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DEPOSITING PROCESSED KIMBERLITE IN PITS AND UNDERGROUND

MVEIRB Environmental Assessment 1819-01

Public Hearing Technical Session September 5-6, 2019

Public Hearing Project Team

Rio Tinto Diavik Team Panel

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- **Additional Rio Tinto Diavik Team**
- **Dave Patterson** – Business Partner, Health Safety Environment
- **Steve Bourn** – Closure Study Lead
- **Mark Nelson** – Advisor, Environment
- **Winter Bailey** – Manager, Communities and External Relations
- **Myra Berrub** – Principal Advisor, Communities and Social Performance, Closure
- **Kyle Bennett** – Principal Advisor, Media Relations

Rio Tinto in Canada

•Rio Tinto Operations in Canada

- Rio Tinto Supports a team of 15,000 at 35 sites across Canada
- Producing the materials essential for human progress
- Montreal recently named one of the company's three global hubs
- Diavik is located at Lac de Gras approximately 300 km northeast of Yellowknife
- Joint Venture: 60% Rio Tinto (owner and operator) and 40% Dominion Diamond Mines
- ~1,100 employees including contractors
- Working with local Indigenous groups
- Discovered in 1995, operations commenced in 2003
- Produces around 6-7 million carats per annum
- 117 million carats produced since 2003
- The current mine plan has production ending in 2025

Public Hearing Technical Session Outline

1. Purpose of Processed Kimberlite to Mine Workings (PKMW) Project and Feedback from Engagement
2. PKMW Project Description
3. Summary of Effects to Valued Components
4. Summary of Responses to Interventions

Part 1: Purpose of Processed Kimberlite to Mine Workings (PKMW) Project and Feedback from Engagement

Purpose of the Project

- DDMI is requesting for Approval of the Proposal to deposit PK into one or more of underground and/or open mine workings

- **“Mine Workings”** means the underground and/or open pit area resulting from the development of an ore body

- Mackenzie Valley Environmental Impact Review Board is conducting an environmental assessment (EA) or Review of the Proposal

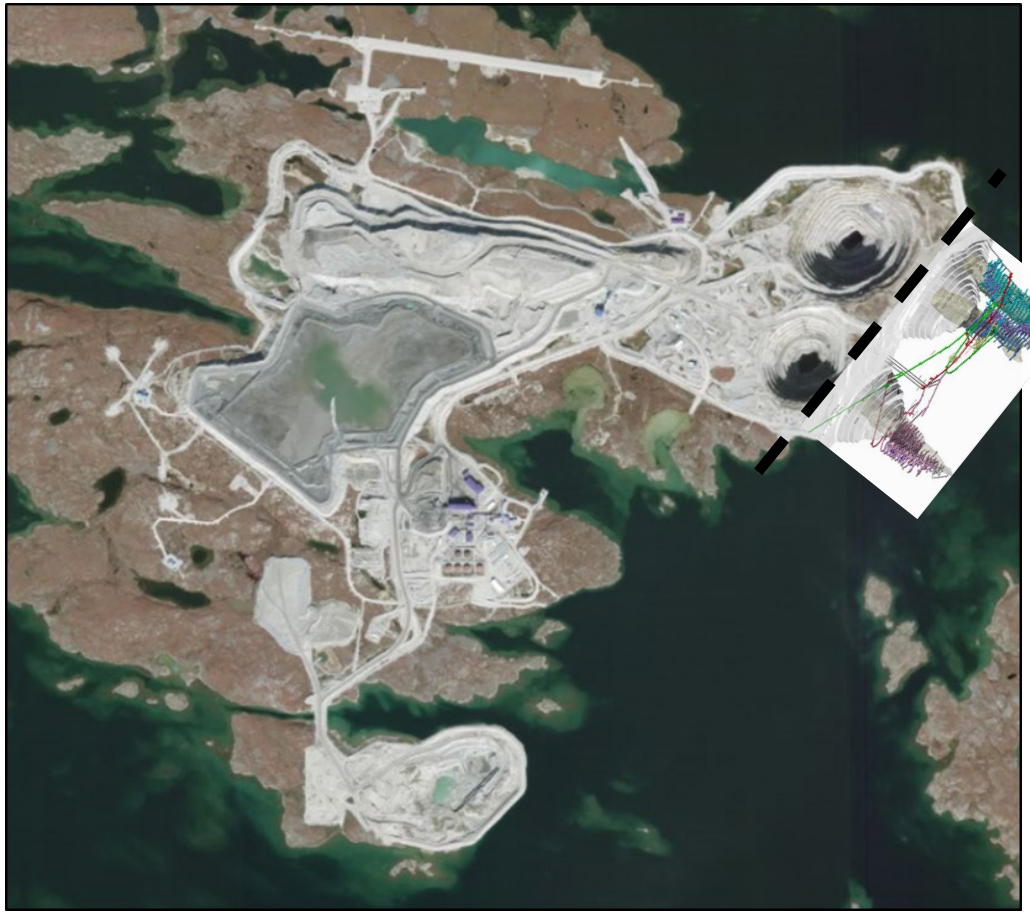
Engagement and Other Operations

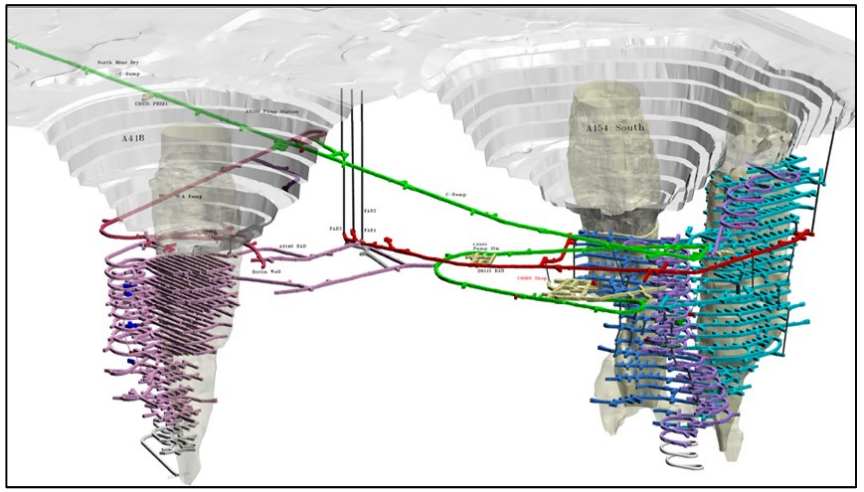
- DDMI did not receive opposition from communities or regulators during the initial engagement phase on the project concept
- What we heard was support to **“put it back where it came from”** as long as it could be done in an environmentally safe manner
- DDMI is the only Operating Diamond Mine in the NWT that does not have approval to deposit processed kimberlite (PK) in Mine Workings

Part 2: PKMW Project Description

Lac de Gras and Diavik Mine Site

Mine Workings at Diavik Include Open Pits and Underground





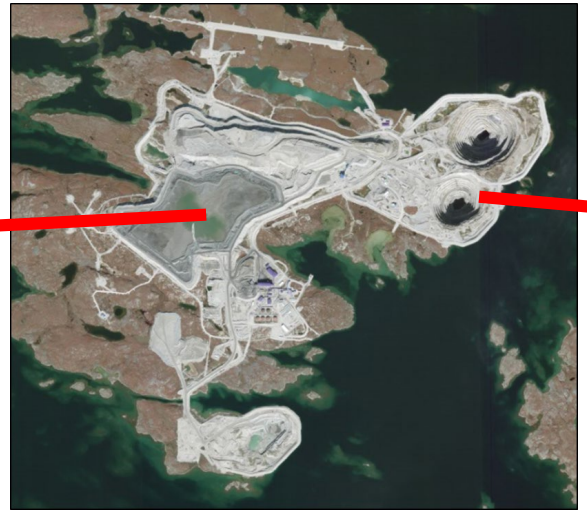
What is Processed Kimberlite?

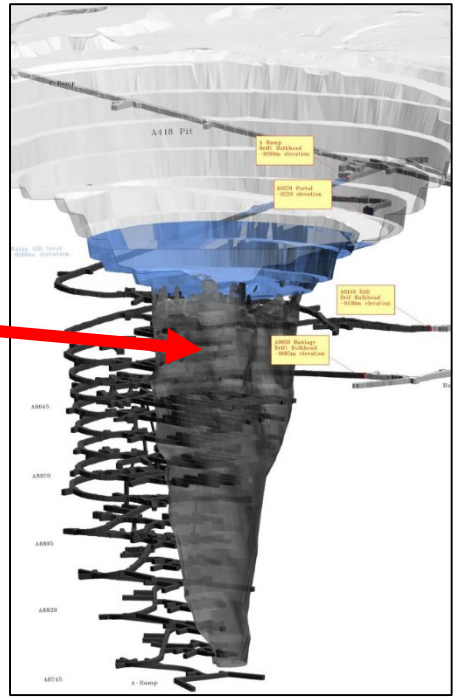
- Kimberlite is the rock that contains diamonds
- The diamonds are removed by crushing and washing the rocks in water
- The remaining material is referred to as ‘processed kimberlite’ (PK) and is a mixture of rock and water

Lac de Gras East Island PK Storage Options

1. Processed kimberlite is currently stored within the Processed Kimberlite Containment (PKC) Facility

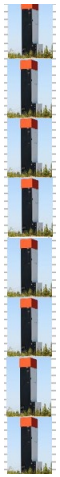
2. Processed kimberlite could be stored within the Mine Workings

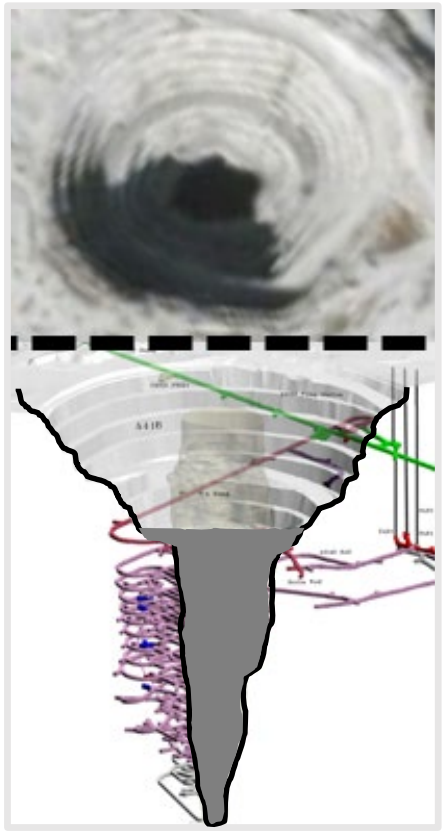




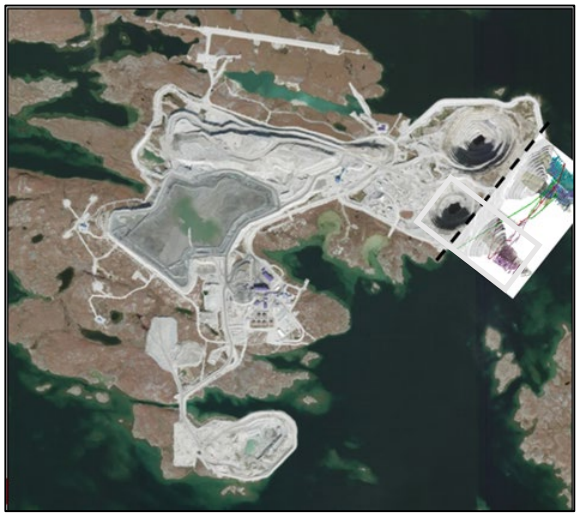
The A418 Mine Working is the Preferred Option for PK Storage

Robertson Head Frame is 76m tall



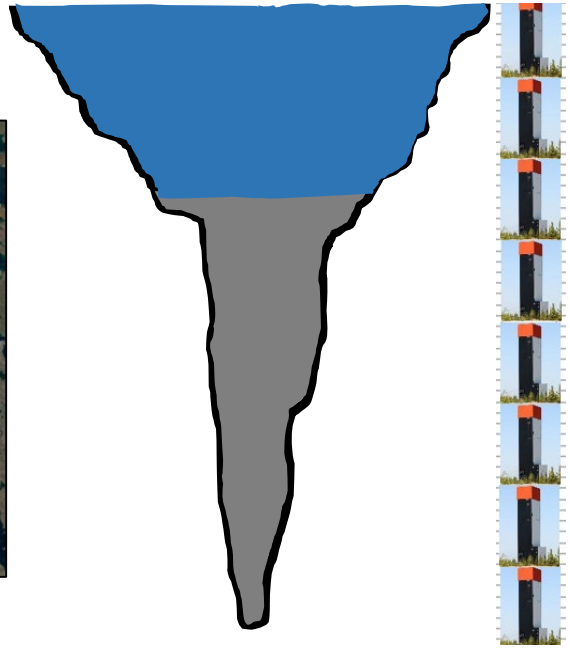


A418 Mine Working is 630m deep



You could stack **8** **Robertson Head Frames** on top of each other in the mine

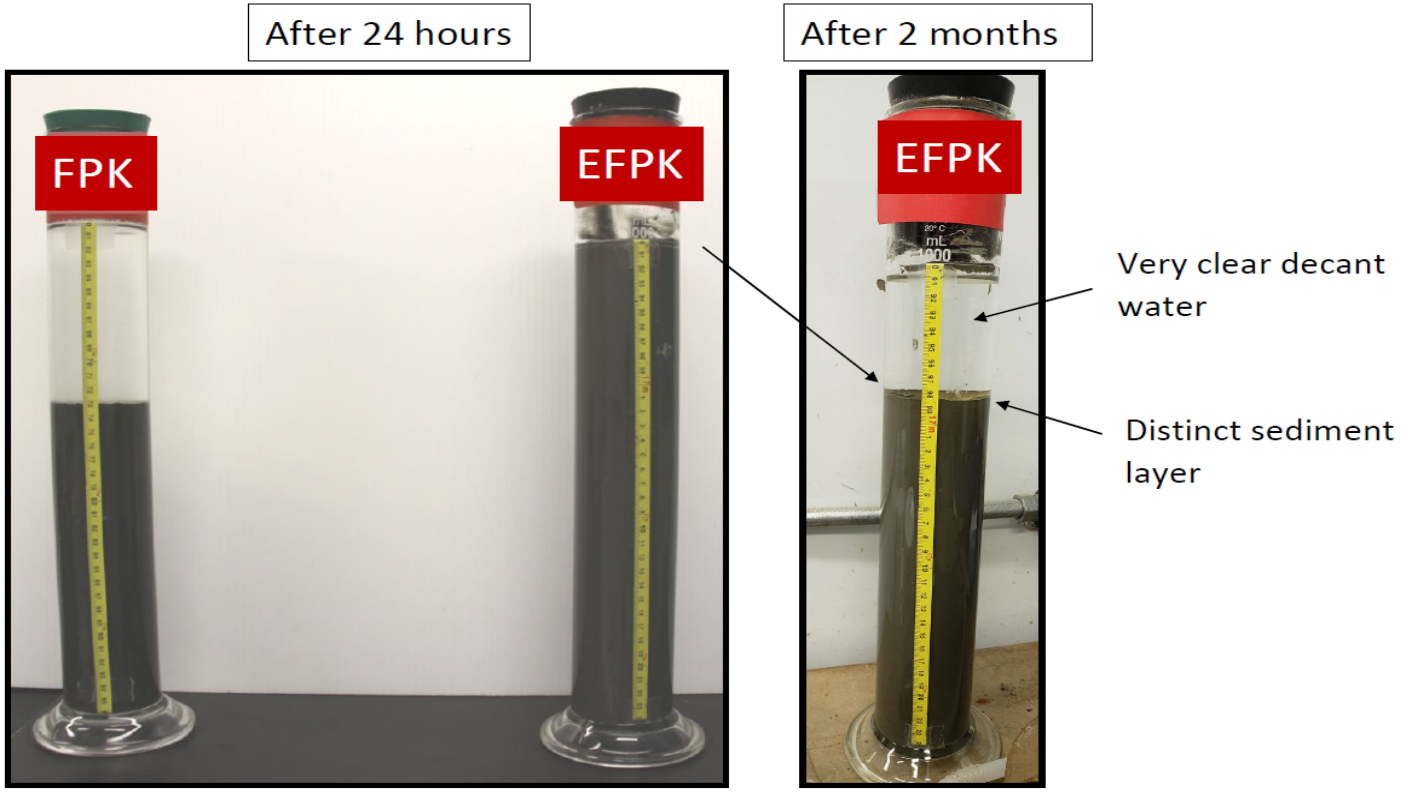
Closure Plan is to fill mine area with water to create pit lakes and open passages to connect the pit lakes with Lac de Gras



Use of Traditional Knowledge in Project Design

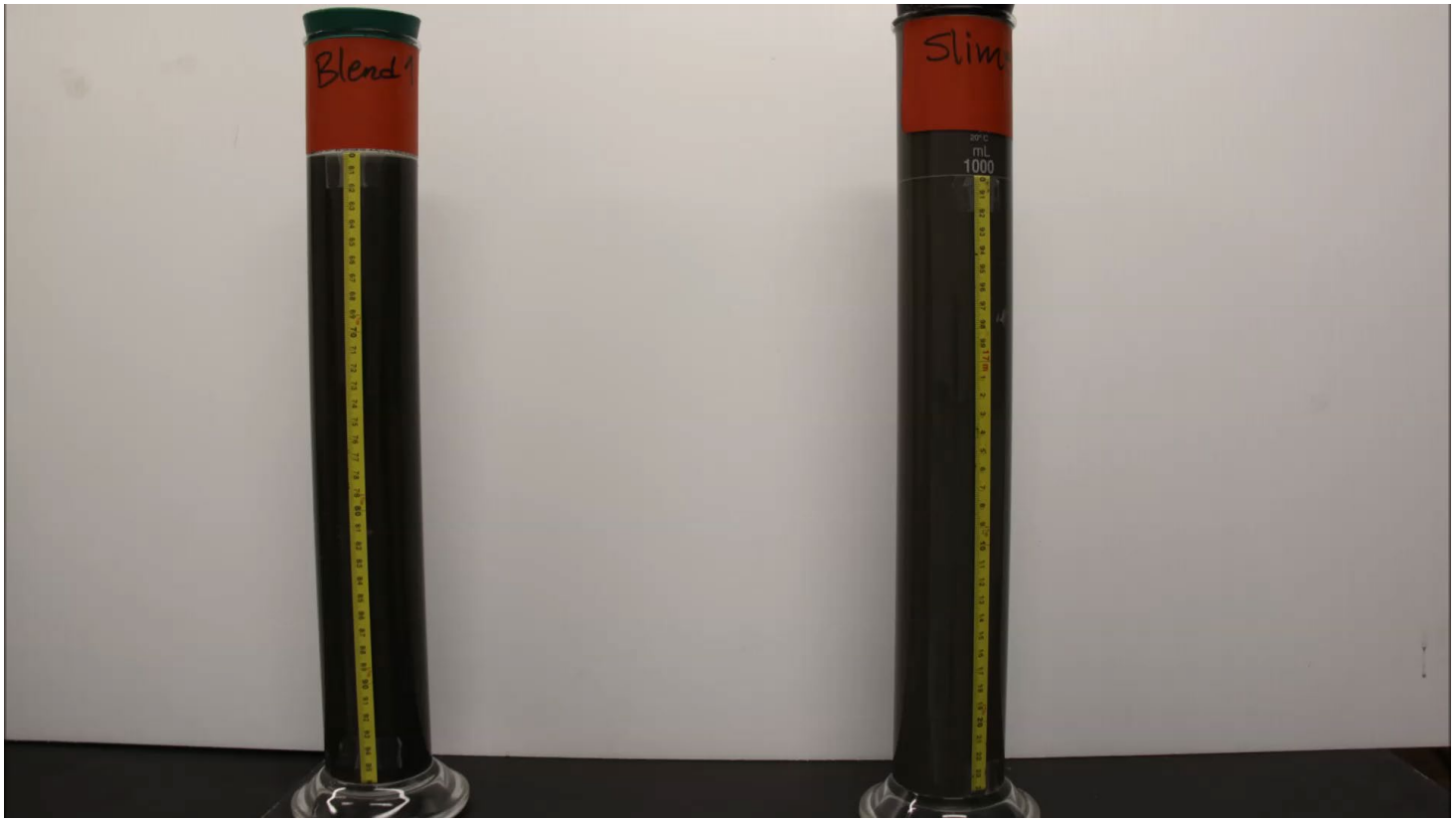
2018 TK Panel Focused on Processed Kimberlite in Mine Workings

Fine Processed Kimberlite Rapidly Settles Out of Water within **24 Hours**

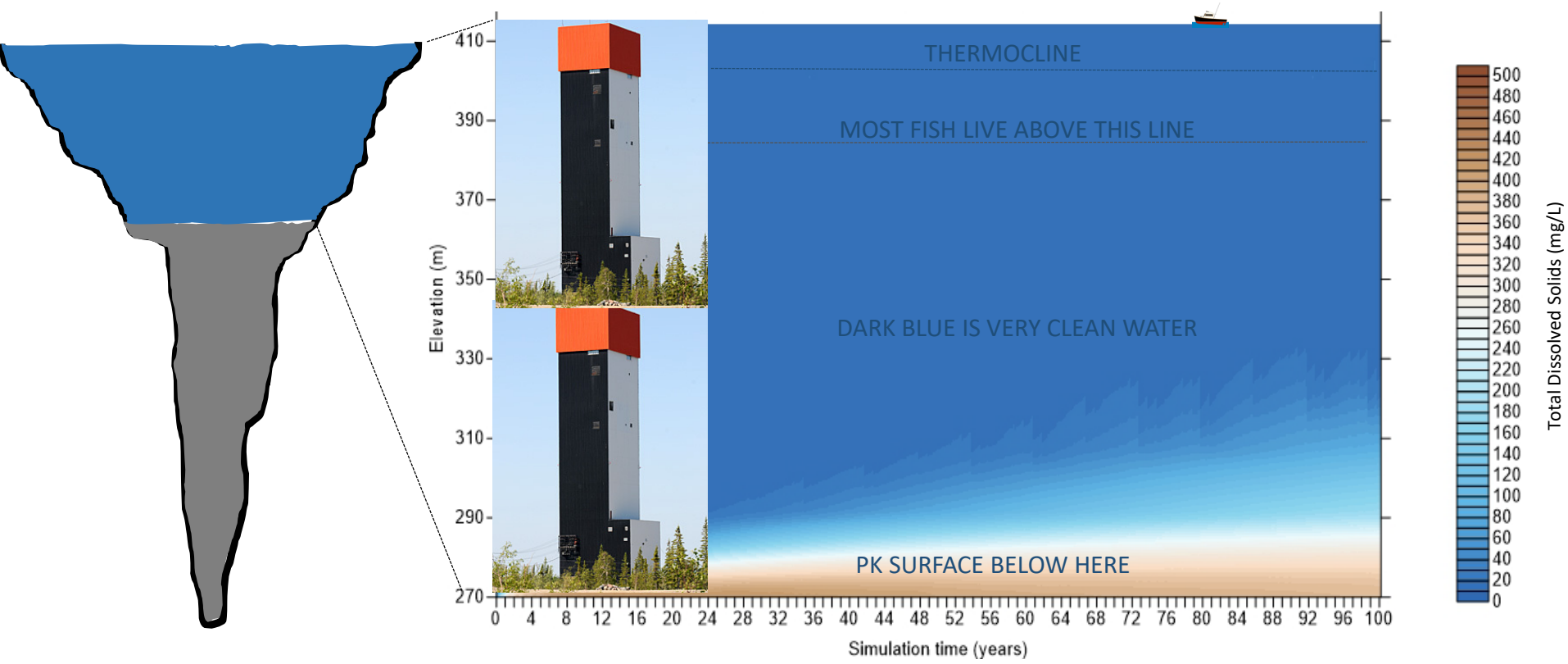


Sample	Initial Height (cm)	24 hr Height Change (cm)	2 month Height Change (cm)
FPK (Fine Processed Kimberlite)	36	13	15
EFPK (Extra Fine Processed Kimberlite)	36	0.2	8.3

Video of FPK and EFPK Settling Over 24 Hours



Modelled Water Quality In The Pit Lake



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Water Quality Modelling Results

Pit Lake Water Quality Parameter	AEMP Benchmark	A418-2a Max*	A418-3a Max*	A418-4a Max*
Sulfate (mg/L)	100	6.5	9.1	12.0
Nitrate-N (mg/L)	3	0.26	0.50	0.72
Ammonia-N (mg/L)	4.7	0.064	0.094	0.12
Nickel (ug/L)	25	0.79	0.91	0.84
Iron (ug/L)	300	4.1	4.9	4.1

* Maximum concentration in the top 40m of pit lake water column over 100-year period after closure

Part 3: Assessment of Effects to Valued Components

DDMI's Conclusions on Project-Specific and Cumulative Impacts and other Environmental Risks

- Water quality is the primary effects pathway to all valued components.
- Modelling of water quality in the top 40 meters of the pit lakes predicts concentrations will remain below AEMP Benchmarks.
- AEMP Benchmarks are protective of aquatic and terrestrial life.
- The only effects pathway to wildlife is through water quality and modelling shows that concentrations will remain below any level of effect.
- No significant negative effects as a result of the construction, operation and closure of the Processed Kimberlite to Mine Workings Project.
- Residual project-specific and cumulative impacts, after mitigation, would be reversible at closure and/or are limited to the Project footprint.
- Environmental risks from accidents and malfunctions are considered remote and resulting effects are considered not significant.

Potential Impacts Assessed and Proposed Mitigation Measures for Water Quality

Potential Impacts Assessed:

- Changes to water quality from project activities associated with the deposition and storage of processed kimberlite (PK) in mine workings.

Proposed Mitigation and Monitoring:

- Optimize operational level of decant water and construct bulkheads to prevent flow of PK or decant water to other mine workings.
- Optimize depth of water cap over PK to protect water quality.
- Breach dikes of pit lakes A418 and/or A154 once monitoring confirms acceptable water quality.
- Monitor water quality within pit lake(s) before and after breaching the dikes.

Potential Impacts Assessed and Proposed Mitigation Measures for Water Quantity

Potential Impacts Assessed:

- Changes to water quantity from project activities associated with the deposition and storage of processed kimberlite (PK) in mine workings.

Proposed Mitigation and Monitoring:

- Water withdrawal rates that are protective of the aquatic environment will be established in discussion with regulators.
- Consider other operations within Lac de Gras in timing the infilling of pit lake(s).

Potential Impacts Assessed and Proposed Mitigation Measures for Fish and Fish Habitat

Potential Impacts Assessed:

- Changes to fish mortality.
- Change to fish habitat.

Proposed Mitigation and Monitoring:

- Promote permanent stratification of the pit lake(s) by separating processed kimberlite (PK) affected water at the bottom from non-PK affected water at the top.
- Work with regulators and Indigenous Groups to identify water withdrawal rates and acceptable periods needed to protect fish and fish habitat, including areas for spawning, rearing and overwintering.
- Habitat creation, enhancement, or restoration works to compensate for habitat losses.

Potential Impacts Assessed and Proposed Mitigation Measures for Wildlife and Wildlife Habitat

Potential Impacts Assessed:

- Change in wildlife habitat.
- Change in wildlife movement.
- Change in wildlife health and mortality risk.

Proposed Mitigation and Monitoring:

- Limit the Processed Kimberlite to Mine Workings Project to the existing mine footprint.
- Water quality monitoring and management to reduce potential risk to wildlife health.
- Wildlife monitoring and removal of wildlife from pit/dike area before infilling
- Employing wildlife deterrents to limit wildlife-project interaction.

Potential Impacts Assessed and Proposed Mitigation Measures for Cultural Use

Potential Impacts Assessed:

- Change in availability of resources for cultural use.
- Change in access to resources or areas for cultural use.
- Changes in sites or areas for cultural use.

Proposed Mitigation and Monitoring:

- Mitigations proposed for water quality, wildlife and wildlife habitat, fish and fish habitat will also help mitigate effects to the availability of traditional resources and resulting effects to cultural use.

Accidents and Malfunctions

Potential Accidents and Malfunctions:

- An uncontrolled rock release from geotechnical instability in a pit wall once filled with processed kimberlite (PK) and water.
- An uncontrolled release of PK from a PK slurry pipeline.

Potential Impacts Assessed:

- Destratification of pit lakes and resulting chemistry including low oxygen conditions.
- Release of contaminants on land and into Lac de Gras.
- Change in access to resources or areas for cultural use.
- Changes in sites or areas for cultural use.

Proposed Mitigation and Monitoring:

- Adherence to best practices and regulatory requirements in project design and execution.
- Application of a Spill Contingency Plan and an Emergency Response Plan.

Part 4: Summary of DDMI's Commitments in Response to Interventions

1. Expanded engagement with non-signatory Indigenous Groups

- DDMI undertakes extensive community engagement with signatory Indigenous Groups, however DDMI accepts that more could be done to engage with Fort Resolution Metis Council (FRMC) – Northwest Territory Metis Nation (NWTMN) and Deninu Kue First Nation (DKFN).

- DDMI commits to meeting with each group annually to:
  i. Provide updates on the PK to Mine Working Project specifically but also on closure planning generally;
  ii. Review recommendations made by the Traditional Knowledge (TK) Panel and DDMI's responses; and
  iii. Consider any recommendations from FRMC/NWTMN and DKFN and provide written responses.

2. Reconnection criteria to define culturally acceptable pit-lake conditions

- DDMI recognizes the importance of the views of Indigenous Groups to the decision on whether to breach the pit lakes and re-join with Lac de Gras.
- DDMI commits to working toward the development of acceptance criteria for re-connection that are TK-based.
- DDMI will:
  i. Seek the TK Panel's permission to change the scope of the September 12-16, 2019 TK Panel session to instead develop recommended TK-based re-connection criteria;
  ii. Ask that the Environmental Monitoring Advisory Board (EMAB) facilitate the revision/support of the recommended TK-based criteria with the five (5) Indigenous Parties represented on EMAB;
  iii. Provide opportunity for Indigenous Groups that are not represented on EMAB to review and comment on TK-based criteria;
  iv. Submit the TK-based re-connection criteria to the Wek'èezhìi Land and Water Board (WLWB) for public review and approval as a closure criteria.

3. Fish habitat off-setting plan

- With the implementation of proposed mitigation measures, residual environmental effects are not expected to significantly impact pit lake fish habitat, however DDMI acknowledges that some Indigeneous Groups have still expressed concern about reconnecting the pit lakes to Lac de Gras.
- DDMI appreciates Fisheries and Oceans Canada's willingness to work with DDMI to consider alternative fish habitat off-setting plans should pit lake reconnection no longer be considered acceptable.
- DDMI commits to considering alternative off-setting plans that are reasonable, practical and provide fisheries benefits to Indigenous Communities.
- DDMI will advance alternative off-setting plans by February 1, 2020 if:
    i. There is a high likelihood that predicted pit-lake water quality conditions will not meet TK-based pit-lake criteria for reconnection; or
    ii. It is determined that TK-based acceptance of pit-lake reconnection can only be determined by visually inspecting the pit-lake making it not possible to confirm acceptability based on predicted water quality; or
    iii. The MVEIRB determines that DDMI should not breach the dike and allow access to the pit-lake.

4. Removal of A21 Open-Pit from Review

- DDMI continues to advise that A418 is the preferred location at this time for PK deposition to mine workings.
- DDMI accepts Interveners' recommendation to remove the A21 Open-Pit from consideration for processed kimberlite (PK) deposition in the current Review.
- DDMI believes it is prudent to continue to consider A154 to provide the maximum practical flexibility. Limiting the deposition location option to only the preferred A418 could result in an inability to adapt to changes in mine plans because of the long lead times inherent in permitting processes.

5. Conditions to be included in an Amended Water License or as Follow-Up Measures

- Additional modelling of pit water quality
- Independent Review of final model predictions
- Pit Lake monitoring – operations, after filling, after re-connection
- Wildlife Management
- Monitoring Plans

Questions?