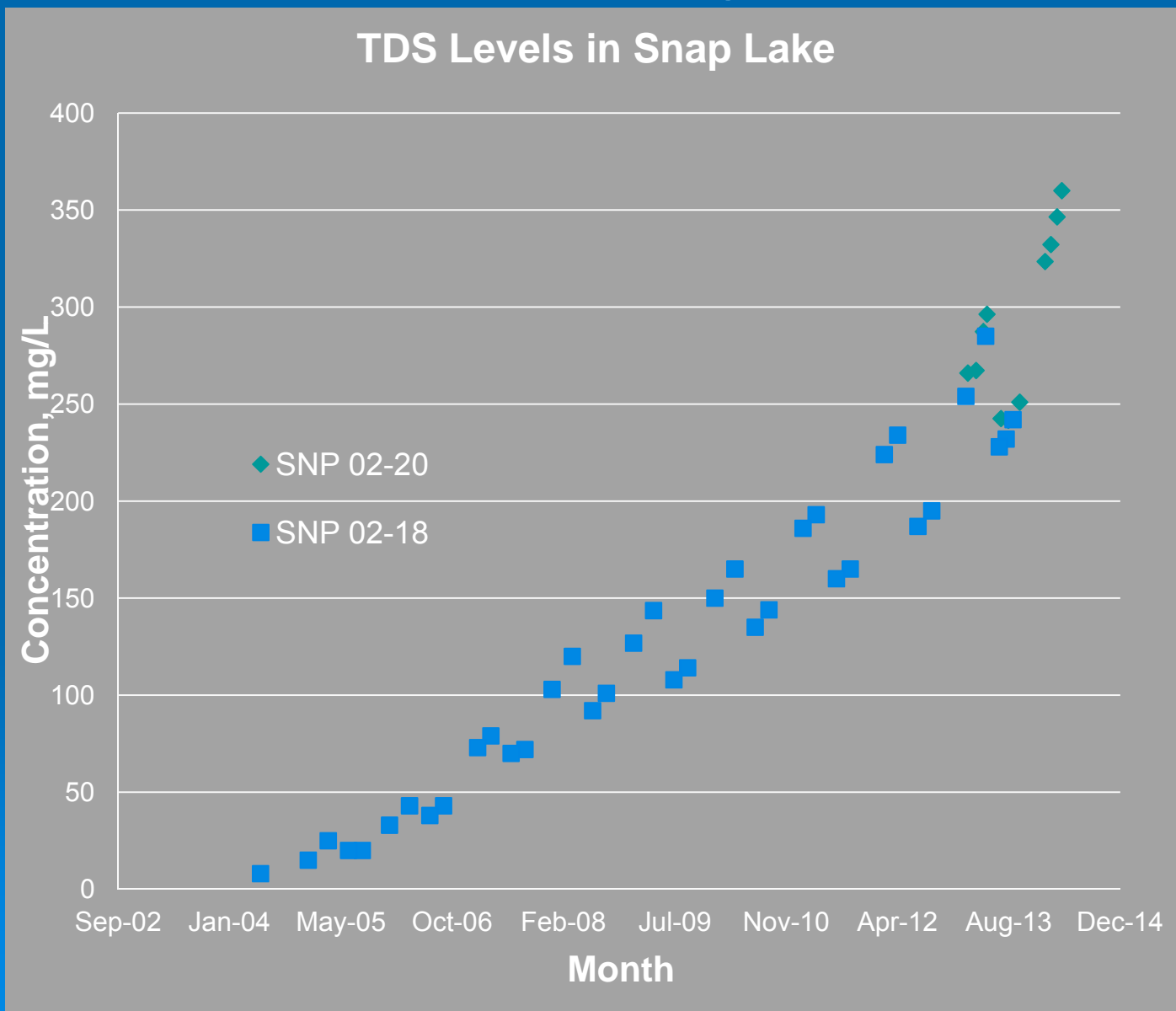


1.1 Mine Update – April 2014

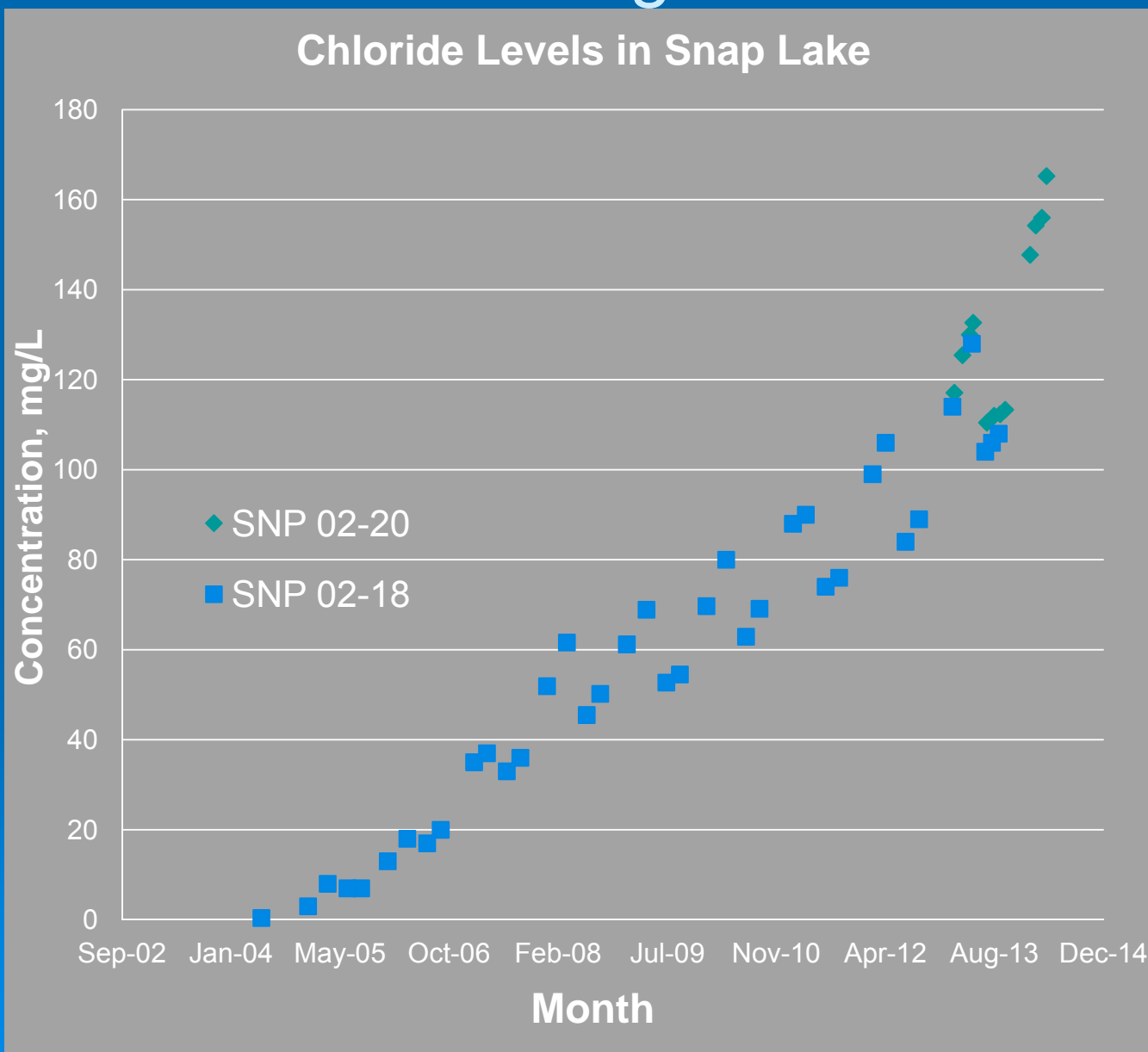
- Production rate: 94.6 % of its capacity (89,396 tonnes of kimberlite processed)
- 3,813 m³ of water withdrawn from Snap Lake
- 1,228,944 m³ of treated water discharged into Snap Lake
- 79,989 tonnes of coarse reject and 55,999 m³ of slimes deposited in the North Pile
 - 5,174 m³ of paste deposited underground
- 3 spills (1 reportable)
 - 152 underground hydrocarbon spills (5,966 L)
- Water sampled in 7 monitoring stations
 - The monthly average for all parameters met compliance except for
 - chloride which reported a rolling 6-day average exceeding the monthly limit of 310 mg/L
 - Water management practices are continually assessed in order to reduce chloride at source
 - On April 3, the maximum Concentration of Any Grab Sample for Coliform was exceeded



TDS Levels at the Edge of the Mixing Zone are above 350 mg/L in April 2014



Chloride Levels at the Edge of the Mixing Zone Have Been above 120 mg/L Since March 2013



1.2 Spill Reporting in May 2014

- No spill reports received in May 2014



1.3 2013 Annual Closure and Reclamation Plan Progress Report

- Submitted on April 28, 2014
 - Required by Water Licence MV2011L2-0004



1.4 AEMP 2013 Annual Report

- Submitted on May 1, 2014
 - Required by Water Licence MV2011L2-0004



1.5 Chronic Toxicity Testing

- Letter dated May 6, 2014
 - Based on 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 revise the condition of an ELS Rainbow Trout to the Fathead Minnow larval test



1.6 De Beers Responses to Comments on EAAR 2012

➤ Dated May 7, 2014

- De Beers responded to two comment letters on the 2012 Environmental Agreement Annual Report (EAAR 2012)
 - YKDFN letter dated January 7, 2014
 - SLEMA letter dated January 20, 2014



1.7 Maximum Monthly Average Chloride EQC Exceedance in April 2014

➤ Notice dated May 12, 2014

- 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)
 - Rolling average on April 23 – 313 mg/L
 - Rolling average on April 29 – 321 mg/L
 - Rolling average on May 5 – 311 mg/L



1.8 Exceedance of AEMP Action Levels for Cesium and Thallium

➤ Dated May 12, 2014

- 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 will be developed to assess the exceedance, and the scope and Table of Contents for this plan will be submitted to the Board by July 15, 2014



1.9 Responses to Chloride Exceedance

- Dated May 28, 2014
 - Provided a summary of actions undertaken since September 2013, and an action plan intended to prevent non-compliance in the future
 - To respond the Inspector's letter date May 10, 2014 regarding the exceedance of the Average Monthly Limit (AML) for Chloride at Snap Lake Mine



2. Inspection Update

- AANDC Inspector – Marty Sanderson
- No inspection received in May 2014



2.1 Responses to SLEMA's Concerns on Dedicated Inspector from the Department of Lands (I)

➤ Dated May 6, 2014

- Mr. Sanderson has taken over responsibility for Inspections of the Snap Lake Mine since Mr. Kramers' departure
- A competition was initiated to staff a vacant Resource Management Officer Position early in 2014 and was nearing completion
- We are well aware of the chloride and total dissolved solids concentration at the Snap Lake mine as well as the environmental assessment associated with De Beers Water Licence amendment application. We are monitoring the situation closely and expect additional trips to site will be required in the coming week



2.1 Responses to SLEMA's Concerns on Dedicated Inspector from the Department of Lands (II)

- The number of Inspection reports for the Snap Lake mine have dropped to a level below what is normally expected at a Diamond Mine in the NWT but we are confident that Mr. Kramers was paying close attention to the activities on site and having very regular communication with both staff at the Mine Site and staff in the GNWT
- We will do our best to make up for the reduced number of Inspections in the coming months and we will plan on attending the next SLEMA Board meeting on June 10th



2.2 Exceedance of Average Monthly Limit for Chloride (I)

- Letter addressed to Glen Koropchuk, the Chief Operating Officer, De Beers Yellowknife Projects, on May 10th, 2014
 - De Beers Canada Inc is now out of compliance with the Average Monthly Limit for Chloride (310 mg/L)
 - The Department of Lands is initiating the legal sampling program as of May 11th, 2014
 - If non-compliance is confirmed at the end of the sampling period the Inspector will be forced to examine enforcement actions against De Beers Canada Inc



2.2 Exceedance of Average Monthly Limit for Chloride (II)

- In the interim, De Beers must provide the Inspector with a plan outlining what has been done since the exceedance in September 2013 and what will be done to prevent exceedances in the future, no later than May 30th, 2014
- Given the spikes observed in chloride concentrations at various times in the year an increased average monthly limit may not be sufficient to ensure compliance



3. Regulators' Update – MVLWB (I)

- Invited reviewers to submit comments on LUP Application and updated Spill Contingency Plan (MV2014D0010), on May 1, 2014
 - Due on May 21
- Distributed the 2013 Annual Closure and Reclamation Plan Progress Report for comment, on May 5
 - Due on May 26
- Distributed the 2013 AEMP Annual Report for comment, on May 7
 - Due on June 11



3. Regulators' Update – MVLWB (II)

- Extended the review of the 2013 Water Licence Annual Report for one more week to May 21, 2014; extended the proponent response deadline to June 9
- Determined that further study needs to be conducted on the Land Use Permit Application (MV2014D0010), on May 22



4. Aboriginal Update

- YKDFN Commented on the proposed amendments to the Environmental Agreement on April 1, 2014



5. Stakeholders' Update

- Environment and Natural Resources (ENR) commented on
 - Snap Lake Working Group (SLWG) Meeting Term of Reference (ToR), Meeting Structure and Topics and Action Items on April 30, 2014
 - 2013 Water Licence Annual Report (WLAR 2013) on May 21
 - Added Diesel Fuel Storage Capacity on Site on May 21
 - 2013 Annual Closure and Reclamation Plan Progress Report on May 26
- DFO Commented on AEMP 2013 on May 29, 2014



5.1 ENR Comments on SLWG ToR

- No comments or recommendations at this time



5.2 ENR Comments on WLAR 2013

- No comments or recommendations at this time



5.3 ENR Comments on Added Diesel Fuel Storage Capacity on Site

- No comments or recommendations at this time



5.4 ENR Comments on the 2013 Annual Closure and Reclamation Plan Progress Report (I)

- ENR requests that the proponent include all closure research commitments from ICRP Version 3.2 in all future progress reports and within the next iteration of the ICRP
- ENR recommends that De Beers provide additional rationale regarding the development of closure criteria
- ENR recommends that De Beers clearly link the development of reclamation research and studies to the development of closure criteria, options and activities. This would help assist in the development of a more complete ICRP during its next iteration



5.4 ENR Comments on the 2013 Annual Closure and Reclamation Plan Progress Report (II)

- ENR recommends that De Beers provide a commitment to install thermistors in the future to monitor aggradation
- ENR requests De Beers provide clarification regarding the necessity for water treatment post-closure
- ENR requests De Beers provide clarification on potential implications to security should water treatment post-closure be necessary



5.5 DFO Comments on AEMP 2013

- “DFO- Fisheries Protection Program has reviewed the Snap Lake 2013 AEMP Report and has no comments or concerns”



6. Agency's Activities

- SLEMA issued a letter on Dedicated Inspector to the Department of Lands on May 2, 2014
- SLEMA staff attended the Pre-Hearing Conference via phone on May 13
- SLEMA issued a letter on the 2013 Water Licence Annual Report on May 21
- SLEMA issued a letter on Land Use Permit Application – Increase Fuel Storage on May 21
- SLEMA issued a letter on the 2013 Annual Closure and Reclamation Plan Progress Report on May 26
- SLEMA staff attended the Snap Lake Working Group meeting on May 28



7. SLEMA Reviews (I)

- Exceedance of Monthly Average Limit for Chloride on April 23, 2014
- 2013 Water Licence Annual Report (WLAR 2013)
 - Summary of September 2013 Geotechnical Site Inspection of North Pile Facility and Water Management Pond Dams
 - Geotechnical Monitoring Program Summary for the Period 1999-2013
 - 2013 Acid/Alkaline Rock Drainage (ARD) and Geochemistry Monitoring Report



7. SLEMA Reviews (II)

- 2013 Annual Closure and Reclamation Plan Progress Report
- 2013 Aquatic Effects Monitoring Program Annual Report (AEMP 2013)

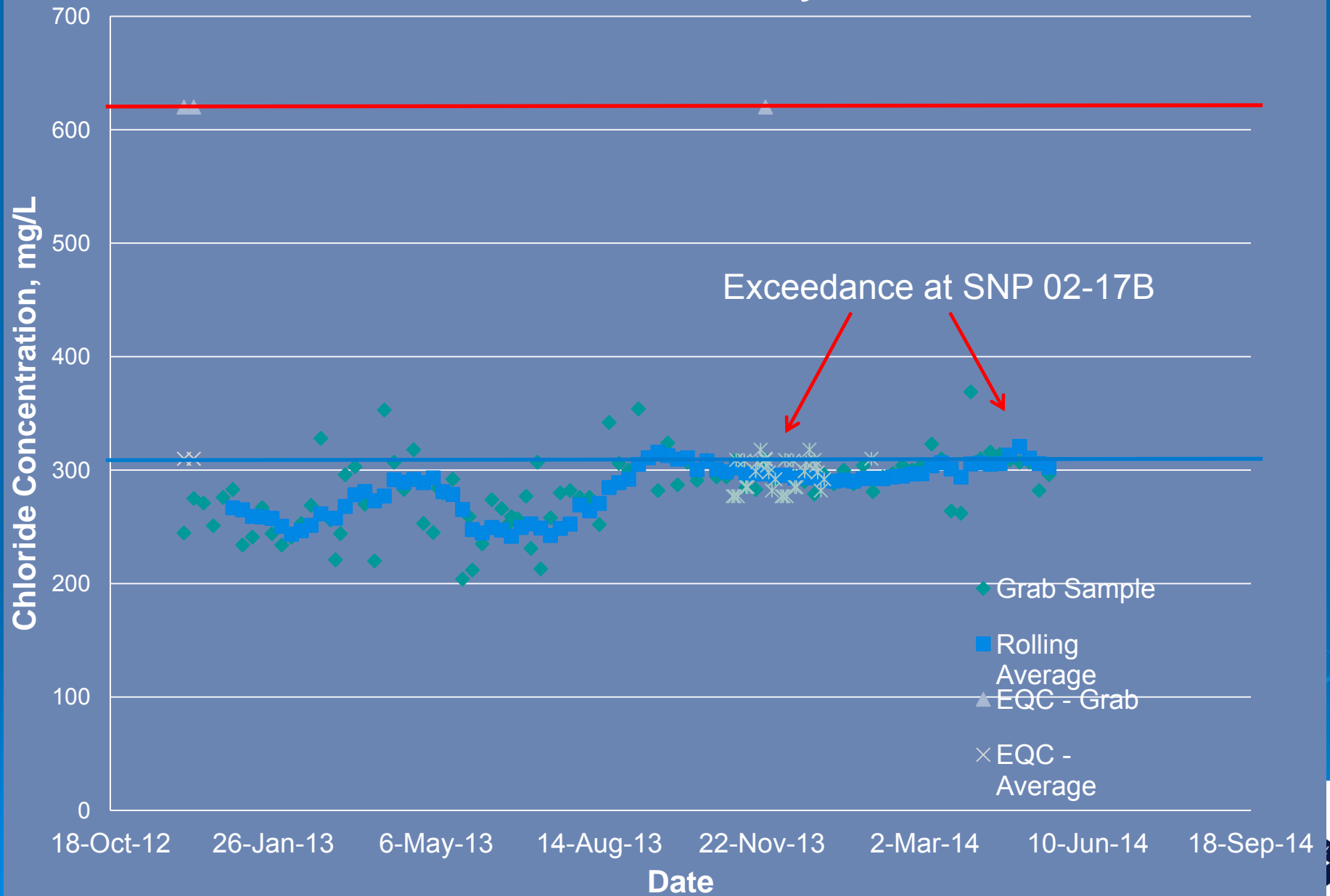


7.1 Exceedance of Monthly Average Limit for Chloride on April 23, 2014

- SLEMA staff sent a reminder of possible exceedance to De Beers via e-mail on April 30, 2014
- De Beers staff sent a notice of exceedance of Chloride at SNP 02-17B to SLEMA on May 5
 - Rolling monthly average concentration on April 23 is 313.3 mg/L, which is above the Water Licence limit (310 mg/L)
 - Further monitoring indicated two more exceedances (320.8 mg/L on April 29 and 310.5 mg/L on May 5)



Chloride Data Analysis

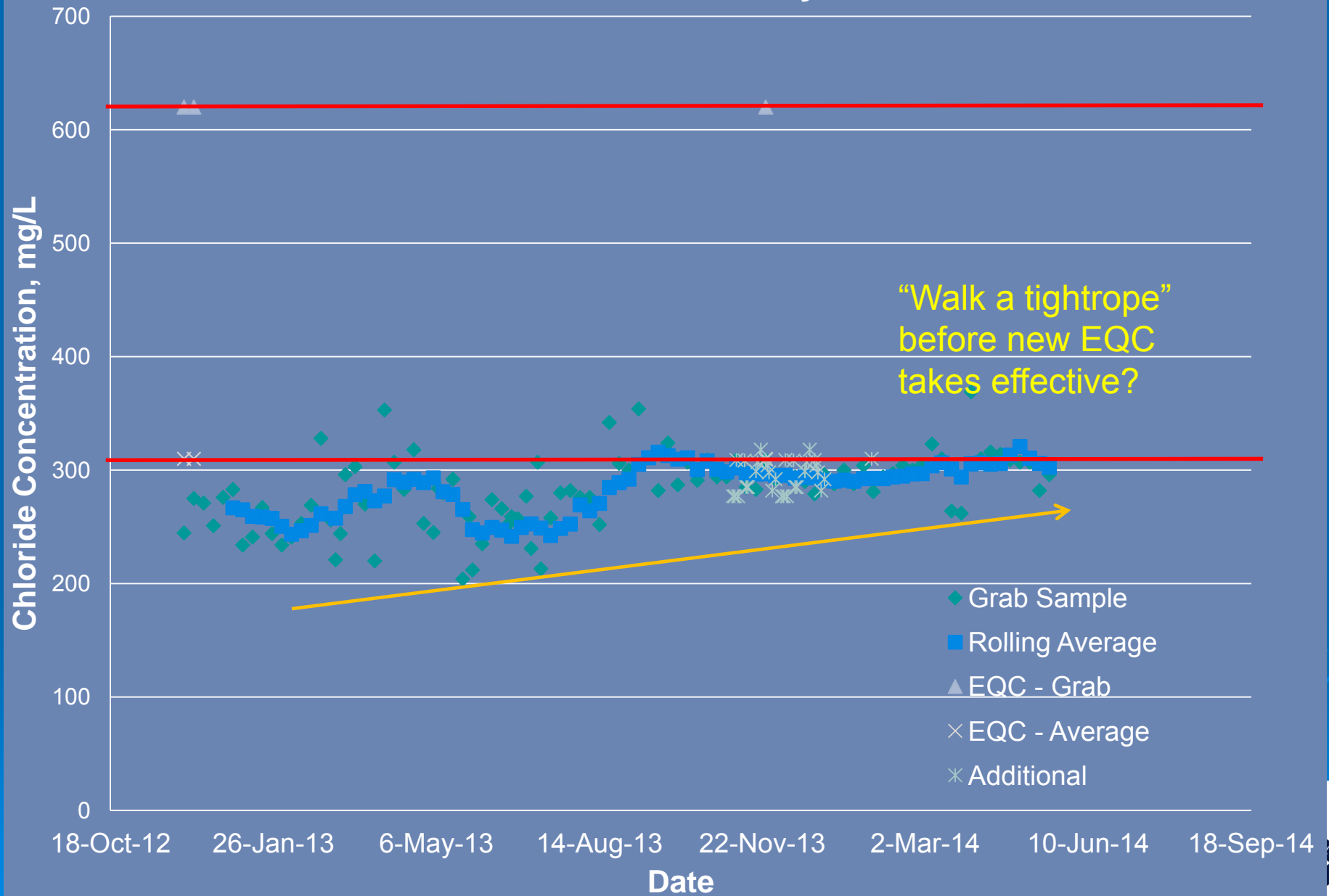


Comments from the Environmental Analyst (I)

- It is stated in De Beers responses on May 28 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”
- This statement is 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 who are close to the AML (310 mg/L)
 - $(310+316+314+309+307+307)/6=310.5$



Chloride Data Analysis



Comments from the Environmental Analyst (II)

- This is not the first time of non-compliance, and this is a reoccurring event. Last non-compliance took place in September/October 2013
- De Beers' approach to Chloride management is like "to walk a tightrope"
 - There appear no effective mitigation measures in place at the mine site to prevent from reoccurring
 - De Beers appears to rely on the luck
 - There would not be "a single high grab sample result" any more before the proposed EQC is approved



7.2 2013 Water Lincence Annual Report (WLAR 2013)

➤ Important Data (I)

- The total amount of freshwater removed from Snap Lake during 2013 was 42,289 cubic metres (m³)
- The total amount of discharge from the WTP to Snap Lake was 13,631,019 m³
- The total volume of slimes discharged to the North Pile was 401,869 m³



Important Data (II)

- There was no paste deposited on surface during 2013. The volume of Processed Kimberlite Paste placed as underground backfill in 2013 was 18,513 m³. The target for paste underground is 150,000 m³ for 2014
- The annual quantity of slurry solids, grits, and paste solids placed in the North Pile was 481,383 tonnes, 977,476 tonnes, and 0 tonne respectively



Comments from the Environmental Analyst (I)

- 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

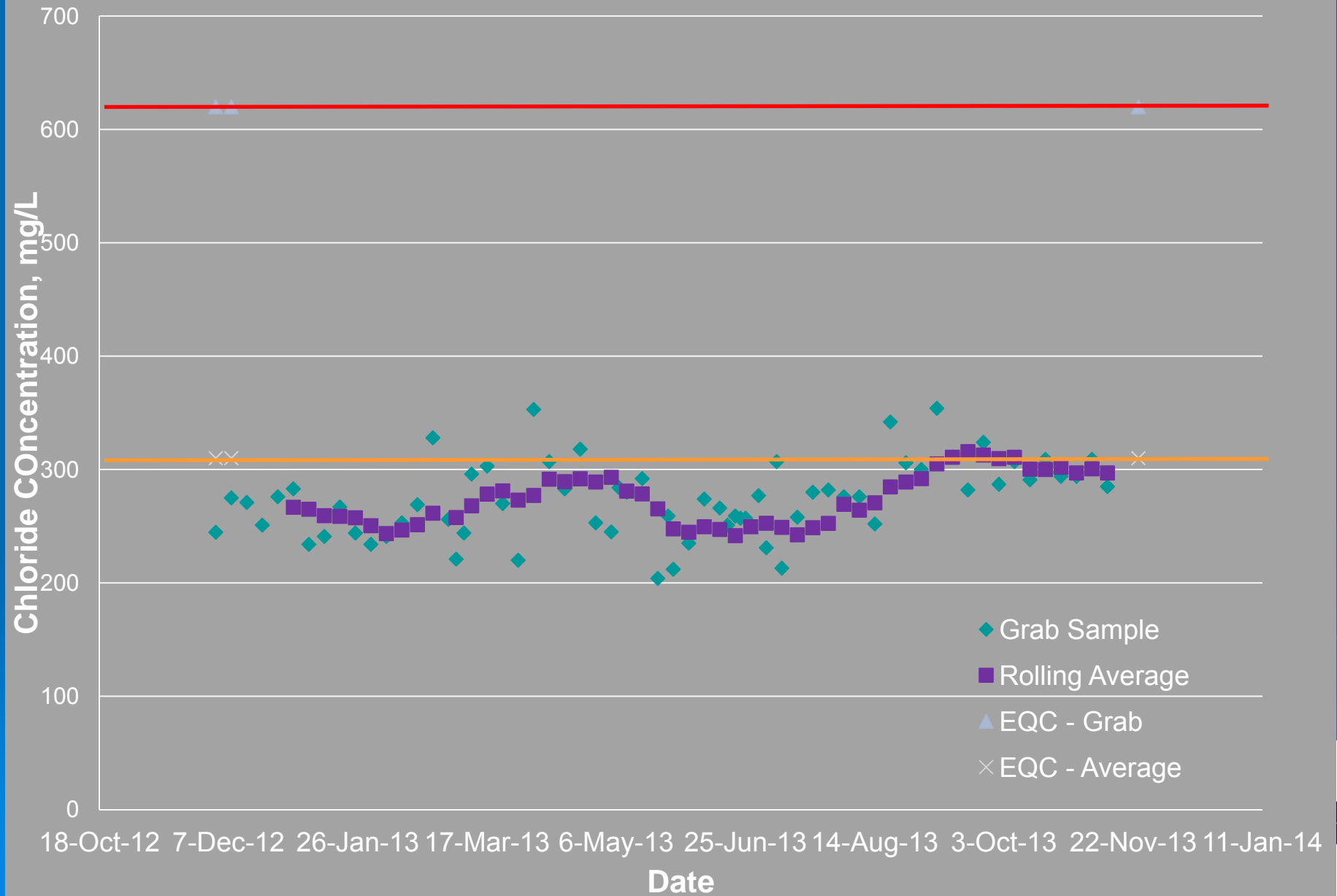


Comments from the Environmental Analyst (II)

- 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



Chloride Data Analysis



7.3 Summary of September 2013 Geotechnical Site Inspection of North Pile Facility and Water Management Pond Dams

- Appendix II of the WLAR 2013
- The geotechnical inspection was performed by Golder engineer, Mr. Paul Mr. Bedell, between September 9 and 12, 2013
- De Beers' improvements and efforts in the North Pile were acknowledged by the Engineer
 - Water management
 - Mine plan and operation, maintenance, and surveillance manuals
 - North Pile development coordination



Issues with Geotechnical Monitoring Program

- “De Beers confirmed that most, if not all, of the required monitoring data are being collected; however, they are not being interpreted, communicated, or used for operational purposes. This is a deficiency in the operation of the North Pole facility and the WMP dams. Further, no quality assurance program exists for the geotechnical monitoring program. The use of a data management system is being developed by De Beers to replace the current use of Excel to improve the quality and effectiveness of the data management and presentation; Golder strongly supports this effort.”



Comments from the Environmental Analyst

- The Report is satisfactory
 - All recommendations in the Report are supported



7.4 Geotechnical Monitoring Program Summary for the Period 1999-2013

- Appendix III of the WLAR 2013
- The report presents the results from the monitoring of thermistors, piezometers, and survey prisms installed on the Site



Hydraulic (Groundwater) Gradient from Snap Lake towards the East Cell

- 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. The design and operation of the East Cell perimeter water control structures further induces a hydraulic gradient from Snap Lake into the ditches and sumps. The monitoring results 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; considered to be acceptable



Comments from the Environmental Analyst

- The Report is satisfactory
 - All recommendations in the Report are supported



7.5 2013 Acid/Alkaline Rock Drainage (ARD) and Geochemistry Monitoring Report

- Appendix IV of the WLAR 2013
- The geochemistry inspection was performed by Mr. Ken DeVos, P.Geo., of Golder, between September 9 and 12, 2013



Conclusions (I)

- No visible signs of incipient acid generation were observed in the roads, rock pads or building foundations at the Mine during the 2013 geochemical inspection. Some minor staining of metavolcanic rock near the FAR was observed; however, downstream monitoring shows that acidic conditions are not developing at this time



Conclusions (II)

- The composition of samples collected in 2013 was within the range of composition of samples in the existing geochemical dataset
- The geochemical assessment of kimberlite, PK, and granite has not changed based on the results of the 2013 geochemical assessment
- The composition of metavolcanic rock is variable. It is not expected that the metavolcanic materials currently near surface on site will result in acidic conditions developing in the runoff, based on ongoing monitoring data from SM 05 over the past decade



Conclusions (III)

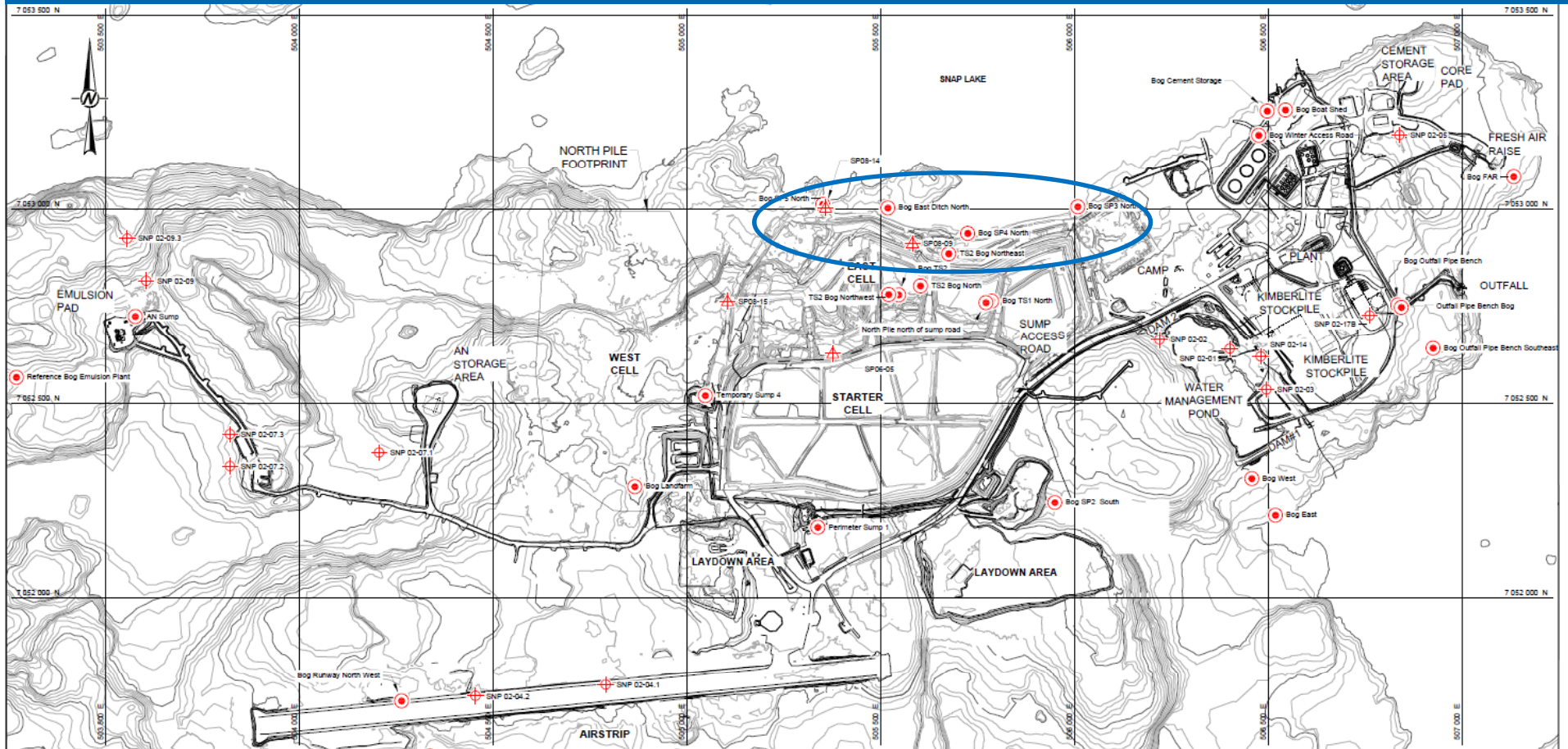
- The results of water quality analysis at most SNP monitoring stations, bog and seepage monitoring stations was similar to concentration trends observed during the previous monitoring year



Water Quality of Bog Water between the East Cell perimeter embankment and Snap Lake (I)

- Bogs between the East Cell perimeter embankment and Snap Lake include Bog SP3 North, Bog SP4 North, Bog SP5 North, Bog SP5 North Shoreline, and Bog East Ditch North. Concentration ranges of the main parameters of discussion were similar in all bogs; thus, concentration ranges are presented as a summary of the range for all bogs north of the East Cell. All bogs had a similar major ion composition, and were generally calcium-chloride type water





LEGEND

- + SNP Monitoring Locations
- 2013 Water Quality Monitoring Locations
- △ Piezometer Locations

REFERENCES

Survey information provided by De Beers Canada Inc. in August 3, 2013. Where current ground survey information was not provided, the 2004 base map information provided by AMEC Americas Limited was used.

NOTES

Grid is displayed in Transverse Mercator, Datum: NAD83, Coordinate system: UTM zone 12.

DRAFT

SNAP LAKE MINE

Snap Lake Mine Site Configuration Including Water Quality Monitoring Locations

PROJECTION: UTM Zone 12 DATUM: NAD83

200 0 200
SCALE METRES

FILE No: 1413490004-4500_5-2

JOB No: 14-1349-0004

OFFICE: GOLDFIELD VICTORIA

REVISION No: A

DRAWN: JEF

CHECK: --

DATE: March 18, 2014

Figure 5-2

DE BEERS
GROUP OF COMPANIES

Water Quality of Bog Water between the East Cell perimeter embankment and Snap Lake (II)

- Concentration ranges measured in the East Cell bogs were:
 - pH ranged from 5.9 to 7.4
 - TDS concentrations ranged from 6.6 to 197 mg/L
 - Nitrite ranged from less than 0.05 to 0.24 mg/L as N
 - Nitrate concentrations ranged from 0.006 to 12 mg/L as N
 - Chloride concentrations ranged from 0.62 to 50 mg/L



Comments from the Environmental Analyst (I)

- The data range of TDS and Chloride in Bog Water between the East Cell and Snap Lake 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 7.4)
- These two lines of evidence demonstrate that the design and operation of the East Cell perimeter water control structures function well



Comments from the Environmental Analyst (II)

- The Report is satisfactory
 - All recommendations in the Report are supported



7.6 2013 Annual Closure and Reclamation Plan Progress Report

➤ Main components

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



North Pile Development (I)

- It represents the vast majority of remaining project activities on surface at the project site
 - Phase IV Embankments design which included upstream heightening of the embankments was deemed not geotechnically feasible
 - Alternative options are now being considered, including:
 - raising the height of the current Starter and East Cells by changing the angle of embankment slopes to allow downstream embankment raise,
 - expansion of the current North Pile footprint, or
 - a combination of the two approaches



North Pile Development (II)

- Deposition of PK and waste rock in the Starter Cell is expected to be complete in late Q2 of 2014
- Deposition of PK and waste rock in the East Cell began in 2012 and is projected to continue until 2015 or 2016, depending on various properties of the deposited PK (e.g. density, beach angle, etc.) *Relocation of the non-hazardous solid waste landfill into subcell 1 of the East Cell was approved by the MVLWB in 2012, and work was performed in 2013*
- Original designs for the West Cell are currently being finalized, and construction is expected to start in late 2014 or early 2015
- A rock cover design for the Starter Cell is currently being developed



Implications of variances in project schedule and activities to the Closure and Reclamation Plan (I)

- Variances to the original Project schedule include:
 - Construction of the IL6 diversion ditch and catchment area, the expanded apron quarry area and various site infrastructure components (e.g. 5th diesel generator, 2nd diffuser, new sewage treatment plant, etc.)
 - Deviation from the initial North Pile development schedule
 - Delay of PK deposition in the underground mine workings
 - 4 Deposition of processed kimberlite as a slurry/slime into the North Pile rather than paste



Implications of variances in project schedule and activities to the Closure and Reclamation Plan (II)

- Implications of variance items 1 and 2 to the Closure and Reclamation Plan include corresponding adjustments to scheduling and the overall scope of site infrastructure decommissioning activities. These adjustments are not expected to delay the completion of final closure and post-closure timeline beyond the current schedule
- The orientation and complexity of the underground ore body, as well as, mine configuration will prevent the initial design of 50% PK deposition from being reached. Current estimates predict approximately 30% of PK by volume will be deposited underground as paste



Implications of variances in project schedule and activities to the Closure and Reclamation Plan (III)

- The post-closure stability of the North Pile embankments does not depend on the deposition of paste, which was reaffirmed by De Beers in 2011. Further, Aboriginal Affairs and Northern Development Canada (AANDC) have also acknowledged that the perimeter embankments are “performing adequately”
- Additional focuses for reclamation research have been identified to assess potential implications of the deposition of PK as slurry as opposed to a paste on the thermal, hydraulic and geochemical processes within the Starter Cell and East Cell waste materials



Progressive Reclamation

- Limited opportunity to progressively reclaim infrastructure
 - The majority of the site infrastructure is required for mining operations until closure, which limits the number of prospective facilities that can be reclaimed before the end of the mine life
 - This is primarily due to the exclusively underground mining activities at Snap Lake and relatively small footprint compared to nearby diamond mines
- Areas and/or mine components that have been identified for progressive reclamation throughout the life of the mine include:
 - North Pile disposal facility;
 - Contaminated soil areas, as necessary; and,
 - Various small legacy areas from the exploration phase (e.g. North Pit, South Pit and Bulk Sample Mine Rock Pad)



Reclamation Research Status

- The purpose of reclamation research is to address uncertainty in the engineering and environmental elements regarding closure, obtain information that can lead to the development of appropriate closure criteria, and allow the ICRP to be continuously refined
 - Engagement activities completed in 2013 specific to mine closure and reclamation included community meetings, workshops and site visits



Interim Closure and Reclamation Plan (ICRP) Status

- ICRP underwent a review process with the MVLWB and other stakeholders, and MVLWB approval 3.2 was received in early 2014



Financial Security and Reclamation Liability

- The summarized current security held at the end of 2012, with deposition of PK having occurred in both the Starter Cell and East Cell is as follows:
 - Type A Land Use Permit, \$19,878,845;
 - Type A Water Licence, \$36,917,856; and,
 - Environmental Agreement – Additional Security Deposit, \$20,000,000



Comments from the Environmental Analyst (II)

- The Report is satisfactory
 - No concerns are raised



8. Water Licence Amendment Application

- Preparation for the EA Public Hearing
- De Beers Responses to Information Requests
- EcoMetrix Review of Amendment Application
- Technical Reports
 - NSMA, YKDFN, LKDFN, EC, GNWT, and DKFN



8.1 Preparation for the EA Public Hearing (I)

- The MVEIRB distributed notices about
 - Pre-hearing conference, May 13, 2014
 - 1:30-4:30 in the MVEIRB Boardroom
 - Deadline for Technical Reports – May 21, 2104
 - Parties' presentations due on May 30, 2014
 - Introductions on party status applications
 - SLEMA is not a Party but a Member of the Public



Party vs. Member of the Public

- Member of the public means a person other than a party, who is allowed to participate in an environmental assessment or environmental impact review proceeding subject to these Rules of Procedure for Environmental Assessment and Environmental Impact Review Proceedings
- Party means an individual or an organization which is granted standing in an environmental assessment or an environmental impact review proceeding on the terms set out by the Review Board and may include but is not limited to a developer, a first nation affected by a proposed development, the federal or any responsible minister, a designated regulatory agency or the occupier of any land affected by the development



8.1 Preparation for the EA Public Hearing (II)

➤ Pre-Hearing Conference

- Held on May 13, 2014
- MVEIRB chaired the conference
 - Staff from MVLWB, De Beers, GNWT, EC, YKDFN, LKDFN, NSMA, SLEMA, etc., attended the conference
 - Rules, party status, presentations, hearing agenda, time allotments, and upcoming dates and deadlines were discussed

➤ Draft Public Hearing Agenda was distributed out on May 16, 2014



8.1 Preparation for the EA Public Hearing (III)

➤ The following organizations are registered parties:

- Environment Canada (May 2, 2014)
- Government of the Northwest Territories (May 13)
- Lutsel K'e Dene First Nation (May 5)
- North Slave Metis Alliance (May 13)
- Yellowknives Dene First Nation (May 12)
- Deninu Kue First Nation (May 22)



8.1 Preparation for the EA Public Hearing (IV)

- MVEIRB issued the Hearing Directive and Agenda for the Public Hearing to be held on June 5 and 6, on May 26, 2014
- Parties submitted their presentations
 - YKDFN (May 26)
 - NSMA (May 29)
 - LKDFN, EC, GNWT, and DKFN (May 30)
- Ecometrix submitted presentation on May 30



8.2 De Beers Responses to Information Requests

- De Beers provided responses to Information Requests (IRs) resulting from the April 15/16th Technical Sessions at the Yellowknife Inn, and to IRs provided on April 22nd in response to the DE Beers Supplemental Filing, on April 30, 2014

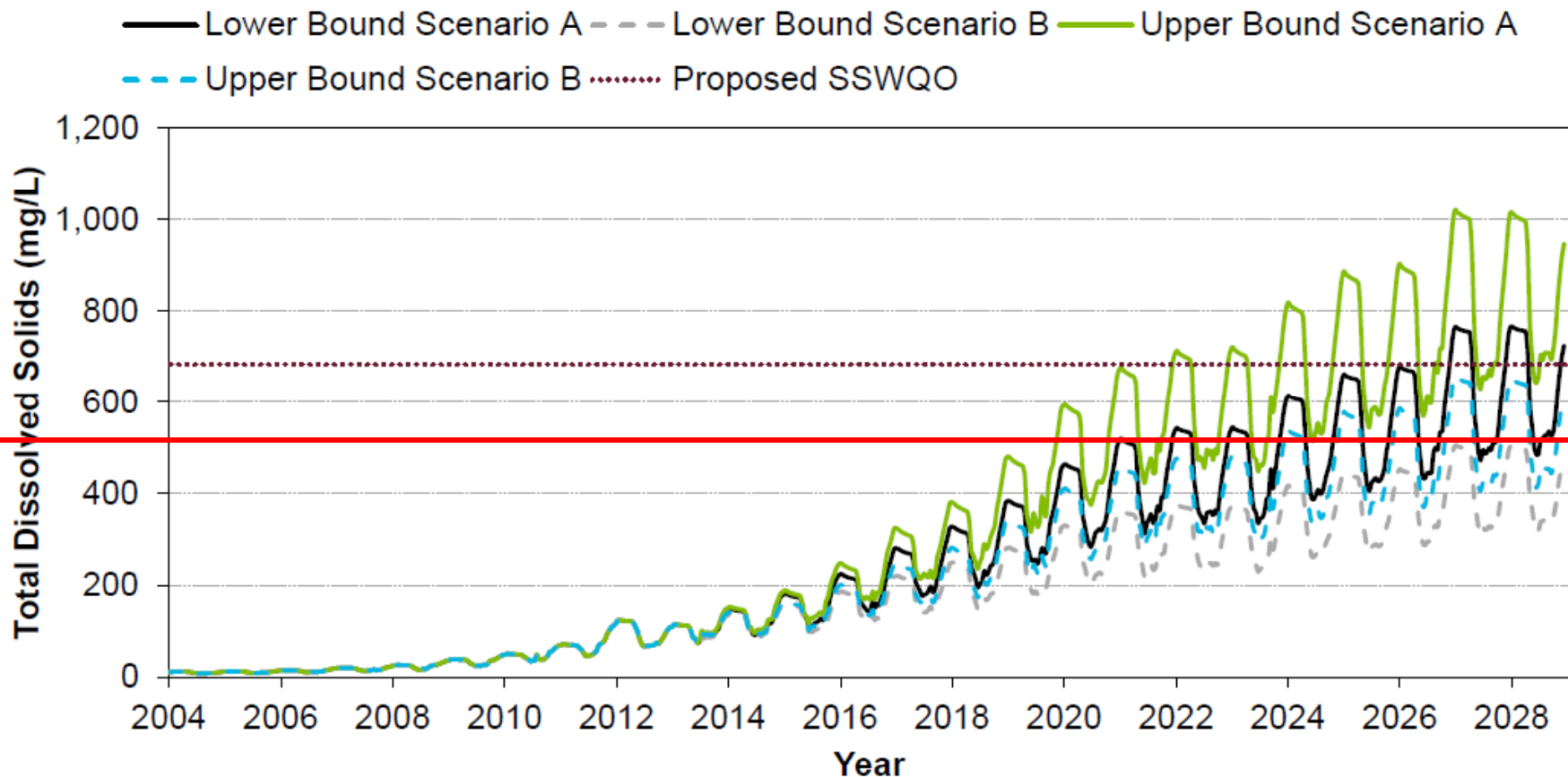


8.2.1 De Beers Responses to SLEMA Information Requests (I)

- SLEMA request – TDS concentrations in Snap Lake at the water intake location over time (IR#2)
- De Beers response – two figures
 - TDS concentrations will be above 500 mg/L (Health Canada – Drinking Water Quality Guidelines, Aesthetic Objective) in most of the scenarios if without mitigation
 - TDS concentrations will be below 500 mg/L in all scenarios if proposed EQC are met (with mitigation)

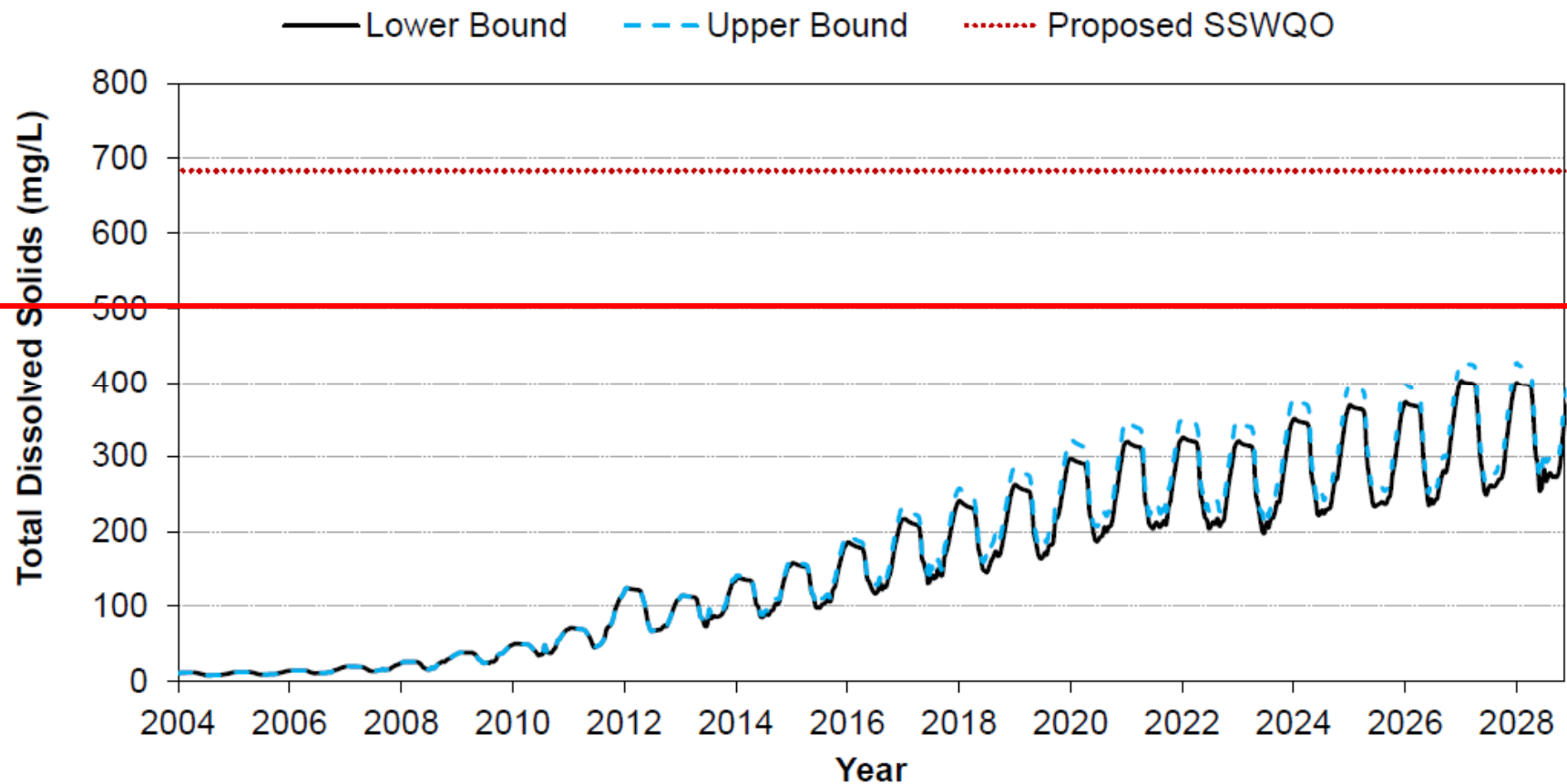


Predicted Depth-Averaged Total Dissolved Solids Concentrations in Snap Lake Near the Water Intake (Without Mitigation)



mg/L = milligrams per litre; SSWQO = site-specific water quality objective.

Predicted Depth-Averaged Total Dissolved Solids Concentrations in Snap Lake near the Water Intake (Proposed EQC are Met)



mg/L = milligrams per litre; EQC = effluent quality criteria; SSWQO = site-specific water quality objective.

8.2.1 De Beers Responses to SLEMA Information Requests (II)

- SLEMA request – De Beers review the equation and results provided for the following investigation and confirm whether they are justifiable
 - 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
- De Beers response – The 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%



8.2.1 De Beers Responses to SLEMA Information Requests (III)

➤ SLEMA Information Request on May 7, 2013

- Is Downstream Lake 1 (DSL1) upstream of Downstream Lake 2 (DSL2)? If yes, it will be weird to see the predicted concentrations in DSL1 are lower than DSL2, as shown on page 10 of De Beers Information Request Responses.
- Table 11.3-3 of AEMP 2013 Annual Report clearly shows that the concentrations of TDS and Chloride in DSL1 are higher than those in DSL2. Is the model calibrated?

➤ De Beers Response

- Downstream Lake 1 (DSL1) is upstream of Downstream Lake 2 (DSL2)

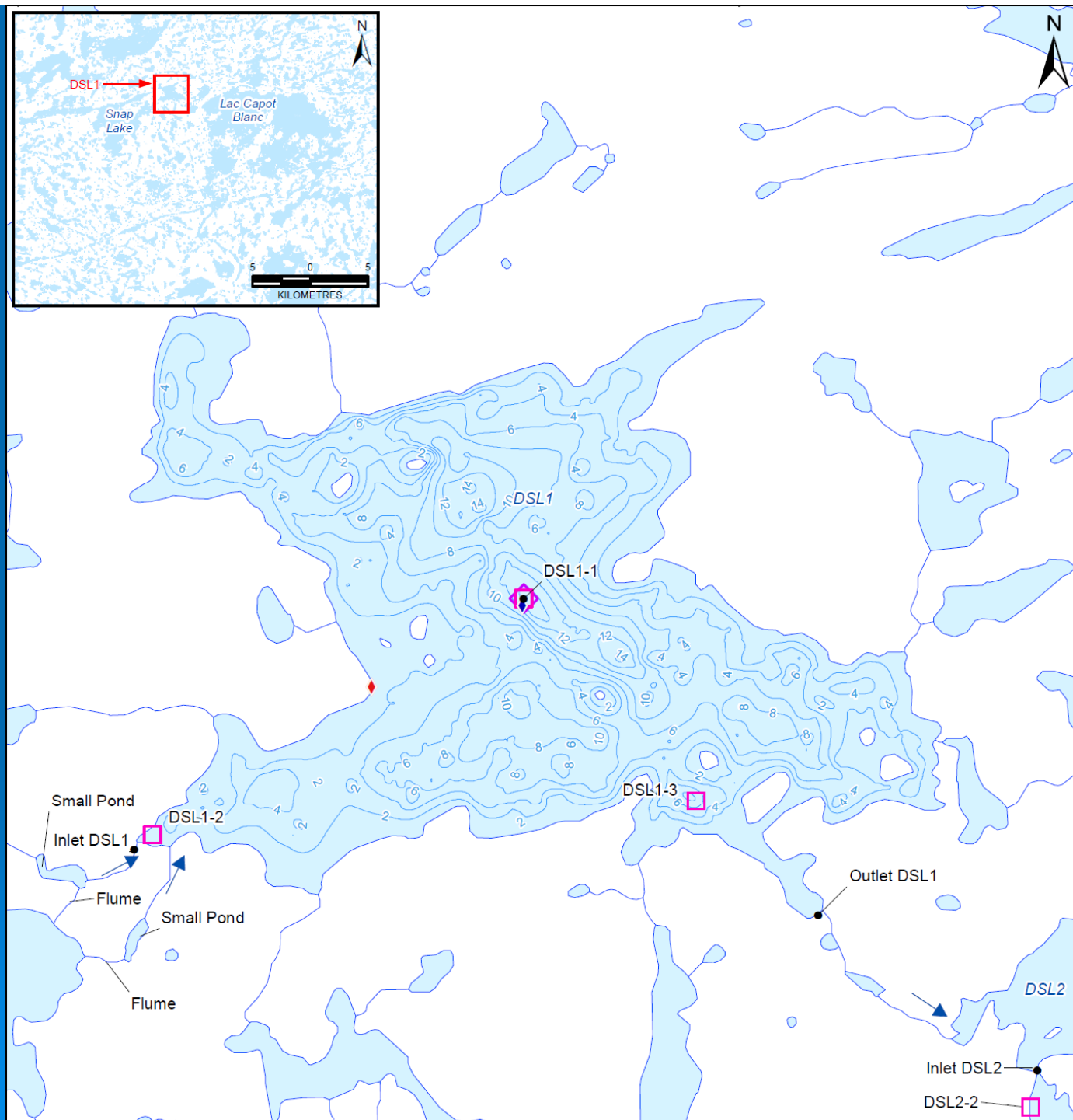


8.2.1 De Beers Responses to SLEMA Information Requests (IV)

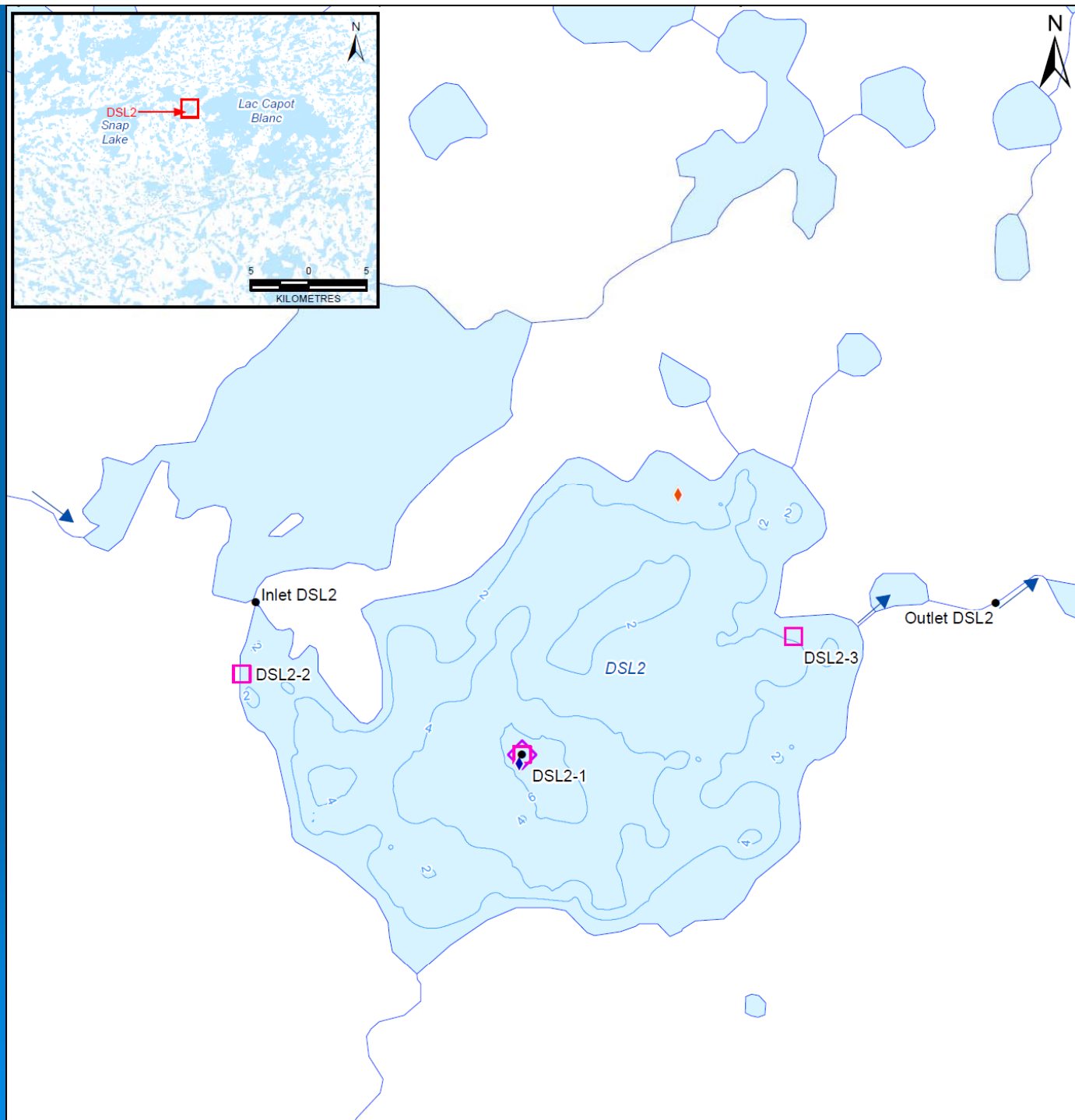
- During the ice-covered season, total dissolved solids (TDS) concentrations in DSL2 are predicted to be higher than concentrations in DSL1 because of the influence of ice formation, and the resultant reduction in lake water volume. The ice-covered lake volume in DSL2 is less than DSL1, resulting in higher parameter concentrations in DSL2 compared to DSL1, particularly later in operations when concentrations are at a maximum
- Because the DSL1 and DSL2 models are mass balance models, they do not allow for calibration or predictions at different horizontal and vertical locations within the lakes



Downstream Lake 1



Downstream Lake 2



Comments from the Environmental Analyst

- This is a special example for abnormal
 - As showed in the above two figures, DSL1 is bigger and deeper, and DSL2 is smaller and shallower, which is the case resulting in higher parameter concentration in DSL2 compared to DSL1 in the winter due to ice formation
- The Response is satisfactory



8.2.2 De Beers Responses to IR#5

- IR#5 - analysis for chloride, as well as the other constituents of TDS that the Review Board scoped in, and hardness downstream of Snap Lake over time
- De Beers responses – simplified methods, were described and used to provide approximate maximum concentrations; time-varying results were not available because calcium, chloride, fluoride, magnesium, and sulphate have not yet been incorporated into the downstream lakes model (i.e., set-up, calibration and simulation)



Table MVRB/MVLWB_IR#5-1 Maximum Concentrations in Downstream Lake 1, Downstream Lake 2, and Lac Capot Blanc Without Mitigation

Parameter	Maximum Predicted Concentrations															
	Lower Bound Scenario A				Lower Bound Scenario B				Upper Bound Scenario A				Upper Bound Scenario B			
	Snap Lake Outlet	DSL1	DSL2	LCB Outlet	Snap Lake Outlet	DSL1	DSL2	LCB Outlet	Snap Lake Outlet	DSL1	DSL2	LCB Outlet	Snap Lake Outlet	DSL1	DSL2	LCB Outlet
Total Dissolved Solids (mg/L)	1,280	989	1,114	136	827	640	722	94	1,735	1,381	1,552	192	1,101	879	989	127
Chloride (mg/L)	295	228	257	31	464	359	405	53	634	504	567	70	398	318	357	46
Fluoride (mg/L)	0.45	0.35	0.40	0.05	0.45	0.35	0.40	0.05	0.47	0.38	0.42	0.05	0.47	0.38	0.42	0.05
Sulphate (mg/L)	58	45	50	6	88	68	77	10	118	94	106	13	76	61	68	9
Hardness (mg/L as CaCO ₃)	489	378	426	52	732	566	639	83	977	777	874	108	639	510	574	74

mg/L = milligrams per litre; CaCO₃ = calcium carbonate; DSL1 = downstream lakes 1; DSL2 = downstream lakes 2; LCB = Lac Capot Blanc.

Table MVRB/MVLWB_IR#5-2 Maximum Concentrations in Downstream Lake 1, Downstream Lake 2, and Lac Capot Blanc With Mitigation

Parameter	Maximum Predicted Concentrations							
	Lower Bound				Upper Bound			
	Snap Lake Outlet	DSL1	DSL2	LCB Outlet	Snap Lake Outlet	DSL1	DSL2	LCB Outlet
Total Dissolved Solids (mg/L)	638	483	542	67	698	542	609	76
Chloride (mg/L)	287	217	244	30	314	244	274	34
Fluoride (mg/L)	0.29	0.22	0.25	0.03	0.32	0.25	0.28	0.03
Sulphate (mg/L)	46	35	39	5	50	39	44	5
Hardness (mg/L as CaCO ₃)	372	282	316	39	407	316	355	44

mg/L = milligrams per litre; CaCO₃ = calcium carbonate; DSL1 = downstream lakes 1; DSL2 = downstream lakes 2; LCB = Lac Capot Blanc.

Comments from the Environmental Analyst

- It is noted that the concentrations of TDS and its constituents in Downstream Lake 1 (DSL1) are lower than those in DSL2. however, DSL1 is the upstream of DSL2
- Table 11.3-3 in Part B of AEMP 2013 Annual Report clearly shows that the concentrations of TDS and Chloride in DSL1 are higher than those in DSL2
- The application of “simplified methods” for DSL1 is questionable

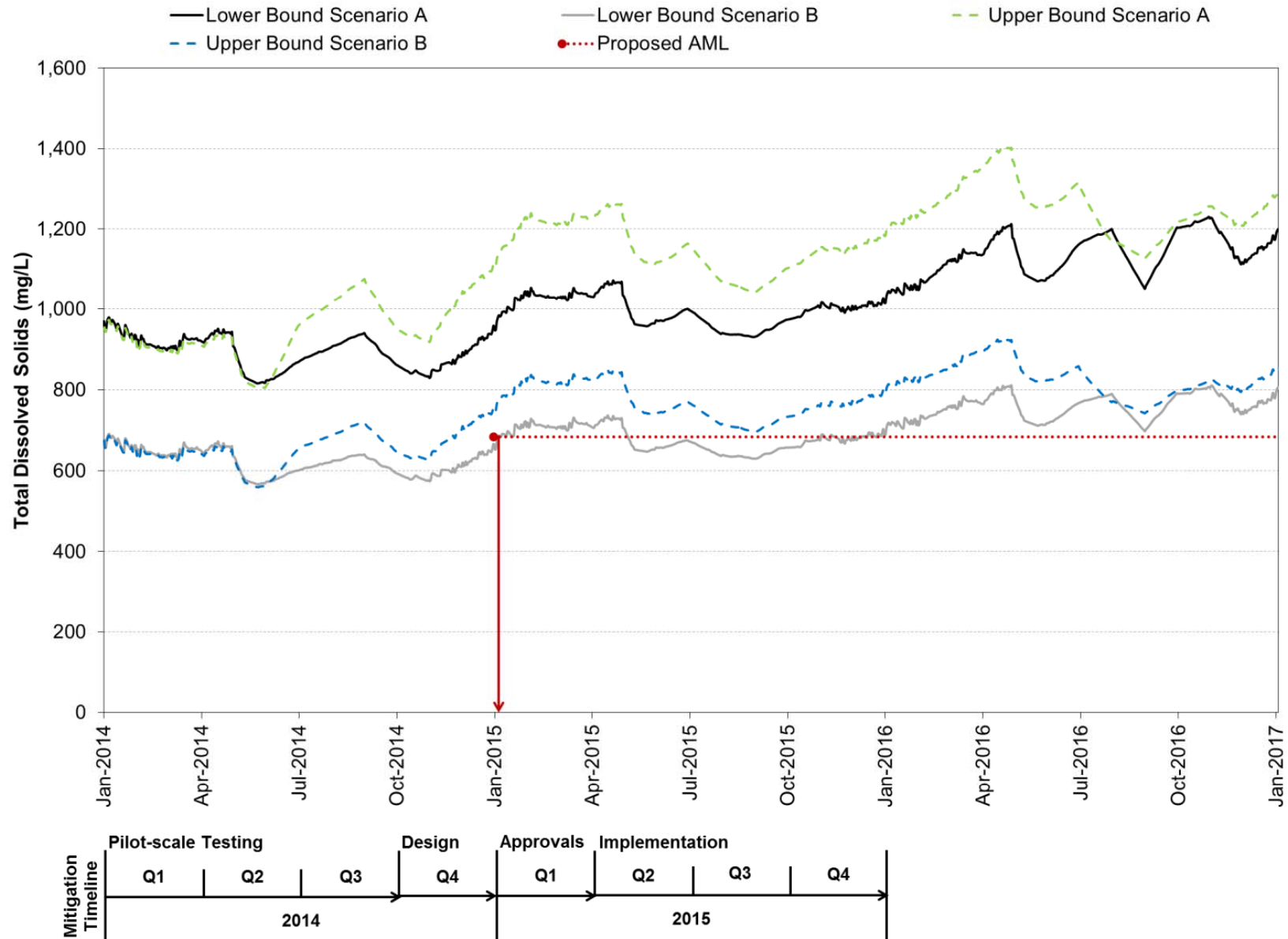


8.2.3 De Beers Responses to IR#10

- IR#10 – a timeline of the planning, testing and implementation of mitigations to reduce TDS levels in the effluent, and a graphic or table that aligns the timeline for the TDS mitigations with the predictions of end-of-pipe TDS concentrations
 - By January 2015, end-of-pipe TDS concentrations are predicted to be higher than the proposed average monthly limit (AML) of 684 mg/L
 - De Beers would, therefore, be out of compliance with the Water Licence, should an AML of 684 mg/L be adopted as early as January 2015



Predicted Total Dissolved Solids Concentrations at End-Of-Pipe Without Mitigation and Anticipated Timeline for Implementation of Mitigation

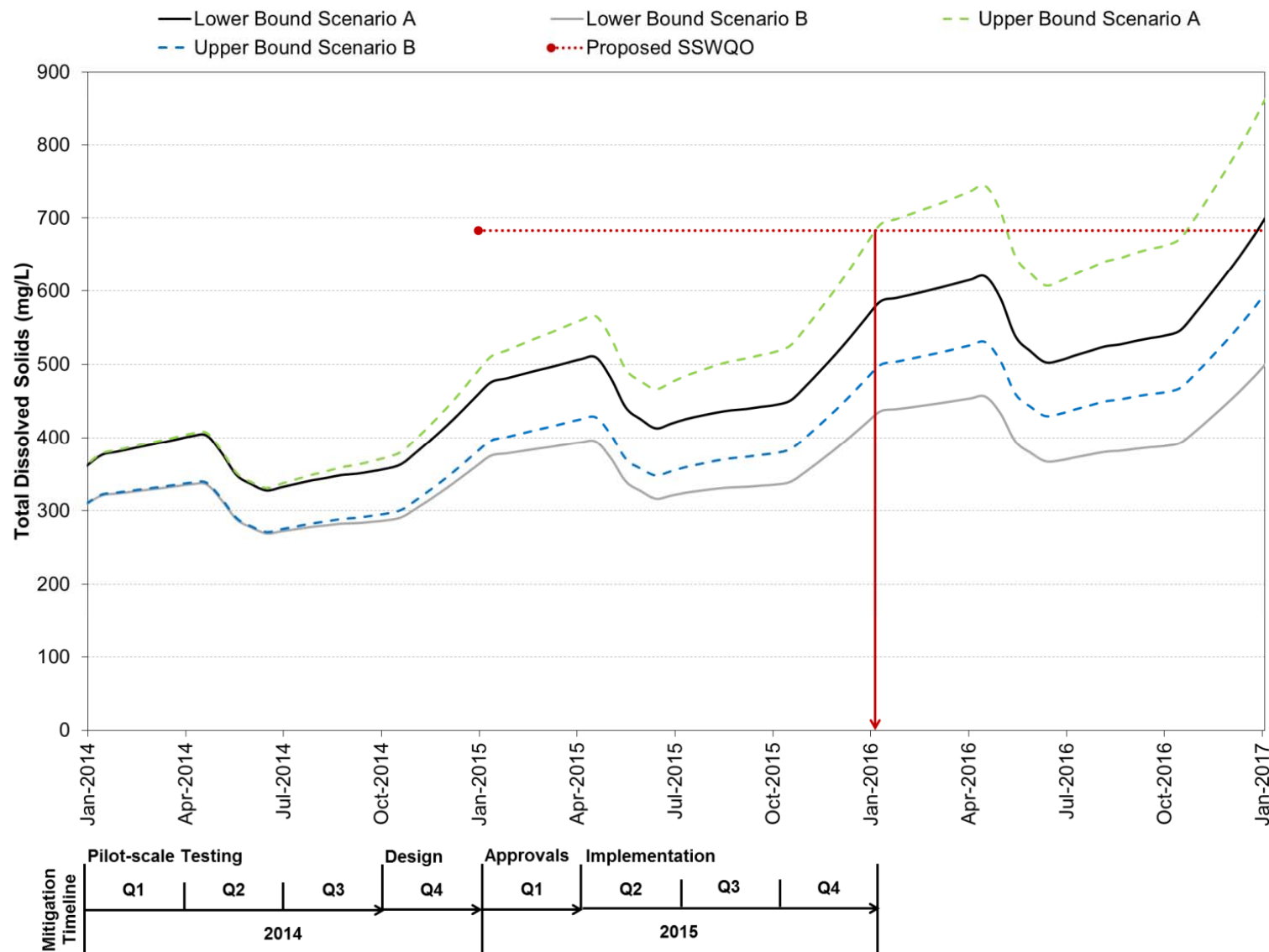


De Beers Responses

- To allow for implementation of mitigation, De Beers proposes an interim protective TDS AML of 850 mg/L, which would apply between January 2015 and January 2016 and be inclusive of TDS, chloride, fluoride, and sulphate
 - The model predicted that an interim TDS AML of 850 mg/L would maintain TDS concentrations in Snap Lake below the proposed SSWQO of 684 mg/L
 - An interim TDS AML of 850 mg/L is achievable without mitigation if TDS concentrations at end-of-pipe to January 2016 match predicted TDS concentrations from Upper Bound Scenario B or Lower Bound Scenario B



Predicted Whole-lake Average Total Dissolved Solids Concentrations in Snap Lake Without Mitigation and Anticipated Timeline for Implementation of Mitigation



Comments from the Environmental Analyst

- The interim AML is an appropriate move in response to SLEMA comment letter dated January 16, 2016



8.2.4 De Beers Responses to IR#11

- IR#11 - an assessment of what the environmental effects on Snap Lake would be if no additional mitigation was put in place for TDS at the Snap Lake Mine
- De Beers responses
 - Without mitigation, maximum TDS concentrations during operations are predicted to range from: 827 to 1,735 mg/L at the outlet of Snap Lake; from 640 to 1,552 mg/L in Downstream Lakes 1 and 2; from 94 to 562 mg/L in Lac Cabot Blanc; from 89 to 176 mg/L upstream of King Lake, which is approximately kilometres (km) from the Mine; and, lower downstream

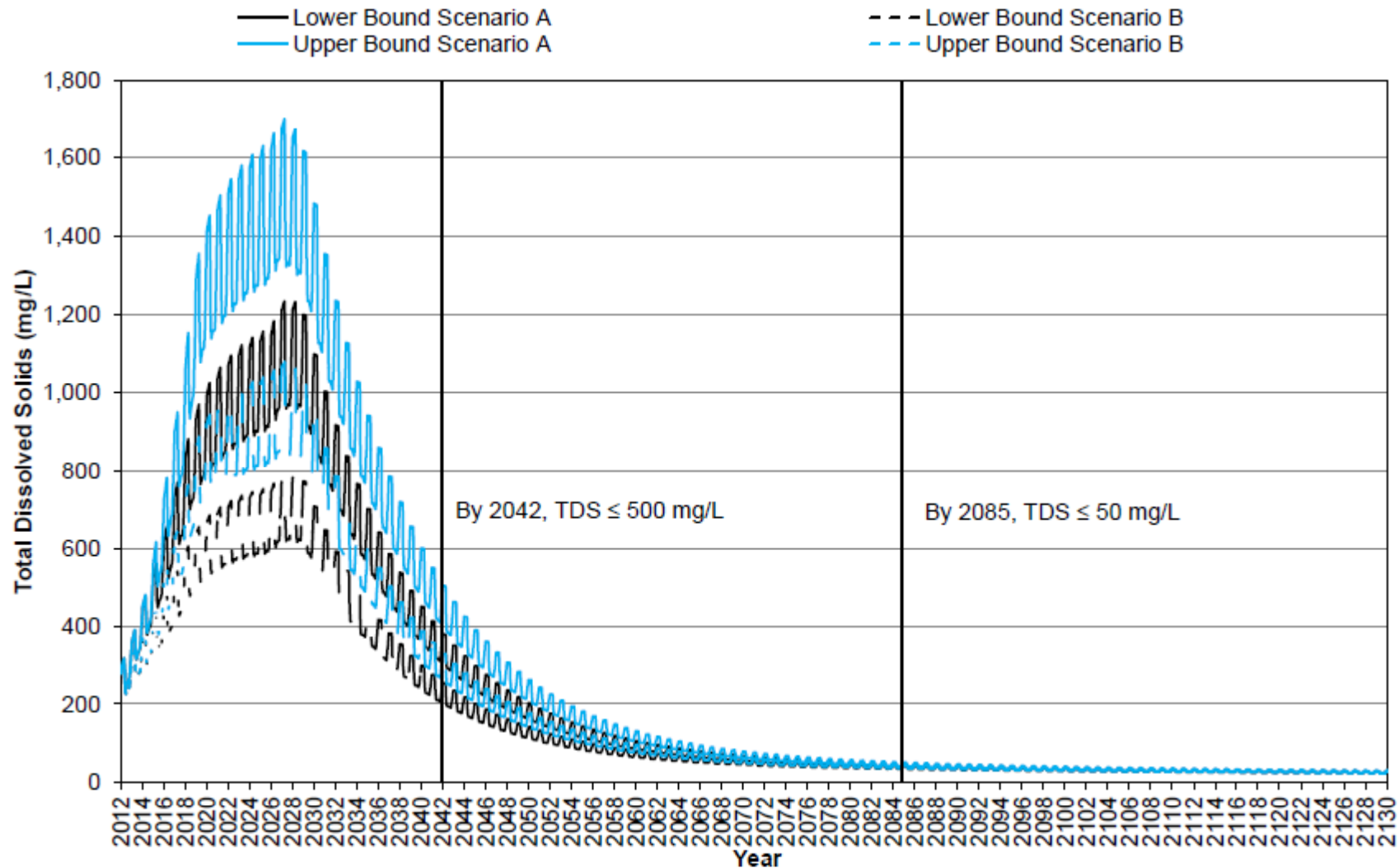


Environmental Effects if without Mitigation

- Minor environmental effects (on daphnid reproduction, a small percentage of the zooplankton community) on Snap Lake up to approximately 1,000 mg/L TDS comprising 46% chloride;
- Potentially slightly mineral-tasting drinking water in Snap Lake and the immediate downstream area (areas exceeding 1,200 mg/L TDS; and,
- An uncertain level of environmental effects on Snap Lake above approximately 1,400 to 1,500 mg/L TDS comprising 46% chloride (predictions are not possible above tested concentrations)



Predicted Whole-lake Average Total Dissolved Solids Concentrations in Snap Lake, 2012 to 2130, Unmitigated Scenario



mg/L = milligrams per litre; TDS = total dissolved solids; ≤ = less than or equal to.

8.2.5 De Beers Responses to IR#13

- IR#13 – trends in the amount of explosives used per tonne of ore mined (kg/tonne) as a means of monitoring the effectiveness of explosives management measures
- De Beers Response

Table MVRB/MVLWB_IR#13-1: Explosive Use per Tonne Rock Blasted

Year	2012	2013	2014 (to Apr 27, 2014)
Tonnes Blasted	1,079,616	1,332,175	426,844
Explosives Used (kg)	1,436,885	1,747,368	513,853
Explosive Usage (kg) per tonne mined	1.33	1.31	1.20



Comments from the Environmental Analyst

- It is good to see De Beers take efforts to reduce the amount of nitrate through improvements to blasting practices underground and make progress
- De Beers is encouraged to continue the efforts



8.3 EcoMetrix Review of Amendment Application (I)

➤ Submitted on May 9, 2014

- Overall, the proposed Site Specific Water Quality Objectives (SSWQOs) for TDS, Chloride, Fluoride, Nitrate, Ammonia, Strontium, Sulphate, Copper, and Nickel seem to be adequately protective against toxic effects in Snap Lake
- In general, the models are as accurate as possible given the data that DBCI has collected, and that the model predictions for future concentrations are either realistic or conservative



8.3 EcoMetrix Review of Amendment Application (II)

- Overall, there likely would be adverse effects on sensitive zooplankton taxa at the highest predicted TDS concentrations of 1700 mg/L in Snap Lake, and in downstream lakes 1 and 2 at predicted peaks around 1400 mg/L. There is no evidence that TDS effects at the highest predicted exposure levels will extend beyond this threshold of significance, but major changes in the zooplankton community cannot be ruled out



8.3 EcoMetrix Review of Amendment Application (III)

- Overall, there likely would be adverse effects on sensitive zooplankton taxa at the highest predicted chloride concentrations of 800 mg/L, and in downstream lakes 1 and 2 at peaks around 660 mg/L. There is no evidence that chloride effects at the highest predicted exposure levels will extend beyond this threshold of significance, but major changes in the zooplankton community cannot be ruled out



8.3 EcoMetrix Review of Amendment Application (IV)

- “Since we are confident that the model is reasonably accurate, and either realistic or conservative, we are also confident that if DBCI meets their proposed EQCs, the proposed WQOs will be met in Snap Lake.
- This does not address the question of whether the conceptually proposed mitigations, when plans are finalized in detail, will be sufficient to enable the mine to meet the proposed EQCs. However, the Mine Water Treatment Plant Alternatives Evaluation (CH2MHill, 2012) suggests that TDS, chloride and nitrate removal efficiencies greater than 90% are possible using reverse osmosis technology. Thus, without consideration economics, it should be feasible in theory to achieve EQCs in the treated mine effluent”



8.3 EcoMetrix Review of Amendment Application (V)

- Overall, the EQC calculation methodology from Alberta (1995) and US EPA (1991) was considered to be appropriate. EQCs for ammonia and nitrites should be re-derived to take loss terms into account consistent with the Snap Lake model



8.4 Technical Reports

- NSMA submitted their technical report on May 20, 2014
 - 5 recommendations proposed
- YKDFN, LKDFN, EC, GNWT, and DKFN submitted their technical reports on May 21, 2014
 - YKDFN proposed 6 recommendations
 - LKDFN proposed 7 recommendations
 - EC proposed 4 recommendations
 - GNWT proposed 10 recommendations
 - DKFN proposed 2 recommendations
- De Beers responded to Technical Reports on May 28



8.4.1 NSMA's Technical Report (I)

- Submitted on May 20, 2014
- Proposed 5 recommendations
 - Develop endpoints for future water discharge that are mutually agreed upon and will not cause harm to the fish and wildlife of Snap Lake and downstream, ensure these endpoints are verified through multiple peer reviewed scientific studies
 - Require additional consultation and face-to-face meetings to occur with each Aboriginal party to further explain the quantity and quality of proposed mine effluent, how the environment will be protected what technology will be installed when



8.4.1 NSMA's Technical Report (II)

- Require additional water treatment technology be installed by De Beers to reduce total dissolved solids in mine effluent to meet effluent quality criteria that is proven to protect the health of the aquatic environment
- Require a dedicated site inspector be employed by the Government of the Northwest Territories for the life of the Project and ensure communication with the existing independent monitoring body SLEMA be continued as well as with Aboriginal parties
- Require an additional third-party, unbiased scientific study be conducted to review all current and available data, and communicate the findings of this study related Aboriginal parties



8.4.2 YKDFN's Technical Report (I)

- The Project should be required to prepared a concordance table that looks at the predictions made during the EA and complete a comparison of the monitoring data to identify areas of future concern and unpredicted impacts
- The Project should be required to complete a review for each measure, suggestion and commitment made, indicating how they succeeded in meeting the required action. If the task has not been completed, the project should identify how they will implement the needed mitigation or commitment. This should be captured as a measure in the current decision, directing this review to be submitted as a special study for approval with MVLWB permit



8.4.2 YKDFN's Technical Report (II)

- YKDFN strongly reject the “pollute up to” approach and recommend that a more objective approach be employed, setting the TDS limit at 500 mg/L. this level will limit the impacts to the environment while protecting the land users, ensuring that their perception of the area is not significantly changes and the mine site can be remediated with public confidence



8.4.2 YKDFN's Technical Report (III)

- Given the situation facing the community, we recommend that the Project and industry be directed to undertake academic studies to consider the issues facing Ndilo and Dettah and issue recommendations aimed at promoting community health. Within almost 20 years of data the study would no longer need to rely on predictions – what has happened can guide and inform public policy development



8.4.2 YKDFN's Technical Report (IV)

- The Board should put a measure in place to protect the Lady of the Falls. This measure should be clear that any alteration in water quality in this area is unacceptable, whether it be project specific or cumulative in origin
- YKDFN are frustrated with the company's approach to consultation and ask the Board to require the project to resubmit the engagement record with only relevant engagements, indicating what concerns they gathered from these processes and how they sought to mitigate them. This will ensure that companies do not try to paper the record to create large volumes



8.4.3 LKDFN's Technical Report (I)

- Whatever the board decides to set the new limits at, that they be strict limits not to be exceeded, as public and environmental concern would be too great beyond these limits
- The Board place a measure that completely protects the Lady of the Falls. No level of change is acceptable at this site regardless of the source of the effluent
- The Board work with the Land and Water Board to create a response framework where the “high” action level is if the effluent plume reaches the outflow of Mackay Lake



8.4.3 LKDFN's Technical Report (II)

- The Board require the company to provide substantial information about these technologies (TDS removal) and investigate various combinations of them in a cost benefit analysis
- Improved treatment and source control be the priority in terms of approaches to the water quality issues, not raising the licence limits
- The Board set the TDS limit no higher than Canadian Drinking Water Quality Guidelines of 500 mg/L for the protection of the way of life of the aboriginal people of the north
- The Board set the a fluoride limit no higher than Canadian Drinking Water Quality Guidelines of 1.5 mg/L



8.4.4 EC's Technical Report (I)

- EC is of the opinion that the conclusions drawn by DeBeers are, in general, supported by the Analysis
 - If there is the potential for a deleterious substance to be deposited, Best available Technology Economically Achievable (BATEA) be applied to achieve end-of-pipe concentrations that will not result in harm to aquatic life in receiving waters
 - De Beers provides regular updates to the MVEIRB/MVLWB on their treatment system pilot testing program in order that the Boards can have an understanding of what end-of-pipe limits could be achieved by treating a given volume of effluent



8.4.4 EC's Technical Report (II)

- De Beers assess the seepages from the North Pile and the Water Management Pond and quantify the amount of TDS and chloride that are entering Snap Lake from these seepages
- De Beers monitor water quality parameters, such as, temperature, pH, specific conductance, dissolved oxygen, and any other parameters that would help to identify water quality conditions related to the potential for stratification of Snap Lake, and that De Beers develop contingency mitigation measures which can be implemented in the event this is observed



8.4.5 ENR's Technical Report (I)

- The Minister of AANDC has delegated to the GNWT Minister of Lands certain powers, duties and functions
 - The Minister of Lands will receive and distribute the Report of Environmental Assessment, will participate in and distribute decisions, and will have the power to extend time limits
- The Minister of ENR has the delegated authority to approve the water licence amendment, pending the outcome of the environmental assessment



8.4.5 ENR's Technical Report (II)

- The GNWT has determined that:
 - The magnitude of impact under unmitigated conditions is significant based on future concentrations of TDS and its constituents (chlorides) both in Snap Lake and downstream from Snap Lake
 - The loss of traditional use in the area and the ability to drink water at Snap Lake should be assessed as a significant adverse impact on the environment, based on the concerns raised by Aboriginal groups (i.e.. YKDFN)



8.4.5 ENR's Technical Report (III) - Recommendations

- The GNWT recommends that the Review Board include a specific statement in the Report of Environmental Assessment that the conclusions and measures that result from this environmental assessment are specific to the Snap Lake Mine and Snap Lake
- The GNWT recommends that the Review Board consider the unmitigated, worst case scenario for the Snap Lake Mine as a significant deviation from the original impacts authorized in the Report of Environmental Assessment in 2003



8.4.5 ENR's Technical Report (IV) - Recommendations

- The GNWT recommends that the Review Board include a measure requiring De Beers to conduct a robust study on the anticipated reduction time of hardness during the recovery of Snap Lake (post operation) and how this reduction will compare to metals and nutrients over time. Specific attention should be given to impacts that would result from the utilization of any hardness-adjusted Site Specific Water Quality Objectives (SSWQOs)
- The GNWT recommends that the Review Board assess the uncertainties related to varied concentration reductions over time for various hardness-adjusted parameters and that these uncertainties be taken account when assessing the significance of proposed increases in TDS and its constituents



8.4.5 ENR's Technical Report (V) - Recommendations

- The GNWT recommends that the Review Board consider that an unmitigated, worst case scenario for the Snap Lake Mine will likely lead to a significant adverse impact on the traditional use of Snap Lake (i.e. fishing, drinking water, etc.) and its downstream aquatic environment
- The GNWT recommends that the Review Board include a measure requiring De Beers to minimize the degree or extent of project related impacts to Snap Lake and the downstream aquatic environment



8.4.5 ENR's Technical Report (VI) - Recommendations

- The GNWT recommends that the Review Board include a measure requiring De Beers to take necessary steps during operation and at closure to return Snap Lake to pre-mining conditions as soon as possible post-closure
- The GNWT recommends that the Review Board include a measure to require De Beers to prevent measurable change water quality at Old Lady of the Falls



8.4.5 ENR's Technical Report (VII) - Recommendations

- The GNWT recommends that the Review Board include a measure to require DeBeers to ensure protection of the traditional use of water in Snap Lake and downstream
- The GNWT recommends that the Review Board include a measure requiring De Beers to implement, no later than 18 months following the issuance of the water licence, mitigation sufficient to protect the aquatic environment and maintain traditional use of Snap Lake



8.4.6 DKFN's Technical Report

- Suspension of the environmental review decision phase until after the results of the above noted studies (the phased and pilots studies for 2014) are completed and results are presented by De Beers
- Identification of specific management actions, other than ongoing studies, by De Beers regarding mining practices that could reduce the levels of TDS



8.4.6 De Beers Responses (I)

- De Beers recognizes that, while the mandate of the Mackenzie Valley Review Board (Review Board) in this environmental assessment is to make a determination whether the proposed development will result in significant impacts to the environment, it is also the responsibility of the MVLWB to determine whether the proposed SSWQOs and FOC are appropriate and protective



8.4.6 De Beers Responses (II)

- De Beers requests that the MVLWB apply an interim EQC for TDS, inclusive of its parameters, that will allow De Beers to complete feasibility and engineering designs and implementation of appropriate mitigation to achieve SSWQOs and EQC as prescribed by the MVLWB through the subsequent regulatory process



8.4.6 De Beers Responses (III)

- While De Beers has presented the “unmitigated scenario” to allow reviewers to appreciate that unregulated effluent might cause significant effects to the aquatic environment, the unmitigated scenario is unrealistic in light of De Beers’ proposal
- De Beers does not intend to discharge effluent to a level beyond an approved EQC, and, in this regard, has proposed appropriate SSWQOs and EQC that will ensure that there are no significant impacts to the aquatic environment



8.4.6 De Beers Responses (IV)

- De Beers has considered the concerns and recommendations of reviewers regarding the quality of water in relation the Canadian Drinking Water Quality Guidelines. De Beers realizes that the taste of Snap Lake water during the time when effluent is being discharged to Snap Lake may be perceived as “fair” if the development proposal is approved. However, the water will remain safe for human consumption
- Modeling indicates that the water within Snap Lake will return to “good” (<500 mg/L) and “excellent” taste levels (<300 mg/L) within 4 and 10 years, respectively, of the cessation of effluent discharge post-mining



8.4.6 De Beers Responses (V)

- In response to concerns raised about Snap Lake discharge potentially affecting Lady of the Falls, De Beers is very confident that Snap Lake effluent will not affect this very special place. Models of the flow of effluent in lakes downstream of Snap Lake show that Snap Lake effluent will only be detectable, over the life of mine, up to about 54 km downstream from the mine. Parry Falls is 421 km downstream of Snap Lake, with Lady of the Falls a further 15 km downstream



8.4.6 De Beers Responses (VI)

- De Beers agrees that there have been unforeseen changes at the Snap Lake Mine since pre-construction predictions were considered during the original environmental assessment
- There have been many learnings over the current life of the Mine; however, the health of Snap Lake remains unimpaired. The fish are safe to eat and the water is safe to drink
- De Beers has made many operational improvements since construction and operations began 9 year ago in order to proactively recognize and manage water-related concerns



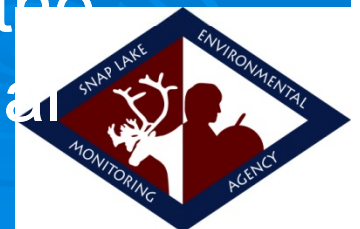
8.4.6 De Beers Responses (VII)

- In regards to engagement on this proposal, De Beers has been meeting with regulators and other parties since the water licence renewal process in 2011 to develop an appropriate methodology to establish protective SSWQOs
- De Beers commits, in 2014, to continuing engagement, including providing project updates to each of the affected communities, as well as to hosting each community at the Snap Lake Mine

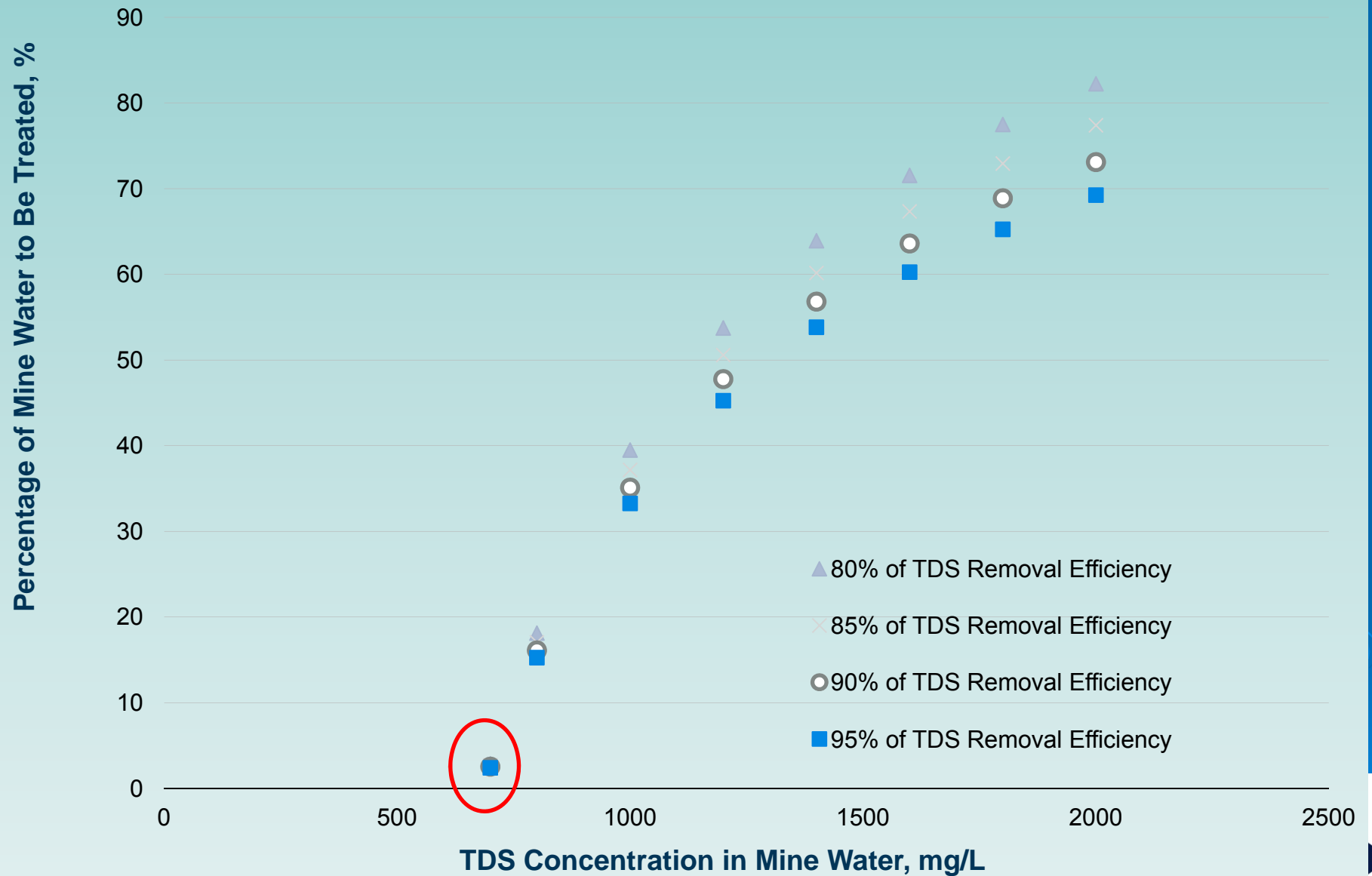


8.5 Revisit of the Ratio of Mine Water to be Treated

- SLEMA issued a letter on April 22, 2014 on the impacts of TDS level in mine water and TDS removal efficiency of mitigations on the ratio of mine water to be treated to meet the proposed Effluent Quality Criterion (EQC) for TDS
 - De Beers proposed EQC of 684 mg/L was investigated
- YKDFN and LKDFN proposed on May 21 the TDS limit no higher than Canadian Drinking Water Quality Guidelines of 500 mg/L for the protection of the way of life of the aboriginal people of the north



Impacts of Mitigation Efficiency and TDS Level in Mine Water on the Percentage of Mine Water to Be Treated if EQC is 684 mg/L



Ratio of Mine Water to Be Treated (I)

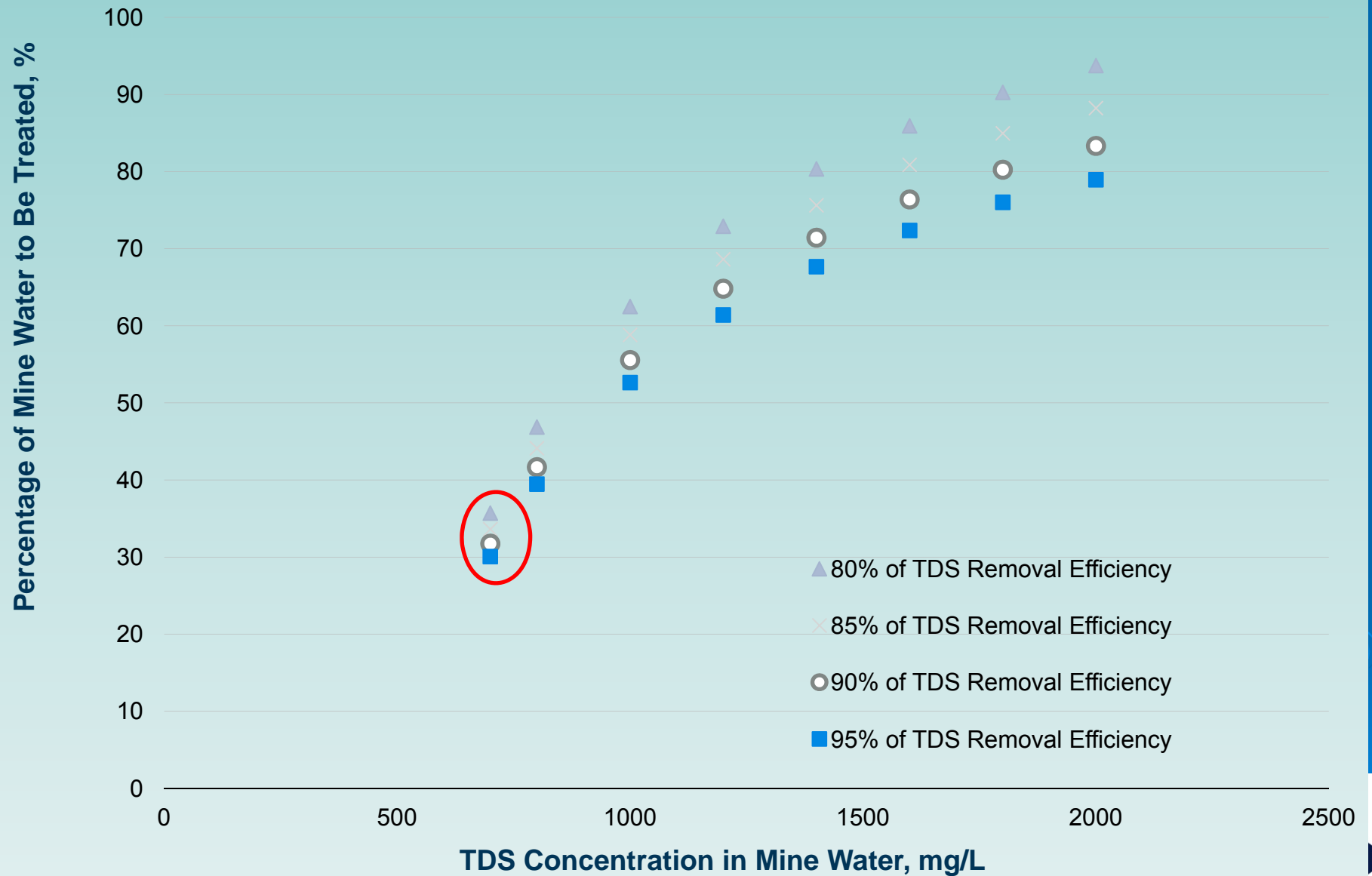
➤ $R > 100(C - EQC) / (\eta C)$

- 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, %

➤ 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



Impacts of Mitigation Efficiency and TDS Level in Mine Water on the Percentage of Mine Water to Be Treated if EQC is 500 mg/L

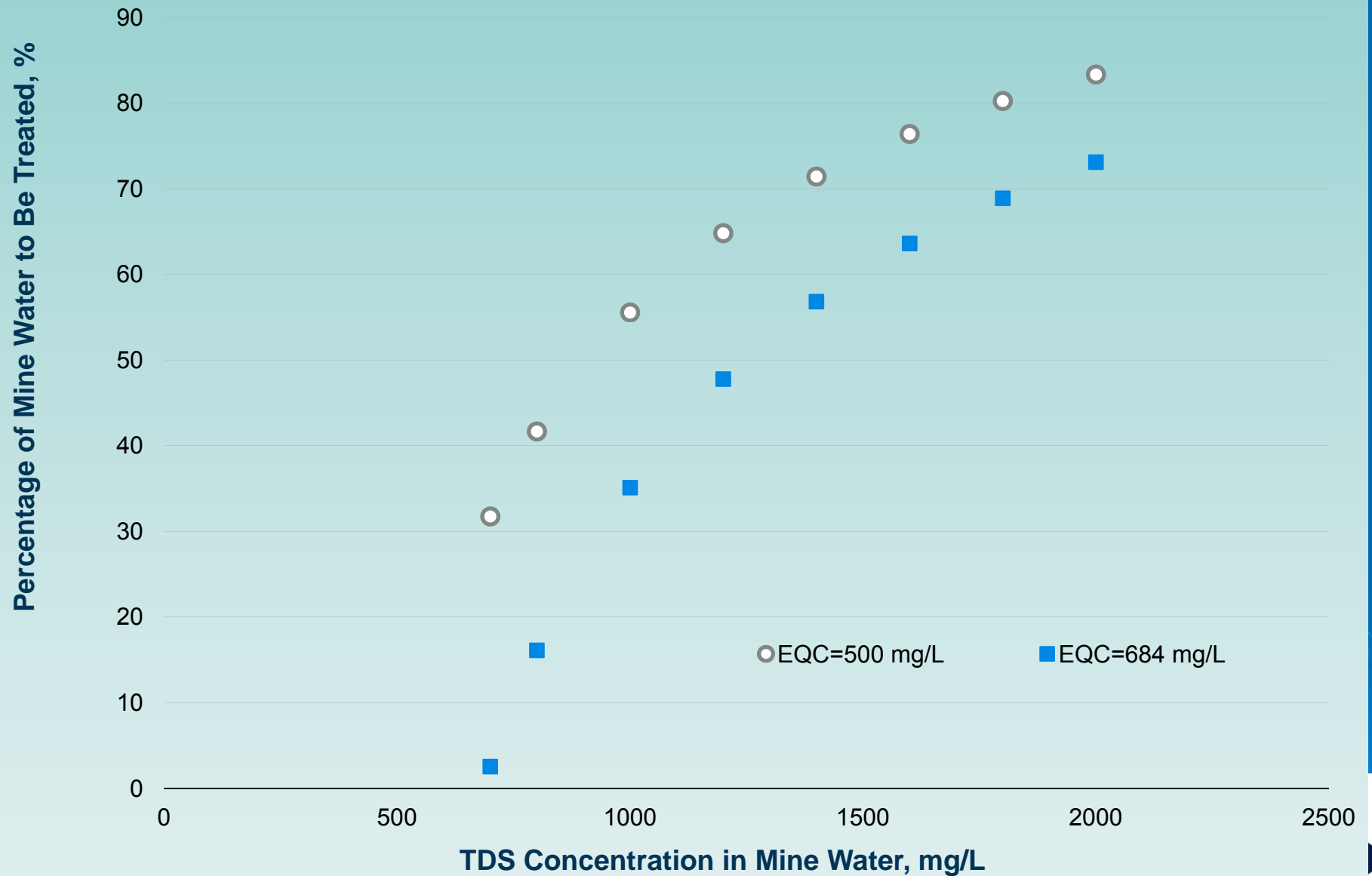


Ratio of Mine Water to Be Treated (II)

- $R > 100(C - EQC) / (\eta C)$
 - 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, %
- It is clear that if EQC is more stringent (lower value), the more mine water has to be treated



Impacts of EQC and TDS Level in Mine Water on the Percentage of Mine Water to Be Treated if TDS Removal Efficiency is 90%



Comments from the Environmental Analyst

- ENR's Technical Report states 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
- 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

