Environmental Monitoring Advisory Board

Intervention to the Mackenzie Valley Environmental Impact Review Board

Diavik Diamond Mines' EA1819-01

Depositing Processed Kimberlite into Pits and Underground

September 5, 2019

Introduction: Comments on Review Process

- Inadequate project description
- Many rounds of information requests
- Hundreds of IR's, multiple submissions and updates
- Summary Impact Statement not comprehensive
- Almost impossible to keep track of information
- Information format not conducive to review by non-technical people

Recommendation:

- **MVEIRB consider whether information provided was:**
  - **Sufficient**
  - **Understandable**
- **Information management lessons for future assessments**

Introduction: Participant funding

- EMAB pleased funding was made available to participants
- Recommendation:
  - MVEIRB recommend participant funding be established
    - allow full participation in environmental assessment and water licence proceedings

Introduction: Summary of Recommendations

1. Definition of significance
2. Reliability of predictions
3. Assessment of effects on water quality
4. Benchmarks for unanticipated mixing scenarios
5. Decision to reconnect to LDG
6. Effects to fish and fish habitat
7. Effects to wildlife
8. Monitoring (pre and post dike breach)

Introduction: Summary of Recommendations

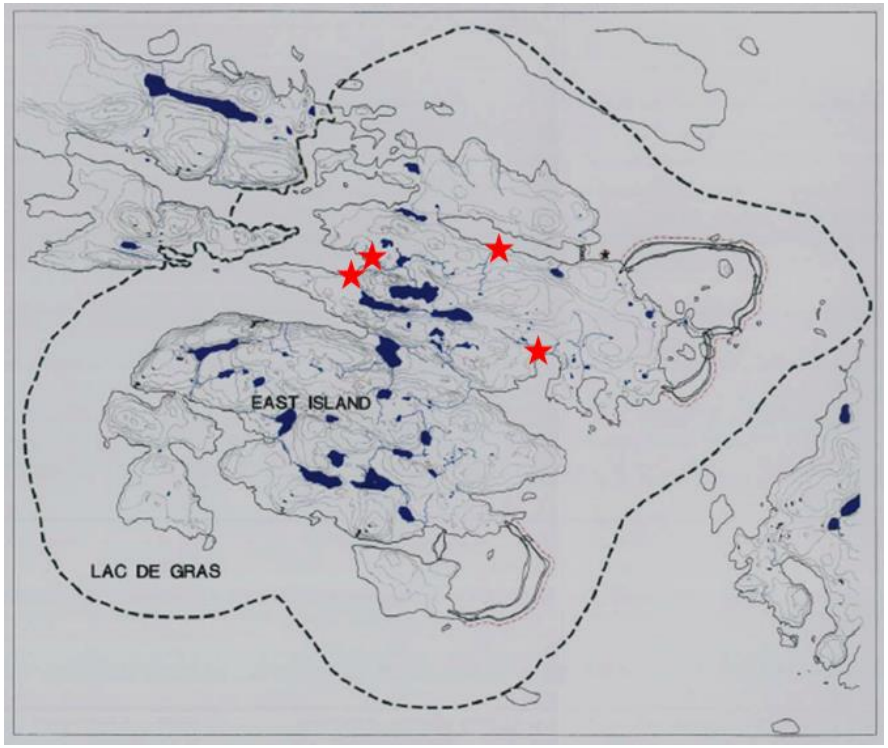
9. Descriptions of contingency plans
10. Revised closure objectives
11. Cumulative effects to water quality
12. PK Slimes
13. Supplementary IR Responses
14. Intervention Responses

- A21 – recommendations addressed by Diavik commitment
- Presentation - highlights

1. Definition of Significance

Overview:

- CSR definitions from 1999
  - Outdated – may not be relevant for PKMW project
- Values of Affected Communities not sufficiently accounted for
- Concern definitions will be misused



1. Definition of Significance

Summary of Recommendations:

1. Diavik should update definitions and thresholds of significance to reflect current conditions
   - include perspectives of affected peoples

2. MVEIRB to consider Diavik's proposed significance definitions
   - Reflect current conditions
   - clarify implications of significance definitions during the regulatory phase

2. Reliability of Predictions

Overview:

- Assessment of significance based on model predictions
- Many uncertainties about model accuracy
- Inputs:
  - Calibration
  - Loadings inputs not included in the models or adequately addressed in sensitivity analyses
  - PK porewater
  - Densities and consolidation rates
  - EFPK behaviour
- Sensitivity analyses limited

2. Reliability of Predictions

Summary of Recommendations:

1. MVEIRB should require confirmation of predictions
2. MVEIRB should engage an independent expert to review Diavik's modelling
3. Refined modelling should be reviewed prior to final approvals
4. If predictions change Diavik should reassess potential for significant adverse affects

2. Reliability of Predictions

Diavik Responses to Interventions

Conditions to be included in an amended water license or as follow-up measures – item 5(a)&(b)

EMAB view is that uncertainty regarding predictions should be minimized before allowing project to proceed.

- Any MVEIRB approval should be conditional on independent expert agreement that modelling has been done to standard of best practice
- Expert should be truly independent of Diavik:
  - Not involved with Diavik before
  - Review managed by MVEIRB or designate.
  - No communication between Diavik and expert without project manager.

Response does not change EMAB Recommendations

3. Assessment of Effects on Water Quality

Overview:

- Compare to baseline conditions
  - Water quality should be as close as possible to what it was before Diavik was developed

Recommendation:

- Compare changes to water quality to baseline conditions
  - negligible magnitude = changes from baseline not detectable by reasonable monitoring

4. Benchmarks for Unanticipated Mixing Scenarios

Overview:

- Diavik proposes ecological thresholds for water quality 20% higher than AEMP benchmarks
  - Exposure to water above AEMP benchmarks could result in adverse effects

Recommendation:

- Ecological thresholds for water quality should be protective of aquatic life

5. Decision to Reconnect to LDG

Overview:

- Diavik proposes water quality will determine when to connect the pit lake to LDG
- Should also consider:
  - Sediment quality
  - Stability of pit walls
  - Traditional knowledge

5. Decision to Reconnect

Summary of Recommendations:

1. Monitor water and sediment quality comprehensively
   - ensure conditions are protective of aquatic life
2. MVEIRB to require sediment quality and pit wall stability to be considered
3. MVEIRB to require TK criteria
   - EMAB supports Diavik commitment to develop TK Acceptance Criteria (Aug 22'19 letter, item 2)
     - EMAB comment on Item 2(ii)
       - EMAB was not aware of this proposal
       - EMAB does not speak for Aboriginal Parties to EA
       - Diavik is responsible to work with communities on TK Criteria; not EMAB's mandate
       - WLWB has directed Diavik to engage directly with communities on a number of issues: closure, AEMP
       - Diavik has resources, expertise and experience to do this

6. Effects to Fish and Fish Habitat

Overview:

- Critical assumption: fish will not go below 40 meters
- Dissolved oxygen predictions only for A418
- Slimy sculpin unable to move away from contaminants
- Post-breach fish and habitat monitoring not described
- Fish tissue monitoring for metals not described
  - Users must feel assured fish are safe to eat

6. Effects to Fish and Fish Habitat

Summary of Recommendations

1. Confirm fish only use upper 40m
2. Confirm depth of contaminated water before breaching
3. Monitor fish use of enhanced habitats
4. Run DO Mass-balance model for A154
5. DO surveys throughout pit lake
6. Do fish tissue metals surveys on large-bodied fish (e.g. trout)
7. Sample any aquatic life in pit lake before breaching

6. Effects to Fish and Fish Habitat

Diavik Responses to Interventions

Conditions to be included in an amended water license or as follow-up measures

Item 5 (c) Pit Lake Monitoring

- Diavik has not proposed any monitoring of:
  - fish use of the pit lake below 40 m. or
  - aquatic health
- deficiency in the scope of the proposed monitoring that needs to be addressed
- response does not change EMAB recommendations

7. Effects to Wildlife

Overview:

- Open water in pits could attract wildlife
  - Particularly in spring when pit lakes will have open water sooner than LDG
  - Especially a concern for waterfowl
- Diavik did not assess potential effects on wildlife during operations
- Diavik committed to update monitoring and management plans (July 4’19 response to ECCC IR#6)

7. Effects to Wildlife

Summary of Recommendations:

1. MVEIRB should acknowledge the potential for the project to interact with wildlife during the operational period.
2. MVEIRB should require the management plans to include specific requirements on wildlife and waterfowl use of pit lakes during operations

EMAB acknowledges Diavik Responses to Interventions: conditions to be included in an amended water license or as follow-up measures; Item 5 (d) Wildlife Management

This response does not change EMAB's recommendations

8. Monitoring (Pre and Post Dike Breach)

Overview:

- Current water quality monitoring plan is not adequate
  - Only 1 sample location monitored over time at 4 depths in pit lake
  - Only 1 transect sampled once before breaching pits
  - Reduce monitoring in pits to twice per year after breaching

8. Monitoring

Summary of Recommendations:

Note: EMAB made 19 recommendations related to monitoring

1. Comprehensive monitoring program to:
   - confirm model predictions and
   - water quality throughout the pit lake in all seasons.
   - sediment quality monitoring – potential for sediment to be present, such as:
     - ramps and benches
     - enhanced habitat
2. Before reconnecting
   - Sample for at least two years, throughout the pit lake in all seasons
3. After Breaching
   - Two years in pit lake – confirm chemocline is stable
   - Throughout lake to determine water exchange with LDG
   - Extent of effect on LDG

8. Monitoring

EMAB acknowledges Diavik Responses to Interventions: conditions to be included in an amended water license or as follow-up measures; Item 5 (e) Monitoring Plans

Diavik has made several specific proposals for monitoring water quality

- proposals are inadequate
  - duration
  - spatial extent
  - scope
    - Fish & aquatic life, fish health, fish habitat
    - Sediment quality
- MVEIRB should address monitoring in follow-up measures to the level of detail that ensures adequate data will be collected and analyzed
- Response does not change EMAB recommendations

9. Descriptions of Contingency Plans

Overview:

- Diavik proposes to provide details of contingency plans following approval of the project
  - EA should assess if plans are feasible
  - EA should assess potential effects on LDG if contingency conditions occur

9. Contingency Plans

Summary of Recommendations:

Diavik should:

1. Develop a more detailed description of the contingency plan to re-close the dike after breaching
2. Provide more information on potential impacts associated with contingency plans
    - Describe impact on LDG in the event of increased loading due to unanticipated mixing
3. How did views of Affected Communities affect contingency plans?

10. Revised Closure Objectives

Overview:

- Closure planning needs to be refined
  - Closure plans need to address actual site conditions
- PKC facility closure plan needs updating if the PKMW project is approved

Recommendations:

1. Need for timely updating of closure plan to address the PKMW Project.
   - Including closure objectives and criteria

11. Cumulative Effects on Water Quality

Overview:

- Diavik's cumulative effects assessment not adequate
  - Modelling details not described
  - No direct explanation of how effects from Diavik's other operations and Ekati's operations are considered in combination with the PKMW project
  - No rationale for water quality parameters considered / not considered

Recommendations:

1. MVEIRB should seek additional clarification about methods used to predict cumulative effects to water quality

12. PK Slimes

Overview:

- Moving slimes eliminates critical issues with closing PKC facility
  - Maintaining the dams, pond, and spillway
  - Risks to wildlife and humans
  - Concerns of TK Panel
- The pits would be a permanent and physically stable location for storing the slimes
- Diavik has proposed pushing the feasibility study back to 2021

12. PK Slimes

Summary of Recommendations:

1. Diavik should be required to evaluate the feasibility of slimes relocation from the PKC to the pits ASAP as a condition of any approval.

13. Diavik Responses to MVEIRB Supplementary Information Requests

Questions:

- evidence of net increase in water levels in pit lake over time
- support for assumption that water movement would be the same if dike is breached compared to isolated to fish
- Support for predicted extent of effects on LDG
  - 10 meters if pit lake is “isolated”
  - 50 meters if dike is breached

14. Diavik Responses to Interventions

Overview:

- EMAB has not reviewed these as a Board
- Specifics addressed under individual topics
- Item 5 - Conditions to be included in an Amended Water License or as Follow-Up Measures
  - In general EMAB prefers these conditions be addressed as Follow-Up Measures

Thank you – Questions?