

## RECORD OF MEETING

Date/Time: March 11, 2014: 7:45 – 5:40

Location: Snap Lake Mine

Subject: Regulators' Site Visit

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## PARTICIPANTS

Sarah-Lacey MacMillan, Environment Canada  
Chuck Hubert, Mackenzie Valley Environmental Impact Review Board  
Simon Toogood, Mackenzie Valley Environmental Impact Review Board  
Angela Love, Mackenzie Valley Land and Water Board  
Rosanna Nicol, Mackenzie Valley Land and Water Board  
Zhong Liu, Snap Lake Environmental Monitoring Agency  
Peter Chapman, Golder and Associates  
Tasha Hall, Golder and Associates  
Chafic Kouri, Government of the Northwest Territories – Environmental Assessment  
Lindsay Luke, Government of the Northwest Territories – Environmental Assessment  
Stu Niven, Fisheries and Oceans Canada

## DE BEERS CANADA INC. TOUR LEADS:

### Management:

Environment: Erica Bonhomme  
Technical Services: Kevin Gostlin  
Mine Operations – Process: Peter Mooney  
Mine Operations - Underground: Herman Henning  
Mine General Manager: Maxwell Morapeli

### Operations and Services:

Alex Hood, Tom Bradbury, Sarah Altimimi (Environment)  
Rob Johnson, Clark Millner, Pat Decque, Eric Kuleba (Mine Operations – Underground)  
Jack Bellanger, Mike Easthom, Mike Cripps, Jesse Clark (Site Services)  
Todd Ritchie (Mine Operations)  
Kevin Oberkirsch (Asset Optimization)  
Darlene Lebrun (Training)

# DE BEERS

GROUP OF COMPANIES



Surface tour group participants

## Agenda

Time	Action
7:45-8:00 am	Check in at <b>Summit Air</b> 27 Yellowknife Airport, Yellowknife NT X1A 3T2 (867) 669-9789
8:30 am	Depart Yellowknife to Snap Lake mine

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Time	Action
9:15 am	Arrive at Snap Lake mine – plane will hold for the day
9:40 am	Safety Orientation – Legendary Sky Boardroom
10:00	Underground Training – Mine Ops Boardroom
10:15 am	Mine and Environmental Overview and Purpose of Visit
11:00 am	Surface Tour <ul style="list-style-type: none"> <li>• Water Management Infrastructure (sumps, Water Management Pond, pump shack)</li> <li>• North Pile (get out at the test caps)</li> <li>• Waste Management area</li> <li>• Laydowns</li> <li>• Tank farms</li> </ul>
12:15 pm	Water and Sewage Treatment Plant Tour
<b>12:50</b>	<b>Lunch and Q/A</b>
1:30 pm	Underground Tour <ul style="list-style-type: none"> <li>• Water Management System</li> <li>• MSS</li> <li>• Key infrastructure</li> </ul>
4:00 pm	Debrief in Legendary Sky Boardroom
4:15 pm	Check in
4:45 pm	Wheels Up
5:30 pm	Arrive in Yellowknife

**7:45-9:30 AM**

*Presenter: Alex Hood*

Alex greeted each guest as they arrived on site and invited comment on expectations and items of interest for the day. Upon arrival at the main camp, Erica greeted the bus and gave a safety share of watching your hands and footing during the day.

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**9:40-10:30 AM**

*Presenter: Dar Lebrun, Kevin Oberkirsch*

General Site and Underground Orientation

**10:30 -11 AM**

*Presenter: Erica Bonhomme, Kevin Gostlin- Presentation Attached*

Presentation attached; the presentation discussed the process of delineating and mining ore at Snap Lake Mine, as well as the process for managing ore, waste and water.

**11:15 - 12:05 AM**

*Presenters: Alex Hood, Erica Bonhomme, Peter Mooney, and Mike Easthom*

The surface site tour started near the water management pond, and the flocculent tank where a general overview was given. The group then drove through the waste management area, where it was explained how waste is sorted, labeled in appropriate containers and shipped off site. The tour viewed two new incinerators. The tour then proceeded to the top of the North Pile, where an overview was provided of how the Starter Cell is designed and constructed. The tour was able to see processed kimberlite slurry being deposited to one of the cells. The group was able to see the network of temporary and permanent sumps around the pile, designed to capture all water seepage from the North Pile. The location of the next phase of North Pile development, including the East Cell and West Cell, were pointed out. The tour was able to see the location of the landfarm and test caps, old construction camp, fuel tank farm including the proposed location of new tanks. On the way to the next stop, the group passed the portal to the underground, and the conveyor to the process plant. The tour concluded at a viewpoint overlooking the outfall diffuser, where the installation and operation of the diffuser was explained.

Many good questions were asked during the surface tour and answered by De Beers personnel.

**12:05-12:30 PM**

*Presenter: Mike Cripps*

The site visit also included visits to the sewage treatment plant, water treatment plant and modular water treatment plant. The tour began with an explanation of the water treatment process and a review of the schematics in the control room. The importance of the PLC room was also explained, in which everything is interlocked and controlled by the PLC unit..

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**12:40-1:25 PM**

Lunch was provided in the cafeteria, and was an opportunity for participants to sit with DBC staff to review the tour and answer general questions about mine construction, operations and employment.

**1:30- 3:35 PM**

*Presenters: Herman Henning, Kevin Gostlin, Jesse Clark*

The group proceeded to the Mine Operations wicket to change to underground gear, and proceed underground in three vehicles. The tour went through various areas of the mine, but stops of interest focused on ore development and underground water management. The group first went to the dirty water settling sump area to see how material is settled and to observe the volumes of water that enter and are managed in the underground mine workings. The second stop on the tour was to see recently-active mine heading, to observe how the ore can be “pinched-out” and diluted. Participants were shown the difference between the host rock and kimberlite and how NAG and PAG is assessed visually. The final stop on the tour was to see the clean water pumping areas and some of the water management infrastructure. Questions in both areas focused on how we dispose of waste that is settled in the dirty water area and how active grouting takes place to reduce water inflows.

**3:35-4:15 PM**

*Erica Bonhomme, Kevin Gostlin, Alex Hood*

The group had the opportunity for further question and answers and it was reiterated that for feedback on the tour, participants could contact Erica Bonhomme or Alex Hood. Conversation focused on how permafrost aggrades in the north pile and the equipment used to monitor temperature and water in the pile. Questions were asked about segregating “clean” and “dirty” water, and the water management system. There were questions about the progression of paste research, to which DBC responded that two information items are to be provided to the Mackenzie Valley Land and Water Board in the coming weeks - a response to Action Items from the October Snap Lake Working Group meeting and a Technical Memorandum as a part of the Water License Annual Report. Participants noted that they would like the opportunity to see the paste plant and process plant areas. DBC noted that these are restricted areas, which require extra precautions, and that to address this, DBC will be creating a video of those areas for visitors. It was also noted that it would be nice to visit the mine during the summer months, to which DBC agreed, but noted that they hoped that it was useful to participants to see the mine ‘sooner rather than later’.

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**4:15-5:40 PM**

*Presenter: Alex Hood*

The group left the main camp area through security to disembark. As the plane left for Yellowknife, the plane did two loops around the mine site allowing stakeholders an aerial view of site with Alex pointing out Key features.

# **Snap Lake Mine Regulators Visit**

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11 March 2014

DE BEERS  
GROUP OF COMPANIES

# Objectives & Format

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## Objectives:

- Overview of the mine and its operations
- Context for regulators who review applications and management plans related to Snap Lake Mine
- Observe environmental management practices in use
- Opportunity to ask questions of mine staff

## Format:

- Visual, interactive, multidisciplinary
- Visit main aspects of mine operations
- Not specific to any plan or application currently under review

# Snap Lake Mine Overview

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- 100% owned and operated by De Beers Canada Inc., a division of the De Beers Group of Companies
- Snap Lake Mine officially opened in July 2008; planned mine life 20 years
- 100% underground mining
- 540 permanent employees
- 1.3 M carats produced in 2013

# Regulatory Setting



- Snap Lake Mine operates under water licence, land use permit
- Mine infrastructure is located on three leases
- Other legislation applies to fuel storage, incineration, mine resupply, explosives management, wildlife and fisheries protection, and mine health and safety
- Inspection is conducted regularly by AANDC, with occasional visits by EC and ENR.
- SLEMA has a role to observe aspects of mine operations not otherwise covered by other authorizations per the Environmental Agreement

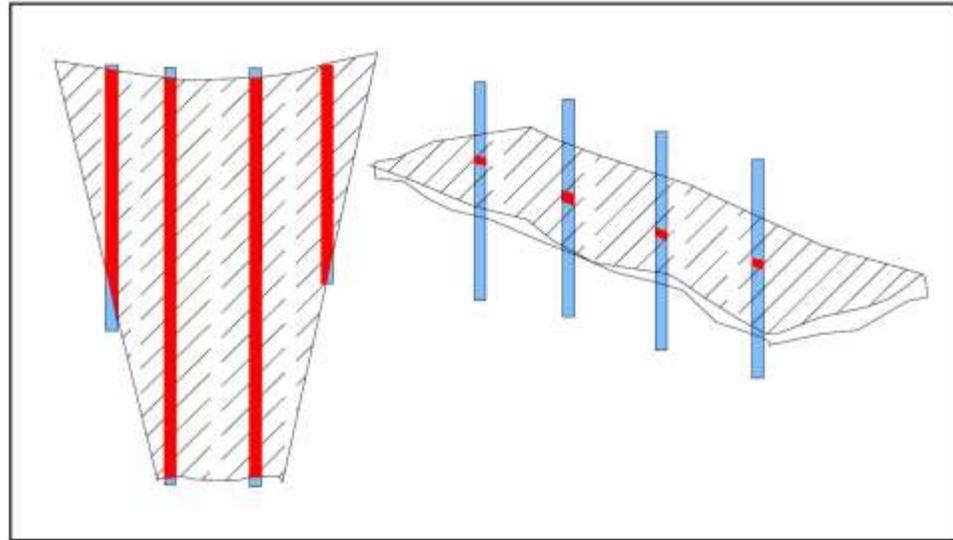
# Geologic Overview

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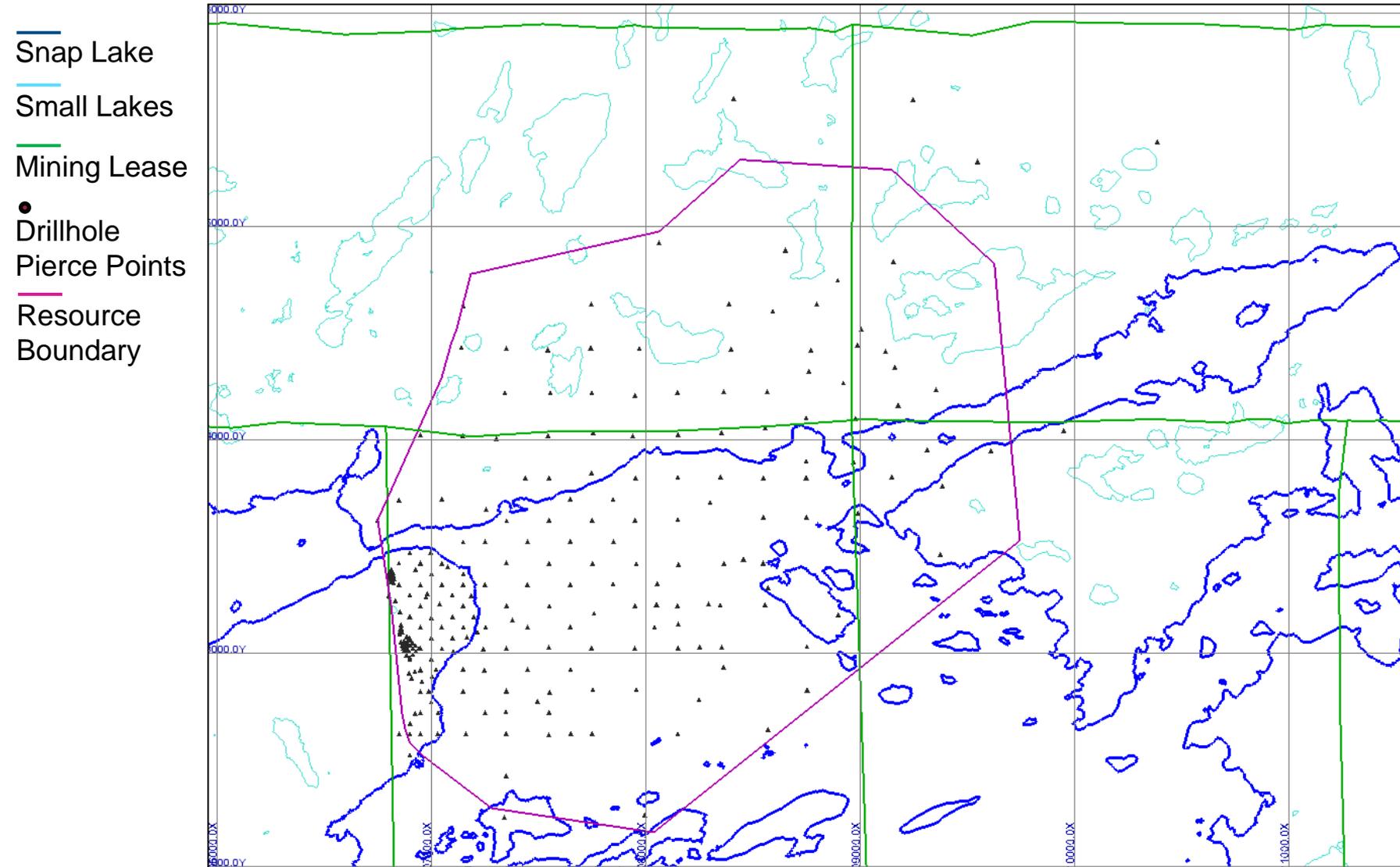
Kimberlite typically comes in the form of a 'pipe'

Snap Lake Ore body is a broad, flat, dyke

Proprietary Image Removed  
(Kimberlite Pipe Schematic)



# Geologic Overview





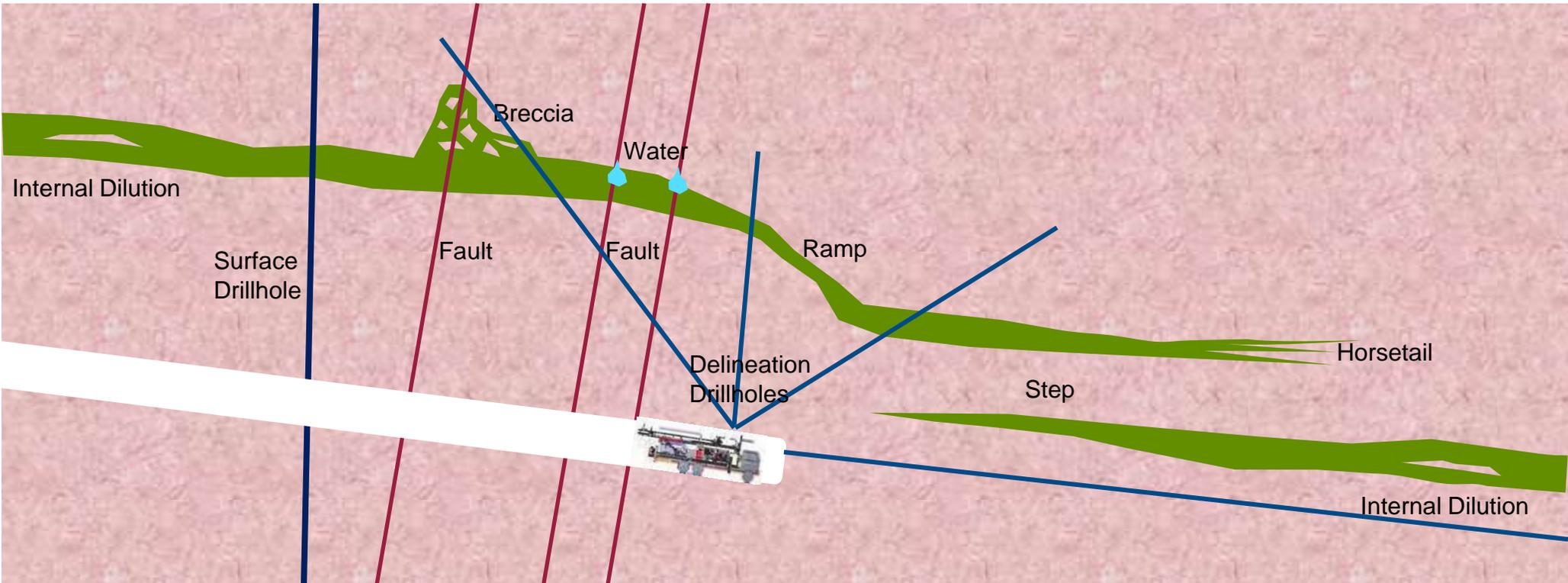


# Snap Lake Dyke schematic – cross-section



Common geological features

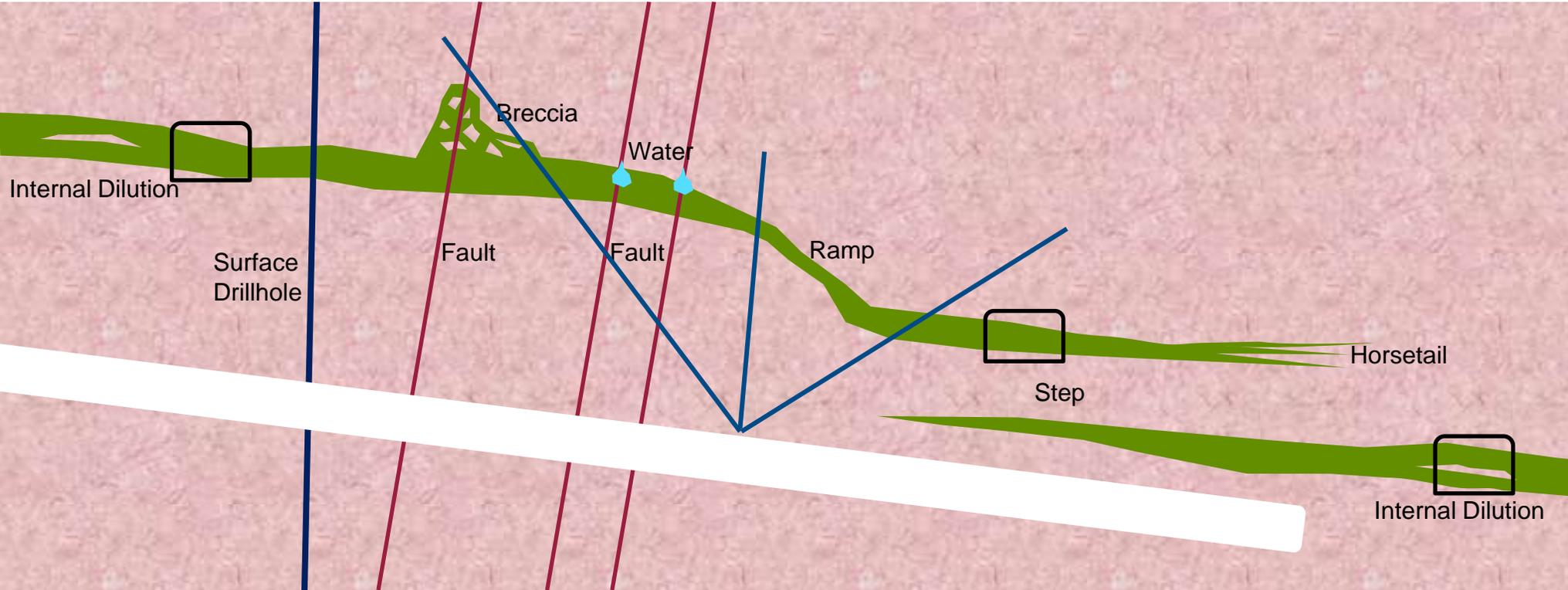
# Snap Lake Dyke schematic – cross-section



Footwall mining – mining in waste beneath the ore body (~30m)

- Ventilation circuits
- Haulage
- Utilities (electrical and water)
- Infrastructure (crusher and conveyor)
- Delineation drilling platform

# Snap Lake Dyke schematic – cross-section



Mining dimensions  
Height ~ 4m  
Width 4.8m  
Length ~ 3.4m

~ 25 blasts per day  
~ 100 active tunnels per month

# Rocktypes and Muck types

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KIMBERLITE



GRANITE



DIABASE



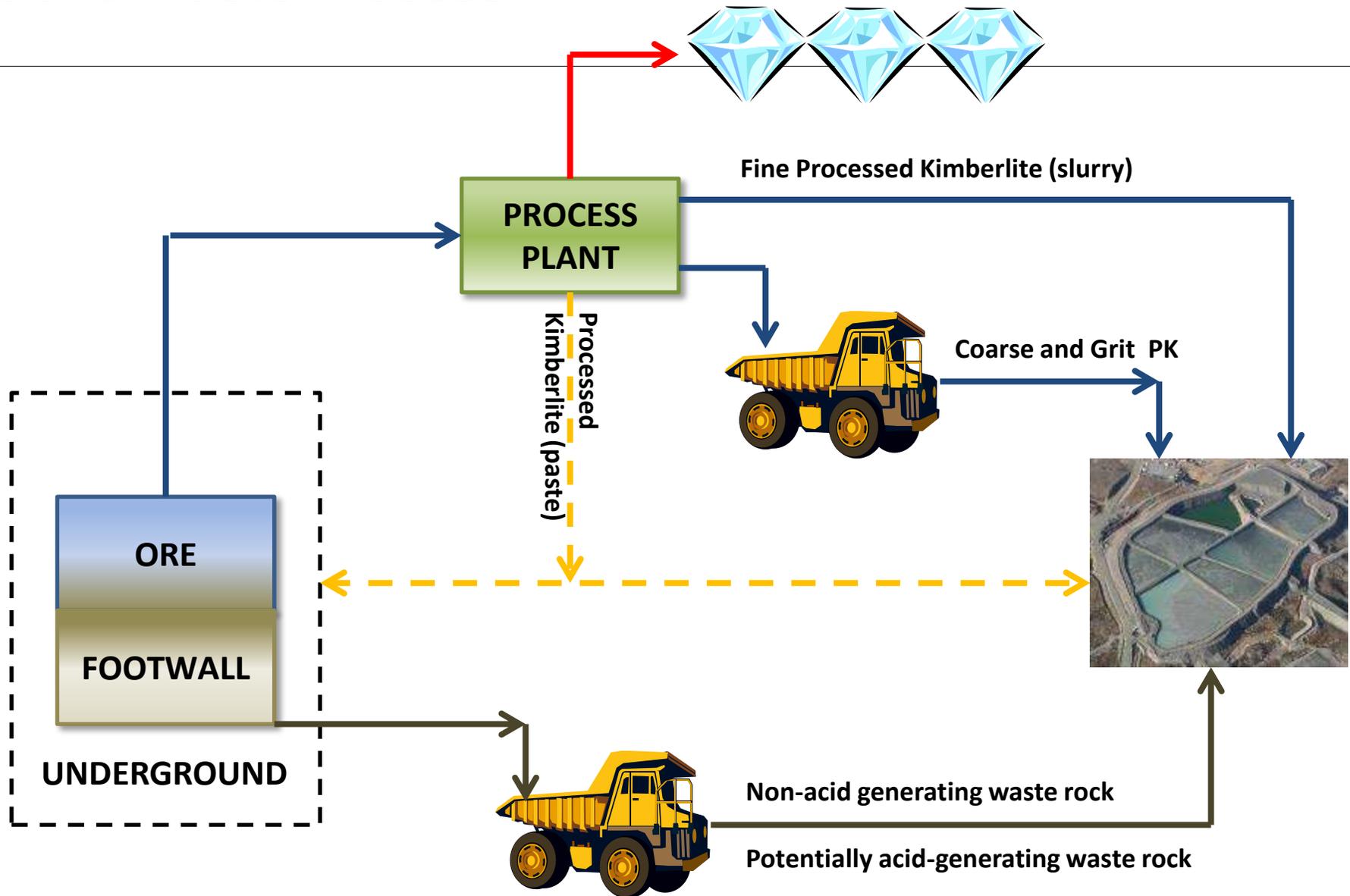
METAVOLCANIC

Non-Acid Generating Rocks

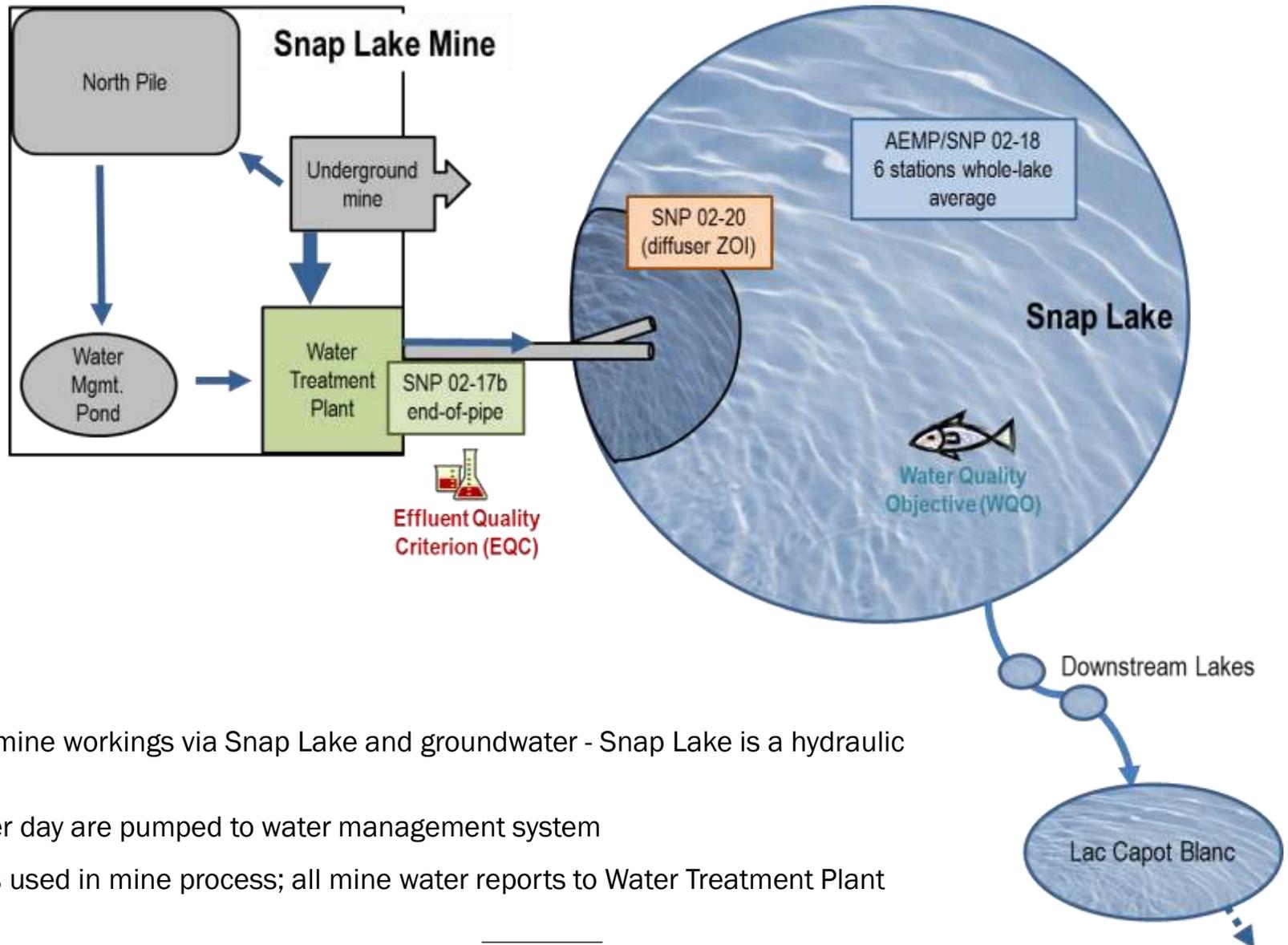
Potentially Acid Generating Rocks

- 1) “Dirty Waste” No kimberlite – some Metavolcanic or Diabase
- 2) “Clean Waste” No kimberlite, Metavolcanic or Diabase
- 3) “Ore” Kimberlite-bearing material

# Ore and Waste Process



# Water Management



- Water enters mine workings via Snap Lake and groundwater - Snap Lake is a hydraulic sink
- 42,000 m<sup>3</sup> per day are pumped to water management system
- Some water is used in mine process; all mine water reports to Water Treatment Plant

# SURVEILLANCE NETWORK PROGRAMME SAMPLING STATIONS



# Environmental Management in Practice

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## *Environmental Management Plans*

- Waste, Spills, Emergencies
- Water
- North Pile, Acid Rock Drainage /Geochemical Characterization
- Air, vegetation, wildlife
- Closure and Reclamation

## *Environmental Monitoring Programs*

- Aquatic Effects Monitoring Program and Surveillance Network Program
- Wildlife and Wildlife Habitat
- Air Quality, vegetation

## *SHE Operating Procedures*



November 2013

## Spill Contingency Plan



# Tour Itinerary

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Surface Tour (11:00 – 12:30)

Lunch (12:30 – 1:15)

Underground Tour

Debrief

Check-in 4:15

## *Things to Remember*

- PPE Required outside at all times
- Stay with your group
- Ask before taking pictures
- Safety thought of the day: “Shortcuts cut life short”
- Dispose of food waste appropriately

# Snap Lake Mine- March 11, 2014



1. Water management Pond
2. Lay Down Area
3. Waste Management Area
4. North Pile
5. Temporary Sump 4
6. IL6 Ditch
7. Fuel Storage
8. Mine Portal
9. Ore transport
10. Outfall (diffuser)
11. Sewage Treatment Plant/Water Treatment Plant
12. Accommodation complex