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Processed Kimberlite to Mine Workings - Scoping Meeting

Introduction and Project Overview

Sean Sinclair, Environment Superintendent

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Presentation Outline

- Introduction and Project Overview
- Water Quality Modelling Approach
- Scope of the Environmental Assessment

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Diavik Team

Sean Sinclair – Environment Superintendent

Gord Macdonald – Closure Manager

Kofi Boa-Antwi – Regulatory Advisor

Mark Nelson – Environment Advisor

Rio Tinto in Canada

Rio Tinto Operations in Canada

- **Aluminum**
- **Energy & Minerals**
- **Copper & Diamonds**
- **Rio Tinto Corporate Support Offices**

- Supporting a team of 15 000
- 35 sites across the country
- Producing the materials essential for human progress
- Montreal recently named one of the company's three global hubs

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The Diavik diamond mine

Rio Tinto Operations in Canada

Diavik at a glance

- Located at Lac de Gras approximately 300 km northeast of Yellowknife
- Joint Venture: **60% Rio Tinto** (owner and operator) and **40% Dominion Diamond Mines** (acquired by The Washington Companies)
- **~1,100 employees** including contractors
- **5 local Indigenous groups**
- Discovered in 1995, operations commenced in 2003
- Produces around **6-7 million carats** per annum
- **Over 100 million carats** produced since 2003
- The current mine plan has production **ending in 2025**

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Bringing the two billion year old gems to the surface

- **Four kimberlite pipes** mined using open pit and underground mining methods
  - A154 North
  - A154 South
  - A418
  - A21
- Above ground **processing plant** has a **~2.4 million tonne** capacity
- In Yellowknife, we **clean and sort** Diavik rough diamonds for their onward sales and marketing journey

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Regulatory Approvals / Authorizations for the Diavik Diamond Mine Project

Approvals/Authorizations for Diavik to date not limited to the following:

1. Canadian Environmental Assessment Act Approval
2. Environmental Agreement
3. Surface Leases
4. Fisheries Act Authorizations
5. Navigation Protection Act Approvals
6. Water Licence

Purpose of the Proposal / Application

- To request an amendment to the Water Licence to permit the option of deposition of Processed Kimberlite (PK) material into Mine Workings (A418, A154, and A21 pits)

- **“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) on the Proposal

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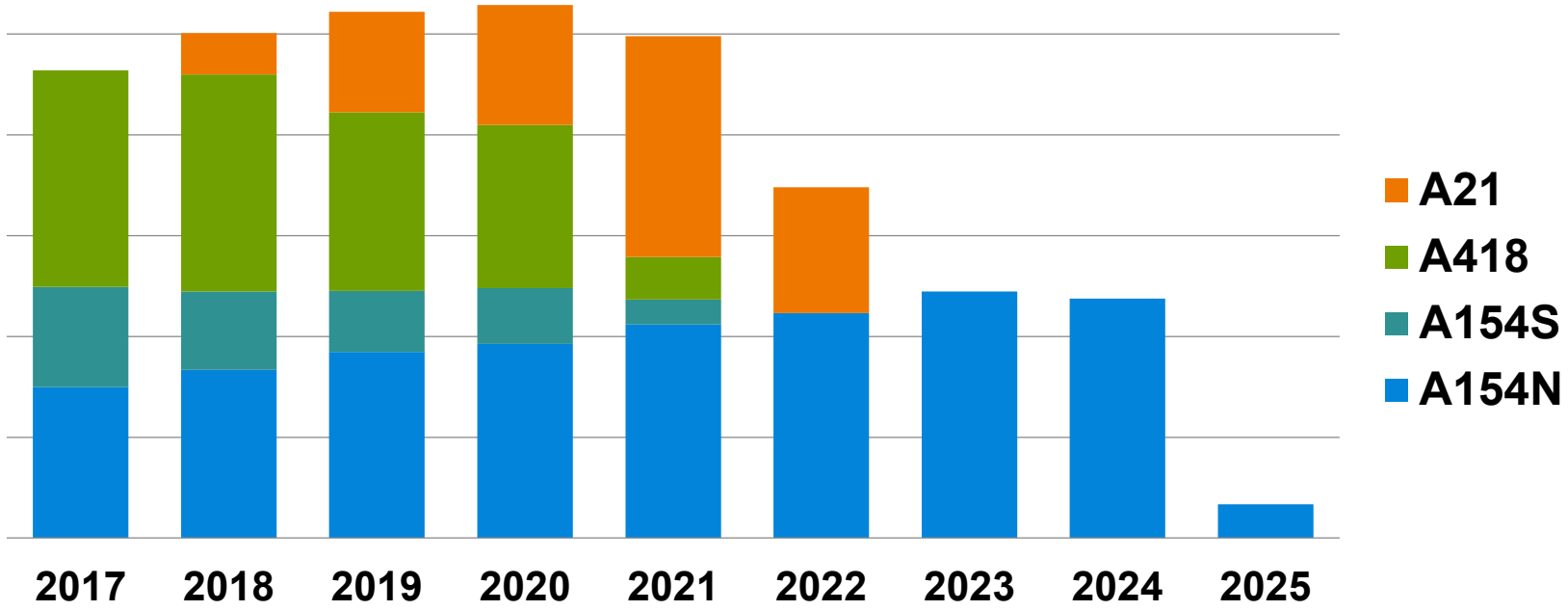
PK Production and Storage

- Based on the current mine plan, the PKC will be full in 2021 without additional dam raise beyond current approvals
- Underground mining of the A154S and A418 kimberlite pipes will be completed by 2022
- Underground mining of the A154N kimberlite pipe will be completed in 2025
- Open pit mining of the A21 kimberlite pipe will be completed by 2023



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Current PK Storage

- Processed kimberlite is currently stored within the Processed Kimberlite Containment (PKC) Facility
- The PKC Facility is surrounded by a lined dam that DDMI has constructed and made higher over the years
- The amount of storage area left within the PKC will not fit the amount of processed kimberlite that will be produced during the remaining years of mining
- PKC dam expansion opportunities are limited by the size of East Island

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Benefits of the Deposition of PK to Mine Workings

- Improves health and safety related to operations and closure
- Reduces environmental risks related to PK storage
- Ensures certainty in PK storage capacity for the life-of-mine
- Enhances operational flexibility
- Reduces capital expenditures for the life-of-mine
- Reduces closure risks

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Assessment of Potential Environmental Risks and Impacts

- Assessed the potential for adverse impacts to biotic and abiotic components, including water quality and fish and fish habitat

- Assessment based on robust data from site specific studies, literature review, and Traditional Knowledge

- Assessed operational, health and safety, and environmental risks, including the potential for accidents and malfunctions

Assessment of Potential Environmental Risks and Impacts

- Applied credible assumptions where scientific uncertainty exists
- Applied conservatism and the precautionary approach
- Certainty and confidence in results informed by ongoing operations and on modelling
- Monitoring programs and adaptive management

Assessment of Potential Environmental Risks and Impacts

- Committed to protecting the health and safety of workers and the environment in executing the proposal

- Committed to ensuring PK to Mine Workings does not result in significant adverse impacts to the environment

Stakeholder Engagement

- Proposed PK to Mine Workings informed by DDMI's ongoing engagement with stakeholders

- PK to Mine Workings addresses concerns regarding the long-term stability and environmental risks of the Processed Kimberlite Facility

- Engaged stakeholders on potential impacts, proposed mitigation measures, the acceptability of residual impacts, and how mitigation might be enhanced

Stakeholder Support

- Broad support for the Proposal among our Participation Agreement partners and communities

- PK to Mine Workings not likely to be a cause of significant public concern

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Alternatives Assessment / Options Analysis

Option	Key Advantages	Key Disadvantages
1. Traditional Dam Raise	• permitted • known approach	• high cost • footprint restrictions • new construction necessary • limited closure options
2. A418 Deposition with Current Dam Height	• lower cost • maximum use of existing storage capacity • no new dam construction • enhanced closure options	• license amendment • high risk of running out of PKC storage before A418 is available.
3. Additional On-Site Storage	• no new dam construction • lowest cost • enhanced use of existing facilities	• loss of original facility functionality • license amendment • site runoff risk • expanded closure footprint
4. PKC Dam Raise and A418 Deposition	• limits risk of running out of storage space • maximize use of existing storage capacity • enhanced closure options	• moderate cost • new dam construction necessary • license amendment

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Water Quality Modelling Approach

Gord Macdonald, Closure Manager

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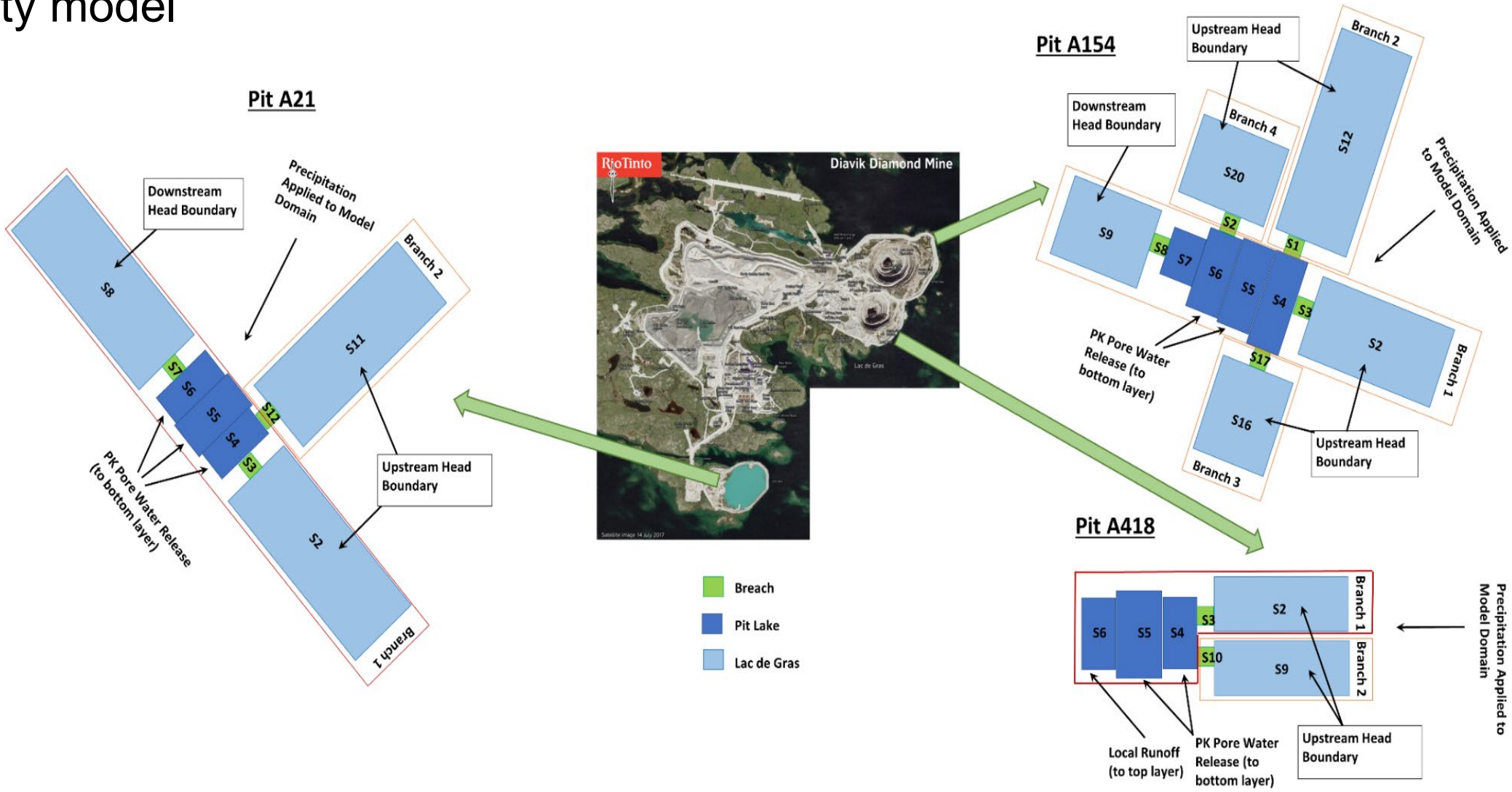
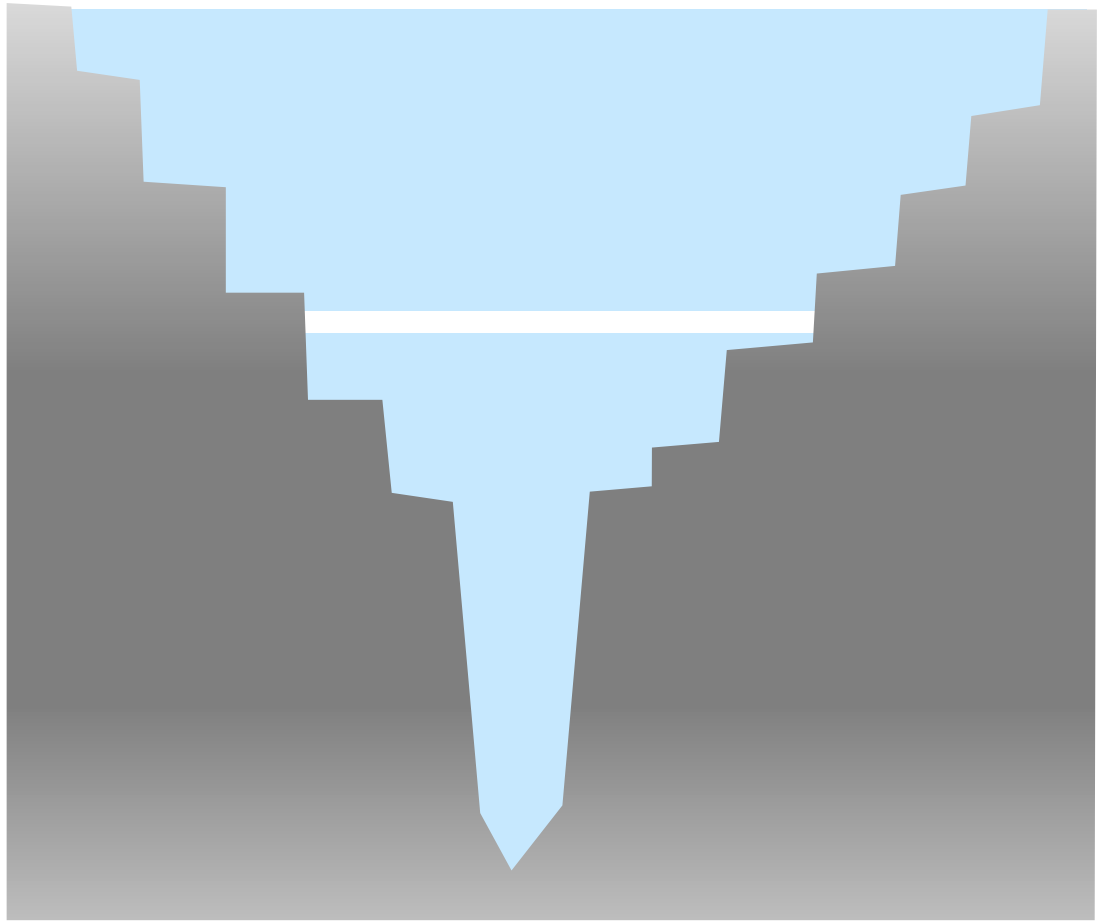
Water Quality Modelling Approach

- CE-QUAL-W2: a two dimensional, laterally averaged, hydrodynamic, and water quality model

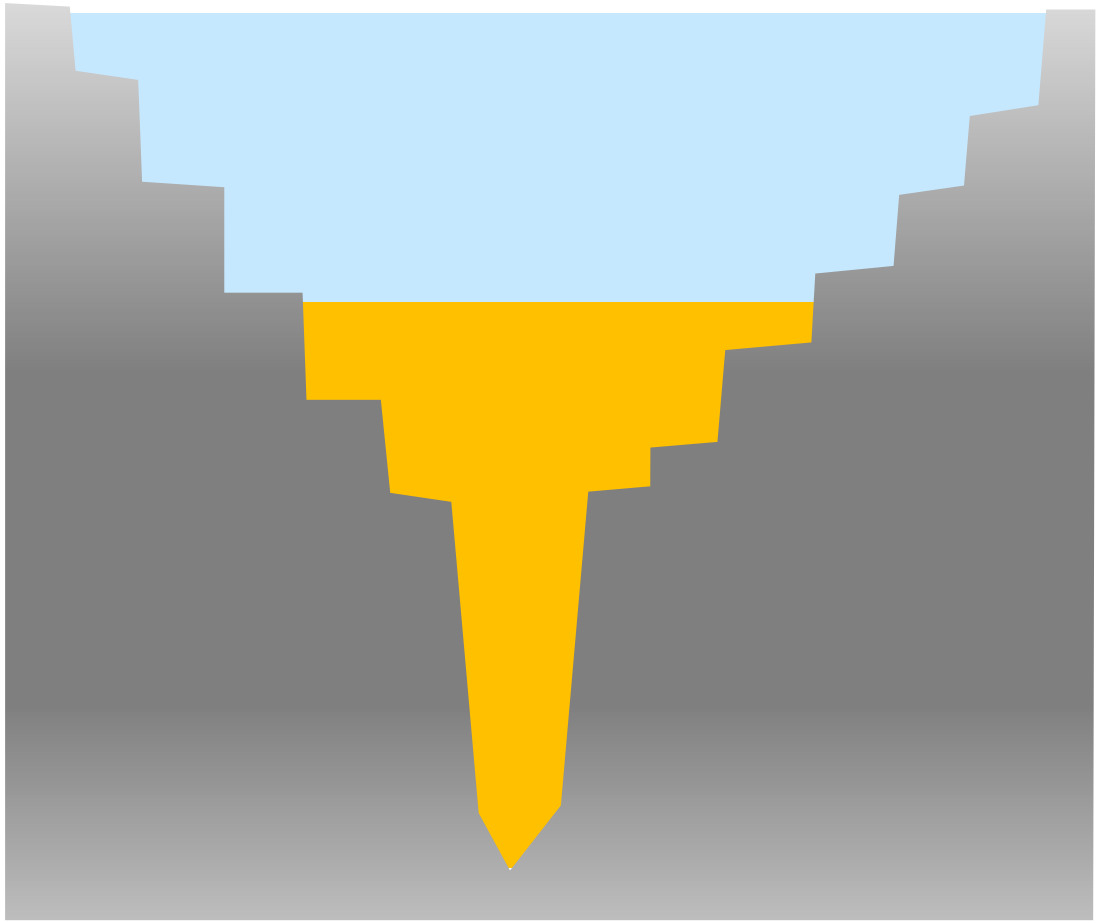


Processed Kimberlite Deposition into Mine Workings

Conceptual model – consolidation & pore water release over time



As conceptualized



As modelled

Pit Lake Modelling Results[1]

- Surface water quality remains below Benchmarks and similar to Lac de Gras

Parameters	Unit	AEMP Benchmark	Lac de Gras[2]	Scenario 2-a	Scenario 3-a	Scenario 4-a
				at Depth of 40 m Below Surface	at Depth of 40 m Below Surface	at Depth of 40 m Below Surface
Chloride	mg/L	120	1.9 - 5.2	3.5	3.7	3.5
Sulfate	mg/L	100	2.19 - 5.47	4.0	4.7	4.0
Nitrate as nitrogen	mg/L	3	0.001 - 0.105	0.063	0.12	0.064
Aluminum	µg/L	87	4.46 - 9.74	6.3	6.3	6.3
Arsenic	µg/L	5	0.202 - 0.401	0.28	0.3	0.28
Cadmium	µg/L	0.1	0.0025 - 0.0054	0.0029	0.0042	0.0029
Copper	µg/L	2	0.5 - 0.661	0.59	0.6	0.59
Lead	µg/L	1	0.0025 - 0.007	0.0035	0.0048	0.0035
Molybdenum	µg/L	73	0.265 - 2.79	0.99	2.1	1.0
Nickel	µg/L	25	0.642 - 0.886	0.77	0.79	0.77
Uranium	µg/L	15	0.092 - 0.157	0.12	0.12	0.12
Zinc	µg/L	30	0.11 - 0.38	0.21	0.48	0.21

2a – 5.0 Mm^3 deposited PK
3a – 5.0 Mm3 deposited PK plus 5.0 Mm^3 of dredged PK slimes
4a – Scenario 2a but with initial decant water level at 15m vs 5m

1. Results for A418 taken from response to Technical Session IR-5
2. Range of measured concentrations at AEMP MF3-1 and MF3-2 (DDMI 2017)

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Scope of the EA

Kofi Boa-Antwi, Regulatory Advisor

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Scope of the Environmental Assessment

- EA to focus on the Closure Phase
- EA scope to be for storage of PK in mine workings
- An unanticipated mixing event to be considered within “Accidents and Malfunctions”
- Effects Criteria and Significance to be as defined in the Comprehensive Study Report (1999) for the Diavik Diamond Mine Project

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Scope of the Environmental Assessment, cont'd

- Wildlife effects assessment to be limited to Caribou
- "Cultural use of the area post-closure" relates to fishing and/or drinking of water within pit lakes and Lac de Gras
- No requirement to develop additional baseline data – will reference existing data used in previous assessments
- Cumulative impacts will only be considered where there are residual impacts

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Questions?