AGNICO EAGLE

# HOPE BAY PROJECT

# Proponent's Response to Comments Received on the 2021 Annual Report and 2021 Annual Geotechnical Inspection Reports

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**Prepared for**
Nunavut Water Board

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# HOPE BAY PROJECT

# Proponent's Response to Comments Received on the 2021 Annual Reports

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# 1. ECCC-1

## 1.1 SUBJECT

Aquatic Effects Monitoring Program Results

## 1.2 REFERENCES

Section 7.0 - Aquatic Effects Monitoring Program, Hope Bay Project - 2021 Nunavut Water Board Annual Report

## 1.3 COMMENT

The Annual Report only provides a brief summary of the overall conclusions of the 2021 aquatic effects monitoring program but does not provide the detailed report.

## 1.4 ECCC RECOMMENDATION(S)

ECCC recommends that the annual report include the referenced Aquatic Effect Monitoring Report as an appendix to the annual report as the AEMP is a requirement of the Water Licence.

## 1.5 RESPONSE TO ECCC-1

The AEMP was submitted under a separate cover letter to the NWB on March 31, 2022 in accordance with Schedule B Item 9 of the Type 'A' Water Licence 2AM-DOH1335.

# 2. ECCC-2

## 2.1 SUBJECT

TL-12 Monitoring of Underground Dewatering

## 2.2 REFERENCES

Appendix D: Water Licence(s) Monitoring Data, Hope Bay Project - 2021 Nunavut Water Board Annual Report

## 2.3 COMMENT

Appendix D-1 provides the monitoring results for the various sampling stations at the mine site. Station TL-12 monitors the underground dewatering. The monitoring data provided at this location is for TL-12A and TL-12B. In response to comments from ECCC in the 2020 Annual Report, the Proponent provided information that TL-12A monitors quality before treatment, and TL-12B monitors quality after treatment has occurred. This distinction between monitoring stations at TL-12 is not described in the annual report and may cause confusion to the reviewer when interpreting results.

## 2.4 ECCC RECOMMENDATION(S)

ECCC recommends that in future annual reports the Proponent provide a description of the differences in monitoring location for TL-12A and TL-12B to aid the reviewer in interpretation of results.

## 2.5 RESPONSE TO ECCC-2

Agnico apologizes for the confusion and will ensure future annual reports provide a description to differentiate between the two sampling points. TL-12A is untreated underground mine water and TL12-B represents the treated underground mine water.

# 3. ECCC-3

## 3.1 SUBJECT

Air Quality Data

## 3.2 REFERENCES

Section 3.1 Construction and Operations: Doris, Hope Bay Project - 2021 Nunavut Water Board Annual Report

## 3.3 COMMENT

The report mentions that installation and commissioning of air quality monitors at the Doris Air Quality monitoring building was performed in 2021. It is not evident whether the installation is consistent with the objectives of the Air Quality Management Plan issued by TMAC Resources in April 2019. There is no summary of any air quality data in the annual report.

## 3.4 ECCC RECOMMENDATION(S)

ECCC recommends the Proponent confirm the details of what instruments were installed, and what parameters are measured, at the Doris Air Quality monitoring building. Please provide summaries, if available, of air quality measurements taken at the monitoring building.

## 3.5 RESPONSE TO ECCC-3

For most of 2021, monitoring at the Doris Site continued using the same methods/locations as in previous years. In November 2021, Agnico commissioned one new continuous particulate monitor - a Thermo Scientific Model 5014i Beta Attenuation Particulate Monitor equipped with a TSP inlet to monitor TSP and a Thermo Scientific Model 5014i Beta Attenuation Particulate Monitor equipped with a PM2.5 inlet to monitor PM2.5.These monitors provide enhanced coverage of ambient particulate levels by measuring hourly data as opposed to the previously utilized Partisol non-continuous monitors that collected single 24-hour samples once every six days. Installation and operation of these continuous particulate monitors is described in Sections 3.2 and A2.2 of the Air Quality Management Plan (April 2019). Installation of these monitors was originally intended to occur in 2019 but was delayed due to the COVID-19 pandemic. Dustfall is also measured at the Doris air quality building.

Results of the ambient monitoring program at the Doris and Madrid sites for January to September 2021 (Q1-Q3 2021) are presented in the Q1-Q3 2021 Atmospheric Compliance Monitoring Program Report (Nunami Stantec, March 2022) available on the NIRB Registry online. All measured ambient particulate concentrations were below their relevant air quality objectives for Q1-Q3 2021. Results of ambient particulate monitoring for Q4 2021 are currently being analysed and will be presented in a Winter 2021-2022 Atmospheric Compliance Monitoring Program Report that will be submitted to the NIRB in November 2022.

# 4. ECCC-4

## 4.1 SUBJECT

Visual Monitoring for Thermal Degredation

## 4.2 REFERENCES

Summary of Recommendations - Table 2: Madrid Project 2021 Annual Geotechnical Inspection, Attachment 2: Summary of Observations and Recommendations – Madrid, 2021 Annual Geotechnical Inspection Report for the Doris and Madrid Sites, Hope Bay Project, Nunavut

## 4.3 COMMENT

The recommendation by SRK Consulting (Canada) Inc. is that “Visual monitoring of this location should occur on an at least biweekly between approximately May and the end of August. Visual monitoring should look for signs of thermal degradation (in the disturbed areas below the former pad) and any signs of erosion (or increased sediment in the runoff water).”

## 4.4 ECCC RECOMMENDATION(S)

ECCC recommends that the Proponent implement this recommendation and follow through with the visual monitoring suggested by SRK Consulting (Canada) Inc.

## 4.5 RESPONSE TO ECCC-4

Agnico will endeavor to complete the recommended bi-weekly inspections. The results of the former Madrid portal pad inspections will be presented in the 2022 Annual Geotechnical Report.

# 5. CIRNAC-1

## 5.1 SUBJECT

Potential Future Water Treatment Requirements

## 5.2 COMMENT

Regarding water quality in the Tailings Impoundment Area (TIA), the following five parameters have consistently been flagged as potential water quality challenges: TSS, total arsenic, total copper, total cyanide, and unionized ammonia. Monitoring data and water quality predictions from 2021 reinforce that each of these parameters will need to be monitored closely to determine if additional water treatment and/or other mitigations become necessary.

Based on our review of the 2021 Annual Report, it is unclear to CIRNAC what steps AEM is already taking to proactively prepare for potential exceedances of each parameter of concern. For example, AEM's future management strategies for annual TSS spikes and predicted exceedances of the MDMER arsenic criterion are not described in the 2021 Annual Report. While CIRNAC appreciates that these uncertainties do not need to be resolved during the current temporary closure, an update on the options under consideration to manage these potential water quality exceedances would be helpful.

## 5.3 CIRNAC RECOMMENDATION(S)

CIRNAC recommends that AEM summarize the treatment options and other mitigations that have already been considered to manage the predicted increases of parameters of concern in the TIA.

## 5.4 RESPONSE TO CIRNAC-1

Agnico is committed to complying with MDMER and will not discharge non-compliant water from the Doris TIA. Based on the future interpretation of TSS trends, Agnico has procured a water treatment plant for the Doris TIA water that would help to reduce seasonal elevated TSS concentrations below MDMER limits, to allow for more operational flexibility, prior to discharging to Robert's Bay. The WTP also has the capacity to treat water from underground dewatering. Treatment of both TIA and UG waters can be done by batch separately or by commingling the two sources. The design of the plant considers future expansion and the ability to treat metals as required via chemical dosing. Details of the water management at site can be found in the Hope Bay Project Doris and Madrid Water Management Plan (June 2022). Construction of the plant is scheduled for Fall 2022 and commissioning is anticipated by freshet 2023.

# 6. CIRNAC-2

## 6.1 SUBJECT

Incinerator Stack Testing

## 6.2 COMMENT

Schedule B of Water Licence 2AM-DOH1335 provides a checklist of activities that shall be reported in the annual reports for the NWB submission. With regard to incinerator operation, Item 11 of the checklist requires that AEM report the results of incineration stack testing.

In 2021, AEM waste management operators attempted to optimize incineration conditions to address past exceedances. A stack test to assess the techniques applied was planned for 2021 with equipment shipped to site for September 2021. However, as all site visits were cancelled, the stack testing was not performed or reported in 2021.

AEM did not provide time lines as when the when the stack testing will be performed in 2022.

## 6.3 CIRNAC RECOMMENDATION(S)

CIRNAC recommends that AEM provide:

Timelines for the stack testing in 2022; and
The summary of the stack testing results in the 2022 Annual Report.

## 6.4 RESPONSE TO CIRNAC-2

The stack test is currently scheduled for August 24-31, 2022, at Hope Bay. A summary of the stack testing results will be presented in the 2022 Annual Report.

# 7. CIRNAC-3

## 7.1 SUBJECT

Production Suspension

## 7.2 COMMENT

In October 2021, AEM stopped Doris milling operations. In February 2022, AEM announced its decision to place the Doris Mill into Care and Maintenance and suspend production at the Hope Bay Project. On March 30, 2022, Agnico Eagle provided the Nunavut Water Board with formal written notice of Care and Maintenance for the Doris - Madrid operations under Part J, Item 4 of the Water Licence 2AM - DOH1335 (Water Licence). As required by Part J, Item 5 of the Water Licence, AEM developed and submitted a Doris - Madrid Care and Maintenance Plan.

The Care and Maintenance Plan describes the activities to be implemented for the maintenance of mine site facilities, management and monitoring measures, and procedures to be implemented in accordance with temporary closure goals and regulatory requirements.

While the Care and Maintenance Plan describes the operational approaches that will be followed by AEM, it does not provide information and timelines on the decision-making process that AEM will use to determine whether to re-initiate operations at the Hope Bay Project.

AEM's decisions regarding the future of the Hope Bay Project have potential environmental impact implications and, should ensure that interested parties are duly informed.

## 7.3 RECOMMENDATION

CIRNAC recommends that AEM provide further details on:

a) The technical, logistical and/or financial factors that contributed to the decision to suspend production;

b) The evaluations that AEM is undertaking to inform decisions regarding the operational future of the Hope Bay Project;

c) Currently anticipated timelines for the decision-making process; and

d) How they plan to engage/inform NIRB, NWB, CIRNAC and other interested parties throughout the decision-making process.

## 7.4 RESPONSE TO CIRNAC-3

Agnico announced its decision on February 18, 2022 to place the Doris Mill into Care and Maintenance and suspend production of the Hope Bay Project. This decision was made after reassessment of the operation and weighing the importance of growing Hope Bay's gold resources to support future expansion as opposed to maintaining low-volume/high-cost mine production operation. After careful consideration, Agnico has decided to focus on exploration and expanding the property resources to make an informed decision for a future start-up of the mine. This decision allows Agnico to take a methodical approach and carefully examine the existing deposits and the significant potential for more resources. There are no specific timelines to

resume production, but is likely between two and three years before a decision is made. The existing Care and Maintenance Plan will be followed as per the Water License requirements and once a decision is made on the next steps, the appropriate parties will be informed.

# 8. CIRNAC-4

## 8.1 SUBJECT

Closure Planning

## 8.2 COMMENT

AEM's decision to place the Doris Mill into Care and Maintenance and suspend production of the Hope Bay Project is an important development when considering closure planning. This is addressed through Part J Item 6 of NWB Type A Water Licence 2AM-DOH1335 which specifies that the following requirement shall be met within twelve months of AEM providing notice of its intent to enter into Care and Maintenance:

"Should the Project remain, or be in Care and Maintenance, submit to the NWB an updated estimate of total mine closure restoration liability, and continue to do so every three (3) years thereafter"

Based on this requirement, AEM will be required to submit an updated liability estimate by March, 2023. Linked to this requirement, CIRNAC notes that there have been significant inflationary pressures across the entire Canadian economy. These inflationary pressures are likely to have a major impact on the unit costs of goods and services that are required to implement mine closure.

## 8.3 RECOMMENDATION

CIRNAC recommends that AEM:

> Clarify if the temporary suspension of production will eventually transition into a permanent closure or there will be resumption of production prior to the full closure;
> Ensure that the current temporary suspension of operations is addressed in the next iteration of the Interim Closure and Reclamation Plans (ICRP) for the Hope Bay Project. Specifically, the ICRP should include options that involve the temporary production suspension transitioning into a permanent suspension requiring full closure earlier than previously planned;
> Should undertake a comprehensive update of all unit costs used in the preparation of its updated liability estimates, when developing an updated cost estimate of total mine closure 12 months after the current production suspension (per Part J Item 6 of NWB Type A Water Licence 2AM-DOH1335), to address recent inflammatory pressures for goods and services within the mining industry; and
> Proactively engage with NWB, KIA and CIRNAC to ensure that the next iteration of the Hope Bay Project ICRPs and updated cost estimates address the potential that the current temporary production suspension will become permanent.

## 8.4 RESPONSE TO CIRNAC-4

Agnico announced its decision on February 18, 2022 to place the Doris Mill into Care and Maintenance and suspend production of the Hope Bay Project. There are no specific timelines to resume production, but is likely between two and three years. At this time a full closure is not anticipated.

Agnico will ensure that the next iteration of the ICRP, considers the applicable scenarios. An updated closure plan based on changes to the mine plan and associated closure cost/security amounts will be submitted to the NWB in February 2023.

# 9. KIA-NWB-1

## 9.1 SUBJECT

Missing 2021 Wildlife Mitigation and Monitoring Plan and other Project documents

## 9.2 REFERENCE

Agnico Eagle, Hope Bay Project 2021 NIRB Annual Report (April 2022)

> Doris North Project Certificate No. 003, Revised Term and Conditions No. 25, 27, 29
> Madrid-Boston Project Certificate No. 009, New Term and Conditions No. 4, 17, 19, 20, 21, 22, 24, 26, 27

## 9.3 SUMMARY

The updated 2021 Hope Bay Project Wildlife Mitigation and Monitoring Plan was not available for review alongside the 2021 NIRB Annual Report.

## 9.4 DETAILED REVIEW COMMENT

Throughout the 2021 NIRB Annual Report, Agnico Eagle states that they submitted to NIRB an updated Hope Bay Project Wildlife Mitigation and Monitoring Plan (Agnico 2021) in April 2021. However, the updated WMMP Plan is not available on the NIRB Public Registry, nor was the document sent directly to the KIA for review. As such, it was not possible to provide a comprehensive review of Agnico Eagle's compliance with the 12 TOCs that reference the updated WMMP Plan (noted in the References section above). The KIA has provided technical review comments based on the information available in the 2021 NIRB Annual Report, the 2021 WMMP Compliance Report, and other relevant Project documents. However, it is anticipated that some outstanding issues may be addressed in the updated 2021 WMMP Plan, and that other issues may arise through review of the updated WMMP Plan.

The KIA also notes that the "Waste Rock, Ore and Mine Backfill" document uploaded to the NIRB Public Registry for review does not appear to be the intended management plan developed by Agnico Eagle in 2022. In addition, within the "Operations, Maintenance and Surveillance Manual: Hope Bay Doris Tailings Impoundment Area" document, the Dam Emergency Plan (AEM 2022) in Appendix F is missing.

## 9.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

> Please distribute the updated 2021 WMMP Plan and other missing management plans to the KIA and other interested parties for review as soon as possible.

## 9.6 RESPONSE TO KIA-NWB-1

The 2021 WMMP Plan was submitted and distributed to Parties as part of the 2020 NIRB Annual Report (Appendix E) and is available on the NIRB Registry.

Agnico apologizes that the wrong file was uploaded for the "Waste Rock, Ore and Mine Backfill Management Plan". Furthermore, Agnico apologizes that it was not made clear that Appendix F of the "Operations, Maintenance and Surveillance Manual: Hope Bay Doris Tailings Impoundment Area" is not yet complete, and is scheduled to be completed by the 2022 Annual Report. The Waste Rock, Ore and Mine Backfill Plan was most recently updated in June 2022 and was distributed to Parties as part of the Naartok Portal Modification Request with the NWB. The current version is included as Appendix B.

# 10. KIA-NWB-2

## 10.1 SUBJECT

General report structure

## 10.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022)

## 10.3 SUMMARY

The structure of the Hope Bay Project 2021 NWB Annual Report is not user-friendly, and the addition of bookmarks, as well as overall improvement of the report structure, may be required to aid the readers.

## 10.4 DETAILED REVIEW COMMENT

In general, the organization and structure of the Hope Bay Project 2021 NWB Annual Report is difficult for readers to follow, as it contains multiple appendices within appendices. For example, the main Appendix F (2021 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid Mines, Hope Bay Project) has an Appendix A to E within it. However, the entire report has five appendices titled “Appendix F” within the document. The current structure of the report makes it difficult to know which appendix is being referenced at times, and the reader should always be able to easily find referenced appendices.

## 10.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

> The KIA requests/recommends the following:
> Please re-organize the report for next year, such that all appendices have a unique number or letter (i.e., Appendix A-1, etc.).
> Please consider adding bookmarks to the PDF to allow the reader to easily navigate to different appendices and sections.

## 10.6 RESPONSE TO KIA-NWB-2

Agnico will endeavor to improve the report structure of the 2022 Annual Report and will take the above mentioned factors into consideration. As some reports come finalized from external consultants it is not always possible to edit the appendix names. Nonetheless, Agnico will work with our consultants to improve the readability of the report.

# 11. KIA-NWB-3

## 11.1 SUBJECT

Ongoing issues with environmental resource maps

## 11.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Hope Bay Spill Contingency Plan; Appendix 3: Environmental Resource Maps, p. 1809-1812

## 11.3 SUMMARY

Many of the maps are difficult to interpret with unclear resolution. Furthermore, in most cases, the legends on the maps are unreadable, and certain attributes are outdated.

## 11.4 DETAILED REVIEW COMMENT

In their review of the 2020 NWB Annual Report, KIA commented that the resource maps had extremely low resolution, making it difficult to clearly see and read information presented on the maps, including the legend. The KIA also provided similar comments regarding the same resource maps in previous reviews, and again no improvements have been made. Furthermore, some important fisheries information is still missing from maps A, B, and C. The maps show sampled fish bearing lakes/ponds but do not include fish habitat information for watercourses (i.e., rivers and creeks) that connect with these larger waterbodies. For example, the maps do not present known Arctic char runs/migration habitats. The maps present information/data for certain VCs but only within various time periods. For example, raptor nests are shown for the 2006-2008 period and the 2009 to 2015 period on maps A, B and C. Monitoring has been conducted since 2015, however the environmental resource maps have not been updated. Map updates should be provided, as they can aid with protecting environmental values by providing current information for environmental resources.

## 11.5 RECOMMENDATION/REQUEST

The KIA requests the following:

> Please increase resolution of Environmental Resource (Sensitivity) Maps A, B, C, and D to improve legibility. It would be helpful if the proponent applied a standard map resolution to all maps. Due to the amount of information shown on some maps (including insets), a larger scale and size format would help.
> Please update maps to provide current information for environmental resources, including fish habitat, which can be used to guide spill contingency planning and support other management objectives.
> If the proponent does not intend to update maps, please explain how the proponent intends to protect environmental values.
> Please consider adding a feature count next to important attributes on the legend to inform the reader on the number of important features on the map. This will help the reader understand quickly how many environmental values may be impacted by a spill, as well as help ensure no features that may not be easily recognized on a map are missed.

## 11.6 RESPONSE TO KIA-NWB-3

Agnico will endeavor to update the Spill Contingency Plan Appendix 3 Environmental Resource Maps and take the recommended feature count addition into consideration for the 2022 Annual Report .

# 12. KIA-NWB-4

## 12.1 SUBJECT

Impact of runoff from drill sites on vegetation, soils, and wildlife

## 12.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Summary of Project Activities for 2021; Section 3.2.1: Drilling, p. 23.

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Ore and Mine Backfill Management Plan; Section 2.6: Underground Brine Water, p. 1881.

## 12.3 SUMMARY

The proponent conducts underground diamond drilling using saline water to prevent the drill equipment from freezing as it excavates through permafrost. Water quality monitoring was performed on runoff; however, the proponent does not note the impacts of using saline water on vegetation, soil, and wildlife via potential spills.

## 12.4 DETAILED REVIEW COMMENT

In Section 3.2.1 of the summary of project activities for 2021, the proponent states "Water quality monitoring was performed on runoff from drill sites and water used for drilling to ensure the respective Water License Criteria were met". Furthermore, in the Ore and Mine Backfill Management Plan, the proponent notes that underground brine water may be used as a lubricant in the drilling procedure to ensure a lower freeze point and to avoid water supply lines freezing.

An excess amount of runoff of underground brine water may result in a brine spill, which can heavily impact wildlife and vegetation. If tundra plants and soils absorb underground brine runoff water, it could also attract various species of wildlife. Ungulates, such as caribou, will seek soils with higher salt content for mineral supplementation to compensate for deficiencies or imbalances, and to aid with digestion by decreasing the influence of digestive disorders and toxic plant compounds, as well as for mineral supplementation (Ayotte et al. 2008). Furthermore, a brine spill can burn tundra vegetation, which already occurred in the area in 2011. Although no long-term impacts from this event were documented, a spill of this calibre could have been toxic to fish if it were to occur in certain contexts:

https://www.cbc.ca/news/canada/north/hope-bay-orbit-garant-make-reparations-for-spill-charges-1.2661673

The impact of another brine spill would be detrimental to the area, as tundra vegetation grows at a slower rate and may take hundreds of years before recolonizing the area.

## 12.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

Please consider additional safety protocols when using underground brine water to avoid a spill from reoccurring.
Please document all spills of any severity, report them to the KIA, and remediate immediately as required.

## 12.6 RESPONSE TO KIA-NWB-4

Underground brine water, when used during drilling, is limited to use underground and has no direct impact to wildlife or the tundra. Agnico will continue to document all spills as outlined in the Hope Bay Spill Contingency Plan.

# 13. KIA-NWB-5

## 13.1 SUBJECT

Open burning and incineration impacting soils, vegetation, and wildlife

## 13.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Solid Waste Disposal; Section 6.1.1: Non-Hazardous Waste Management – Camp Incinerators, p. 30.

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Solid Waste Disposal; Section 6.1.2: Non-Hazardous Waste Management – Open Burning, p. 30.

## 13.3 SUMMARY

The proponent has ensured that animal attractants will be promptly incinerated; however, they have not defined "promptly". Furthermore, the proponent does not mention the impacts of open burning waste on soils, vegetation, or wildlife, or whether those potential impacts are monitored for.

## 13.4 DETAILED REVIEW COMMENT

In Section 6.1.1 of the section on Solid Waste Disposal, the proponent notes that the Incinerator Management Plan strives to ensure that "animal attractants are promptly incinerated". A definition of "promptly" should be provided if the timing is longer than expected.

In Section 6.1.2 of the section on Solid Waste Disposal, the proponent mentions the use of open burning for untreated wood, cardboard, and paper products; however, this protocol should be avoided when possible as it can have negative impacts on soils, vegetation, and wildlife. Pollutants from open burning typically disperse through the air as gas, particulate matter, or ash (Cogut 2016). Open burning of waste releases toxic and/or organic pollutants, such as dioxins and furans, into the air, which can impact soil and water quality (Cogut 2016). Organic pollutants are also carcinogenic and have been linked to diseases (Cogut 2016). Furthermore, open burning releases greenhouses gases, such as carbon dioxide, methane, and particulate matter, into the atmosphere, which impact air quality and can lead to respiratory diseases in extreme cases (Cogut 2016). Although less severe than contaminated wood, combustion of untreated woods releases dioxin emissions, in turn impacting air quality and therefore impacting wildlife and vegetation (Lavric et al. 2004).

Open burning could also lead to ash build-up, therefore impacting soils. Additionally, open burning could lead to toxic dioxins and furans being deposited on vegetation, which may be later consumed by wildlife (Environment Canada 2010). Dioxins released from open burning also tend to bind to organic matter in sediments and soils (Lavric et al. 2004); therefore, further mitigation may be required.

## 13.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

> Please define the timeline of incineration, and what the proponent considers "prompt" timing for disposal of animal attractants.

Please indicated whether any monitoring is occurring, or will occur, to determine impacts of incinerator burning on the surrounding environment.

## 13.6 RESPONSE TO KIA-NWB-5

All wildlife attractants are disposed of immediately, and incineration takes place daily. The only wildlife attractants that are stored is kitchen grease and grease trap waste which is shipped to KBL Environmental for disposal, typically within a month. The incinerator is routinely inspected (prior to every use) to ensure the incinerator is operating as per standard operating procedures. Incinerator stack-emissions testing is conducted to measure emissions of dioxins, furans and mercury from the domestic waste incinerators. Waste incineration practices are outlined in the Hope Bay Project Incinerator Management Plan and the related Non-Hazardous Waste Management Plan. Stack testing is conducted according to the CCME Canada-Wide Standard for Waste Incinerations Stack Testing Requirements (CCME 2001c). New incinerators will be stack tested within six (6) months of installation and commissioning. In addition, a representative stack test on existing incinerators will be conducted after a significant change to site activities with the potential to change the waste stream or every three (3) years, whatever is more frequent.

# 14. KIA-NWB-6

## 14.1 SUBJECT

Ocean discharge pipeline 100 litres spill

## 14.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Section 11: Spill Reports; p. 46-49.

## 14.3 SUMMARY

A 100 litres spill of treated effluent from the ocean discharge pipeline was reported; however, the extent and severity of the spill were not explained. Furthermore, the spill was not reported to ECCC.

## 14.4 DETAILED REVIEW COMMENT

On June 27th, 2021, in the summary table of reportable spills in 2021, the proponent notes that a 100-litre spill of treated effluent from the ocean discharge pipeline occurred. Details surrounding the impact and remediation or monitoring of the spill were not provided.

## 14.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

> Please provide details on the impacted surface area of the June 27th, 2021 spill caused by an ocean discharge pipeline leak.
> Please confirm whether the proponent conducted soil sampling in the area to determine the severity and extent of the spill.

## 14.6 RESPONSE TO KIA-NWB-6

Agnico can confirm that the spill of treated effluent on June 27, 2021 was reported to the ECCC. As no allowable discharge to tundra criteria exist for this effluent stream, an assessment of the impact of the spill was conducted by comparing the results to allowable criteria outlined in Part F Item 18 (a) of Water Licence 2AM-DOH1335. Although no effluent was discharged to a water body as a result of this event, the results of this sample were also compared to the allowable criteria outlined in Schedule 4 of the Metal and Diamond Mining Effluent Regulations SOR/2002-222 (MDMER).

Results of the sample collected were below the allowable limits outlined in Part F Item 18 (a) of 2AM-DOH1335 licence and Schedule 4 of the MDMER. Chloride and salinity levels of the sample (3530 mg/L and 6.5ppt respectively) indicate that some minor impact to vegetation in a localized area (45 $m^2$) surrounding the vacuum break may occur. No impacts to vegetation have been identified to date, and with the recent inspection one year later confirming that no impacts were identified, the area will no longer be monitored.

# 15. KIA-NWB-7

## 15.1 SUBJECT

Lead analysis for paint in Doris Commercial infrastructures

## 15.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Section 15: Annual Inspection Activities; Table 15-1: Summary of Annual Inspection Activities, p. 65.

## 15.3 SUMMARY

The proponent expects to do a lead analysis in paint for the demolition of buildings in Windy Lake Camp; however, they did not outline the timeline and reporting of the analysis.

## 15.4 DETAILED REVIEW COMMENT

On August 19-20, 2021, in the summary table of annual inspection activities, the proponent notes that a lead analysis of paint will be conducted on the infrastructures of the Windy Lake Camp to continue remediation of the facility. The paint in the infrastructures must be lead-free to be demolished, cut up, and burned (refer to TC-03 on the impacts of open burning). The proponent has not detailed the timeline of the lead analysis, and the expected date of completion. Furthermore, the proponent did not clarify when or if they will provide the results of the lead analysis to the KIA. The lead analysis should be submitted to the KIA prior to the release of the 2022 annual report if possible.

## 15.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

> Please provide details on the timeline of the lead analysis and expected date of completion.
> Please provide the KIA the results of the lead analysis should they be completed prior to the release of the 2022 annual report.

## 15.6 RESPONSE TO KIA-NWB-7

Agnico provided KIA with the results of the lead analysis on July 4, 2022. Testing has confirmed the absence of lead in the paint.

# 16. KIA-NWB-8

## 16.1 SUBJECT

Load balance parameters for initial screening assessment of water

## 16.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix E: Water and Load Balance Assessment; Section 2.2: Review of Water Quality Inputs; Table 7: Initial Screening Assessment of Water and Load Balance Parameters, p. 234.

## 16.3 SUMMARY

Further details may be required for the comparison of results to model prediction for the "conservative" and "trending well" classification types in the table explaining the initial screening assessment of water and load balance parameters.

## 16.4 DETAILED REVIEW COMMENT

In Section 2.2 of the Water and Load Balance Assessment, a review of water quality inputs is described, and Table 7 presents the initial screening assessments of water and load balance parameters. Under the "conservative" classification type, the proponent explains that measured values are below the model predictions, but that "some values may be at or close to the method detection limit and slightly above the model prediction". Furthermore, under the "trending well" classification type, the proponent explains that measured values are tracking well with the model predictions, but that "some parameters tended to exhibit seasonal offsets from measured data". The current laboratory testing used for the assessment of water and load balance parameters had higher detection limits than the predicted values; therefore, it is not possible to determine if the model predictions were correct. To help better inform water quality and the level of accuracy of the model predictions, more details on the quantitative results for each parameter should be provided, explaining what values were at or close to the detection limits or exhibited seasonal offsets.

## 16.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

- Please note parameters close or equal to the method detection limit and provide these parameters to the KIA.
- Please consider using a laboratory that can detect the water quality parameters at a lower detection limit, such that the proponent can comment on the values as being above or at the model prediction values.

## 16.6 RESPONSE TO KIA-NWB-8

Parameters for which some or most of the measured concentrations were reported as equal or close to the method detection limit (MDL) are listed in the table below, along with a comment on how MDLs compare with predictions. The parameters listed have not been identified at constituents of potential concern (COPCs). For many of the parameters, the MDLs (and in most cases, the available detectable values)

were below model predictions, therefore these parameters can be classified as conservatively predicted in the model.

Historically, predicted concentrations for total and dissolved phosphorus and vanadium were similar to or conservative compared to the detectable values. It is acknowledged, however, that many of the recently reported values have been at the MDLs, which tend to be higher than predictions. Measured data at MDLs are not conducive in assessing model prediction accuracy.

Agnico will confirm with the current laboratory that testing methods are using the most appropriate MDLs.

**Figure 16-1 Parameters with Values Reported Close to or Equal to the MDL**

| Parameter | Comments |
|---|---|
| Thiocyanate | Detectable values were consistently within annual range of predictions. |
| Total and Dissolved Beryllium | MDL values were consistently below or within range of predictions. |
| Total and Dissolved Cadmium | MDL and detectable values were both consistently below predictions. |
| Total and Dissolved Chromium | MDL values were generally below or within range of predictions (i.e., less than 0.004 mg/L). A higher MDL (0.005 mg/L) was used for some values in April to September 2021, but detected values reported within the same time frame were below MDLs of 0.001 mg/L and 0.003 mg/L. |
| Total and Dissolved Lead | MDL and detectable values were both consistently below predictions. |
| Total and Dissolved Mercury | MDL and detectable values were both consistently below predictions. |
| Total and Dissolved Silver | MDL and detectable values were both consistently below predictions. |
| Total and Dissolved Thallium | Detectable values were consistently below predictions. MDL range was consistently below or within range of predictions. |
| Total and Dissolved Vanadium | MDL values were generally above predictions. Total and dissolved vanadium are discussed further in the response to KIA-NWB-28. |
| Total and Dissolved Zinc | MDL and detectable values were both consistently below predictions. |
| Total and Dissolved Phosphorus | MDL values were generally above predictions. Total and dissolved phosphorus are discussed further in the response to KIA-NWB-28. |

# 17. KIA-NWB-9

## 17.1 SUBJECT

Impacts of alternate dust suppressants

## 17.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Operations, Maintenance, and Surveillance Manual; Section 4.4: Dust Management, p. 668.

## 17.3 SUMMARY

The proponent notes the use of alternate chemical dust suppressants that are mainly comprised of sugars, starches, and minerals. Further details should be provided on the type of dust suppressant, its response to wildlife and vegetation, and the time it takes to disintegrate or break down.

## 17.4 DETAILED REVIEW COMMENT

In Section 4.4 of the Operations, Maintenance and Surveillance Manual, the proponent notes that alternate suppressants composed of sugars, starches, and minerals will be used during the winter season to control dust. Dust suppressants can impact site characteristics such as topography, soil texture and chemistry, groundwater flow path, vegetation, and wildlife (Piechota et al. 2004). A response to dust suppressants should be evaluated, particularly for soil and soil microbes, aquatic organisms, and vegetation (Piechota et al. 2004). The environmental impacts of the alternate dust suppressants on wildlife and vegetation should be outlined if known. If widely used in the tundra, these chemical dust suppressants can enter the food chains for many species. Furthermore, to mitigate long-term impacts, the length it takes the chemical suppressants to break down or disintegrate in an Arctic environment should also be outlined.

## 17.5 RECOMMENDATION/REQUEST

The KIA requests/recommends the following:

> Please outline or determine the known impacts of the alternate dust suppressants on wildlife and vegetation.
> • Please detail the length of time it will take the chemical suppressants to break down in an Arctic environment.

## 17.6 RESPONSE TO KIA-NWB-9

As per the Air Quality Management Plan, Hope Bay may use GN approved chemical dust suppressants as required. Hope Bay has used EK-35 for dust suppression on the airstrip and site roads. EK-35 is approved for use in Nunavut by the Government of Nunavut Department of Environment.

# 18. KIA-NWB-10

## 18.1 Subject

Impacts of blasts on wildlife

## 18.2 References

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Hope Bay Project Quarry Management Plan; Section 3.1.6: Wildlife Monitoring, p. 1648.

## 18.3 Summary

Wildlife monitoring efforts during blasts include visual inspection of the quarry and surrounding tundra, and behavioural monitoring of animals near the blast area. Further details on the visual inspection procedure and behavioural monitoring program should be provided.

## 18.4 Detailed Review Comment

In Section 3.1.6 of the Hope Bay Project Quarry Management Plan, the proponent notes that visual inspections of the quarry and surrounding tundra will be carried out to verify no caribou or muskox are within 2.8 km from the quarry high point. The KIA recommends that visual inspections should only occur on fog-free days, when line of sight is optimal, and visibility to the intended distance is possible. Furthermore, as 2.8 km is a relatively short distance, it may be beneficial to lengthen the line of sight using an infrared detection device, as trialed for the Back River project.

The proponent also mentions that should a caribou or muskox be found at a distance greater than 2.8 km from the blast site, behavioural monitoring during the blast will be conducted to evaluate an individual's response to the blast. The KIA expects that details on behavioural monitoring should be provided in the missing WMMP Plan (see review comment KIA-TC-01) and recommends cross-referencing it in Section 3.1.6 of the Hope Bay Project Quarry Management Plan. In the case of Hope Bay, the goal of behavioural monitoring is meant to lead to adaptive management; however, it should be outlined how monitoring results will be used to inform mitigation through adaptive management.

## 18.5 Recommendation/Request

The KIA requests/recommends the following:

> Please elaborate on the visual inspection procedure and confirm whether these will be carried out on clear days.
> • If visual inspections will only be carried out on clear days, please confirm if blasting will also only occur on clear days. If blasting may occur on non-clear days, please explain how Agnico will ensure that no caribou or muskox are located within 2.8 km of the blast.
> • Please provide further detail on the behavioural monitoring program, and how it will be used to inform mitigation through adaptive management. Alternatively, provide the updated WMMP for 2021, which may contain these details.

## 18.6 RESPONSE TO KIA-NWB-10

The Wildlife Mitigation and Monitoring Plan (WMMP, Revision 7, 2021) and Hope Bay Quarry Management Plan (QMP, Revision 5, 2021) includes the same measures to manage potential disturbance to caribou and muskox due to blasting noise in quarries. These include a height of land (HOL) survey to determine if caribou or muskox are present within 2.8 km and holding blasts until these animals leave the area. Should animals be observed beyond 2.8 km, then their behavioural response to the blast will be noted.

The commitments were updated made as part of the 2017 Madrid-Boston FEIS. The visual inspection is carried out by trained environmental staff. It is up to these staff to determine if the survey can go ahead and to gauge distance based on maps and known landmarks.

During August 2017, the Hope Bay Inuit Environmental Advisory Committee (IEAC) interviewed the blasting manager to determine what mitigation was being conducted for caribou. The blasting manager indicated that they were taking a very conservative read of the management plan and were prepared to pause blasts should any animal be observed at any distance. However, to date, no animal had been observed in these pre-blast surveys.

Between 2018 and present there have been very few above-ground blasts and no observations of animals have been made during pre-blasting surveys. Note that above-ground blasts are typically only conducted during road or pad construction when new gravel material is required, and is not part of the standard mining process, which is underground.

# 19. KIA-NWB-11

## 19.1 SUBJECT

Mitigation measures on oiled shoreline vegetation and nests/eggs

## 19.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Hope Bay Spill Contingency Plan; Section 2.3.19.2: Mitigation of Impacts to Birds, p. 1695.

## 19.3 SUMMARY

The proponent noted wildlife monitoring and assessment surveys for oiled and unoiled wildlife; however, they do not consider the impacts on oiled shoreline vegetation consumed by wildlife, as well as culturally important vegetation.

## 19.4 DETAILED REVIEW COMMENT

In the event of an oil spill, the proponent has noted initial wildlife response measures will include hazing to deter wildlife from spill area, wildlife monitoring of impacted species, and bird collection. For wildlife monitoring, the procedures include “assessment surveys for oiled and unoiled wildlife”. Although the proponent notes the impacts to archaeological features and sensitive habitats in Section 2.3.19.3, a link between the indirect negative impacts oiled vegetation may have on wildlife is lacking. The proponent does not mention assessment surveys for oiled shoreline vegetation that may be consumed by either terrestrial or marine wildlife. Indirect impacts from oil spills may also affect wildlife as they may consume oiled vegetation, and therefore vegetation should also be assessed. In cases where shorelines of soils, rocks and vegetation are oiled, a need for immediate remediation and shore clean-up may be required. Furthermore, culturally important vegetation should be assessed, as they can be become poisonous, and therefore a danger to First Nations, as well as wildlife. Oiled nests and eggs should also be assessed during an oil spill.

## 19.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

> Please consider incorporating oiled shoreline vegetation, culturally important vegetation, and nests and eggs to assessment surveys following an oil spill.
> done.

## 19.6 RESPONSE TO KIA-NWB-11

Oil spill clean ups will include vegetation, including culturally important vegetation. This will be added to the Spill Contingency Plan. Nests and eggs will also be considered during wildlife assessments, and will be added to the Spill Contingency Plan.

# 20. KIA-NWB-12

## 20.1 SUBJECT

Mitigation measures on shoreline substrates or aquatic vegetation

## 20.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Hope Bay Spill Contingency Plan; Section 2.3.19.3: Mitigation of Impacts to Archeological Features and Sensitive Habitat, p. 1695.

## 20.3 SUMMARY

The proponent has mentioned the removal of oiled shoreline substrates or aquatic vegetation following advice given by ECCC and the DFO.

## 20.4 DETAILED REVIEW COMMENT

In Section 2.3.19.3, the proponent lists mitigation impacts to archaeological features and sensitive habitat, including contacting the Project Archaeologist to advise next steps, and removing oiled shoreline substrates or aquatic vegetation under the guidance of ECCC and the DFO. The proponent does not mention reporting to the KIA to seek their approval or advice prior to removing oiled shoreline substrates or aquatic vegetation. Inuit organizations should also be consulted prior to any removals, as culturally important vegetation may also be impacted.

## 20.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

• Please consider only removing oiled shoreline substrates or aquatic vegetation after the approval of local First Nations in addition to ECCC and the DFO.

## 20.6 RESPONSE TO KIA-NWB-12

Agnico will seek advice and approval from the KIA and First Nations, prior to removal of shoreline substrate or aquatic vegetation; this will be added to the Spill Contingency Plan.

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# 21. KIA-NWB-13

## 21.1 SUBJECT

Environmental impact of diesel fuel on terrestrial wildlife and vegetation.

## 21.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Hope Bay Spill Contingency Plan; Appendix 1: Hazardous Materials and Product Specific Emergency Response Plans – Diesel Fuel Specific Spill Response Plan, p. 1767.

## 21.3 SUMMARY

The proponent has noted that diesel fuel is toxic to aquatic life with long lasting effects but does not mention the impacts to terrestrial wildlife and vegetation.

## 21.4 DETAILED REVIEW COMMENT

In the Diesel Fuel Specific Spill Response Plan, the proponent lists health effects, as well as environmental effects. The only listed environmental effects include toxicity to aquatic life with long lasting effects. The proponent does not include terrestrial wildlife or vegetation in the environmental effects; however, diesel fuel can be highly volatile to terrestrial species for a short time, as they may inhale toxic fumes before the diesel has dissipated, feed on contaminated fish, or try to clean fuel from fur and feathers leading to ingestion. Furthermore, if diesel spills into feeding areas for terrestrial wildlife, such as songbirds, this could result in immediate mortality. Terrestrial wildlife and vegetation should be incorporated under environmental effect in the diesel fuel specific spill response plan.

## 21.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

> Please consider including toxicity to terrestrial wildlife and vegetation to the environmental effects in the diesel fuel specific spill response plan.

## 21.6 RESPONSE TO KIA-NWB-13

Agnico agrees with this recommendation and will add terrestrial wildlife and vegetation under environmental effect in the diesel fuel specific spill response plan.

# 22. KIA-NWB-14

## 22.1 SUBJECT

Monitoring wildlife avoidance of pollution ponds

## 22.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Hope Bay Project Doris and Madrid Water Management Plan; Section 3.2: Facilities, p. 1913.

## 22.3 SUMMARY

Monitoring protocols for pollution control pond in the Doris Mine Area include measuring water levels, total discharge, and water quality. Wildlife should also be monitored to ensure they are not using the pollution control ponds.

## 22.4 DETAILED REVIEW COMMENT

In Table 3-1 of Section 3.2, the proponent has listed out two pollution control ponds in the Doris Mine Area. For all pollution ponds, the proponent recommends the following monitoring procedures: (1) measure water levels during open water season and frequently during winter or intense rainfall, (2) ensure the pumps have in-line flow meters to quantify total discharge, and (3) take water quality samples annually. More frequent water testing should be considered, as unsafe or toxic water can be detected sooner. Furthermore, wildlife should be monitored to ensure they are not consuming water from pollution ponds, or are exposed to the potentially harmful water, such as ducks wading or swimming on the pollution ponds. Even if fences are established around the pollution ponds to deter wildlife, it cannot prevent waterbirds from using the ponds; therefore, a wildlife monitoring program would be beneficial. The KIA expects that details about wildlife monitoring at pollution control ponds are provided in the missing WMMP Plan (see review comment KIA-TC-01) . The Proponent could also refer to the WMMP Plan within the Water Management Plan to demonstrate that potential wildlife effects are being considered.

## 22.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

> Please consider incorporating wildlife in the pollution control pond monitoring protocol to ensure they do not consume or expose themselves to potentially toxic water.
> Please consider taking water quality samples more frequently if any wildlife is detected using the ponds.

## 22.6 RESPONSE TO KIA-NWB-14

Agnico will update the Water Management Plant to reference the Wildlife Mitigation and Monitoring Plan (2021) with regards to Waterbirds and Shorebirds Monitoring and will consider an increase to the water quality sampling frequency if any wildlife is detected. This update will be submitted with the 2022 NWB Annual Report.

# 23. KIA-NWB-15

## 23.1 SUBJECT

Water quality monitoring not expected in the sumps

## 23.2 REFERENCES

Agnico Eagle, Hope Bay Project 2021 NWB Annual Report (March 2022), Appendix H: Updated Management Plans – Hope Bay Project Doris and Madrid Water Management Plan; Sections 3.2.4 and 4.2.2: Sumps, pp. 1915 and 1925.

## 23.3 SUMMARY

The proponent does not expect to conduct water quality monitoring in the sumps; however, they do not provide an explanation as to why not.

## 23.4 DETAILED REVIEW COMMENT

In Sections 3.2.4 and 4.2.2 of the Hope Bay Project Doris and Madrid Water Management Plan, the proponent noted that they do not expect water quality monitoring in the sumps. It is not clear why the proponent is not testing water quality in the sumps, and further explanation may be required. It should be outlined if a condition in the license exists where the water quality in sumps only needs monitoring under a certain criterion not predicted to be met in this scenario.

## 23.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

> Please clarify why the proponent is predicting that water quality monitoring in the sumps will not be required.
> Please clarify the established triggers or thresholds where water quality monitoring would be required in the sumps.

## 23.6 RESPONSE TO KIA-NWB-15

The sumps ensure any seepage that may be bypassing the contact water ponds or emanating from Pads is captured and returned to the water management system via an automated float operated pump. Water quality monitoring is conducted at the contact water ponds and is not required at the sumps. Given that water quality is monitored directly upstream of the sumps, Hope Bay does not require established triggers or thresholds where water quality monitoring would be required at the sumps.

# 24. KIA-NWB-16

## 24.1 SUBJECT

Clarification needed for Care and Maintenance activities

## 24.2 REFERENCES

Agnico Eagle, Hope Bay Project Care and Maintenance Plan (April 2022), Section 3.1: Underground Mine Workings, p. 23; Section 4.2: Water and Waste, p. 34.

## 24.3 SUMMARY

Although an updated Doris and Madrid Water Management Plan (April 2022) was submitted with the Care and Maintenance Plan, it does not include additional information about water management and inspections that may be different as a result of care and maintenance activities. Further clarification is also needed for water and waste management and monitoring during this phase of the Project (Section 4.2 of the Care and Maintenance Plan).

## 24.4 DETAILED REVIEW COMMENT

In Section 3.1 of the Doris-Madrid Care and Maintenance Plan (DMCMP), the Proponent describes how the Madrid North portal has been moved into Care and Maintenance, including installation of water management equipment. The Proponent states that "an electric, manually operated, submersible pump is located underground which can be used to pump water into a truck or to the ore lined pad as needed." It is unclear how frequently the Madrid North portal will be inspected to determine whether the pump needs to be manually operated. The KIA expected to see further discussion about Madrid North underground water monitoring and inspection in the April 2022 Hope Bay Project Doris and Madrid Water Management Plan (WMP), which was updated and distributed along with the DMCMP for review. However, there does not appear to be additional information about Madrid mine water management in the WMP; Section 6.1 (Care and Maintenance Options) has not changed since the previous version of the plan. The Hope Bay Project Groundwater Management Plan (March 2022), where discussion of mine water would be appropriate, was not updated for the DMCMP and does not explicitly include mine inflow monitoring and mitigation during Care and Maintenance.

In Section 4.2, the Proponent states that water and waste management will continue throughout Care and Maintenance as per the Project's Type A and Type B water licenses. Monitoring and reporting will include "visual inspections of discharge to tundra from contact water ponds and sumps". It is unclear what visual inspections of discharge are meant to accomplish. Based on Section 5.5 (Inspections) of the WMP, visual inspections may be used to assess the "integrity of erosion protection at point of discharge to the tundra". However, one of the major components of the WMP is to conduct water quality sampling prior to discharge to the tundra, and this type of monitoring is not mentioned in Section 4.2 of the DMCMP. It will be important to continue with water quality testing to avoid or minimize potential impacts to tundra vegetation and wildlife that may forage on this vegetation.

## 24.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

Please update the Doris and Madrid Water Management Plan and/or the Groundwater Management Plan to include measures needed during Care and Maintenance that may be different from the scope of the current plans.
Please clarify whether water quality testing will continue to be conducted on contact water ponds and sumps prior to discharge to the tundra, and at what frequency/time of year. Visual inspections for signs of erosion, if this is the purpose, is only one aspect of water management and monitoring.

## 24.6 RESPONSE TO KIA-NWB-16

Updated Management Plans were submitted to the NWB with the Doris-Madrid Care and Maintenance Plan on April 29, 2022. No changes to water quality monitoring or testing is proposed during Care and Maintenance.

# 25. KIA-NWB-17

## 25.1 SUBJECT

Large-scale site layout

## 25.2 REFERENCES

Hope Bay Project - 2021 NWB Report (AEM, March 2022) Appendix C

## 25.3 SUMMARY

Site layouts provided do not show a large-scale plan view of the three areas (i.e., Doris, Madrid and Boston) encompassing the Hope Bay Project and do not include Boston.

## 25.4 DETAILED REVIEW COMMENT

A comprehensive site layout should include all Project areas to allow for a geospatial understanding of the relevance of area-specific activities/monitoring to another. Furthermore, Figure C-1 and Figure C-2 outline changes to the extents of various facilities in 2021 (e.g., Doris tailings impoundment area (TIA) subaerial beach extents; Figure C-1), but do not show these in detail (e.g., inset) nor is the relevance of these 2021 extents presented by including comparable extents from 2020 (or other years), for example.

## 25.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

> Include a plan view map of all three areas, similar to the one provided in the Aquatics Effects Monitoring Program (reviewed as part of BGC's review of AEM (April 2022) and found in Appendix D-4 therein).
> In addition to the 2021 extents of facilities, BGC recommends prior year's extents are included.

## 25.6 RESPONSE TO KIA-NWB-17

Agnico will consider all the recommendations listed and improve the Site Layouts provided in Appendix C.

# 26. KIA-NWB-18

## 26.1 SUBJECT

Model-estimated Lake water levels

## 26.2 REFERENCES

Hope Bay Project - 2021 NIRB Report (AEM, April 2022), Appendix D-2. Water Licence Monitoring data 2BE-HOP1222, Table D2-3.

## 26.3 SUMMARY

> The bulk of data presented in Table D2-3 are italicized, which (according to the table notes) reflects "estimated and modelled values"
> Non-italicized data is provided for dates between June 25 and August 19, consistent with the active monitoring period of the water level station at Windy Lake.
> No details nor references are provided to describe the assumptions and approach used to estimate/model Windy Lake mean daily water levels (as presented in Table D2-3).

## 26.4 DETAILED REVIEW COMMENT

Review of the information shown in Table D2-3 suggests a linear interpolation is used to estimate water levels. Specifically, a model-estimated low of 18.196 metres above sea level (m asl)) was assumed for water levels from January 1 to June 10, 2021 and November 13 to December 31, 2021 and a linear interpolation was applied to "connect" these low values to the measured data recorded from June 25 to August 19, 2021.

It is not clear if these interpolated values, from June 11 to June 24, 2021 and August 20 to November 12, 2021 are reflective of the start of ice break-up and lake freeze-over periods, respectively. Further, it is unclear if the May 17, 2021 under-ice monitoring was incorporated into the values presented in Table D2-3.

## 26.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

> KIA requests TMAC/AEM provide the assumptions and approaches used to estimate/model Windy Lake mean daily water levels, as shown in Table D2-3 and discussed in Appendix D-2.

## 26.6 RESPONSE TO KIA-NWB-18

Water level at Windy Lake was estimated using several methods depending on what information was available. Data collection began on June 25, 2021 when the Windy Outflow station was installed. Due to the limitations caused by the COVID 19 pandemic, stations that required helicopter access such as Windy Outflow could not be accessed at the scheduled removal time in late September. When they were visited in late October, the stations were frozen into the lakes and inaccessible. Water level and discharge estimates were based on data from Doris Lake when possible, as the year round station provides data during the winter, break up and freezing periods not available from seasonal stations. Where possible,

estimated water levels for Windy Lake were back calculated from the estimated discharge, as discharge is generally more directly comparable between watersheds than lake level fluctuation.

Flow was predicted to have started on June 10 with channels ice free by June 12, based on site photos taken at Doris Creek every 3 to 5 days. Flow is predicted to end on November 12 based on the Doris Lake water level no longer dropping and a significant cold snap with average temperatures below -20°C.

From June 12 to June 24, and August 20 to November 12, linear regressions with discharge at Doris Creek (TL-2) were used to estimate flow, shown in the Table below. Separate linear regressions were developed for high flow and low flow periods as the correlation between Windy Lake and Doris Lake discharge changes depending on the season.

**Linear Correlations for Estimating Flow at Windy Outflow Using Data from Doris Lake Outflow**

| Estimated Period | Correlation Period | Equation | $R^2$ |
|---|---|---|---|
| Jun 12 – Jun 24 (high flow) | Jun 25 – Jul 15 | Q = 0.038 * Doris + 0.2175 | 0.84 |
| Aug 20 – Nov 12 (low flow) | Aug 1 – Aug 19 | Q = 0.2204 * Doris – 0.0003 | 0.98 |

Windy Lake water level was back calculated from the estimated flows using the Windy Outflow rating curve from June 12 to June 24, and August 20 to November 12. An exponential growth curve was used to connect the estimated winter water level from June 10 to the estimated freshet water level for June 12.

The May 17 water level survey was not used to estimate winter water levels as the survey result was higher than water levels observed during freshet, which likely indicates an erroneous measurement. Instead, the water level calculated for the end of flow on November 12 was used for all periods where flow was predicted to be zero (January 1 to June 9 and November 12 to December 31).

# 27. KIA-NWB-19

## 27.1 SUBJECT

Water and load balance contributions

## 27.2 REFERENCES

Hope Bay Project - 2021 NIRB Report (AEM, April 2022), Appendix E. Doris Mine Annual Water and Load Balance Assessment

## 27.3 SUMMARY

Section 1.0 of the Water and Load Balance Assessment (SRK, March 23, 2021) describes the contributing flows and loads to the Doris TIA, but does not include sludges (from the Sewage Treatment Plant [STP]) to be deposited in the TIA as outlined in the Domestic Wastewater Treatment Management Plan and discussed in the main report (Section 5.1; AEM, March 2022).

## 27.4 DETAILED REVIEW COMMENT

Section 1.0 of Appendix E states, “The Doris TIA receives tailings slurry from the mine’s process plant (mill); mine water from the Doris and Madrid underground mines; runoff from the Naartok East crown pillar recovery pit; runoff from the camp, ore and waste rock pads (and associated ponds); as well as natural runoff and precipitation.”

The above statement does not include wastes from sludges produced by the STP and to be stored in the Doris TIA, as described in Section 5.1 of the main report (AEM, March 2022) as follows:

“Sludge produced by the treatment plant is disposed of in the TIA as outlined in the Hope Bay Domestic Wastewater Treatment Management Plan.”

It is not clear how much sludge waste was generated in 2021 and where it is ultimately stored.

## 27.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

> Provide details on how STP sludges are managed at site.
> Clarify if sludge wastes were produced in 2021 and provide details on where in the NWB submission that these sludge waste volumes are recorded and where they are to be stored for the long term.
> Describe whether sludge wastes are included in the water and load balance model.

## 27.6 RESPONSE TO KIA-NWB-19

As per the Hope Bay Domestic Wastewater Treatment Management Plan, both wastewater treatment plants (WTP) are each equipped with 500 gallon waste disposal tanks. This allows the WTP operator to store up to 1,000 gallons of wasted sludge before disposal in required. Approximately every 4 to 5 days, the WTP operator utilizes the vac-truck to sufficiently drawdown the level in the sludge disposal tank. The

sludge is then transferred to the TIA for disposal. The sludge is deposited towards the South Dam, where it ultimately remains frozen with the tailings.

Daily records of operation and maintenance are required to evaluate the effectiveness of the WTP operation and are stored on Agnico servers. Sludge volumes are provided to the NWB as part of the monthly monitoring reports for water licence 2AM-DOH1335. Sewage treatment plant effluent, not sludge wastes, are considered in the water and load balance model, as described in the Final Environmental Impact Statement (FEIS) Water and Load Balance report (SRK, November 2017).

# 28. KIA-NWB-20

## 28.1 SUBJECT

Water and load balance build details

## 28.2 REFERENCES

Hope Bay Project - 2021 NIRB Report (AEM, April 2022), Appendix E. Doris Mine Annual Water and Load Balance Assessment, Section 2.1.4

## 28.3 SUMMARY

No model build details are provided in Appendix E, as SRK (March 23, 2022) defers this description to the Final Environmental Impact Statement (FEIS) Water and Load Balance report (SRK, November 2017). However, the absence of basic details of model software, a flow/load schematic to describe inputs/outputs, and governing mechanisms/assumptions hinders a reader's review of model suitability.

## 28.4 DETAILED REVIEW COMMENT

In several sections of the SRK (March 23, 2022) memo, the authors briefly describe mechanisms or inputs to the model that were updated to account for 2021 data and/or where differences to FEIS-modelled values exist. For example, Table 5 and Table 6 compare FEIS modelled flows to those measured in 2021 and, in each case, model flow terms were updated to reflect measured values.

Models are typically dynamic in that updates to one component invariably influence other components and therefore model predictions. Without an understanding of the model structure, it is unclear how these updates may influence other model components.

## 28.5 RECOMMENDATION/REQUEST

The KIA recommends/requests the following:

Provide a schematic (e.g., box-and-pointer diagram) describing the model components, linkages, and nodes associated with the water and load balance model
Provide this schematic in future Water and Load Balance Assessment reporting
Provide a summary of the key mechanisms and assumptions incorporated in the model.

## 28.6 RESPONSE TO KIA-NWB-20

As referenced in the report, the model schematic and summary of the key mechanisms and assumptions are provided in the Final Environmental Impact Statement (FEIS) Water and Load Balance report (SRK, November 2017). These fundamentals remain unchanged with the annual assessment. Nonetheless, Agnico will include these recommendations in the 2022 Annual Water and Load Balance Assessment.

# 29. KIA-NWB-21

## 29.1 SUBJECT

Comparison of FEIS modelled mine water flows vs. measured

## 29.2 REFERENCES

Hope Bay Project - 2021 NIRB Report (AEM, April 2022), Appendix E. Doris Mine Annual Water and Load Balance Assessment, Section 2.1.4

## 29.3 SUMMARY

Table 5 presents a summary of FEIS forecasted and measured mine water flows for 2021, which breaks down measured 2021 flows from the Doris Mine to Roberts Bay (170,000 m3) or to the Doris TIA (320,000 m3), as well as flows from the Madrid Mine (0 m3). In comparison, the FEIS modelled mine flows were estimated to be 500,000 m3.

The paragraph preceding Table 5 states, "Although the sources and destinations are different than originally modelled, the overall amount of mine water that was indicated as needing management in the FEIS was consistent with the total intercepted mine outflows, with measured flows being 97% of the predicted.

## 29.4 DETAILED REVIEW COMMENT

It is not clear if the authors assume the similarity between FEIS- modelled versus measured values for total intercepted mine flows in 2021 to be a suitable rationale to assess the appropriateness of the FEIS model for flow and load predictions in 2021. Furthermore, it is not clear how the value of "97% of the predicted" was calculated, when 490,000 m3 of mine water was measured and 500,000 m3 was modelled in the FEIS – should this value be 98% or is there a rounding error or other input not described?

It is expected that most modelled flow terms have associated water quality inputs (or geochemical source terms), which would influence water quality predictions at downstream model nodes or receptors. Therefore, while the authors have updated the model to account for the measured flows in 2021, the observation that the source or origin of these 2021 measured flows differs considerably from the FEIS assumptions suggests comparison of water quality predictions to the FEIS modelled values may no longer relevant.

## 29.5 RECOMMENDATION/REQUEST

KIA requests that TMAC/AEM provide:

A description on how the appropriateness of FEIS modelled flows versus those that were measured in 2021 was evaluated.

Comment as to how the differences in flow origin/sources in 2021 may impact water quality model predictions relative to those provided as part of the FEIS.

## 29.6 RESPONSE TO KIA-NWB-21

The values summarized in the report have been rounded. The un-rounded total annual measured flow (488,847 m3) is approximately 97.35% of the un-rounded FEIS flow (502,156 m3).

Model information is evaluated in two ways:

1. The goodness of fit of water quality predictions is assessed by comparing predicted values to measured values.
2. Actual measured flows are compared to the FEIS-forecasted mine water flows (Table 5 of 2021 Water and Load Balance Annual Assessment) to provide transparency on the progression of mining to date, with respect to water quantities, compared to the mine plan used for the FEIS.

It is not assumed that water quality predictions will remain consistent with the FEIS if sources of inflow differs from that originally planned in the FEIS. As stated, comparisons made for calibration are between measured water quality and the model predictions generated from the most recent measured water quality dataset (as opposed to 2017 FEIS water quality dataset and model predictions). However, viewing the 2017 FEIS water quality is still a useful comparison in evaluating how and if our understanding of the system has changed.

# 30. KIA-NWB-22

## 30.1 SUBJECT

Comparison of updated model output to measured data

## 30.2 REFERENCES

Hope Bay Project - 2021 NIRB Report (AEM, April 2022), Appendix E. Doris Mine Annual Water and Load Balance Assessment, Section 2.2

## 30.3 SUMMARY

Updates to water balance inputs are made to the calibrated 2020 model (SRK, March 30, 2021) and modelled water quality are compared to measured water chemistry collected at the Doris TIA at the reclaim pump station (TL-1)

Parameters are grouped based on whether they are defined as:

Conservative = measured values are less than model prediction

Trending well = measured values are tracking well with the model predictions

Underpredicted = measured values are greater than model predictions

No action to update water quality inputs is taken if parameters are defined as 'conservative' or 'trending well', whereas updates are considered if they are defined as 'underpredicted'.

Cyanate (CNO) is identified as underpredicted

Section 2.2.1 states measured CNO values in 2021 range from 2 mg/L to 7 mg/L, in contrast to modelled values between 0 mg/L and 4 mg/L. The same section states the process water source term, which is not described further, has a CNO value reflecting 56% of the measured value at the process plant supernatant (TL-5) (i.e., 40 mg/L vs. 72 mg/L, respectively).

Despite these differences, "no change was made to the calibrated SRK (2021) model" since there is "high variability in the data, and predictions for other cyanide derivatives and nitrogen species (especially ammonia) trended well with measured values."

## 30.4 DETAILED REVIEW COMMENT

Time-series plots of modelled versus measured values in 2021 are provided in Attachment 2 and figures associated with cyanate derivates or N-species involved in cyanide degradation (i.e., thiocyanate (SCN), ammonia, cyanide (CN)) were reviewed. The following is observed:

Overestimation of modelled CN values, by up to several orders of magnitude, relative to measured values

Peak modelled SCN values are underestimated relative to measured values

Modelled ammonia values agree with measured values and generally follow the observed seasonality in both modelled and measured trends

It is also noted that other N-species (i.e., nitrate (NO3) and nitrite (NO2)), which may represent further derivatives of ammonia degradation through nitrification and/or denitrification, are shown to be overestimated by model predictions (NO3) or demonstrate an inconsistent 'seasonal' trend to measured values (NO2).

Taken as a whole, the results of N-species in the time-series plots are not immediately suggestive of a "trending well" classification (with the exception of ammonia). Further details should be provided on the evaluation of the suitability of modelled values to measured data for these parameters, to support the statement in Section 6 of "overall the mechanisms behind the FEIS water and load balance appear to be well calibrated to the measured data for most parameters.

## 30.5 RECOMMENDATION/REQUEST

KIA requests TMAC/AEM describe the mechanisms and assumptions used to model CNO and other cyanide derivatives and/or N-species. Further. these details are recommended to be included as part of annual water and load balance reporting, to support the assessment and conclusions made therein.

## 30.6 RESPONSE TO KIA-NWB-22

The documents summarized in Section 1 Table 1 (Previous Model Calibrations) of the 2021 annual report (reproduced below) can be referenced for more detailed discussions on the mechanisms, inputs, and assumptions used to model nitrogen species and cyanide derivatives. Summaries for this information have been compiled and are provided at the end of this section.

Historically, there is uncertainty associated with the modelling of N-species, cyanide, and cyanide derivatives. The breadth of mechanisms and reactions occurring in the TIA and the factors affecting these processes can be complex. The model approach to calibration has relied on assumptions for which degradation reactions occur and uses degradation rates with the objective of replicating measured trends for assumed initial reactant species with respect to the trends observed in their assumed degradation products.

Several processing changes occurred in 2020 and 2021, disrupting steady-state conditions previously assumed for the processing plant and causing anomalous concentrations in N-species and cyanide derivatives. Madrid ore was processed for the first time in October 2019 (SRK 2020, SRK 2021), impacting trends in process water chemistry throughout 2020 without conclusively reaching equilibrium. Additionally, there was a temporary disruption to processing in March and April of 2020 to due to the COVID-19 pandemic (SRK 2021). The processing of Madrid ore was suspended at the beginning of 2021, and the processing of Doris ore was conducted in a batch process prior to being suspended after October 2021.

For these reasons, emphasis was placed on total cyanide and ammonia (the product of several modelled degradation reactions) for the 2021 calibration, with recommendations for the continued monitoring and review of inputs for cyanide derivatives in the future.

The inputs, mechanisms, and assumptions for N-species, cyanide, and cyanide derivatives are summarized below:

<u>Source Term Concentrations</u>

Source term concentrations were provided for N-species, cyanide, and cyanide derivatives in the FEIS, as detailed in the water and load balance report (SRK 2017a) and geochemical source term report (SRK 2017b). The source terms have been reviewed and updated using measured data as needed in the annual reporting model validations.

Monthly source term concentrations are applied to contact water flow volumes, and were derived as follows:

- Tailings process water effluent
    - Concentrations for N-species, cyanide, and cyanide derivatives associated with reagent dosing, derived from metallurgical detoxification testing on tailings process water and updated with measured data (SRK 2019, SRK 2020)
- Underground mine water
    - Concentrations for N-species and cyanide associated with detoxified tailings placed as backfill, derived from metallurgical detoxification testing on tailings process water and updated with measured data (SRK 2019)
- Sewage effluent
    - Concentrations for N-species associated with biological material in sewage, derived from supplier estimates for packaged sewage treatment plants

1. Source Term Mass Loading

Mass loading rates for N-species are assumed to be from explosives residues and were scaled from shake flask extraction tests on Doris run-of-mine (ROM) rock (SRK 2017b).

Loading rates are applied to mined ore and waste rock quantities and added to contact water as follows (SRK 2017a):

- Tailings process water effluent
    - Mass loads for N-species associated with explosives residues on processed ore
- Underground mine water and crown pillar recovery trench contact water
    - Mass loads for N-species associated with explosives residues loading to mine and/or contact water
    - Mass loads for N-species associated with explosives residues on waste rock used for backfilling
- Contact water ponds and sedimentation ponds
    - Mass loads for N-species associated with explosives residues on ore and waste rock stockpiles

2. Biological Degradation Rates

Degradation rates for total cyanide (TCN), cyanate (CNO), thiocyanate (SCN), and ammonia (NH4+) ammonia were provided in the FEIS and were derived from mass balance data at the Colomac Mine (SRK 2017a). The model validation for the 2019 calendar year (SRK 2020) included an update to these degradation rates based on mass balance on measured data.

Degradation reactions in the TIA that are or have been replicated in the model include the following:

- TCN degradation to CNO via oxidation
    - Modelled for the FEIS (SRK 2017a) but removed in a subsequent model validation (SRK 2020) based on measured site data and mass balance calculations

- TCN degradation to free cyanide (FCN) and weak acid dissociable cyanide (WAD CN) via photolysis of metal-cyanide complexes
    - Not originally modelled for the FEIS but was added in lieu of TCN oxidation to CNO based on available scientific literature (SRK 2020)
- Volatilization of FCN and WAD CN (analytical method for WAD CN includes FCN fraction)
    - Not originally modelled for the FEIS but was added in a subsequent model validation (SRK 2020) based on mass balance calculations
- CNO degradation to NH4+ via biological oxidation
    - Modelled for the FEIS (SRK 2017a), high variability in the process effluent noted in subsequent model validations (SRK 2020, 2021, 2022)
- SCN degradation to NH4+
    - Unchanged since the FEIS (SRK 2017a)
- NH4+ degradation to various other forms of nitrogen
    - Modelled for the FEIS (SRK 2017a) and reviewed and updated with any changes in species that degrade into ammonia (SRK 2020)

References:

SRK Consulting (Canada) Inc. 2021. Doris Mine Annual Water and Load Balance Assessment – 2020 Calendar
Year. Memo Prepared for Agnico Eagle Mines Ltd. 1CT022.066. March 30, 2021.

SRK Consulting (Canada) Inc. 2020. Doris Mine Annual Water and Load Balance Assessment – 2019 Calendar
Year. Memo Prepared for TMAC Resources Inc. 1CT022.066. March 26, 2020.

SRK Consulting (Canada) Inc. 2019. Doris Mine Annual Water and Load Balance Assessment – 2018 Calendar
Year. Memo Prepared for TMAC Resources Inc. 1CT022.045. March 19, 2019.

SRK Consulting (Canada) Inc. 2018. Doris Mine Annual Water and Load Balance Assessment – 2017 Calendar
Year. Memo Prepared for TMAC Resources Inc. 1CT022.013. February 28, 2018.

SRK Consulting (Canada) Inc. 2017a. Madrid-Boston Project Water and Load Balance, Hope Bay Project.
Report Prepared for TMAC Resources Inc. 1CT022.013. November 2017.

SRK Consulting (Canada) Inc., 2017b. Geochemical Source Term Predictions for the Proposed Madrid North, Madrid South and Boston Mines, Hope Bay Project. Report prepared for TMAC Resources Inc. 1CT022.013. November 2017.

# 31. KIA-NWB-23

## 31.1 SUBJECT

Underpredicted values

## 31.2 REFERENCES

Appendix E Doris Mine Annual Water and Load Balance Assessment – 2021 Calendar Year

Section 2.2 Review of Water Quality Inputs and 2.2.1 Cyanate Table 7 Page 234 of 1938

## 31.3 SUMMARY

AEM categorizes predicted concentrations of water quality parameters under four different classifications; conservative, trending well, underpredicted or detection limit greater than prediction. To understand how predictions are classified it is important to understand the methods used determine the classifications. It is recommended the AEM provide clarity of the methods used to classify each parameter.

## 31.4 DETAILED REVIEW COMMENT

To understand if parameters are being correctly classified, a more fulsome definition and the methods used for classification need to be provided.

AEM defines underpredicted as, "Model predictions are lower than measured values." In section 2.2.1 AEM states, "Cyanate (CNO) concentrations in 2021 generally varied within a range of approximately 2 and 7 mg/L with values steadily increasing during ice cover, then decreasing during the open water season before the cycle repeats as ice formation repeats again. The modelled values follow a similar trend, but exhibit an offset at a lower range from measured values, ranging instead between 0 and 4 mg/L."

The reviewer would like to understand what qualifies a parameter as "underpredicted"? Is the difference based on the absolute difference between predicted and measured or a multiplication factor? Or is it based on professional judgement which takes into consideration the parameter of interest?

Please provide clarity on the classification.

## 31.5 RECOMMENDATION/REQUEST

It is recommended that AEM provide a more fulsome definition of each of the predicted parameter classifications and the methods used for classification..

## 31.6 RESPONSE TO KIA-NWB-23

The definitions for the classifications in the 2021 validation report are clarified as follows:

- Conservative - measured values below the model predictions
- Trending Well - predictions trending similarly with measured data in magnitude and seasonality
- Underpredicted - measured values above the model predictions

- At Detection Limit – measured values reported at the method detection limit (i.e. concentration below testing detection), and detection limit greater than the model predictions

The latter classification had been presented together with ‘Conservative’ values in Table 7 of the 2021 annual report, but will be presented and discussed separately in future model validation reports.

The approach to evaluating water quality predictions has been primarily qualitative, using professional judgement to interpret trends with consideration given to factors affecting specific parameters, behaviours expected under modelled conditions, and knowledge of any events or changes that may impact concentrations.

An evaluation of the classifications, including the need for additional categories and a more fulsome definition of each category, will be included in the next annual report. Professional judgement will continue to be the basis for the assessment and classification of the parameters.

# 32. KIA-NWB-24

## 32.1 SUBJECT

SNP early indicators

## 32.2 REFERENCES

Hope Bay Project 2021 Kitikmeot Inuit Association Annual Report.

Appendix D Water Licence(s) Monitoring Data

## 32.3 SUMMARY

A single year's worth of the surveillance network program (SNP) station data is provided in the annual reports. Early signs of the need for additional treatment and assessing adherence to model inputs would be improved with a discussion that includes additional years data to identify trends in water chemistry.

## 32.4 DETAILED REVIEW COMMENT

The potential need for water treatment can be more easily assessed by evaluating water quality over several years. A single year's worth of data is currently presented in annual reports making it more difficult to identify changes in water chemistry.

Data from SNP sites are collected based on the requirements set out in the mines Water Licence(s). Data are provided in annual reports for the past year. The SNP stations are not regulated via effluent quality criteria but act as early warning indicators for potential treatment requirements and to assess model inputs. It is recommended that TMAC include previous years data in the annual reports or provide data analysis (or graphical displays) of previous data so the SNP data can more easily provide early signs that additional treatment may be required, and to assess adherence with the inputs to models that generated FEIS predictions.

## 32.5 RECOMMENDATION/REQUEST

Include previous years SNP data in annual reports to help detection the need for additional treatment and to assess adherence with the inputs to models that generated FEIS predictions.

## 32.6 RESPONSE TO KIA-NWB-24

Data analysis, verifying model input and identifying treatment requirements is the principal purpose of the Annual Water and Load Balance Assessment (Appendix E of the 2021 Annual NWB Report). Graphs containing historical measurements are provided for SNP Station TL1, which is the primary output of the model used to assess treatment requirements (Attachment 2 of Appendix E).

# 33. KIA-NWB-25

## 33.1 SUBJECT

Doris Sedimentation Pond

## 33.2 REFERENCES

Hope Bay Project 2020 Kitikmeot Inuit Association Annual Report.

Appendix D Water Licence(s) Monitoring Data Appendix D.1. 2AM-DOH1335

## 33.3 SUMMARY

Table D1-1 indicates that sampling at SNP station ST-1 is collected annually.

## 33.4 DETAILED REVIEW COMMENT

It is important that regular sampling of water that is transferred from ST-1 to the TIA from June to October is monitored on a monthly basis.

Table D1-1 indicates that samples are collected from ST-1 annually, however water is transferred from ST1-1 to the TIA from June to October of any given year. Therefore, sampling should be completed to be representative of the entire transfer period to ensure it is meeting the influent water quality requirements of the water treatment plant.

## 33.5 RECOMMENDATION/REQUEST

It is recommended that AEM complete monthly sampling while discharging to the TIA.

## 33.6 RESPONSE TO KIA-NWB-25

Monthly sampling of the sedimentation pond is not required for the water treatment plant (WTP). The design of the WTP plant is based on a maximum of 200 mg/L of TSS from the TIA, an order of magnitude greater than currently existing in the TIA. The sedimentation pond accounted for only 1.4% of the total inflow volume to the TIA and 0.4% of the total volume in the TIA.

# 34. KIA-NWB-26

## 34.1 SUBJECT

TSS exceedance at BOS-2

## 34.2 REFERENCES

Hope Bay Project 2020 Kitikmeot Inuit Association Annual Report.

Appendix D Water Licence(s) Monitoring Data Appendix D.4. 2BB-BOS1727

## 34.3 SUMMARY

TSS concentrations exceeded the maximum allowable concentration in any grab sample at BOS-2 on September 5th, 2021.

## 34.4 DETAILED REVIEW COMMENT

TSS concentrations exceeded the maximum allowable concentration in any grab sample at BOS-2 on September 5th, 2021. TSS concentrations were well above the maximum allowable concentration in any grab sample of 30 mg/L.

## 34.5 RECOMMENDATION/REQUEST

Was the high TSS concentration considered a spill? It is recommended that AEM provide further discussion regarding the high TSS concentration and complete follow up monitoring after exceedances to monitor TSS concentrations and complete investigations to determine reason for high TSS concentrations.

## 34.6 RESPONSE TO KIA-NWB-26

The Containment Pond (BOS-2) has been used to consolidate water from the smaller fuel containment berms and from the Bulk Fuel Storage Facility (BOS-5), to facilitate testing and treatment while allowing the fuel berms to be promptly vacated of water. As in previous years, water from the Containment Pond (BOS 2) is sampled for and screened against both BOS-2 and BOS-5 criteria. Exceedances are not considered spills as water has not been discharged from any of facilities or containment berms. The source of the TSS is the waste rock that the fuel containment berms were originally built from.

# 35. KIA-NWB-27

## 35.1 SUBJECT

Modeling Total Suspended Solids

## 35.2 REFERENCES

Hope Bay Project 2021 Nunavut Water Board Annual Report Appendix E. Doris Mine Annual Water and Load Balance Assessment – 2020 Calendar Year

Section 1 Introduction

Section 2.2 Review of Water Quality Inputs Section 5. 1 Measured Values

Table 12

Attachment 2 Annual WLB Assessment – 2021 – PLOTS

## 35.3 SUMMARY

TSS concentrations are not currently evaluated as part of the model predictions as parameters are treated conservatively by the model. As it currently stands TSS concentrations are underpredicted by the model therefore, settling does not appear to be a problem of model predictions. Furthermore, TSS concentrations at the TIA exceed MDMER criteria.

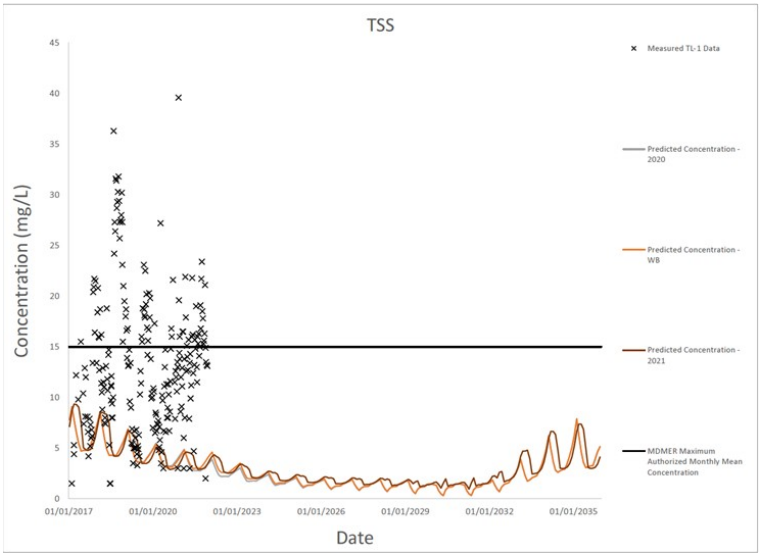
## 35.4 DETAILED REVIEW COMMENT

It would be of benefit to AEM if they were to evaluate predicted model TSS concentrations as they are currently under predicted and concentrations at the TIA exceeded MDMER criteria in October of 2021.

In section 2.2 AEM states, “TSS was not evaluated as the model is a conservation of mass balance that does not include a mechanism for TSS settlement (SRK 2021).”

Mass balance modelling predicts fully mixed concentrations, and treats all parameters as conservative, in that they do not undergo any assimilation (uptake, transformation, settling) reactions after discharge. It does, however, provide a conservative calculation of fully mixed concentrations in the receiver. Therefore, all parameters, not just TSS, would be treated conservatively. AEM has modeled TSS and provide outputs as plotted in Attachment 2 (reproduced below). The

plot shows that despite mass balance modeling not taking settling into consideration, measured concentrations are greater than predicted. Furthermore, in Section 5.1, Table 12 it is noted that TSS concentrations in the Doris TIA exceeded the MDMER maximum authorized monthly mean concentration (15 mg/L) in October (18.75 mg/L). With conservative predictions, a model should typically be overpredicting TSS concentrations. We are concerned however, that AEM’s model is underpredicting. This suggests there may be a problem with the assumptions of the model or a divergence in on site conditions.




## 35.5 RECOMMENDATION/REQUEST

It is recommended that TSS be evaluated as part of the annual water load balance assessment as concentrations of TSS appear to be under-predicted and concentrations at the TIA appear to be higher than authorized under MDMER.

## 35.6 RESPONSE TO KIA-NWB-27

TSS is included in modelling and reporting for completion, as an MDMER parameter that affects discharge capability from the TIA. However, the GoldSim model is not an appropriate tool for TSS predictions. GoldSim can predict water quality based on conservation of mass calculations plus other representation of other mechanisms (mechanisms that can be parameterized). TSS predictions in the TIA are not accurate due to a number of factors and mechanisms/sources (including an annual algae bloom) that cannot be replicated with certainty in the model. Expected TSS conditions are evaluated through a review of historical values and trends. Predictions of TSS concentrations will be removed from future annual model reports.

Agnico actively monitors TSS in the TIA (and other parameters defined in the permit and MDMER) and does not discharge during periods of exceedance. Agnico is currently in the process of implementing TSS management in the TIA the impact of which will be reviewed in future water quality characterization reports.

# 36. KIA-NWB-28

## 36.1 SUBJECT

Misclassification of Water Quality Parameters

## 36.2 REFERENCES

Hope Bay Project 2021 Nunavut Water Board Annual Report Appendix E. Doris Mine Annual Water and Load Balance Assessment – 2021 Calendar Year

Section 1 Introduction

Section 2.2 Review of Water Quality Inputs Attachment 2 Annual WLB Assessment – 2021 - PLOTS

Hope Bay Project 2020 Nunavut Water Board Annual Report

## 36.3 SUMMARY

Several measured concentrations of total and dissolved phosphorus and total vanadium were greater than predicted concentrations in both 2020 and 2021. However, these values were considered conservative (measured values below model predictions), no efforts were made to explain the discrepancy between measured and predicted results and no efforts were made to correct the model predictions.

## 36.4 DETAILED REVIEW COMMENT

Underpredicting concentrations of several metals indicates that the model predictions are not accurate. This was noted in review comments of the 2020 annual report as well as noted in the review of the 2021 annual report.

AEM states, “After the water balance (quantity or volume) adjustment, the model was assessed from a water quality perspective. Parameters were grouped based on the comparison of predicted and observed results for the Doris TIA. The following parameter groups were previously identified Conservative predictions (measured values below the model predictions),

- Predictions trending well with measured data,
- Underpredicted, and,
- Detection limit greater than prediction (i.e. below testing detection)

The model was considered adequate for the parameters where predictions were conservative (overestimated in the model), trending well with measured data, and where detection limits were greater than prediction. Underpredicted values were assessed individually and adjusted based on measured observations in the process water, mine water and the Doris TIA.”

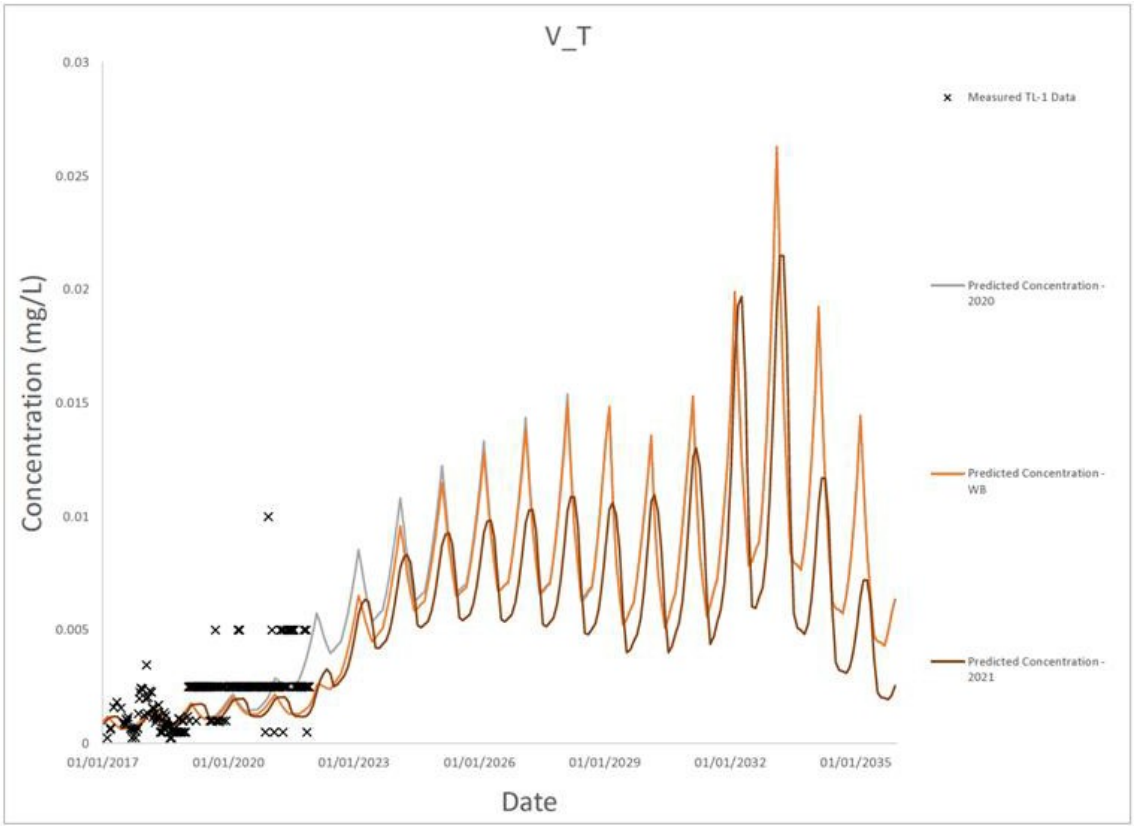
According to Section 2.2, Table 7 in the 2021 report: Initial Screening Assessment of Water Load Balance Parameters (reproduced below), concentrations of total and dissolved phosphorus, and total vanadium were all categorized indicating “measured values are below model predictions”. Plots presented in Attachment 2 of the Annual Water Load and Balance Assessment show a large number of measured values above the predicted concentration line. Parameters that were considered

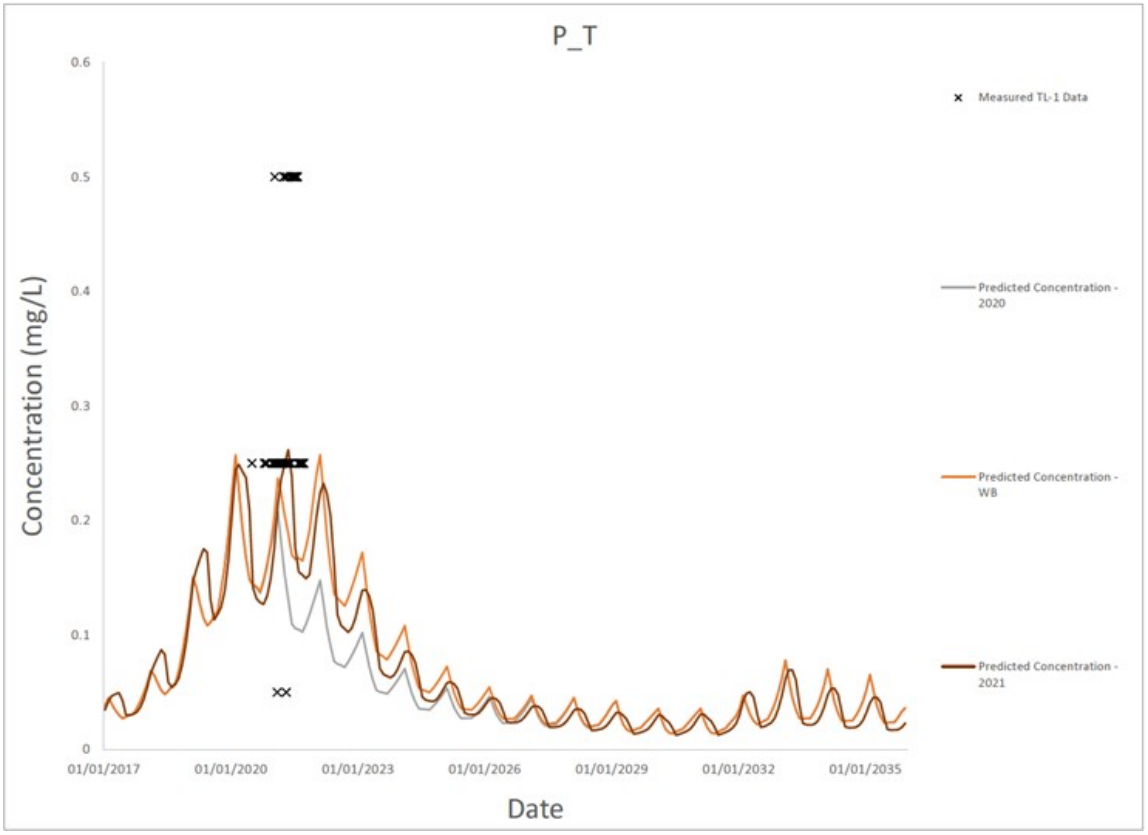
underpredicted were carried forward in the assessment and a discussion of corrective actions provided. Since total and dissolved phosphorus, and total vanadium were not classified as underpredicted, they were not carried forward in the analysis and no corrective actions were discussed for the greater than predicted concentrations. It is recommended that AEM provide a more detailed definition of classification types (number of measured values greater than the predicted value to be considered underpredicted) to support the classifications provided, indicate if the detection limit is greater than prediction for these parameters or reclassify total and dissolved phosphorus and total vanadium. A discussion should be provided for these parameters regarding the potential causes for the underprediction, potential corrective measures if necessary, and improvements to model outputs.

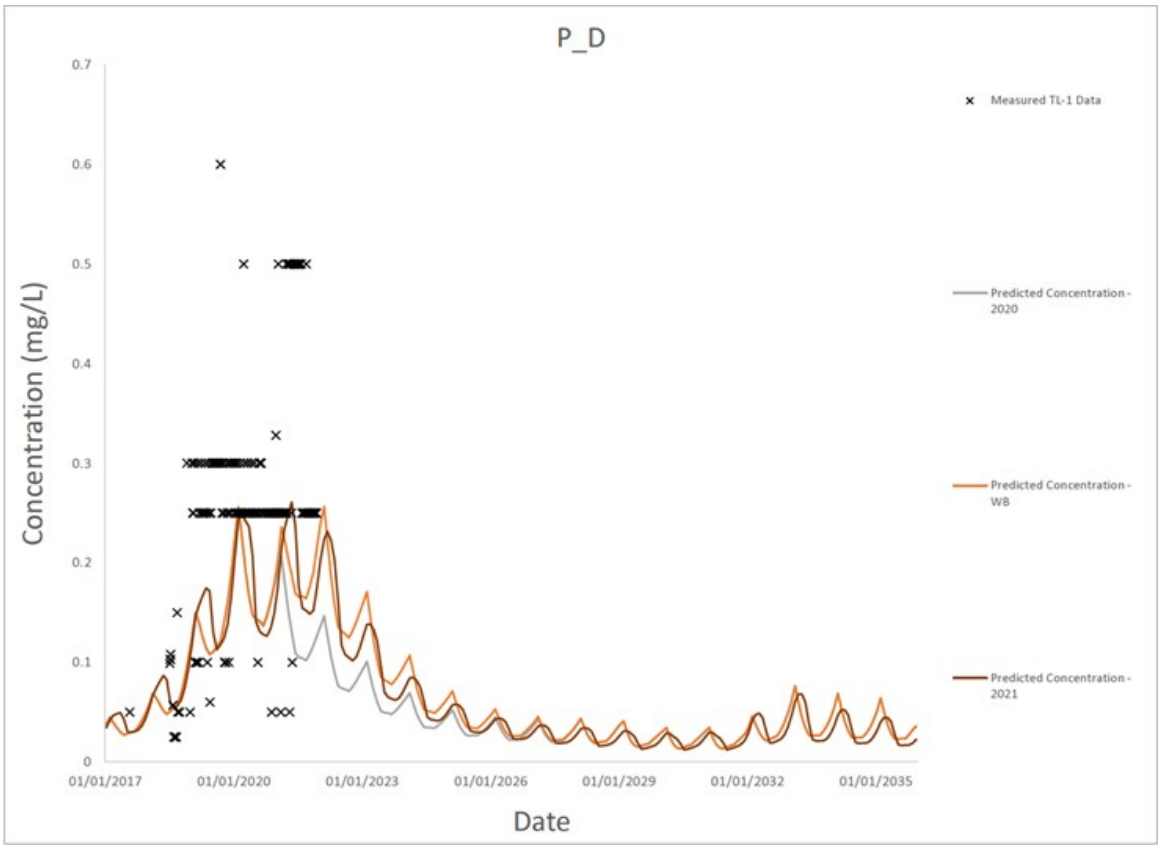
**Table 7: Initial Screening Assessment of Water and Load Balance Parameters**

| Classification Type | Parameters Included | Comparison to Model Prediction |
|---|---|---|
| Conservative | F, nitrate ($NO_3$)<br><br>Dissolved Metals: Al, Sb, As, Ba, Ca, Cd, Cr, Cu, Fe, Pb, Li, Hg, Mn, Mo, Ni, Se, Ag, Tl, V, P, Zn<br>Total Metals: Al, Sb, As, Ba, Ca, Cd, Cr, Fe, Pb, Li, Hg, Mn, Mo, Ni, Se, Ag, Tl, V, P, Zn | Measured values are below the model prediction. The modeled values are reflective of conservative assumptions (typically higher predictions than measured parameter values).<br><br>*Note: some values may be at or close to the method detection limit and slightly above the model prediction; these parameters were still considered to be in the conservative classification type.* |
| Trending Well | Total dissolved solids (TDS*), Cl*, ammonia ($NH_4$), nitrite ($NO_2$), total cyanide (CN-T), Free cyanide (CN-F), WAD cyanide (CN-WAD), thiocyanate (SCN)<br><br>Dissolved Metals: Be, B*, Co, Mg*, Na*, U<br>Total Metals: Be, B*, Co, Cu, Mg*, Na*, U | Measured values are tracking well with the model predictions.<br><br>**Note: while predicted values were within measured ranges, some parameters tended to exhibit seasonal offsets from measured data.* |
| Underpredicted | cyanate (CNO) | Model predictions are lower than measured values. Corrective actions discussed in subsequent sections. |

Sources: https://srk.sharepoint.com/:x:/r/sites/NA1CT022.076/Internal/4_2021_AnnualWLB/Inputs/HopeBay_2021Inputs_1CT022-066_R00_ajb_nf.xlsx?d=w1f5e5cf44ca64e258620c218b584fe03&csf=1&web=1&e=3KqTYd


V_T
Concentration (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
01/01/2017
01/01/2020
01/01/2023
01/01/2026
01/01/2029
01/01/2032
01/01/2035
Date
Measured TL-1 Data
Predicted Concentration - 2020
Predicted Concentration - WB
Predicted Concentration - 2021


P_T
Concentration (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0
01/01/2017
01/01/2020
01/01/2023
01/01/2026
01/01/2029
01/01/2032
01/01/2035
Date
Measured TL-1 Data
Predicted Concentration - 2020
Predicted Concentration - WB
Predicted Concentration - 2021




## 36.5 RECOMMENDATION/REQUEST

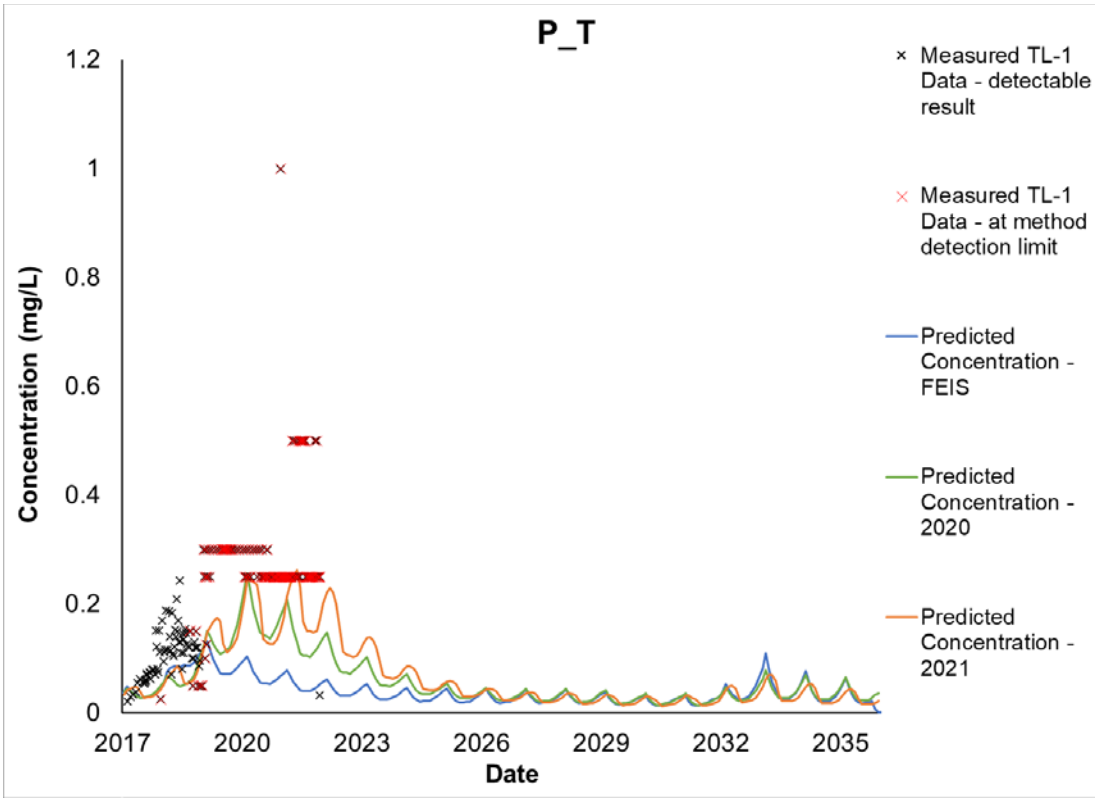
It is recommended that AEM provide a more detailed definition of classification types (number of measured values greater than the predicted value to be considered underpredicted) to support the classifications provided or reclassify total and dissolved phosphorus and total vanadium. A discussion should be provided for these parameters regarding the potential causes for the underprediction, potential corrective measures if necessary, and improvements to model outputs. It is noted that this was identified in the review of the 2020 annual report and continued to be a problem for the 2021 annual report.

## 36.6 RESPONSE TO KIA-NWB-28

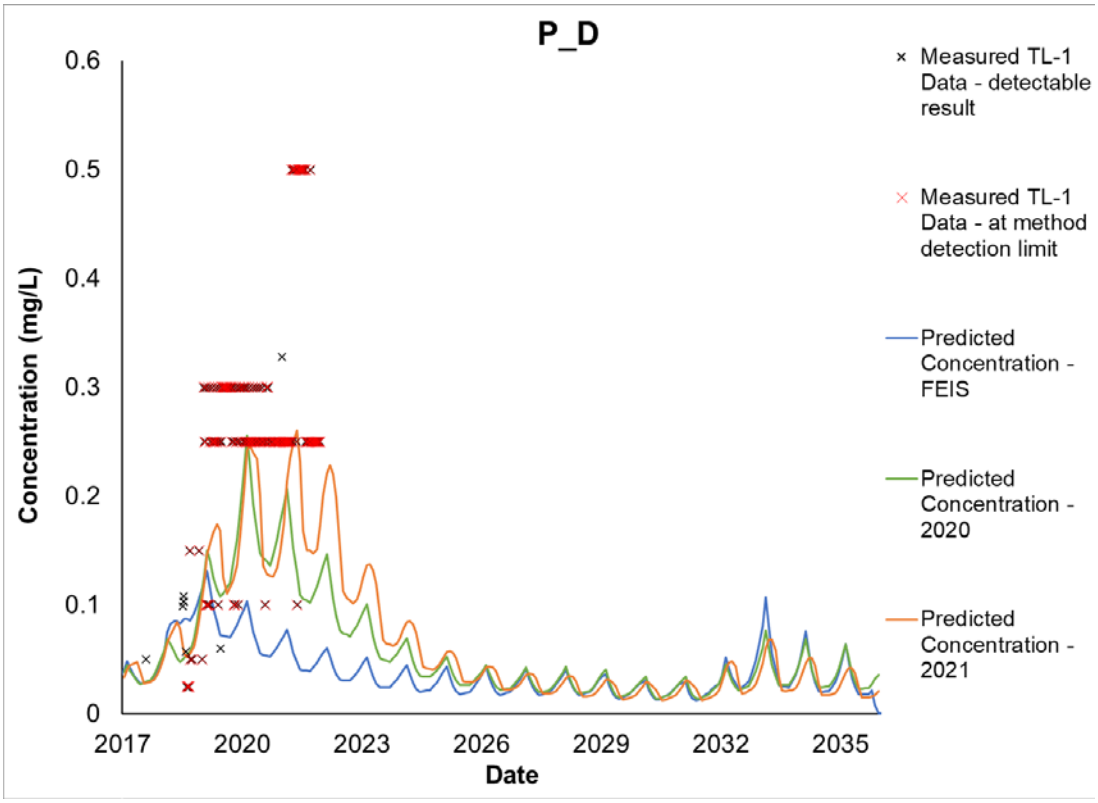
The classification approach is mainly qualitative, as described in the response to KIA-NWB-23, and more detail will be provided in future annual reports to support classifications.

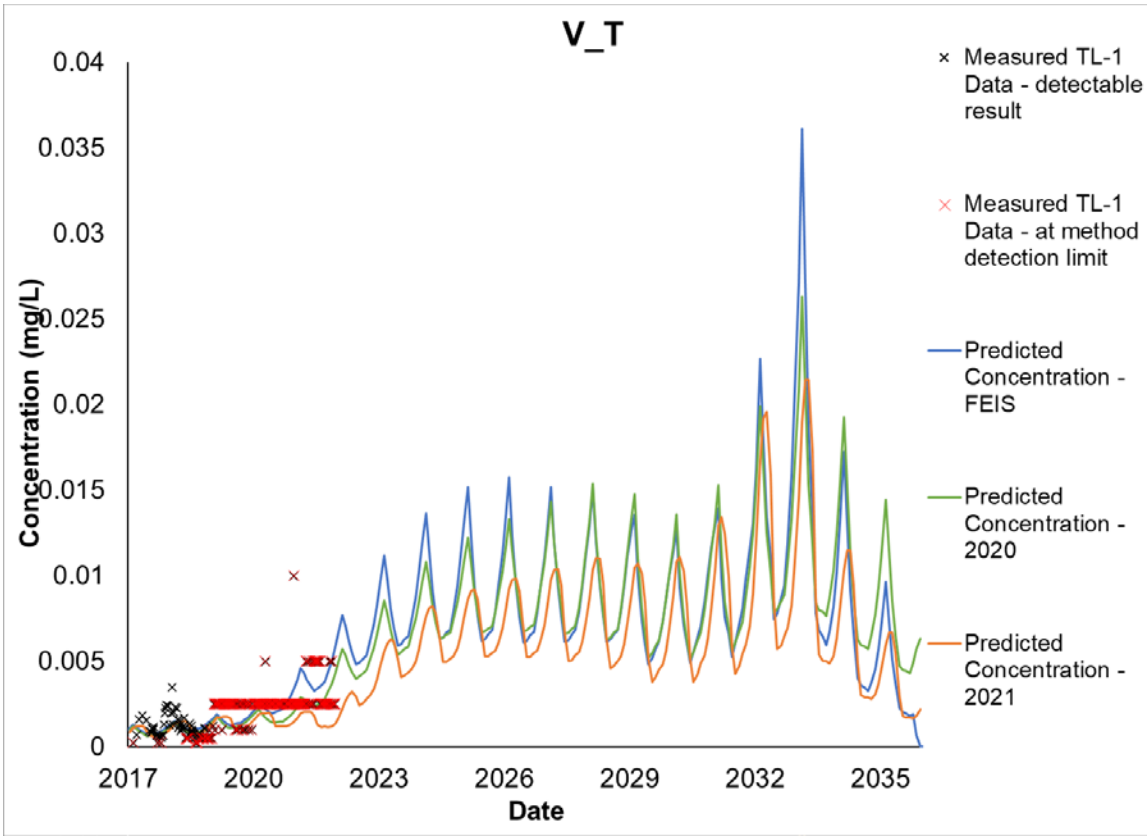
In Table 7 (Initial Screening Assessment of Water Load Balance Parameters) in Section 2.2 of the 2021 report, parameters with measured values at the MDL and greater than the prediction line were presented together with conservatively predicted parameters, as noted in the third column ('Comparison to Model Predictions') of the table. In future reports, these parameters will be presented and described separately.

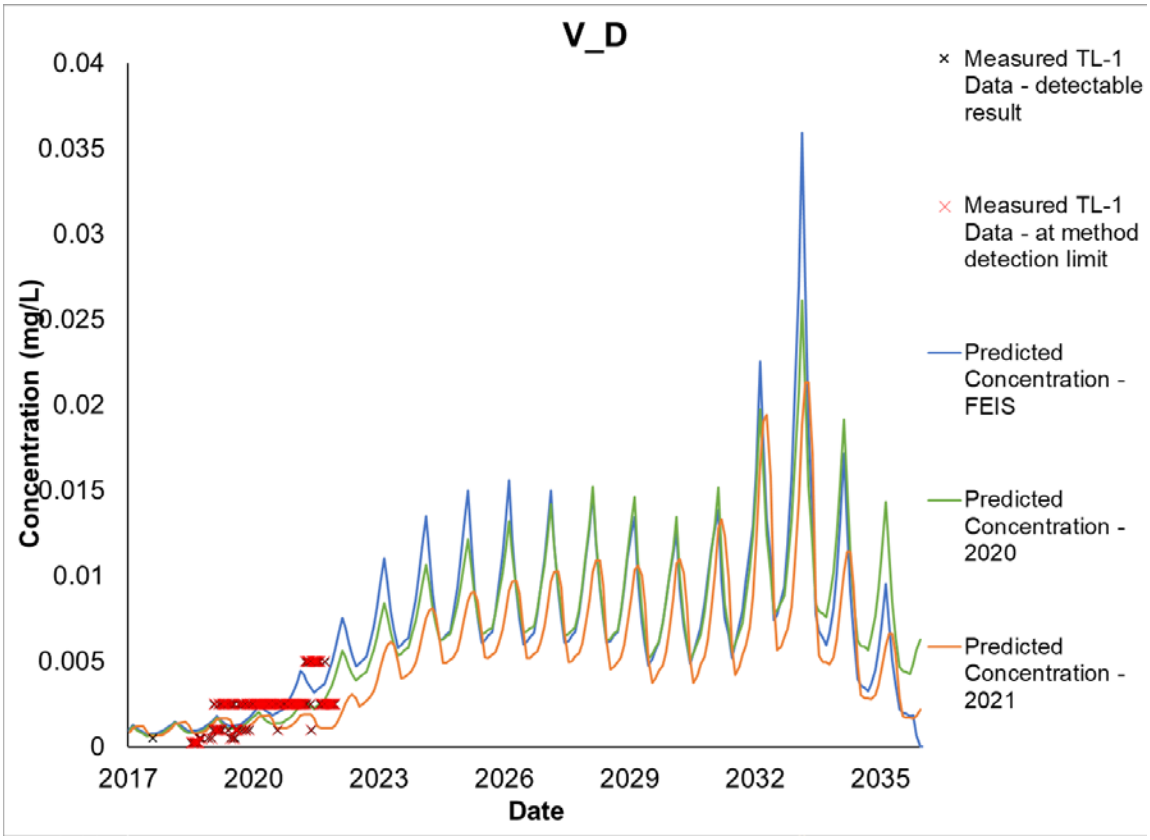
Total and dissolved phosphorus and vanadium are discussed in KIA-NWB-8, and the majority of the measured data have been reported at the MDL (see figures below that highlight MDL results in red). Model inputs have not been updated in recent validation reports (SRK 2021, SRK 2022) as it is unclear how predictions trend with actual concentrations which are obscured by high MDLs. Vanadium and phosphorus predictions will continue to be reviewed and discussed in the 2022 validation, and inputs may be updated should detectable data be reported in 2022.




Note: data was missing from the total phosphorus plot provided in the 2021 annual report. This data is included in the above plot, and the error has been rectified for future reporting




V_T
Concentration (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
2017
2020
2023
2026
2029
2032
2035
Date
Measured TL-1 Data - detectable result
Measured TL-1 Data - at method detection limit
Predicted Concentration - FEIS
Predicted Concentration - 2020
Predicted Concentration - 2021


V_D
Concentration (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
2017
2020
2023
2026
2029
2032
2035
Date
Measured TL-1 Data - detectable result
Measured TL-1 Data - at method detection limit
Predicted Concentration - FEIS
Predicted Concentration - 2020
Predicted Concentration - 2021

# 37. KIA-NWB-29

## 37.1 SUBJECT

Distance of Chemical Storage

## 37.2 REFERENCES

Hope Bay Project 2021 Nunavut Water Board Annual Report Appendix H. Updated Management Plans

Hope Bay Spill Contingency Plan

Module A: Doris page 1709

## 37.3 SUMMARY

To ensure that AEM if abiding by all regulations and policy it is important to know if chemical storage locations are a minimum of 31 meters from waterbodies/watercourses.

## 37.4 DETAILED REVIEW COMMENT

To protect water quality and aquatic biota from mine related degradation due to chemical spills and leaks it is important that all chemical storage locations remain a minimum distance of 31 meters from watercourses/waterbodies. It is recommended that AEM reassure the reviewer that this regulation is being followed.

Pages 1716 and 1717 have photos of Roberts Bay Laydown and Doris Camp highlighting fuel or chemical storage locations and spill kit locations. The figures do not have a distance reference, so it is not possible for the reviewer to determine the distance of fuel and chemical storage locations to waterbodies/watercourses. Fuel and chemical storage locations must be a minimum 31 m from waterbodies/watercourses. Please indicate if fuel and chemical storage locations abide by the minimum distance policy.

## 37.5 RECOMMENDATION/REQUEST

It is recommended that AEM indicate if fuel and chemical storage locations abide by the minimum distance policy or provide a scale for the reviewer to determine it on their own.

## 37.6 RESPONSE TO KIA-NWB-29

Agnico will update the Spill Contingency Plan fuel and chemical storage figures with a scale. The update will be included in the 2022 NWB Annual Report submission.

# 38. KIA-NWB-30

## 38.1 SUBJECT

Suitable Refence Lakes

## 38.2 REFERENCES

Hope Bay Project 2020 Nunavut Impact Review Board Annual Report

Appendix D-4. Hope Bay Project 2020 Aquatic Effects Monitoring Program Report.

Section 3.2.2 Temperature

## 38.3 SUMMARY

Refence Lake B did not reflect the thermal regime of deeper Project lakes in 2020. A deeper refence lake is needed for suitable comparison to deep project lakes.

## 38.4 DETAILED REVIEW COMMENT

To assess the impact of the Project on the physical, chemical and biological properties of lakes in close proximity to project infrastructure both baseline data and suitable Refence Lakes are required. It is not fitting to use Refence Lake B to comparatively assess regional changes in thermal conditions of deep lakes.

The refence lake is used to assess Project related changes to water quality and aquatic biota compared to natural regional shifts. Reference Lake B does not provide a suitable refence for larger deep lakes such as Windy and Doris. An example of this is described in Section 3.2.2 where TMAC states, "In the shallower study lakes, Patch Lake and Reference Lake B, August 2020 temperature profiles were within the range of baseline temperatures (Figure 3.2-2b). However, in the

deeper lakes, Windy and Doris, temperatures were warmer than usual in the upper portion of the water column, and the water column was more strongly stratified than usual." A deeper lake with similar thermal regimes should be used for comparisons to deep Project lakes. The need for more reference lakes is particularly important given the continued expansion of the Project. It is recommended that TMAC identify additional refence lakes that reflect similar physical, chemical and biological attributes as project lakes and expedite the collection of reference data for future monitoring.

This comment was provided to TMAC as part of our review of the 2020 annual report. No response to the recommendation was provided. KIA reiterates the recommendation and notes that while the mine is under care and maintenance it provides a good opportunity to begin monitoring additional reference lakes before the mine expands further.

## 38.5 RECOMMENDATION/REQUEST

It is recommended that AEM identify additional refence lakes that reflect similar physical, chemical and biological attributes as project lakes and expedite the collection of reference data for future monitoring.

## 38.6 RESPONSE TO KIA-NWB-30

The following response was provided in 2021 with respect to the 2020 Report comments:

*"The AEMP follows the approved Hope Bay Project: Aquatic Effects Monitoring Plan (the Plan; TMAC 2018) as required under NIRB Project Certificate No. 009 and Water Licences 2AM-BOS1835 and 2AM-DOH1335. The approved Plan includes monitoring of Reference Lake B as the reference lake for the AEMP. The chemistry, morphology, and biological communities of a reference lake cannot be identical in every way to the exposure lakes, as no two lakes are identical. Rather, Reference Lake B is monitored to represent changes over time in a natural lake in the absence of mining influences. Reference Lake B has been monitored since 2009 and this continuous historical data set allows for robust statistical analysis of monitoring data using before-after/control-impact (BACI) or regression analyses. If a reference lake were added at this stage, similar statistical analysis could not be conducted because of the absence of "before" data from the baseline monitoring period and the absence of an adequately long time series for a regression analysis. Therefore, the addition of reference lakes at this stage would be of limited value from a long-term monitoring perspective. Reference Lake B remains a suitable lake for the AEMP."*

As stated, Reference Lake B is monitored to represent changes over time in a natural lake (absence of mining influence) in the region, and has a dataset that allows statistical analyses for the exposure sites in the current AEMP. If the Hope Bay Project scope changes or new Project development is proposed (i.e., expansion), the need for an additional/alternate reference lake to be monitored for the purpose of identifying potential mine-related effects would be determined through revision of the AEMP Design Plan to include the new development area/activity. The Hope Bay Project is currently in Care and Maintenance thus an update to the Plan is not considered necessary, and is not recommended at this time.

Reference

TMAC. 2018. Hope Bay Project: Aquatics Effects Monitoring Plan. TMAC Resources Inc.: Toronto, ON.

# 39. KIA-NWB-31

## 39.1 SUBJECT

Missing Responses

## 39.2 REFERENCES

HOPE BAY SPILL CONTINGENCY PLAN Appendix 4: Responses to Comments on Previous Plan Versions

## 39.3 SUMMARY

There appears to be missing responses by AEM to several comments.

## 39.4 DETAILED REVIEW COMMENT

It is important that all comments are provided a response so that the reader understands if the comment is dealt with or if it is still outstanding.

For the reviewer to fully understand if these comments have been addressed, a response should be provided for each comment or rationale for why a response is not required.

## 39.5 RECOMMENDATION/REQUEST

It is recommended that AEM provide a response for every comment, even if the response indicates the comment has been addressed or refer to a previous response.

## 39.6 RESPONSE TO KIA-NWB-31

Agnico will update the Spill Contingency Plan fuel to include a response or reference to previous response for every comment. The update will be included in the 2022 NWB Annual Report submission.

# 40. KIA-NWB-32

## 40.1 SUBJECT

Quarry Rock Blasting

## 40.2 REFERENCES

Section 2.1.3 HOPE BAY PROJECT 2020 Nunavut Water Board – Annual Report

Setback distances for quarry blasting are required to protect fish

Section 8.1.3 indicates five blasts took place in Quarry 2

No setback distances are reported from any nearby water bodies

Section 3.1.5 HOPE BAY PROJECT 2020 Nunavut Water Board – Annual Report

Blast vibration monitoring is required for quarry blasting to protect fish

Section 8.1.3 indicates five blasts took place in Quarry 2

No vibration monitoring reported from any nearby water bodies

## 40.3 SUMMARY

Missing information on whether blasting in Quarry 2 is located near any water bodies where setback distances and vibration monitoring would be required.

## 40.4 DETAILED REVIEW COMMENT

It is important to know whether Quarry 2 is located near any fish bearing water bodies.

## 40.5 RECOMMENDATION/REQUEST

Same as above.

## 40.6 RESPONSE TO KIA-NWB-32

All of the Hope Bay Project quarries are greater than 31 m from fish habitat.

# 41. KIA-NWB-33

## 41.1 SUBJECT

Quarry discharge

## 41.2 REFERENCES

Appendix D.2. HOPE BAY PROJECT 2020 Nunavut Water Board – Annual Report

A sample was taken at monitoring station HOP-7D located in Quarry D, on August 8, 2021. Notification of discharge was provided to the

Inspector on May 10, 2021 and results of the monitoring are presented in

Table D2-1. An estimated total of 800 m3 of water was discharged to the tundra (13W 0432823 7551708), based on pumping times.

Section 2.2.4 HOPE BAY PROJECT 2020 Nunavut Water Board –Annual Report

It is required that quarry discharge not be into fish bearing water bodies.

## 41.3 SUMMARY

It is unknown whether quarry water discharged onto the tundra was in proximity to any fish bearing water bodies.

## 41.4 DETAILED REVIEW COMMENT

It is important to know whether the water discharged onto the tundra could have flowed or seeped into any nearby fish bearing water bodies.

## 41.5 RECOMMENDATION/REQUEST

Please report whether the discharged quarry water was in proximity to any fish bearing waters.

## 41.6 RESPONSE TO KIA-NWB-33

The discharged quarry water is not in proximity to any fish bearing waters (> 400 m). In addition, no project related effects were noted in the 2021 Aquatic Effects Monitoring Program Report (ERM, 2022).

# 42. KIA-NWB-34

## 42.1 SUBJECT

Active monitoring stations

## 42.2 REFERENCES

5. Water Use and Waste Disposal (2021 Nunavut Water Board Annual Report)

Text: “During 2021, Agnico collected data from the following active or seasonally active monitoring stations: TL-1, TL-2, TL-5, TL-6, TL-7a, TL-7b, TL-9, TL-11, TL-12, ST-1, ST-2, ST-4, ST-5, ST- 6a, ST-6b, ST-

7, ST-7a/MMS-4b, ST-8, ST-9, ST-11, ST-12, MMS-1, and MMS-9.

Monitoring at stations ST-3 (Landfill Sump), ST-13 (Doris Contact Water Pond Pad U), MMS-4a (Freshwater intake at Windy Lake North), and MMS-8 (Madrid North Fuel Storage Facility) did not occur, as these facilities were not constructed as of 2021.

Monitoring at ST-10 (Doris Site runoff from sediment controls) and MMS-9 (Madrid Site runoff for sediment controls during construction) was not conducted as no new infrastructure was constructed at Doris or Madrid in 2021.”

## 42.3 SUMMARY

MMS-9 is referenced as an active monitoring station; however, Appendix D.1 indicates MMS-9 as not being conducted as no new infrastructure was constructed in Doris or Madrid.

## 42.4 DETAILED REVIEW COMMENT

Same as above.

## 42.5 RECOMMENDATION/REQUEST

Confirm that MMS-9 is not an active monitoring station.

## 42.6 RESPONSE TO KIA-NWB-34

Agnico apologizes for the confusion in the Section 5 text. Sample location MMS-9 represents site runoff from sediment controls during construction. In 2021, this station was inactive as no new infrastructure was constructed.

# 43. KIA-NWB-35

## 43.1 SUBJECT

Year

## 43.2 REFERENCES

5.4 Boston – 2BB-BOS1728 (2021 Nunavut Water Board Annual Report)

Text: "No water was used from Aimaokatalok (Spyder) Lake (BOS-1a) or from Stickleback Lake (BOS-1b) for domestic use at Boston Camp, to support surface exploration drilling activities or any other purpose in 2020.

No samples were collected from monitoring stations BOS-1a or BOS-1b in 2020."

## 43.3 SUMMARY

-

## 43.4 DETAILED REVIEW COMMENT

-

## 43.5 RECOMMENDATION/REQUEST

> Please provide confirmation for whether or not water was used from Aimaokatalok (Spyder) Lake or from Stickleback Lake for domestic use at Boston Camp, to support surface exploration drilling activities or any other purpose in 2021.
> Please confirm no samples were collected from monitoring stations BOS-1a or BOS-1b in 2021.

## 43.6 RESPONSE TO KIA-NWB-35

Agnico apologizes for the typo in Section 5.4 and can confirm that no water was used from Aimaokatalok (Spyder) Lake (BOS-1a) or from Stickleback Lake (BOS-1b) for domestic use at Boston Camp, to support surface exploration drilling activities or any other purpose in 2021. In addition, no samples were collected from monitoring stations BOS-1a or BOS-1b in 2021.

# 44. KIA-NWB-36

## 44.1 SUBJECT

Sample ID

## 44.2 REFERENCES

9.1.1 Doris Waste Rock Influences Area (2021 Nunavut Water Board Annual Report)

6.3.1 Doris (2021 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid North Mines)

5.1.1 Doris Waste Rock Influenced Area (2021 Hope Bay Waste Rock, Ore and Infrastructure Seep Monitoring)

Text:

“Prior to 2020, the seepage chemistry at the toe of the access road had the signature of waste rock and was more dilute than seepage at the toe of Pad I. Since 2020, seepage chemistry has indicated a loading source other than waste rock and has been geochemically characterized according to two loading sources: i) the downstream toe of the waste rock/ore stockpile on Pad I (21- DC-01 to 21-DC-03), and ii) toe of the access road (21-DC-04 and 21-DC-05).

For the access road samples (21DC-04 and 21DC-06)”

## 44.3 SUMMARY

See above

## 44.4 DETAILED REVIEW COMMENT

Attachment 2 – 2021 Field Observations and Measurements confirms that there is no sample ID 21DC-06

## 44.5 RECOMMENDATION/REQUEST

Verify that 21DC-06 is 21DC-05.

## 44.6 RESPONSE TO KIA-NWB-36

Agnico confirms that 21DC-06 in the text referenced above should be 21DC-05. An error was made when summarizing this information from “2021 Seepage Monitoring of Doris and Madrid Waste Rock, Ore, and Infrastructure”, in which 21DC-05 is the sample being referred to.

# 45. KIA-NWB-37

## 45.1 SUBJECT

Source of loading and contaminants

## 45.2 REFERENCES

9.1.1 Doris Waste Rock Influences Area (2021 Nunavut Water Board Annual Report)

6.3.1 Doris (2021 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid North Mines)

5.1.1 Doris Waste Rock Influenced Area (2021 Hope Bay Waste Rock, Ore and Infrastructure Seep Monitoring)

Text: "Concentrations were higher in chloride and ammonia concentrations in the road seepage samples than the Pad I sample, suggesting a loading source other than waste rock"

## 45.3 SUMMARY

Additional source of loading is expected.

## 45.4 DETAILED REVIEW COMMENT

The 2021 Seepage Monitoring of Doris and Madrid Waste Rock, Ore, and Infrastructure Technical Memo indicates that not only chloride and ammonia concentration are higher in the road seepage samples than the Pad I sample but also Nitrate and Cyanate.

## 45.5 RECOMMENDATION/REQUEST

The additional loading source for the seepages 21DC-04 and 21DC-05 should be identified and investigated, as necessary.

## 45.6 RESPONSE TO KIA-NWB-37

A potential source of nitrate, cyanate, ammonia, and chloride concentrations observed at the toe of the access road (e.g. samples 21DC-04 and 21DC-05) is the detoxified tailings that are temporarily stored at the Doris pad prior to transfer underground for placement as backfill. The concentrations of manganese and cadmium in these samples also support that detoxified tailings are the potential loading source (refer to Section 4.1 of 2021 Hope Bay Waste Rock, Ore and Infrastructure Seep Monitoring (p. 24).

Operational practices at Hope Bay do not support this theory. Agnico has inspected the camp pad and has not observed detoxified tailings out of the approved storage area. Moreover, the tailings slurry pipes are routinely inspected and are operating as intended.

Of note is that the concentrations of all aforementioned parameters have decreased since 2021 suggesting that the load is being flushed and there has been no additional load since 2020, the first year that these concentrations were observed. Seepage observed at the toe of the road (e.g. 21DC-04 and 21DC-05) is captured by collection sumps downstream of the camp pad and transferred to the TIA.

# 46. KIA-NWB-38

## 46.1 SUBJECT

Arsenic values

## 46.2 REFERENCES

9.1.1 Doris Waste Rock Influences Area (2021 Nunavut Water Board Annual Report)

6.3.1 Doris (2021 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid North Mines)

Test: “A comparison of seepage trace element concentrations is summarized as follows: Higher for stockpile stations: sulphate (530 mg/L), arsenic (ranging from 0.0040 to 00042 mg/L and three times higher), cobalt (0.034 to 0.035 mg/L and one order of magnitude higher), molybdenum (0.012 to 0.013 mg/L and one order of magnitude higher), and nickel (0.051 to 0.053 mg/L and one order of magnitude higher). Trends in these parameters were relatively stable except sulphate, which has been increasing with time.”

## 46.3 SUMMARY

Arsenic values are ranging from 0.0040 to 0.0042 according to Table 3-1 Summary of select Laboratory Results of 2021 Doris Waste Rock Influenced Area (WRIA) Seepage Samples – 2021 Seepage Monitoring of Doris and Madrid Waste Rock, Ore, and Infrastructure / Technical Memo. Concentration values in text is incorrect.

## 46.4 DETAILED REVIEW COMMENT

Same as above.

## 46.5 RECOMMENDATION/REQUEST

Please rectify concentration values: arsenic (ranging from 0.0040 to 0.0042 mg/L).

## 46.6 RESPONSE TO KIA-NWB-38

Arsenic concentrations in Table 3-2 are correctly stated but the decimal point was missing. The concentration range is confirmed to be 0.0040 to 0.0042 mg/L.

# 47. KIA-NWB-39

## 47.1 SUBJECT

Sulphate values

## 47.2 REFERENCES

9.1.1 Doris Waste Rock Influences Area (2021 Nunavut Water Board Annual Report)

Test: "For stockpile seepage, trends for all parameters were either decreasing or stable except for sulphate, which was increasing."

Technical Memo: 2021 Seepage Monitoring of Doris and Madrid Waste Rock, Ore, and Infrastructure. 4.1 Doris Waste Rock Influenced Area

Historically, sulphate concentrations in seepage at the toe of the access road were lower than… ore (average stable rate of 13 mg/kg/week, n=3; SRK 2015a) compared to Doris ore (average stable rate of 3.2 mg/kg/week, n=4; SRK 2015b).

## 47.3 SUMMARY

The effects of sulphate increase in the seepage from the toe of the stockpile on Pad I on receiving environments should be clarified.

A remediation action plan, to decrease or to stabilize the sulphate concentrations at the seepage should be investigated.

## 47.4 DETAILED REVIEW COMMENT

Same as above

## 47.5 RECOMMENDATION/REQUEST

Please confirm if the 2021 updated water balance includes the latest sulphate concentrations for the waste rock influenced area and clarify how the proponent is addressing this increase in sulphate concentrations.

## 47.6 RESPONSE TO KIA-NWB-39

The 2021 updated water and load balance includes sulphate concentrations measured at the Doris Sediment Control Pond (SCP) which collects drainage from the Pad I area prior to transfer to the TIA. Measured water quality data is used to assess if predictions based on the historical understanding of site conditions align with actual site data. The 2021 sulphate predictions for the TIA aligned with measured concentrations, and the SCP accounted for only 1.4% of the total inflow volume to the TIA (0.4% of the total volume in the TIA). Accordingly, loadings from waste rock are relatively minor compared to other sources, such as the tailings slurry.

# 48. KIA-NWB-40

## 48.1 SUBJECT

Concentration values

## 48.2 REFERENCES

9.1.3 Madrid infrastructures and Roads (2021 Nunavut Water Board Annual Report)

6.3.2 Madrid North (2021 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid North Mines)

4.2.2 Infrastructure and Roads (2021 Seepage Monitoring of Doris and Madrid Waste Rock, Ore, and Infrastructure / Technical Memo)

Text:

Nitrogen nutrients, which are present in or residuals of explosives, were present at significantly lower concentrations in 2021, including ammonia (two orders of magnitude lower), nitrate (three to five orders of magnitude lower) and nitrite (up to two orders of magnitude lower).

Trace element concentrations were lower for all elements indicated as having high rates of metal leaching by the 2020 seepage survey, including dissolved cadmium (one to two orders of magnitude), cobalt (two orders of magnitude), iron (three to four orders of magnitude), manganese (one order of magnitude), nickel (one order of magnitude), selenium (one order of magnitude) and zinc (one order of magnitude).

Seepage from the Overburden Stockpile in 2021 was characterized by lower concentrations of EC and most major ions, whereby EC, sulphate, calcium, and potassium were one order of

magnitude lower than 2020 samples and chloride, magnesium and sodium were up to two orders of magnitude lower. The major ion composition of 2021 samples was relatively uniform and distinctive from 2020 seepage samples.

Ammonia and phosphorus concentrations in 2021 were two orders of magnitude lower than in 2020.

Concentrations of dissolved trace elements were lower in 2021 with levels one or two orders of magnitude lower for antimony, cadmium, cobalt, iron, lead, manganese, molybdenum, nickel, selenium, and zinc. Notably, arsenic concentrations were roughly equivalent.

The significant decrease in concentrations of major ions and trace elements in seepage from 2020 to 2021 validates the conceptual geochemical model that the source loading to seepage chemistry in 2020 was the thawing and draining of frozen saline porewater within overburden. Seepage samples collected in 2021 were from a different location than 2020 samples and therefore may represent drainage from non- and less saline overburden that is present in the stockpile (SRK 2021d).”

## 48.3 SUMMARY

Concentration values not indicated.

### 48.4 DETAILED REVIEW COMMENT

Same as above

### 48.5 RECOMMENDATION/REQUEST

To be consistent with the rest of the report, please indicate concentration values ranges.

### 48.6 RESPONSE TO KIA-NWB-40

Specific concentration ranges will be indicated in future reporting. This change will be included in the 2022 NWB Report.

# 49. KIA-NWB-41

## 49.1 SUBJECT

Underground Seepage Monitoring (TL-11)

## 49.2 REFERENCES

Appendix D

Text: “In December, three flowing seeps were identified, and samples were collected at each location. Results of this sampling is provided in Table D1-33 and Table D1-36.”

## 49.3 SUMMARY

Table D1-33 and D1-34 present a summary of the results of seepages from Underground Backfilled Stopes (TL-11). Three seeps were observed and sampled at three locations during the inspection in August and December 2021 (TL-11A, TL-11B and TL-11C).

## 49.4 DETAILED REVIEW COMMENT

It has been noted a difference in some parameters for seep TL11-C between the two sampling events (i.e.: Conductivity: 21800 µs/cm in August and 279 µs/cm in December, Ammonia- Total (as N): 34.2 mg/l in August and 0.0117 mg/l in December, Sulfate: 1910 mg/l in august 2021 and 4.23 in December 2021 etc.). It is recommended to explain or investigate the cause of the fluctuation in concentrations between August and December sampling. Concentrations appear to be stable during the two sampling events for seeps TL-11A and TL-11B.

## 49.5 RECOMMENDATION/REQUEST

The fluctuation of conductivity, total ammonia, sulfate and metals concentrations at TL-11C between the two sampling events should be clarified or investigated.

## 49.6 RESPONSE TO KIA-NWB-41

Table 4-9 in “2021 Geochemical Monitoring of Flotation and Detoxified Tailings, Doris Mill” (Appendix E of 2021 Waste Rock, Quarry and Tailings Monitoring Report, Doris and Madrid North Mines) indicates the levels at which all TL-11 samples were collected. TL11-3 from August was collected at Level 110 and TL11 C from December was collected from Level 74 and therefore these samples were collected from two different areas of the underground. Specifically, the distance of the ponded water from stope and the lower concentrations for sample TL11-C collected in December indicate that the water sampled was not in contact with backfill (waste rock and/or detoxified tailings) and therefore represents contact water from underground mine wall rock. Further discussion is included in Section 4.5 of the aforementioned memo.

# 50. KIA-NWB-42

## 50.1 SUBJECT

Table D1-44

## 50.2 REFERENCES

Appendix D – Table D1-44

Sample ID: MMS-1/MAE-04S ALS ID: YL2100748-005

Date Sampled: 2021-07-07 -13:45

## 50.3 SUMMARY

Table D1-44 shows results for Sample MMS-1/MAE-04S from 2021-07-07 twice.

## 50.4 DETAILED REVIEW COMMENT

There is a possibility that one Sample ID was overwritten.

## 50.5 RECOMMENDATION/REQUEST

Please verify the following:

That Table D1-44 is not missing one Sample Result from 2021-07-07 (MMS-1/MAE-04N)

If no other sample result is missing or overwritten, please remove duplicate (MMS-1/MAE-04S – 2021-07-07)

## 50.6 RESPONSE TO KIA-NWB-42

Agnico apologizes for the duplicate entry and can confirm no lab results for MMS-1/MAE-04N were excluded from Table D1-44.

# 51. KIA-NWB-43

## 51.1 SUBJECT

HOP-7D sample results

## 51.2 REFERENCES

Appendix D.l2 Text: “A sample was taken at monitoring station HOP-7D located in Quarry D, on August 8, 2021. Notification of discharge was provided to the Inspector on May 10, 2021 and results of the monitoring are presented in Table D2-1.”

## 51.3 SUMMARY

Table D2-1 refers to 2BE-HOP1222 Sample Stations, Sample Frequency and Analytical Parameters and not HOP-7D sample results.

## 51.4 DETAILED REVIEW COMMENT

No Table shows HOP-7D sample results from August 8th, 2021.

## 51.5 RECOMMENDATION/REQUEST

Please add Table with HOP-7D parameter results from August 8th, 2021.

## 51.6 RESPONSE TO KIA-NWB-43

Agnico apologizes that the referenced table was missing. The results for HOP-7D from August 8, 2021 are provided below. This data was also provided to the NWB as part of the Monthly Monitoring Reporting required under Water Licence 2BE-HOP1222.

**Table 1. HOP-7D Results**

| Sample ID | | HOP-7D | Part J Item 6 (a) & (b) | |
|---|---|---|---|---|
| ALS ID | | YL2100974-001 | Maximum Authorized Monthly Mean Concentration (mg/L) | Maximum Authorized Concentration in a Grab Sample (mg/L) |
| Date Sampled | | 2021-08-08 17:15 | | |
| Parameter | Units | Water | | |
| pH | pH | 8.10 | 6.0 to 9.0 | 9.0 |
| Conductivity | uS/cm | 443 | 500 | 500 |
| Ammonia, Total (as N) | mg/L | 0.0402 | 2 | 4 |
| Total Suspended Solids | mg/L | <3.0 | 15 | 30 |
| Oil and Grease | mg/L | <5.0 | 5 | 10 |
| Oil And Grease (Visible Sheen) | | Absent | No visible sheen | No visible sheen |
| Aluminum (Al)-Total | mg/L | 0.155 | 1.0 | 2.0 |
| Arsenic (As)-Total | mg/L | 0.00259 | 0.05 | 0.10 |
| Copper (Cu)-Total | mg/L | 0.00251 | 0.02 | 0.04 |

| Sample ID | | HOP-7D | Part J Item 6 (a) & (b) | |
|---|---|---|---|---|
| ALS ID | | YL2100974-001 | Maximum Authorized Monthly Mean Concentration (mg/L) | Maximum Authorized Concentration in a Grab Sample (mg/L) |
| Date Sampled | | 2021-08-08 17:15 | | |
| **Parameter** | **Units** | **Water** | | |
| Iron (Fe)-Total | mg/L | 0.091 | 0.30 | 0.60 |
| Lead (Pb)-Total | mg/L | 0.000113 | 0.01 | 0.02 |
| Nickel (Ni)-Total | mg/L | 0.00178 | 0.05 | 0.10 |
| Zinc (Zn)-Total | mg/L | <0.0030 | 0.01 | 0.02 |

**Bold** indicates exceedance of Part F Item 18 (b) Maximum Concentration

^ Indicates duplicate sample.

# 52. KIA-NWB-44

## 52.1 SUBJECT

BOS-2, BOS-5 and BOS-9 Water Quality sampling

## 52.2 REFERENCES

5.4 Boston – 2BB-Bos1727 (2021 Nunavut Water Board Annual Report) Text:

“Water management occurred at the Containment Pond (BOS-2) and the Bulk Fuel Storage Facility (BOS-5) in 2021.

Water accumulation in the Bulk Fuel Storage Facility (BOS-5) was transferred to the Containment Pond (BOS-2). No water was discharged to tundra from this facility in 2021.

Dewatering of the Portal (BOS-9) was not conducted in 2021. Dewatering of the Landfarm Treatment Area (LTA; BOS-6) was not required in 2021. The LTA was decommissioned in 2019 and no water quality sampling was conducted for this facility.

Water quality sampling of seepage/runoff from the ore stockpiles and camp pad to the tundra (BOS-8) was conducted in 2021.

A summary of water quality monitoring for the Boston Site under this license 2BB-BOS1727 is provided in Appendix D.4.”

## 52.3 SUMMARY

There is no mention in the annual report, more specifically in section 5.4, that BOS-2, BOS-5 and BOS-9 were sampled.

## 52.4 DETAILED REVIEW COMMENT

The annual report indicates BOS-8 was sampled in 2021, but it does not specify that BOS-2, BOS-5 and BOS-9 were also sampled in 2021.

BOS-2 was sampled on June 28th, 2021, July 18th, 2021 and September 5, 2021. The sample collected on September 5th, 2021 exceeded the Maximum Concentration in Any Grab Sample for TSS. In addition, Arsenic did not pass the Maximum Average Concentration for the sample collected on July 18th, 2021.

The Bulk Fuel Storage Facility (BOS-5) was sampled in June 28 and the measured concentration for Arsenic and Lead did not pass the Maximum Concentration in any Grab Sample allowable criteria (as outlined in Part D Item 19 of the water license.

## 52.5 RECOMMENDATION/REQUEST

Please add clarification in paragraph 5.4 regarding the sampling and the exceedances for the samples collected at BOS-2, BOS-5 and BOS-9.

## 52.6 RESPONSE TO KIA-NWB-44

Additional information regarding the sampling required under Water Licence 2BB-BOS1727 was detailed in Appendix D.4 of the 2021 NWB Annual Report.

# 53. KIA-NWB-45

## 53.1 SUBJECT

Mine discharge

## 53.2 REFERENCES

2.2.1 Cyanite (Appendix E Doris Mine Annual Water and Load Balance Assessment – 2021 Calendar Year) Text:

"Comparing the measured data to the process water source term, it was found that since 2018, monthly average concentrations of cyanate in process water have increased above the source term concentration of 40 mg/L, with average 2021 concentrations being approximately 72 mg/L."

## 53.3 SUMMARY

SRK stated that cyanate will continue to be monitored in the future to determine if cyanite in process water is maintained at an elevated concentration (indicating a need for a change in source term) or is increasing/decreasing (indicating a need for assessment of the mechanisms controlling cyanate).

## 53.4 DETAILED REVIEW COMMENT

The increasing trend in cyanite has been confirmed based on water sampling results. It is understood that there is a high variability in values, but the increasing trend is clear.

The reasons for the increasing trend in cyanite concentrations should be investigated and clarified and remediation action should be considered.

## 53.5 RECOMMENDATION/REQUEST

Please clarify the reasons for the increasing trend in cyanite concentrations or, at least, please clarify the steps taken to address this potential concern.

## 53.6 RESPONSE TO KIA-NWB-45

The modelled mechanisms affecting cyanate (and other cyanide derivatives) are limited to those for which there is prior knowledge of occurrence, as well as data for parameterization. Of the cyanide derivatives, cyanate has an additional source of uncertainty, as it can be modelled as both a product of total cyanide degradation, as well as a reactant to be degraded into ammonia.

An increasing trend in cyanate concentrations may result from reactions that have not been identified and understood. The continuous recycling of TIA water for use in the Process could explain the gradual increase in cyanate loadings in the process water overtime. Additionally, as discussed in KIA-NWB-22, there has been a number of processing disruptions and changes since late 2019 that have resulted in increased chemical variability in the process plant. The equilibrium of concentrations of cyanide derivatives in process water and in the TIA are assessed as part of the annual assessment, and updates to inputs for processes affecting cyanate are implemented where appropriate. As of February 18, 2022 the Doris Mill has been

placed into Care and Maintenance. There are no specific timelines to resume production, but is likely between two and three years before a decision is made.

# 54. KIA-NWB-1-AGI

## 54.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 54.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Table 3, pages 6 and 7, Section 2.4.4, page 8 and Table 10, page 14.

## 54.3 SUMMARY

A spillway was not planned (or constructed) for the Doris Tailings Impoundment Area (TIA).

- The total actual freeboard (crest to Full Supply Level (FSL)) is 4.0 m and the total actual minimum freeboard (core/GCL to FSL) is 1.5 m for the North Dam.
- Inflow Design Flood (IDF) Freeboard = 2.1 m (at end of mine life when Reclaim Pond is at its minimum size)
- The existing North and South Dams are classified as “High Consequence” classification according to the dam classification guidelines in the Canadian Dam Association (CDA) dam safety guidelines (CDA 2013).
- (CDA) (2013)1 notes that High consequence dams should be designed for Annual Exceedance Probability (AEP) of 1/3 between 1/1000 and PMF (Table 6-1b in CDA 20131).

## 54.4 DETAILED REVIEW COMMENT

Dams with no spillways must retain all water inputs during flood events and CDA (2013) provides criteria to be used for the sizing of the IDF. Information provided by SRK indicates that the IDF freeboard is less that the total actual freeboard, but greater that the total minimum freeboard, meaning that IDF-related water levels higher than the water retaining element (core/GCL) are possible at the end of mine life when the Reclaim Pond is at its minimum size. As such, these higher water levels would be only retained by Run of Quarry (ROQ) material for the North Dam, which is permeable. Therefore, tailings pond water could escape from the dam and/or possibly erode the crest material, dependent upon the design intent of that material. Erosion of the crest material during IDF flooding near the end of mine life could lead to overtopping failure of the North Dam.

## 54.5 RECOMMENDATION/REQUEST

More detail on this specific design aspect, associated risks and related consequences is needed. The following questions should be addressed:

- Can AE/SRK confirm BGC’s understanding of the IDF outlined above?
- During Care and Maintenance (C&M) period what rise in water level would be expected in response to an IDF event being experienced? And what measures will be implemented to maintain the water level below the FSL during C&M.

- What measures does AE propose to take to manage the water level in the TIA towards the end of mine life to prevent water levels exceeding of the core/GCL? Will the FSL be revisited towards the advanced stages of the life of the facility?

## 54.6 RESPONSE TO KIA-NWB-1-AGI

BGC's understanding of the IDF is correct. The rise in water level expected by a response to an IDF event depends on the water level in the TIA at the time of the event. During C&M, the water level is actively monitored, and managed through discharge to Robert's Bay via the Robert's Bay Discharge System to ensure the water level remains below the FSL, and adequate IDF storage is maintained. In addition, Agnico will propose an Emergency Overflow Channel to prevent an overtopping failure of the North Dam. The FSL will be lowered towards the end of mine life to maintain adequate flood storage when there is less available storage in the TIA.

# 55. KIA-NWB-2-AGI

## 55.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 55.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Sections 2.4.4, 2.4.7, 2.6.1 and 4.8.

## 55.3 SUMMARY

No spillway exists for the TIA as of 2021 but a spillway maybe required prior to the end of mine life.

- Reclaim water is drawn from the TIA Reclaim Pond for re-use in the Process Plant (stated volumes ranged from 3.3Mm3 to 4.2Mm3 per month)
- Water from the Doris TIA is discharged to the Roberts Bay Discharge System (RBDS).
- The TIA is used as the overall collector for all site contact water.
- The operational water level range target for 2022 is 31.5 masl or less.
- Agnico Eagle and SRK are in the process of reviewing options for future water management in the TIA. Changes to the operational water and load balance and level targets will be reported on in future reports

## 55.4 DETAILED REVIEW COMMENT

Agnico Eagle announced its decision on February 18, 2022 to place the Doris Mill into C&M and suspend production on the Project. On March 30, 2022, Agnico Eagle provided the NWB with a formal written notice of C&M for the Doris-Madrid operations. C&M activities are planned to the end of 2024.

The water management plan is critical for the safe operation of the TIA, especially during a C&M phase and considering updated constraints including MDMER discharge criteria and RBDS schedule. Operational and monitoring requirements from a revised water management plan should be reflected within the current OMS Manual for the TIA.

## 55.5 RECOMMENDATION/REQUEST

In general, more detail on the revised water management plan is needed. The following questions should be addressed;

- When will a revised water management plan be delivered?
- Will the revised plan consider all new site constraints including the care and maintenance stage of the mine site, including an updated water balance for the TIA pond?
- Will risks to the water levels be outlined and contingency plans be provided for TIA water management and associated monitoring?
- Will the need for an emergency spillway be considered within an updated water management plan?
- The September 2021 TIA pond level was noted as 32.2 masl; will the pond be dropped to meet the noted operational level of 31.5 masl noted previously?

## 55.6 RESPONSE TO KIA-NWB-2-AGI

A revised water management plan concerning the C&M phase was submitted in June 2022. The revised plan considers all new site constraints, including the C&M stage of the mine site. Updated risks and contingency plans for managing the TIA water level will be provided in the 2023 update of the TIA OMS Manual. Detailed design for an emergency spillway (Emergency Overflow Channel) is underway and construction is planned for Fall/Winter 2022.

The TIA pond level will be dropped to meet the operational water level as quickly as possible. Discharge of TIA water is anticipated to begin in August 2022. It should be noted that the operational water level of 31.5 masl will be updated in 2023 following the construction of an emergency overflow channel. The updated operational water level will be presented in the 2023 update of the TIA OMS Manual.

# 56. KIA-NWB-3-AGI

## 56.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 56.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Section 3.1.

## 56.3 SUMMARY

A DSR provides a detailed independent assessment of dam safety, which results in a statement of the current dam safety condition(s) along with summary of associated deficiencies and non-conformances, usually with some associated ranking of associated importance. It is requirement under CDA (2013), and conclusions are important for relevant stakeholders.

## 56.4 DETAILED REVIEW COMMENT

A DSR provides a detailed independent assessment of dam safety, which results in a statement of the current dam safety condition(s) along with summary of associated deficiencies and non-conformances, usually with some associated ranking of associated importance. It is requirement under CDA (2013), and conclusions are important for relevant stakeholders.

## 56.5 RECOMMENDATION/REQUEST

Assuming that the DSR is now completed and has been accepted by AE, the following questions should be addressed;

- Can the DSR dam safety statements, and associated summary of deficiencies and non-conformances be provided to the KIA?
- Has AE agreed to all recommendations regarding deficiencies and non-conformances in the DSR and will all recommendations be addressed? If so, what documentation exist to confirm this?
- Has the Engineer of Record (EOR) reviewed the DSR report and agreed with the noted deficiencies and non-conformances and associated importance ratings? If so, what documentation exist to confirm this?

## 56.6 RESPONSE TO KIA-NWB-3-AGI

The DSR is currently undergoing final revisions. Agnico has agreed to all recommendations regarding deficiencies and non-conformances in the DSR and is developing an action plan to address the recommendations. The EOR will sign the Hope Bay action plan to document the EOR's review of the DSR and acceptance of deficiencies and non-conformances and associated importance ratings.

# 57. KIA-NWB-4-AGI

## 57.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 57.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Section 4.1, Tables 11, and 12, Section 4.2.7, and Section 4.3.3.

## 57.3 SUMMARY

- For the North Dam, 34 weekly visual inspections by site staff conducted during this monitoring year. The inspection rate is below the target (52 inspections).
- For the South Dam, 29 weekly visual inspections by site staff conducted during this monitoring year. The inspection rate is below the target (52 inspections).
- The number of visual inspections has improved in 2021, however additional inspections are required to follow the specified frequency.
- Increase the completion of weekly visual inspections at the South Dam in accordance with the required weekly frequency.

## 57.4 DETAILED REVIEW COMMENT

Visual dam inspections at regular frequency are critical to ensure dam safety by observing the visual performance of the dams. SRK has noted that AE needs to improve the number of visual inspections to follow the recommended frequency. Monitoring of their inspection progress would prevent another potential occurrence of missed inspections not found out until the following year.

## 57.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- What staffing plans and associated contingency plans are in place to ensure AE meets the recommended inspection frequency, especially during the care and maintenance stage?
- How will AE document and monitor that the recommended inspection frequency is being achieved? How will this be communicated to the EOR?

## 57.6 RESPONSE TO KIA-NWB-4-AGI

Agnico has ensured adequate staffing to meet the recommended inspection frequency, even through the care and maintenance period.

Agnico will track inspection frequencies throughout the year, and investigate the cause of any missed inspections. Some inspections have been missed due to weather, and were not documented. Improvements have been made to ensure that all inspections are documented, including inspections that could not be completed due inclement weather. The inspection documentation and inspection frequency

will be reviewed by the SRK as part of the annual geotechnical inspection, the EOR reviews this investigation report.

# 58. KIA-NWB-5-AGI

## 58.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 58.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Section 4.2.2.

## 58.3 SUMMARY

The North 2 thermosyphon is not working correctly.

- It does not appear possible to repair this thermosyphon.
- SRK notes there are no significant concerns arising from the loss of the North 2 thermosyphon.

## 58.4 DETAILED REVIEW COMMENT

Thermosyphons are a critical element in the design of the North Dam and the loss of any such element could have impacts on the performance of the dam. Although SRK has stated "no significant concerns," relevant stakeholders should be informed of the rationale and criteria to support that conclusion.

## 58.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- What specific rationale and associated criteria have SRK used to arrive at the conclusion that no significant concerns exist with the loss of that element?
- What would happen if another thermosyphon became non-functional?
- What specific monitoring requirements are in-place to assess this specific concern?
- What contingency plans are in-place should concerns be noted regarding the dam's performance?

## 58.6 RESPONSE TO KIA-NWB-5-AGI

The North Dam monitoring system includes ground temperature cables to monitored thermal performance of the structure and foundation. Contact temperature measurement are also made on the thermosyphons condenser pipes to provide additional confirmation of thermosyphon function. Both sets of measurements are used to evaluate thermosyphon function.

SRK also completed ground thermal modeling of the North Dam which was based on operation of the dam at FSL over the entire design life without function of the North 2 thermosyphon. The modeling results indicated that the thermal design criteria were met over the design life of the dam. Ground thermal monitoring data collected at the dam also indicates that the frozen core and foundation are within the expected thermal conditions when compared with the thermal design criteria and model estimates.

If an additional thermosyphon unit was to become non-function, the annual extraction of heat from the foundation and core would be less. The thermal mass established by the frozen core and foundation and the additional cooling capacity of functioning thermosyphons would allow time for mitigation to take place. Under this scenario, the TIA water level would be temporarily reduced to the extent practical to decrease thermal loading on the structure and the actual impacts would be assessed, including the need for mitigation.

Mitigation measure may include, but are not limited to:

- Surface chillers installed on the radiators during the thawing season to allow for year-round heat extraction from the remaining functioning thermosyphons.
- Active freezing within functioning thermosyphon evaporator pipes using a closed loop of recirculated chilled brine, assuming no damage to existing evaporator pipes exists.
- Vertical installation of thermosyphons along the dam alignment.
- Upstream or downstream fill structures to mitigate thermal loading from the impounded water.

# 59. KIA-NWB-6-AGI

## 59.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 59.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Sections 4.2.4, 4.2.5 and 4.2.6.

## 59.3 SUMMARY

- Table 15 provides a summary of measured (actual) inclinometer measurements in the North Dam. No comments provided regarding comparison of these values versus design values.
- Table 16 provides a summary of survey monument measurements since 2012. No comments provided regarding comparison of these values versus design values.
- Table 17 provides predicted creep deformations, as well as allowable design values.
- Figure 15 compares predicted versus measured vertical displacements along the dam crest at Station 1+20. No discussion on horizontal displacements is provided.

## 59.4 DETAILED REVIEW COMMENT

Actual dam deformations are measured (as in Tables 15 and 16), but typical practice would be to compare actual versus predicted (or design) values for context, as SRK did for the creep measurements in Section 4.2.6. Vertical displacements are important for water level and liner considerations while horizontal displacements are critical for cracking and stability concerns.

## 59.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- Can SRK confirm that the measured deformation values in Tables 15 and 16 meet design values/expected performance?
- Can SRK confirm that horizontal deformations for creep (Table 17) meet design values/expected performance?
- Can measured deformations be compared to design values for both vertical and horizontal components?
- Can SRK confirm that design deformation values have been considered within TARP's developed for the dam?

## 59.6 RESPONSE TO KIA-NWB-6-AGI

Table 15 and 16 of the 2021 TIA AGI present the measured deformation from the inclinometers and survey monitoring points respectively. Table 17 of the 2021 TIA AGI provides predicted maximum horizontal and vertical displacements. None of these tables provide a comparison of measured and predicted deformation as the predicted deformation at each location varies and would require a substantially onerous modelling effort to determine, with results which would have been overly conservative due to the combined

uncertainties involved. In addition, creep deformation is only one component of the potential deformation mechanisms, other components include dam fill settlement, thaw consolidation etc.

For simple comparison,

In Table 15, the inclinometers indicate a maximum horizontal displacement of 0.033 meters within the dam and 0.016 m within the foundation. These inclinometers are downstream of the dam core, but can be conservatively compared to the predicted maximum horizontal core deformation of 0.4 m (10 years post construction)

In Table 16, the Deep Settlement Points and Crest Settlement Points (which monitor deformation of the core and foundation) can be compared to the maximum predicted horizontal and vertical displacements presented in Table 17, which indicate displacement components are all substantially less than the predicted values (10 years post construction) of 0.4 m horizontal (measured maximum 0.11 m) and 0.6 m vertical (measured maximum -0.09 m). The Surficial Settlement Points are used to monitor overall deformation of the downstream dam shell which the conservative creep modelling predicts substantially more deformation for (Horizontal and vertical deformation of up to 2.5 m), without impacting the function of the dam. The maximum measured deformation on the downstream shell is observed at the thin portion of the shallow rock fill slope (6H:1V) where the active layer of the tundra is expected to be seasonally thawed (leading to minor thaw consolidation at the toe).

While the measured displacements are substantially less than the predicted displacements, the predicted displacements provide a reasonable threshold for comparison and do inform the TARPs. The measured displacements also continue to be incorporated into reviews of the Full Supply Level and freeboard.

# 60. KIA-NWB-7-AGI

## 60.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 60.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Section 4.3.1.

## 60.3 SUMMARY

- Seven ground temperature cables (GTC's) are inactive and 2 GTC's are partially operating out of 27 GTC's originally installed in the South Dam.
- Thermal performance conclusions (actual versus design criteria) are not provided for three areas of the dam identified in Table 19 because GTC's are missing or offline.
- The thermal design criteria along the base of and in the foundation of the key trench is being met in all locations where data is available.
- Four replacement GTCs are suggested to be installed at this time (two upstream and two downstream).

## 60.4 DETAILED REVIEW COMMENT

In situ temperature data is critical to assess the performance of a frozen foundation dam design. By BGC's assessment, the number of specific GTC temperature beads has reduced from 262 to 177, a 32% reduction in the of specific temperature measurement locations. SRK is not able to specifically comment if three areas of the South Dam are meeting design criteria. SRK has recommended that 4 additional GTC's be installed in this dam.

## 60.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- Given that temperature data is missing for three areas of the South Dam (Table 19), what rational is provided that the dam meets its design criteria?
- If no rationale can be provided, what specific risks may exist and what mitigations plans are in place if the risks are realized?
- Will the four recommended GTC's (with associated number of beads) be able to assess the geothermal conditions within the South Dam at a similar level that the original GTC's were intended to? Will SRK be able to provide conclusions for all sections of the dam shown in Table 19?
- What installation deadline has been recommended by SRK and is AE following this schedule?

## 60.6 RESPONSE TO KIA-NWB-7-AGI

The South Dam thermal monitoring system was designed to evaluate thermal performance at six representative locations of the dam alignment stations, with the understanding that it is not practical to instrument every location. Instead, the thermal behavior of the dam at representative locations has been

monitored and reviewed annually. The six monitoring sections cover a range of foundation conditions for the approximate minimum and maximum sections of the dam within and outside of the area of active tailings deposition and under varying foundation conditions.

SRK has recommended replacement of ground temperature cables to provide data in similar locations where instrument failure has occurred. However, replacement of cables within or beneath the key trench and along the upstream GCL will not be possible without compromising integrity of the geosynthetic clay liner. A replacement cable in the key trench foundation at 3+65 will not be possible. In-lieu of this cable, a greater reliance will be placed on the foundation cables at the upstream and downstream toe and the horizontal cable that extends at the upstream liner tie-in (referred to as SD-HTS-B1-KT).

Replacement cables have been planned for the upstream (Station 2+40) and downstream (Station 3+65 and 2+40) foundation in locations that are immediately adjacent to the previous instruments. An additional cable has been planned for installation through the tailings beach. A similar level of monitoring will be re-established for these two sections of the dam. A replacement cable is not planned for the upstream location at 1+55, as this location is outside of the extent of Phase 1 tailings deposition.

Agnico is committed to installation of the specified replacement ground temperature cables in December 2022. Routine site inspection of the dam and review of ground temperature measurements are completed to evaluate thermal performance of the dam. Annual geotechnical inspection of the dam is scheduled for August 2022.

# 61. KIA-NWB-8-AGI

## 61.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 61.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Sections 4.3.2.

## 61.3 SUMMARY

- Table 20 provides a summary of survey monument measurements since 2019 for the South Dam. No comments provided regarding comparison of these values versus design values.
- The overall vertical and horizontal displacement since August 2019 is limited in all survey locations.
- At this point, the limited displacements observed are not of concern.

## 61.4 DETAILED REVIEW COMMENT

Similar context as for Issue 7 for the North Dam.

## 61.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- Can SRK confirm that the measured deformation values in Table 20 meet design values/performance expectations?
- Can the rationale to support the "not of concern" conclusion be provided?
- Can SRK confirm that design deformation values have been considered within TARP's developed for the dam?

## 61.6 RESPONSE TO KIA-NWB-8-AGI

Similar to the response in KIA-NWB-6, Table 20 of the 2021 TIA AGI provides a summary of the horizontal and vertical displacements at the South Dam which can all be summarized as small displacements with a maximum horizontal and vertical magnitude of 0.05 m and -0.06 m, respectively.

Table 20 does not provide a comparison of measured and predicted deformation as the predicted deformation at each location varies and would require a substantially onerous modelling effort to determine, with results which would have been overly conservative due to the temporal nature and combined uncertainties involved and the planned construction of the Phase 2 South Dam raise. In addition, creep deformation is only one component of the potential deformation mechanisms, other components include dam fill settlement, thaw consolidation etc.

For simple comparison, the measured maximum horizontal and vertical magnitude of 0.05 m and -0.06 m can be compared to the predicted displacements of the crest and key trench foundation creep deformation. The predicted vertical component near the crest is approximately -0.5 m, 5 years following construction,

and -1.0 to -1.5 m, 10 years following construction (Phase 1 dam only). The predicted horizontal component is less than 0.5 m near the crest (10 years after construction), increasing in magnitude towards the toe to a maximum of 3.0 m at the toe.

Based on the updated creep deformation modelling completed as part of the 2019 South Dam Design report, predicted horizontal and vertical creep deformations at the Phase 1 dam crest (Point 6) are approximately 0.15 m and 0.18 m respectively, 4 years after construction.

All measured displacements are substantially less than the predicted displacements and the dam is performing as expected and as such the deformation observed is not of concern.

The predicted displacements provide a reasonable threshold for comparison and do inform the TARPs. The measured displacements also continue to be incorporated into reviews of the freeboard of the South Dam.

# 62. KIA-NWB-9-AGI

## 62.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 62.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Section 4.3.5.

## 62.3 SUMMARY

- Permafrost degradation (thaw depressions and ponding) has been observed at the toe of the South Dam.
- Mitigation of the permafrost degradation will be required, and mitigation is proposed as part of the Phase 2 South Dam raise.
- A thermal toe berm should be implemented.

## 62.4 DETAILED REVIEW COMMENT

Permafrost degradation is occurring and SRK has recommended that mitigation measures be implemented. The site is now in care and maintenance with likely a reduce staffing capacity.

## 62.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- What time frame has SRK recommended to implement the noted thermal toe berm?
- Has AE agreed to the time frame with suitable staffing, equipment and resources to implement the measure?

## 62.6 RESPONSE TO KIA-NWB-9-AGI

Agnico has committed to constructing the thermal toe berm in Q1 of 2023, as recommended.

# 63. KIA-NWB-10-AGI

## 63.1 SUBJECT

2021 Annual Geotechnical Inspection – Doris Tailings Impoundment Area, Hope Bay Mine, Nunavut, March 2022 and associated Table 1 Tailings Impoundment Area Annual Geotechnical Inspection Report, Recommendations and Agnico Response

## 63.2 REFERENCES

2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Section 4.7.

## 63.3 SUMMARY

- Settlement and tension cracking have been observed since construction at the TIA Reclaim Jetty Pad.
- Repairs were made to the Reclaim Jetty pad to provide shallower side slopes to reduce the likelihood of a failure.
- There is still one area of the jetty that is over-steepened.
- Survey monitoring does not indicate any displacement concerns after repairs were completed.

## 63.4 DETAILED REVIEW COMMENT

The statement of no concerns following repairs requires some clarification.

## 63.5 RECOMMENDATION/REQUEST

The following questions should be addressed;

- Are there any remaining concerns with the section of the jetty that remains over-steepened?
- Does the over-steepened section require any mitigative measures?

## 63.6 RESPONSE TO KIA-NWB-10-AGI

The TIA Reclaim pumps have been relocated from a jetty to a temporary location at the shore of the TIA, about the elevation of the full-service level, as such the over-steepened jetty is no longer a concern. The reclaim pumps will be permanently relocated to a bedrock outcrop overlooking the TIA in Fall 2022.

# 64. KIA-NWB-11-AGI

## 64.1 SUBJECT

Doris and Madrid - 2021 Annual Geotechnical Inspection – Pad T Doris Waste Rock Pile

## 64.2 REFERENCES

Doris and Madrid - 2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Attachment 1 Summary of Observations and Recommendations Doris.

## 64.3 SUMMARY

- The slopes of the waste rock pile stored on Pad T were observed to have been reduced compared to previous inspections but remain over steepened.
- SRK has recommended that material being excavated from the pad for mine backfill purposes be preferentially sourced from over steepened area of the pad and that the pad be re-surveyed for the purposes of an updated stability assessment.

## 64.4 DETAILED REVIEW COMMENT

Given the current C&M status of the mine it is uncertain when underground placement of waste rock will resume and if the waste rock pile on Pad T will remain over-steepened as a result.

## 64.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- Has the pad been re-surveyed and have the results been used to update the stability assessment of the over-steepened section of the waste rock pile?
- Will placement of waste rock as backfill in the underground mine continue during the C&M period?
- If backfilling activities are not resumed during C&M period, will AE re-slope the over-steepened areas of the waste rock pile to comply with the design criteria?

## 64.6 RESPONSE TO KIA-NWB-11-AGI

In May 2022, a waste rock pile sequencing plan was developed by Agnico to address stability concerns regarding the over-steepened sections of the waste rock pile. Details of the plan and design files were shared with SRK for the purposes of running stability checks to assess the effectiveness of the plan. Stability checks of the proposed plan showed acceptable results for the over steepened section of the pile.

The sequencing plan includes the construction of a buttress at the toe of the over-steepened section, as well as-resloping and benching of the over-steepened section. Execution of the plan will be completed in fall 2022, at which time the pile-will be re-surveyed to confirm that the pile is no longer over-steepened.

Placement of waste rock as mine backfill will not take place during C&M. However, a small quantity of waste rock is being used as a construction material for projects within the TIA, and is being preferentially sourced from the over-steepened sections of the waste rock pile.

# 65. KIA-NWB-12-AGI

## 65.1 SUBJECT

Doris and Madrid - 2021 Annual Geotechnical Inspection – Madrid North Contact Water Pond

## 65.2 REFERENCES

Doris and Madrid - 2021 Annual Geotechnical Inspection (SRK Consulting Canada Inc.), Attachment 2 Summary of Observations and Recommendations Madrid.

## 65.3 SUMMARY

- Survey monitoring of the berm has identified areas of elevated deformations corresponding to where the foundation materials consist of overburden permafrost. The deformations are currently within the design criteria.
- SRK has recommended continued monitoring

## 65.4 DETAILED REVIEW COMMENT

If the deformations are related to warming of permafrost within the foundation materials it could lead to a negative impact on the performance of the facility.

## 65.5 RECOMMENDATION/REQUEST

The following comments and questions are noted and should be addressed;

- What is the root cause of the observed deformation?
- What contingency measures or actions could be undertaken if the deformations exceed the design criteria.

## 65.6 RESPONSE TO KIA-NWB-12-AGI

Elevated displacements have been observed at CWP-SSP-07 and CWP-SSP-13, and to a lesser degree CWP-SSP-03 these points are surficial survey points (boulders with rock bolts installed) and are located near the downstream toe of the structure, where the rock fill is the thinnest, and above zones of overburden permafrost. These conditions suggest expected active layer thaw has lead to consolidation or ‘tipping’ of the boulder are likely the root cause of the displacement.

In June 2021, survey data indicated a 0.1 m horizontal displacement of CWP-SMP-01, while the nearby CWP-SMP-02 has not moved significantly in the same time period. The area was inspected for signs of displacement, but none were observed. Since then, the location has remained constant (within survey accuracy range). The root cause of this displacement is not known, however one potential cause of the displacement may have been disturbance by equipment on site.

If undue deformation is observed, the contingency measured would include draining of the pond, and placement of a small rock buttress along the downstream toe, however the observations to date do not indicate this is necessary.