Agnico Eagle Mines Ltd.’s Whale Tail Pit Project

Nunavut Impact Review Board and Nunavut Water Board – Coordinated Process

Nunavut Water Board Public Hearing
Technical Hearing, Baker Lake
September 26-27, 2017

Indigenous and Northern Affairs Canada's Roles and Responsibilities

INAC's mandate and responsibilities stem from the following legislation:

- Department of Indian Affairs and Northern Development Act (DIAND)
- Nunavut Land Claims Agreement Act (NLCAA)
- Nunavut Waters and Nunavut Surface Rights Tribunal Act (NWNSRTA) and the associated Regulations
- Territorial Lands Act (TLA) and the associated Regulations
- Arctic Waters Pollution Prevention Act (AWPPA)

INAC's Contributions to the Water Licence Application Process

INAC has participated in this Water Licence Application through:

- Scoping
- Information Requests (IRs)
- Technical Review Comments (TRCs)
- Technical Meeting and Pre-Hearing Conference
- Final Submission

Summary of INAC's Review of the Whale Tail Pit Water Licence Application

In its review of this Water Licence Application, the department provided expertise on the following:

- Surface water quality and quantity (including monitoring)
- Groundwater quality and quantity
- Closure costs

The department's final submission to the Nunavut Water Board

(August 14, 2017) included seven (7) Final Comments:

- Five (5) specific to the new Water Licence Application for Whale Tail Pit (2AM-WTP----)
- Two (2) specific to the Water Licence Amendment Application for Meadowbank (2AM-MEA1525)

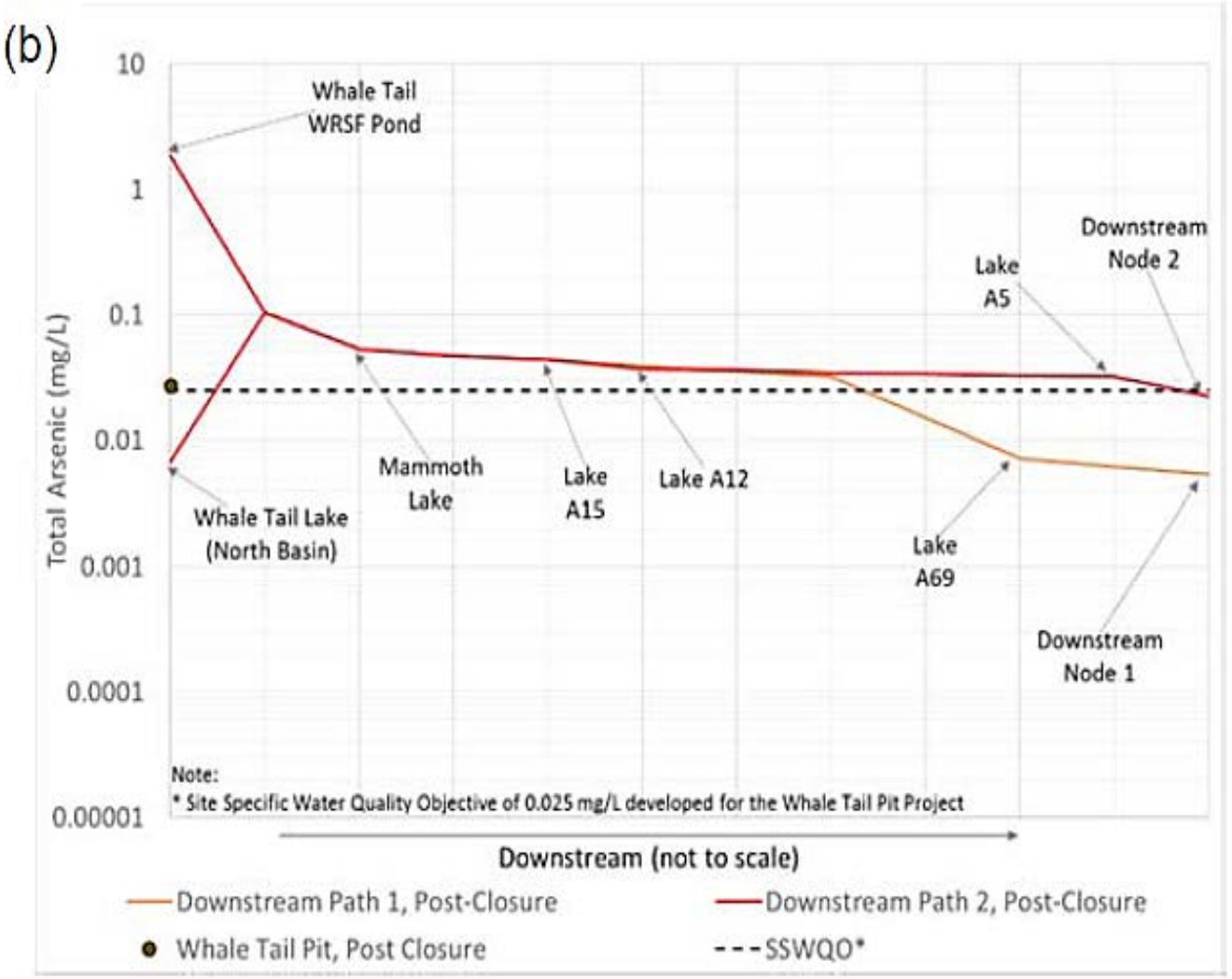
Review Comments Specific to 2AM-WTP----

Water Quality Concern 1: Post-closure Seepage from the Waste Rock Storage Facility (INAC Final Comment #1)

Issue:

- Seepage from the waste rock encapsulated in the Water Rock Storage Facility (WRSF) will occur from the active freeze/thaw zone, with the potential to impact nearby waterbodies.
- Agnico Eagle Mine (AEM) based the modelling of this seepage on the assumption that the material used in the WRSF cover would not be arsenic leaching.
- INAC requested that AEM model the water quality of seepage receiving water bodies with 2% and 5% arsenic leaching material included in the WRSF cover to examine impacts related to less than perfect segregation of cover material.
- Modelling predicts periodic exceedance of water quality objectives for arsenic if a low amount of arsenic leaching materials included in the WRSF cover.

Water Quality Concern 1: Post-closure Seepage from the Waste Rock Storage Facility cont'd



Downstream water quality with 4 m active thaw depth (without treatment) assuming 2% arsenic leaching materials in WRSF cover.

Figure 7b from 'Addendum to Agnico Eagle Mines Whale Tail FEIS Appendix 6-H. Sensitivity Analyses on Water Quality Modelling in Support of Responses to Technical Commitments 30, 36, 37 and 42.

Water Quality Concern 1: Post-closure Seepage from the Waste Rock Storage Facility cont'd

Outstanding concerns:

- It is unlikely that segregation practices for WRSF cover material will be perfect.
- Analyses provided by AEM show the potential for adverse arsenic concentrations in receiving water bodies if even a low amount of arsenic leaching material is included in the WRSF cover.
- Uncertainty around timing of seepage from the WRSF; potential for delayed onset.
- Protection of receiving water bodies requires diligent segregation practices, prolonged and intensive monitoring of seepage and further evaluation of discharges into Mammoth Lake.

Water Quality Concern 1: Post-closure Seepage from the Waste Rock Storage Facility cont'd

Recommendations:

a) Update waste rock management plan to include more waste rock sampling to increase confidence that no contamination is entering WRSF cover.

b) Update monitoring plan for WRSF seepage to include criteria that must be met before dike for WRSF attenuation pond is breached.

c) Conduct hydrodynamic modelling to evaluate mixing of WRSF seepage in Mammoth Lake.

d) Uncertainty around water quality due to seepage be taken into consideration for financial security.

Current status: a) ✓ **b)** ✓ **c)** ✓ **d)** ✓

Water Quality Concern 2: Water Quality Affected by Maximum Thaw Depths in the WRSF Cover (INAC Final Comment #2)

Issue:

- The WRSF cover must be designed with consideration of the thickness of the active freeze/thaw zone.
- Thaw depth linked to seepage and uncertainty around arsenic concentrations.
- AEM has performed thermal modelling to determine depth of active zone under future climate change scenarios, resulting in a recommended cover thickness of at least 3.8 m (including contingency buffer of 0.5 m).
- Data from AEM's Meadowbank Portage WRSF show a thaw depth of up to 5.5 m in some locations.

Water Quality Concern 2: Water Quality Affected by Maximum Thaw Depths in the WRSF Cover cont'd

Recommendations:

a) The current thermal model for the Whale Tail WRSF cover should be further calibrated with the available observational data (ground temperature monitoring) from the Meadowbank WRSF.

b) Continue to update the thermal model as data becomes available to inform final WRSF cover design.

c) Uncertainty around water quality due to seepage be taken into consideration for financial security.

Current status: a) ✗ **b)** ✓ **c)** ✓

Water Quality Concern 3: Post-closure Water Quality in the Flooded Pit and Whale Tail Lake (INAC Final Comment #3)

Issue:

- There is uncertainty regarding water quality in Whale Tail Pit once it is flooded during closure:
  - It is unknown whether diffusion of arsenic into the pit during post-closure will occur.
  - Diffusion of arsenic into the pit would result in arsenic concentrations in receiving environments above the SSWQO (regardless of proposed North Wall Push Back).
- Arsenic leaching into the flooded pit will only occur if the pit is in a groundwater discharge zone.
- The Applicant describes the area around the pit as circum-neutral and is confident that any areas of discharge do not coincide with arsenic leaching material.
- There is presently insufficient information to verify groundwater flow in the pit.

Water Quality Concern 3: Post-closure Water Quality in the Flooded Pit and Whale Tail Lake cont'd

Recommendations:

a) Additional hydrogeological studies are needed to verify hydraulic gradients. This could be done during the 2018 field season prior to dewatering of Whale Tail Lake.

b) Analyses are needed to confirm that meromixis will occur in the pit, if hydrogeological studies show that diffusion of arsenic from around the pit could occur.

c) Updated monitoring plan for the flooded pit, with specific criteria that would need to be met prior to breaching of dams/dikes.

Current status: a) ✗ **b)** ✓ **c)** ✗

Resolved Concerns

Issues resolved since Technical Meeting:

- **Availability of cover material (Final Comment #4)**
  - INAC supports the conclusion that sufficient non-metal leaching and non-acid generating waste rock is available for cover of the WRSF.
- **Ammonia and nitrate concentrations from use of explosives (Final Comment #5)**
  - INAC recommended an alternative method for modelling ammonia and nitrate concentrations in effluent from the use of explosives.
  - Upon further discussion with the Applicant, the original calculations are considered acceptable.

Closure Cost Estimate (Reclamation security)

- INAC's reclamation closure cost estimate for 2AM-WTP---- includes the Whale Tail Pit Project as well as the All-Weather Road connecting the Meadowbank Mine with the Whale Tail Pit.
- INAC's estimate is currently $27.5 million and includes considerations of uncertainty surrounding adverse impacts on post-closure water quality.
- Discussions on the reclamation closure cost estimate have occurred between INAC, Agnico Eagle and the Kivalliq Inuit Association.
- Pending agreement between the parties for a Security Management Agreement, INAC recommends that 50% of the reclamation closure cost estimate be held under the Water Licence 2AM-WTP----.

Review Comments Specific to 2AM-MEA1525

Amendment Concern 1: Meadowbank Tailings Management (INAC Final Comment #6)

Issue:

- South Cell Wall raise to 54 m for Meadowbank Tailings Storage Facility (TSF) to accommodate tailings produced from Whale Tail Pit ore.
- Approval for TSF in 2015 was granted based on activities at Meadowbank.

Recommendations:

a) Facility design change should be reviewed by NWB.

b) INAC recommends that the Applicant submit an updated tailings management plan for review and approval.

Current status: a) ✗ **b)** ✗

Amendment Concern 2: Term of Meadowbank Water Licence (INAC Final Comment #7)

Issue:

- Amendment Application includes water use to 2026, whereas current 2AM-MEA1525 expires in 2025.

Recommendations:

- The Applicant has not requested a change to current Water Licence term.
- INAC recommends that an amended Water Licence include a term to 2026.

Current status: a) ✓ **b)** ✓

Conclusions

- The information, analysis and presentation of the documentation was complete.
- Uncertainties remain as to long-term and post-closure water quality based on the models presented.
- INAC has recommended the Applicant undertake additional modeling as information becomes available and a more intensive monitoring program for the site to better understand the remaining uncertainties and provide more confidence to predicted outcomes.
- Up-to-date modelling and monitoring during operations and closure may show that site conditions match predicted outcomes. However, outcomes that deviate from predictions could result in unintended impacts requiring mitigation.