APPENDIX E.8.2

QIA INSPECTION REPORTS AND BAFFINLAND RESPONSE

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Qikiqtani Inuit Association

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Christopher Murray
Environmental Regulatory and Compliance Manager
Sustainable Development
Baffinland Iron Mines Corporation
Suite 300 - 2275 Upper Middle Road East
Oakville, ON L6H 0C3

June 30, 2021

2021 July Environmental Inspection – Information Request

Mr. Murray,

This Information Request is being issued by the Qikiqtani Inuit Association (QIA) to Baffinland Iron Mines Corporation (Baffinland) with respect to the Environmental Inspection as per the QIA-Baffinland Commercial Lease No.: Q13C301[1]. Information Requests are provided in **Table 1** below. A response is requested on or before July 8, 2021.

Should you have any questions please feel free to contact me.

Sincerely,

Hugh Karpik
Environmental Specialist

[1] QIA and Baffinland (2013). Commercial Lease No.: Q13C301. September 6, 2013.

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Table 1: Information Request – July 2021 Environmental Inspection

Ref#	Information Requests
1.	QIA requests an up-to-date water balance for the WRF and MS-08, including the most recent version of the relevant management plan(s).
2.	QIA requests a recent high resolution site map of the WRF including the area of the emergency discharge.
3.	QIA requests photos taken prior to, during, and following the emergency discharge.
4.	QIA requests a timeline of events leading up to the emergency discharge in relation to water management of the Waste Rock Facility and MS-08.

July 5, 2021

Chris Spencer, Regulatory Manager
Qikiqtani Inuit Association
P.O. Box 1340
Iqaluit, NU X0A 0H0

Re: Baffinland Response to QIA Notice of Unscheduled Inspection

In follow up to the Qikiqtani Inuit Association (QIA) Notice of Unscheduled Inspection[1] and the teleconference held on June 29, 2021, Baffinland Iron Mines (Baffinland) is providing confirmation to QIA that the Inspection as requested under Schedule E of Commercial Lease Q13C301 cannot proceed with Nunavut-based staff at this time due to health and safety considerations.

Baffinland is still under an 'outbreak' order designated by Nunavut Public Health as well as the Public Health Agency of Canada. It is anticipated that this may be lifted on or after July 12, 2021. Until such time, stringent measures remain in place at the site for all employees and contractors to maintain the health and safety of all personnel at the Mary River Project and Nunavummiut.

Baffinland must maintain zero contact between site personnel and all Nunavummiut as per Nunavut Public Health directives. Travel to and from the Mary River Project from any point of pick up within Nunavut is prohibited at this time to adhere to this requirement.

In regards to QIA's letter "Notice of Unscheduled Environmental Inspection" which states "QIA is of the opinion that the emergency discharge from the Waste Rock Facility Pond (MS-08) is a serious occurrence that could result in Environmental Damages", Baffinland provides clarification that no non-compliant discharges from the Waste Rock Facility Pond final discharge point (FDP) MS-08 to the receiving environment have occurred.

Baffinland continues to discharge effluent from FDP MS-08 and monitor the effluent as per Baffinland's Type A Water Licence No: 2AM-MRY1325 – Amendment No. 1 and the Metal and Diamond Mining Effluent Regulations (MDMER). Baffinland maintains the position that no Environmental Damage as defined in the Commercial Lease No. Q13C301 has occurred, or has the potential to occur, as a result of this controlled discharge.

Baffinland recognizes that the scheduled Environmental Inspection in May 2021 was postponed due to the outbreak at Site, and that QIA wishes to reschedule this as soon as possible. In an effort to establish a path forward and recognizing the rights and authority of QIA under the Commercial Lease, Baffinland will work with QIA to facilitate an Environmental Inspection by southern-based QIA staff or contractors until such time that Nunavut-based staff may return to the Mine Site.

[1] QIA (2021) Notice of Unscheduled Inspection. Letter dated June 24, 2021

Should you have any questions or concerns, please do not hesitate to contact Christopher Murray or Connor Devereaux at your convenience.

Regards,

Timothy Sewell
Senior Director – Health, Safety, Environment, Security and Training

Cc: Megan Lord-Hoyle, Lou Kamermans, Christopher Murray, Shawn Stevens, Connor Devereaux Kendra Button (Baffinland)

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Chris Murray
Environmental and Regulatory Compliance Manager
2275 Upper Middle Road East
Suite 300, Oakville, Ontario, Canada
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September 14, 2021

Re: Baffinland Iron Mines Corporation's Mary River Project – Qikiqtani Inuit Association July 2021 Emergency Controlled Discharge Inspection and General Site Inspection Findings and Recommendations

Christopher,

Consistent with requirements under Schedule E, Item 12 of the Commercial Lease No.: Q13C301 (CPL), issued to Baffinland Iron Mines Corporation (Baffinland) by the Qikiqtani Inuit Association (QIA), the QIA conducted a Site Inspection (Inspection) of the Mary River Mine (Project) in July 2021. The inspection was "unscheduled" and conducted with reduced notice pursuant to Schedule E, Condition 6, of the Commercial Lease in response to the "emergency controlled discharge" from the Mary River Mine Site's Waste Rock Facility Sediment Pond (MS-08), through the Final Discharge Point to the tundra.

Chris Spencer and Hugh J. Karpik of the QIA conducted the Inspection on QIA's behalf with remote technical support provided by Richard Nesbitt of Hutchinson Environmental Sciences Ltd. An overview of the inspectors' findings and recommendations is provided below. Photographs associated with the findings and recommendations are provided in Appendix A. An evaluation of the preceding events as summarized by Baffinland resulting in the Emergency Controlled Discharge, a summary of our investigation specific to the event and associated recommendations, is provided in Appendix B.

Sincerely,

Chris Spencer
Regulatory Manager

Attachments:
Table 1: Summary of recommended actions from the July 2021 General Site Inspection.

Table 1: Summary of recommended actions from the July 2021 General Site Inspection.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
1.	KM106 Stockpile (Photo 1)	Potential contact water flowing towards Mary River without apparent interception; it is unclear whether the water reached Mary River or its tributaries. Reddish grey colour suggests high total suspended solids (TSS) and iron.	Baffinland to a) confirm with water chemistry whether observed flow is considered contact or noncontact water, b) confirm whether the observed water reached Mary River or its tributaries, and c) implement mitigations to prevent flow of uncontrolled contact water into receiving environment (if it is considered contact water). Written and photographic documentation to be provided to QIA as evidence of implemented mitigation(s).	October 30, 2021.
2.	Historical Waste Rock Facility (WRF) Final Discharge Point (FDP) (Photo 2)	Tundra and underlying permafrost appear scoured/degraded with settled materials, iron precipitate and metals staining as a result of discharges from historical WRF FDP.	Baffinland to scarify or regrade historical FDP flow path by closure at the latest, or as part of ongoing progressive reclamation. This closure activity should be incorporated into the next iteration of the interim closure and reclamation plan (ICRP) as well as Waste Rock Management Plan (WRMP).	As part of ongoing progressive reclamation or at closure. Edits to the ICRP and WRMP to be included as part of the next annual report (March 30, 2022).
3.	Existing WRF FDP (Photo 3)	Apparent formation of a preferential flow path on the tundra as far as approximately 140 m downgradient of the existing WRF FDP. This is not an immediate concern as the discharges did not reach fish bearing habitat but does suggest	Baffinland to readjust the FDP such that it does not continue to degrade the tundra in the receiving environment, and submit a plan to the QIA, NIRB and NWB detailing how the impacts from ongoing discharges to the tundra will be reduced in the future Baffinland	Readjust FDP and submit FDP management plan to QIA prior to Freshet 2022. Edits to the ICRP and FDP

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#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
		discharges are impacting the tundra.	to further commit to scarifying or regrading the WRF FDP flow path at closure. This closure activity should be incorporated into the next iteration of the ICRP as well as the WRMP. If the WRF FDP is moved ahead of closure, the impacted area should be scarified as part of progressive reclamation.	management plan to be included as part of the next annual report (March 30, 2022).
4.	General	Debris and damage observed throughout the site. Some appears to be the result of wind and snow, but other debris appears to be the result poor site hygiene. Observations include: 1. Visible damage to the WRF Water Treatment Facility cover (Photo 4). 2. Open drum filled with oily liquid without secondary containment (Photo 6) 3. West dyno snow stockpile with visible debris (Photo 9). 4. Degrading insulation along old pipeline to Camp Lake Jetty (Photo 12). 5. Deteriorating Weatherhaven facilities (Photo 13). 6. Duststop ponding in heavy equipment tracks near KM97 Borrow Pit (Photo 15). 7. Metal debris pile near MP-06 (Photo 20). 8. Potential oil spill at northwest corner of power	Baffinland to complete site wide housekeeping and tidying. Baffinland to implement the following corrective actions: 1. Baffinland to repair the WRF cover. 2. Dispose of oily liquid and confirm whether any spilled onto the ground. If a spill occurred, Baffinland to prepare and submit a spill report to the NU/NWT Spill Report Line. 3. Clean up the noted debris. 4. Remove and dispose of old pipeline if it is no longer in use, and remove all detrital insulation from the tundra. 5. Repair Weatherhaven facilities or decommission them. 6. Impacted area to be excavated and disposed of in landfarm. 7. Clean up noted debris. 8. Soil to be tested to confirm whether hydrocarbons are present. If present, soil is to	1. Prior to freeze up, 2021. 2. October 30, 2021. 3. October 30, 2021. 4. October 30, 2021. 5. March 30, 2021. 6. October 30, 2021. 7. October 30, 2021.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
		generation station under construction (Photo 23). 9. Soda Ash on ground near west side of 380-person camp (Photo 25). 10. Potential spills from parked vehicles at 380-person camp parking lot (Photo 26). 11. Residual drilling lubricant leading down the slope of Deposit 3 and old drilling platform (Photo 29).	be excavated and disposed of in landfarm. 9. Soda ash to be cleaned and a spill reported to the NU/NWT Spill Report Line. 10. Soil to be tested to confirm whether hydrocarbons are present. If present, soil is to be excavated and disposed of in landfarm. 11. Soil to be tested to confirm whether hydrocarbons are present. If present, soil is to be excavated and disposed of in landfarm. Baffinland to provide written and photographic documentation of soil test results to QIA and any follow up documentation as appropriate.	
5.	WRF Sedimentation Pond (Photo 5)	Visible edge of WRF Sedimentation Pond liner at inflow from collection ditch. It is unclear if the sedimentation pond is adequately keyed into the ground such that collected contact water does not flow beneath the liner circumventing collection and treatment.	Baffinland to confirm what portions of the Sedimentation Pond liner are adequately keyed into the ground such that contact water in the collection ditches do not flow beneath it, and rekey liner into the ground where required with photographic documentation of the repairs. At a minimum, the exposed portions of the liner should occur below the apex of the slope draining into the pond.	October 30, 2021.
6.	Crusher Facility (Photo 7)	Ponding water beneath crusher facility suggests vibrations from the operations may be melting the permafrost.	Baffinland to confirm the source of the ponding water beneath the crusher facility. Baffinland to further confirm whether	Investigation memorandum to be included with the 2021

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#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
			crusher pad is performing as intended to mitigate impacts to underlying permafrost. Secondary containment or diversion of standing water to appropriate containment facilities may be required around the crusher to mitigate ongoing degradation of local permafrost. Baffinland to investigate the water source and provide a summary of the findings and potential follow up activities in a memo appended to the Annual Report.	Annual Report (March 31, 2022). Site improvements as necessary to be completed prior to Freshet 2022.
7.	Historical Tank Farm TK-001 to TK-004 (Photo 8)	Ponded water observed in secondary containment of historical tank farm with oily residue at surface.	Baffinland to draw down ponded water prior to freeze up. Photographic evidence to be provided demonstrating that dewatering has been completed. Baffinland to further confirm sizing of secondary containment relatively to the historical tank farm, and confirm which management plan outlines the requirement that ponding water in secondary containment infrastructure is drawn down in a timely manner.	Prior to freeze up in 2021.
8.	East Dyno Snow Stockpile (Photo 10)	Ponded water observed with colouration indicating elevated iron and TSS.	Baffinland to clarify East Dyno Snow Stockpile is intended for contact or non-contact snow. If the water is intended as noncontact water, Baffinland to collect and submit water chemistry. Ponding water should be drawn down and	October 30, 2021.

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#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
			disposed of as contact or non-contact water depending on results of water chemistry. Snow stockpile may require secondary containment if it was intended as contact snow stockpile or is determined as one based on water chemistry results.	
9.	Landfill (Photo 11)	Large area with ponding water towards Camp Lake. Edge of ponding water appears to flow past barriers towards Sheardown Lake.	Baffinland to confirm whether water has flowed from the landfill into Sheardown Lake and provide water chemistry for landfill ponding water to confirm whether potential deleterious effects may have occurred. Baffinland to report the outflow as a spill to the NU/NWT Spill Report Line if an uncontrolled / unintended discharge to Sheardown Lake occurred. Baffinland to further improve containment of ponding water proximal to the landfill such that only controlled discharges occur. Photographic evidence and written summary of mitigation measures taken to be submitted to QIA.	Prior to freshet 2022.
10.	PWSP-03 (Photo 14)	Edge of liner visible above the water in center bottom of the pond suggests a potential gap in the liner where contact water may escape the containment. The bubble in the liner increases the likelihood that portion of the liner may become damaged,	Baffinland to draw down the PWSP-03 and repair the liner. Baffinland to submit photographic evidence of remedial actions taken to QIA.	October 30, 2021.

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#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
		allowing contact water to escape the containment.		
11.	Tote road near KM97 bridge (Photo 16)	Erosion visible along tote road near KM97 bridge. Baffinland appears to have tried to mitigate the impacts of the erosion to the nearby watercourse by installing silt fences; the silt fences have been overcome by accumulated sediment and are no longer functional.	Baffinland to replace the silt fencing to mitigate erosion of the tote road near the KM97 bridge. The silt fence should be extended to the toe of tote road bank, and at least 10 m away from the tote road, with edges of silt fence installed in an arc facing upstream to capture all runoff. Baffinland to provide photographic evidence of corrective actions to QIA and establish a weekly monitoring schedule for Erosion and Sediment Control fencing during runoff periods.	Prior to Freshet 2022. Erosion and Sediment Control monitoring reports should be included in Annual Reports going forward.
12.	West bank foundation of KM97 bridge (Photo 17)	Three stacked concrete blocks do not appear to have any backfill supporting them. The misalignment suggests longitudinal forces on the bridge are causing the blocks to shift over time increasing the longer-term potential for stability issues with this portion of the infrastructure.	While we understand Baffinland has employed an engineer to inspect the bridge and produce a summary report of their findings, we suggest a periodic inspection schedule to assess any developing stability issues. We recommend Baffinland employ an engineer to inspect the bridge and produce a new summary report every 2 years. The report is to include recommended mitigations and a timeline in which they must be implemented to prevent structural issues with the bridge.	New inspection to occur as soon as feasible if no inspection has occurred within 2 years, and every 2 years thereafter. Reports to be submitted as part of the Annual Reports following each inspection.
13.	KM86 Snow stockpile (Photo 18)	Snow stockpile at KM86 does not appear to have delineation markers.	Add delineators to snow stockpile ahead. Baffinland to	October 30, 2021.

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#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
			provide photographic evidence of completion.	
14.	KM80 Telecom Seacan (Photo 19)	Apparent smoke damage on telecommunications seacan from exhaust.	Baffinland to evaluate the extent of the damage to the seacan, implement repairs if needed and readjust exhaust manifold to reduce damage and fire risk to infrastructure. Baffinland to submit photographic evidence of remedial actions taken and mitigations implemented.	October 30, 2021.
15.	Q1 ditch leading to LP2 Snow Stockpile area (Photo 21)	Qikiqtaaluk Sana demobilizing equipment for transfer to QMR2. Baffinland indicated during inspection that no further quarry activities are planned for 2021. Debris was present in general area and on connecting laydown. A liner keyed into the ditch is visible in the bottom left of photo.	Baffinland or Qikiqtaaluk Sana to remove keyed liner and debris as part of demobilization activities and progressive reclamation if no further quarry activities are planned for the area. Baffinland to summarize progress of site demobilization and progressive reclamation in the 2021 Annual Report.	Demobilization progress summary to be included with 2021 Annual Report (March 31, 2022).
16.	Drainage downgradient of ore stockpile (Photo 22).	Iron staining visible in drainage pathway of recent (Spring 2021) berm failure and spill of contact water during transfer from MP-03 to MP-05. Pebble sized rocks visible in drainage pathway indicate ephemeral flows with sufficient energy to mobilize loose material. Fish bearing habitat visible in the background.	Baffinland to collect soil samples from the spillway and submit results to QIA for review. If elevated concentrations of metals are present in the upper 5 cm of soil, we recommend Baffinland a) install a silt fence at the end of the flow path to limit mobilization of materials as a result of precipitation and melting snow, and b) excavate the surface 10 cm of impacted soils prior to freshet 2022 to mitigate potential impacts to the receiving environment.	Soil sampling results to be submitted to QIA by October 30, 2021. Silt fence to be installed by and excavations completed, if necessary, prior to Freshet 2022.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline
17.	Fuel drums out of secondary containment	Multiple fuel drums were observed out of secondary containment: 1. LP3 helipad (Photo 24) 2. Qikiqtaaluk Sana laydown at KM5 (Photo 27A) 3. Mine site helipad (Photo 27B)	Baffinland to move all fuel drums such to within secondary containment structures and provide photographic evidence that all drums have been moved. All future drums to remain within secondary containment structures when not in immediate use.	October 30, 2021.
18.	Uncapped drill hole at Deposit 3 (Photo 28)	Uncapped drill hole visible at Deposit 3. It is unclear if the drill hole has been plugged.	Baffinland to confirm whether the drill hole requires plugging with bentonite or equivalent compound. If required, Baffinland to plug and cap the drill hole, and provide photographic evidence of completion to QIA as this relates to the pertinent Water Licence.	Capping and, if needed, plugging of drill hole to be completed by October 30, 2021.
19.	Muster station building inundated by contact water (Photo 30)	Muster station building inundated by contact water approximately 150 mm (6 in) deep. Live wires running through contact water.	Baffinland to a) dewater area around muster station, b) provide details of plan to either remove live wires from the area or prevent future build ups of water in the area, c) implement the plan and d) submit both the plan and photographic evidence it has been implemented to QIA.	October 30, 2021.
20.	Site of KM105 proposed sedimentation pond (Photo 31)	Pooling water without an outlet and no dewatering infrastructure visible.	Baffinland to describe how water in the sedimentation pond will be managed and provide a timeline when the proposed sedimentation pond will be constructed.	September 30, 2021.

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Appendix A

Photograph IDs
Photo 1. M106 Sedimentation Pond. Facing down west berm towards apparent contact water draining to Mary River.
Photo 2. Historical Waste Rock Facility Final Discharge Point. Orange discoloration apparent on terrain down gradient from likely pipe placement.
Photo 3. Formation of preferential flow path, degrading permafrost and iron staining downgradient of Waste Rock Facility Final Discharge Point approximately A) 30 m and B) 140 m down gradient.
Photo 4. Waste Rock Facility Water Treatment Plant damaged tarp ceiling.
Photo 5. Southwest corner of Waste Rock Facility Sedimentation Pond Liner at interface with water conveyance infrastructure.
Photo 6. Open drum filled with oily liquid at precarious angle without secondary containment.
Photo 7. Ponding water beneath crusher facility.
Photo 8. Original mine site tank farm. TK-001 to TK-004. Orange water color with oily residue.
Photo 9. West Dyno Snow Stockpile with visible debris.
Photo 10. East Dyno Snow Stockpile. Large body of pooling water with orange color.
Photo 11. Landfill ponding water. Edge of ponding water appears to flow past barriers towards Sheardown Lake.
Photo 12. Old pipeline to Camp Lake Jetty. Insulation deteriorating and blowing on tundra.
Photo 13. Deteriorating Weatherhaven facilities. Exposed insulation damaged by wind.
Photo 14. PWSP-03. Edge of liner visible above water in centre of frame; liner bubble visible in pond in centre back of pond.
Photo 15. KM97 Borrow Pit DustStop ponding in heavy equipment tracks near mixing station.
Photo 16. Erosion of tote road near KM97 bridge.
Photo 17. West bank foundation of KM97 bridge. Concrete blocks appear misaligned.
Photo 18. KM86 Snow stockpile without delineation markers.
Photo 19. Smoke damage from exhaust of telecom seacan at KM80.
Photo 20. Metal debris pile near MP-06
Photo 21. Q1 ditch leading to LP2 Snow Stockpile area.
Photo 22. Discoloration of tundra along natural drainage down gradient of ore stockpile berm failure spill (Spring 2021)
Photo 23. Potential oil spill at northwest corner of power generation station under construction.
Photo 24. Fuel drums out of containment at LP3 helipad.
Photo 25. Soda Ash on ground near west side of 380-person camp.
Photo 26. Potential spills from parked vehicles at 380-person camp parking lot.

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Photograph IDs
Photo 27. Fuel drums stored outside of containment at A) Qikiqtaaluk Sana laydown (KM 5) and B) Fuel drums stored outside of containment at the mine site helipad. Photo 28. Uncapped drill hole on slope of Deposit 3 Photo 29. Residual drilling lubricant leading down the slope of Deposit 3 and old drilling platform. Photo 30. Muster station building inundated by contact water. Approximately 6in deep. Live wires running through contact water. Photo 31. Site of the KM105 proposed sedimentation pond. Currently large quantity of pooling water with discoloration. No clear drainage path.

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Photo 1. M106 Sedimentation Pond. Facing down west berm towards apparent contact water draining towards Mary River.

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Photo 2. Historical Waste Rock Facility Final Discharge Point. Orange discoloration apparent on terrain down gradient from likely pipe placement.

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Photo 3. Formation of preferential flow path, degrading permafrost and iron staining downgradient of Waste Rock Facility Final Discharge Point approximately A) 30 m and B) 140 m down gradient.

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Photo 4. Waste Rock Facility Water Treatment Plant damaged tarp ceiling.

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Photo 5. Southwest corner of Waste Rock Facility Sedimentation Pond Liner at interface with water conveyance infrastructure.

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Photo 6. Open drum filled with oily liquid at precarious angle without secondary containment.

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Photo 7. Ponding water beneath crusher facility.

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Photo 8. Original mine site tank farm. TK-001 to TK-004. Orange water color with oily residue.

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Photo 9. West Dyno Snow Stockpile with visible debris.

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Photo 10. East Dyno Snow Stockpile. Large body of pooling water with orange color.

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Photo 11. Landfill ponding water. Edge of ponding water appears to flow past barriers towards Sheardown Lake.

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Photo 12. Old pipeline to Camp Lake Jetty. Insulation deteriorating and blowing on tundra.

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Photo 13. Deteriorating Weatherhaven facilities. Exposed insulation damaged by wind.

Photo 14. PWSP-03. Edge of liner visible above water in centre of frame; liner bubble visible in pond in centre back of pond.

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Photo 15. KM97 Borrow Pit DustStop ponding in heavy equipment tracks near mixing station.

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Photo 16. Erosion of tote road near KM97 bridge.

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Photo 17. West bank foundation of KM97 bridge. Concrete blocks appear misaligned.

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Photo 18. KM86 Snow stockpile without delineation markers.

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Photo 19. Smoke damage from exhaust of telecom seacan at KM80.

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Photo 20. Metal debris pile near MP-06

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Photo 21. Q1 ditch leading to LP2 Snow Stockpile area.

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Photo 22. Discoloration of tundra along natural drainage down gradient of ore stockpile berm failure spill (Spring 2021)

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Photo 23. Potential oil spill at northwest corner of power generation station under construction.

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Photo 24. Fuel drums out of containment at LP3 helipad.

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Photo 25. Soda Ash on ground near west side of 380-person camp.

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Photo 26. Potential spills from parked vehicles at 380-person camp parking lot.

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Photo 27. Fuel drums stored outside of containment at A) Qikiqtaaluk Sana laydown (KM 5) and B) Fuel drums stored outside of containment at the mine site helipad.

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Photo 28. Uncapped drill hole on slope of Deposit 3

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Photo 29. Residual drilling lubricant leading down the slope of Deposit 3 and old drilling platform.

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Photo 30. Muster station building inundated by contact water. Approximately 6in deep. Live wires running through contact water.

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Photo 31. Site of the KM105 proposed sedimentation pond. Currently large quantity of pooling water with discoloration. No clear drainage path.

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Appendix B

Emergency Controlled Discharge from MS-08
Investigation and Summary of Findings

Technical Memorandum

Date: **September 13, 2021**

To: **Chris Spencer (Qikiqtani Inuit Association)**

From: **Richard Nesbitt (HESL)**

Re: **Emergency Controlled Discharge from MS-08 Investigation and Summary of Findings**

INTRODUCTION

Baffinland Iron Mines Corporation (Baffinland) informed the Qikiqtani Inuit Association (QIA) on June 23, 2021 of an Emergency Controlled Discharge from the Mary River Mine Site's (the site's) Waste Rock Facility Sediment Pond (MS-08), through the Final Discharge Point to the tundra. QIA subsequently conducted an unscheduled Environmental Inspection of the discharge from MS-08, pursuant to Schedule E, Condition 6, of the Commercial Lease (Q13C301). The unscheduled Environmental Inspection of the discharge was completed along side an inspection of the entire site.

Prior to QIA's inspection, Baffinland clarified the following context for the Emergency Controlled Discharge, stating that *"due to the timing of pond melt, recent precipitation events and limited remaining capacity of the pond (<0.5m freeboard)… the pond is at risk of releasing water over the emergency spillway. Due to the continuing influx of runoff into the Pond, it is possible that runoff will exceed the Pond's capacity in the near future. As per Baffinland's MDMER Emergency Response Plan (BAF-PH1-830-P16-0047), Baffinland will be implementing an emergency controlled discharge to lower the level of effluent in the pond and subsequently collect discharge samples for analysis. The volumes of the effluent released during this event will be recorded and ongoing monitoring of the effluent water quality will occur."*

Baffinland's characterization of the event indicated three contributing factors to a scenario requiring the Emergency Controlled Discharge, rather than being able to conduct water quality sampling of the effluent and providing normal notice to the QIA and other regulators:

- "Timing of the pond melt", suggesting that the rate and timing of melting snow was greater than anticipated under normal operating conditions;
- "Recent precipitation events" suggesting that the volume of rainfall in the days immediately proceeding the emergency discharge in combination with the melting snow were greater than anticipated under normal operating conditions; and,
- "Limited remaining capacity (<0.5 m freeboard)" suggesting the design capacity of the pond was insufficient to accommodate the precedent freshet and rainfall even though the *"capacity of the pond was upgraded in 2019 to account for an expansion of the Waste Rock Facility"*[1].

Each of the three factors was evaluated to determine whether the upgraded capacity was sufficient and whether Baffinland should revisit their approach to managing contact water associated with the Waste Rock

[1] 2020 Annual Report Appendix E.5.4 Fresh Water Supply, Sewage, and Wastewater Management Plan (FWSSWMP). Section 8.2.4 Mine Site Waste Rock Stockpile Pond.

Facility (WRF). An evaluation of the effects that ongoing discharges are having on the tundra receiving environment based on QIA's inspection, is also provided. Specifically, whether there are any signs of channelized flow, and whether vegetation has been degraded because of ongoing discharges.

TIMING OF THE POND MELT

The onset of Freshet and melting of contact snow in and around the WRF is typically one of the largest influxes of water into WRF Pond, standard to water management infrastructure in Nunavut. Baffinland suggested that the rate and timing of melting snow was greater than anticipated under normal conditions.

The timing and rate of Freshet (i.e., the pond melt) may be indirectly inferred from temperature data (indicating melt and runoff) and directly compared to previous years. Temperature measurements for Spring 2021 will not be available for the Mary River site until the 2021 Annual Report is released in 2022. However, Baffinland has used data from Pond Inlet A, Station ID: 2403206, the closest weather station to the Project operated by Environment and Climate Change Canada, to supplement weather and climate measurements made at the Mary River site in the past[2]. The Pond Inlet A station is located 147 km from the Mary River site[2] and has been continuously operated by ECCC since 2013.

Baffinland noted that the "temperatures reported at the north coast (i.e., Pond Inlet) are slightly lower in summer but comparable to the Mary River station in the winter"[2]. The relationship between temperature measured at the Mary River site and Pond Inlet A have been relatively stable over the years (Figure 1) suggesting that Pond Inlet A temperatures are an acceptable surrogate to evaluate the onset of pond melt.

Temperatures measured at Pond Inlet A in winter 2021 were generally warmer than previous years while still remaining predominantly well below freezing (Table 1). May and June (spring), the two months that mostly contribute to the onset of Freshet, were both only around the 75th percentile of measured average monthly temperatures from 2013-2020 (a representation of recent climate data). While the Mary River site is likely to have experienced warmer temperatures, it is unlikely that Spring 2021 represents a significant deviation from recent climate norms. The rate at which the snowpack melted is unlikely to have been substantially higher than in previous years, or have resulted in a more intense Freshet than in the past.

[2] Water Management, Phase 1 Waste Rock Management Plan - Revision 3, Appendix A3 Section 4.1.

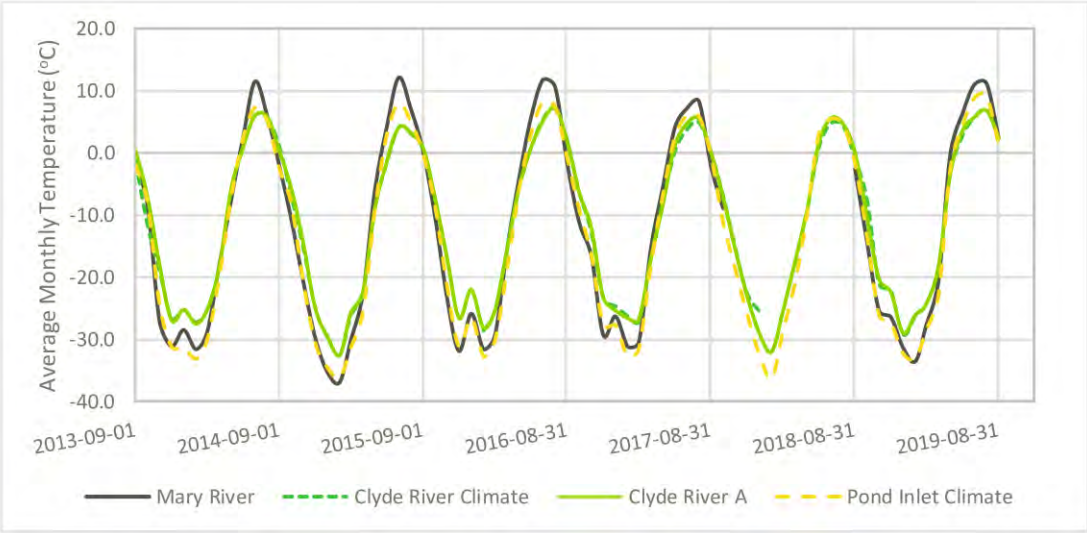

Figure 1. Average temperature recorded at various stations between 2014 and 2019. Figure reproduced from Phase 1 Waste Rock Management Plan - Revision 3 Appendix A3.

Table 1. Pond Inlet A Temperature Summary Statistics (°C) between 2013 and 2021. Winter and Spring 2021 temperatures provided for comparison.

	January	February	March	April	May	June	July	August	September	October	November	December
Min	-34.7	-36.3	-32.9	-25.0	-12.3	2.4	5.1	4.5	-2.2	-13.8	-25.5	-30.6
25th Percentile	-31.9	-34.5	-30.0	-21.4	-9.0	3.0	5.8	5.1	-1.9	-9.0	-21.5	-30.4
Mean	-29.9	-32.9	-29.0	-20.0	-7.5	3.3	7.0	6.2	-1.0	-8.4	-20.0	-27.3
Median	-30.8	-32.7	-29.2	-19.7	-6.9	3.4	7.1	5.8	-1.5	-8.3	-19.5	-27.0
75th Percentile	-28.0	-31.9	-28.8	-18.6	-6.4	3.6	8.6	6.6	-0.4	-7.1	-17.8	-25.8
95th Percentile	-24.2	-29.6	-24.5	-16.9	-4.0	4.2	8.8	8.6	0.9	-5.2	-16.2	-22.8
Max	-22.6	-29.1	-22.2	-16.1	-2.7	4.5	8.9	9.4	1.4	-5.1	-15.4	-22.0
2021	-22.6	-29.1	-28.8	-16.1	-6.4	3.9						

Days where the maximum temperature is above zero degrees Celsius represents the potential days when the snowpack can melt with some additional melting occurring when temperatures are close to zero due to solar irradiance. There were no days above zero degrees Celsius in January, February or March in the 2013 to 2021 period of record for Pond Inlet A. The first day with a maximum temperature above zero measured at Pond Inlet A in 2021 was April 24. This was also the first year temperatures above zero degrees Celsius were measured at Pond Inlet in April. However, the number of days above zero degrees Celsius measure at Pond Inlet A in May and June (up until June 23 when the Emergency Controlled Discharge commenced) did not deviate from historical climate norms. May 2021 had only a single day above 0 °C and representing the lower 25th percentile of the period of record. The relatively low number of days above 0 °C in May would have limited the influence of the melt days observed in April on the overall water balance of the WRF Pond and the onset of freshet in 2021. The number of days temperatures were

above 0 °C in June were relatively consistent over the period of record (aside from 2018 which had fewer than normal days above freezing), and 2021 was no exception (Table 2). While spring temperatures measured at Mary River are likely to have been warmer than those measured at Pond Inlet A, the stability of the relationship between measurements at the two sites suggests that conditions at the Mary River site were relatively similar to previous years; 2021 did not represent a deviation from the number of days temperatures were measured above 0 °C in the period of record and therefore it is unlikely the timing of the pond melt differed significantly from previous years.

Table 2. Pond Inlet A Summary Statistics for Number of Days with Maximum Temperature above 0 °C Between 2013 and 2021. Number of Days above 0 °C in Spring 2021 provided for comparison.

	April	May	June*
2013	0	0	20
2014	0	6	20
2015	0	2	20
2016	0	4	19
2017	0	3	18
2018	0	1	13
2019	0	17	22
2020	0	2	20
2021	4	1	21
Min	0.0	0.0	13.0
25th Percentile	0.0	1.0	19.0
Mean	0.4	4.0	19.2
Median	0.0	2.0	20.0
75th Percentile	0.0	4.0	20.0
95th Percentile	2.4	12.6	21.6
Max	4.0	17.0	22.0
2021	4	1	21

** Prior to June 23*

RECENT PRECIPITATION EVENTS

The volume of water reporting to the WRF Pond is a function of both incident precipitation, runoff and snow melt. Snow melt provides the largest contribution to the water balance during freshet, and precipitation is an important secondary contributor. The Mary River weather station is not equipped to measure snowfall but the actual amount of snow melt reporting to the WRF Pond is mitigated by Baffinland by removing noncontact snow from the WRF Pond catchment to minimize the volume of melt water requiring management during Freshet. The success of these management activities and the resulting volume of melt water that has historically reported to the WRF Pond is not available as Baffinland has experienced operational challenges accurately measuring the volume of water reporting to the WRF Pond[2]. However, the water balance assumes only a total snow accumulation 0.5 m over the WRF. All other snowfall is cleared in the winter and stockpiled outside of the WRF Pond catchment[2]. Given variance in the annual snowfall is not expected to directly influence the volume of melt water reporting to the WRF Pond, potential abnormal on-site conditions may have occurred in 2021 relative to historical snowfall measurements resulting in a particularly challenging season for snow management. However, significantly higher-than-normal snowfall (if it occurred) may have precluded Baffinland from successfully achieving a 0.5 m snowpack thickness

over the WRF which in turn may have contributed to the need for the Emergency Controlled Discharge in June 2021.

Baffinland relies on precipitation data from Pond Inlet A to complement rainfall data collected on site, and this evaluation also used precipitation data from Pond Inlet A. It was assumed that Baffinland successfully dewatered the WRF Pond ahead of the 2020-2021 winter as per the water management strategy for that infrastructure; the 2020 freshet and subsequent 2020 rainfall are not assumed to have impacted the water management concerns contributing to the Emergency Controlled Discharge. It was also assumed that all precipitation fell as snow between October and May, and added to the snowpack requiring active management by Baffinland.

The absolute volume of snowfall measured at Pond Inlet A is not directly applicable to that which fell on the Mary River site, but, the amount of snowfall relative to historical measurements is roughly equivalent between the sites. That is, if snowfall measured at Pond Inlet A corresponds to the median or 75th percentile relative to the historical record, the snowfall measured at the Mary River Site was also assumed to correspond to the median or 75th percentile of values.

Of the eight months (October-May) where snowfall accumulation was expected, snowfall in October and April provided the largest contributions to the overall snow expected on the site. Values measured in these two moths correspond approximately to the 75th percentile of values measured historically (Table 3). Relatively little precipitation was recorded in the other months, similar to measurements in those months over the period of record (2013-2020). Given significant snowfall did not occur directly prior to Freshet (May) and that the precipitation measured over the winter of 2020-2021 was not abnormally high, Baffinland should have had ample time and capacity to segregate contact and noncontact snow to minimize the volumes requiring management and avoid excess snow melt during Freshet.

Table 3. Precipitation Summary Statistics Measured at Pond Inlet A for 2013-2021.

Monthly Precipitation (mm)	July	August	September	October	November	December	January	February	March	April	May	June	Annual
Min	1.10	9.60	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.40	66.30
25th Percentile	20.30	17.65	5.85	1.75	0.23	0.00	0.00	0.00	0.00	0.00	0.53	6.13	101.58
Mean	28.83	33.13	11.75	7.49	0.89	0.74	2.03	0.08	8.64	4.19	5.74	13.41	116.89
Median	26.50	27.30	9.30	7.90	0.45	0.50	0.30	0.00	0.15	1.35	2.40	9.90	122.35
75th Percentile	31.10	42.18	15.93	11.65	1.70	1.28	0.90	0.05	6.10	6.75	8.60	18.60	134.30
95th Percentile	59.70	68.79	26.16	15.23	2.20	1.96	9.24	0.33	37.60	13.22	17.39	28.31	155.15
Max	71.70	77.50	29.20	16.10	2.30	2.20	13.40	0.40	46.00	14.20	17.60	32.40	165.40
	2020						2021						
	17.00	28.80	4.80	11.00	0.40	1.50	0.00	0.00	0.40	7.80	0.40	9.30	81.40

Shaded cells are assumed to contribute to the snow pack requiring management during Freshet.

Baffinland indicated that recent precipitation events contributed to the need for the Emergency Controlled Discharge. In the absence of rainfall data available for June 2021, data measured at Pond Inlet A following the precedent set in Baffinland's site Water Balance does not indicate substantially more rainfall than normal, although there is some uncertainty associated with the conclusion. The relationship between rainfall measured at Pond Inlet A and the Mary River weather station is not exceptionally strong; precipitation measurements collected at the two stations have an r^2 of 0.4989 between 2014 and 2019 (Figure 2).

However, Baffinland has used data from the Pond Inlet station as input to their water balance, increasing recorded values by 30% when applied to the Mary River site[2].

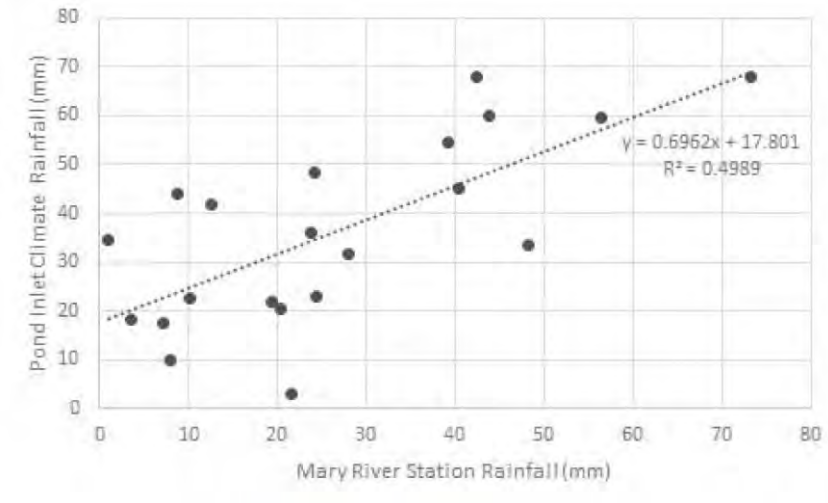

Figure 2. Comparison of concurrent daily and monthly rainfall at Mary River Station and Pond Inlet A between 2014 and 2019. Figure reproduced from Phase 1 Waste Rock Management Plan - Revision 3 Appendix A3.

The precipitation in June is expected to have fallen as rain and contribute to the volume reporting to the WRF Pond. Using data from Pond Inlet A, there were three rainfall events in June prior to the Emergency Controlled Discharge on June 23rd (Table 4). While these are likely to have contributed to the volume of water in the WRF Pond requiring management, the precipitation events were are not considered extreme; individual precipitation events in the period of record included values up to 9.4 mm in a single day, indicating the precipitation at the Mary River Site was not have unusual for the region in the days preceding the Emergency Discharge Event.

Table 4. Pond Inlet A June rainfall and summary statistics for the 2013-2021 period of record.

June Daily Precipitation (mm)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	N
2013	0.0	0.5									0.3	0.0	0.0	0.0	0.0	0.8	3.4	1.3	0.0	0.0	0.0	0.0	0.3	0.0	1.8	9.8	0.0	0.0	0.0	2.5	20.7	22
2014	2.0		0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.9	29
2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	1.8	0.0	0.0	0.0	0.0	0.0	1.6		0.0	0.0	0.0	0.0	0.0	4.4	29
2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		1.6	6.2	29
2017	0.0	0.0	0.0	9.4		0.0	0.0	0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	26
2018	0.0	0.0	0.0			0.0						3.1	0.0	0.0	0.0	0.0	9.4	5.4		0.0	0.0	0.0	0.0				0.0	0.0	0.0	0.0	17.9	19
2019	0.0	0.4	1.1	3.3	0.8	0.0	0.0	0.0	0.0	3.4	10.2	1.8	2.3	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	1.7	0.7	4.4	0.0	0.0	0.0	0.0	0.0	0.0	32.4	30
2020			0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.6	0.2	0.0	0.0	0.0	0.0	3.1	3.6	0.6	10.4	28
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.4	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.6	0.0	0.0	0.0	1.5	2.7	9.3	30

Min	4.4
25th Percentile	6.1
Mean	13.4
Median	9.9
75th Percentile	18.6
95th Percentile	28.3
Max	32.4

Notes
Grey cells indicate days when preciptation is expected to have contrbuted to the Emergency Controlled Discharge
Blank cells indicate data missing from the ECCC Pond Inlet A dataset.
All years in the period of record were greater than 60% complete. 2018 had the least data but was not excluded as the total precipitatoin fell within the range of observations.

LIMITED REMAINING CAPACITY WRF POND

Baffinland highlighted limited remaining capacity of the WRF Pond as a contributing factor to the Emergency Controlled Discharge. Although this may have been a factor, it implies that the WRF Pond is undersized for a relatively normal operational year. The WRF Pond was constructed to accommodate an engineered design flood (EDF) 15 day, 1:10 year event[3]. It is unclear whether this design criteria refers to the historical WRF Pond or that of the upgrades to Pond to accommodate an expansion of the WRF. However, given that the WRF Pond required an Emergency Controlled Discharge with data indicating that both snow and rain in the period leading up to the event were relatively standard, suggests that current pond capacity is not sufficient.

INSPECTION WRF POND AND INVESTIGATION OF EFFECTS

Effluent from the WRF Pond is discharged to the tundra from the final discharge point. Discharges to this location are permitted both under normal discharge conditions as well as during the Emergency Controlled Discharge. Baffinland indicated that the discharges occurred prior to conducting a full suite of water quality analysis[4]; Baffinland has yet to provide water chemistry confirming the Emergency Discharge Event was compliant with relevant discharge criteria.

Some impact to the tundra is expected as a result of ongoing effluent discharges. However, efforts should be made to avoid degradation of the tundra and vegetation. As part of QIA's unscheduled investigation of the Mary River Site, inspectors walked the perimeter of the WRF and terrestrial receiving environment. Figure 4A highlights that 140 m downgradient of the final discharge point, scouring of the tundra was apparent along a preferential flow path. A comparison between Figure 3 and Figure 4 indicates that tundra vegetation has been damaged as a result of the ongoing discharges. Little to no vegetation is visible Figure 3 while a healthy tundra sedge environment is visible in Figure 4. While these environmental impacts need not be remediated at this stage of the project when as discharges are expected to persist for years to come, efforts can be made to minimize the interim effects and remediation required at closure. The current closure strategy for the WRF does not include any consideration of the terrestrial receiving environment[5].

[3] P40, Section 12.2 Water Management, Phase 1 Waste Rock Management Plan - Revision 3.
[4] Christopher Murray. June 23, 2021. Personal Communication.
[5] Baffinland Iron Mines Corporation. 2020. Phase 1 Waste Rock Management Plan - Revision 3. Section 11. WRF Closure.

Figure 3. Impacted area 140 m down gradient of the final discharge point

Figure 4. Unaffected tundra proximal to final discharge point.

Some minor seeps were noted along the bermed perimeter of the WRF during the inspection, but no evidence of overtopping or damage to the berms was apparent; the containment infrastructure appears to be functioning as built.

OTHER CONTRIBUTING FACTORS

The QIA inspection did not specifically identify any other factors that may have contributed to the Emergency Controlled Discharge. However, Baffinland has historically struggled with WRF lift placement resulting in the potential for a thawed zone in the facility which may have resulted in greater than anticipated seepage[6]. We also note that the berms around the facility intended to prevent noncontact runoff from reporting to the WRF Pond may not have functioned as intended. An influx of noncontact water from outside WRF may have contributed to the water balance of the WRF Pond and the need for an Emergency Controlled Discharge.

CONCLUSIONS AND RECOMMENDATIONS

Baffinland provided three factors that lead to the Emergency Controlled Discharge: timing of pond melt, recent precipitation events and limited remaining capacity of the pond. This investigation indicated that the site experienced a relatively standard winter and spring in terms of the volume of snow requiring management, rainfall in the days preceding the Emergency Controlled Discharge, and the timing and intensity of the onset of Freshet (melt). Therefore, it appears that higher-than-normal water did not drain to the pond as a result of environmental factors, but that site management factors may have been the primary contributors.

Baffinland should revisit their approaches to managing the primary inputs to the WRF Pond. Specifically:

1. **Waste Rock Seepage.** Relatively little waste rock seepage is expected if Baffinland's lift placement strategy is successful in ensuring the infrastructure in completely frozen. While our inspection did not identify visible seepage coming from the WRF, we recommend Baffinland provide an assessment of waste rock seepage observed at in 2021 and an evaluation of whether more seepage has been observed than predicted as a precaution. If additional seepage has reported to the WRF Pond than anticipated, we recommend Baffinland provide a management plan for QIA and regulator review, and implement the proposed management activities to limit the volume of future waste rock seepage.
2. **Snow Management.** The water balance and water management strategy assumes that Baffinland limits the snowpack melting within the WRF Pond Catchment to 0.5 m. As snow melt is the primary input to the WRF Pond during freshet, Baffinland should provide an evaluation of how successful snow management activities were in the 2020-2021 winter, and describe the measures that will be taken to ensure 0.5 m or less deep snowpack in the WRF Pond Catchment in the future.

[6] Hutchinson Environmental Sciences Ltd. 2020. Review of Baffinland Waste Rock Management Plan. Prepared for the Qikiqtani Inuit Association.

3. **Noncontact Water Management.** Given Baffinland highlighted recent precipitation events as a contributing factor to the Emergency Discharge Event despite relatively standard preceding precipitation, we are concerned that the berms around the facility intended to prevent noncontact runoff from reporting to the WRF Pond may not have functioned as intended. We therefore recommend Baffinland provide an evaluation of the noncontact water diversion infrastructure to determine whether they are functioning as intended. The berm infrastructure should be improved if noncontact runoff was a contributing factor to the Emergency Discharge Event.
4. **WRF Pond Size.** An Emergency Discharge Event was required despite relatively standard snow and rain fall. Baffinland should provide an assessment of the current storage capacity of the pond after the upgrade, including consideration of sediment accumulation in the pond. Feasibility of upgrading the Pond's capacity as part of current site water management or as part of Phase 2 of the Project currently under review by the NIRB would also be prudent. As a matter of diligence and future planning, Baffinland should revisit the water balance model for the WRF and provide an assessment as to whether the current event design criteria of the Pond is sufficient to accommodate more extreme weather events without the need for future Emergency Discharges.

The investigation of the WRF perimeter and terrestrial receiving environment did not identify significant deficiencies that required immediate attention from Baffinland. However, some degradation of the permafrost in the terrestrial receiving environment and damage to the vegetation downgradient of the of the final discharge point was identified. The following actions should be conducted to address the impacts:

5. **Discharge Approach.** Ongoing discharges to the receiving environment are permitted under the Project's Water Licence. However, damage to the permafrost and formation of preferential flow paths should be avoided. Baffinland should therefore revisit the discharge approach so that ongoing discharges via the final discharge point to the receiving environment no longer damages the tundra through the formation of preferential flow paths.
6. **Closure.** The current closure plan only considers the WRF itself and not the terrestrial receiving environment. The next iteration of the Waste Rock Management Plan (i.e., Version 4) and Interim Closure and Reclamation Plans should include provisions to address the impacts observed in the terrestrial receiving environment as a result of discharges from the WRF.

CLOSING

If you have any questions about the analysis or conclusions presented herein, please contact Richard Nesbitt of Hutchinson Environmental Sciences Ltd.

Reviewed by DIL

Chris Spencer
Manger, Regulatory Affairs
Qikiqtani Inuit Association
P.O. Box 1340
Iqaluit, NU X0A 0H0

RE: QIA 2021 July Environmental Inspection Report

Baffinland Iron Mines Corporation (Baffinland) provides the Qikiqtani Inuit Association (QIA) with the following response to the inspection requests[1], consistent with the Commercial Lease No. Q13C301.

The attached Table 1 provides Baffinland's responses to the 2021 July Environmental Inspection Report.

Should you have any additional concerns or questions regarding the attached responses, please to not hesitate to contact the undersigned at your convenience.

Regards,

Connor Devereaux
Environmental Superintendent

Cc: Megan Lord-Hoyle, Lou Kamermans, Tim Sewell, Shawn Stevens, Kendra Button, Amanda McKenzie (Baffinland)

Attachments

Attachment 1 – Baffinland Responses to QIA 2021 July Environmental Inspection Report

Attachment 2 - Photos

[1] QIA (2021) Re: Baffinland Iron Mines Corporation's Mary River Project – Qikiqtani Inuit Association July 2021 Emergency Controlled Discharge Inspection and General Site Inspection Findings and Recommendations. Letter dated September 14, 2021.

Attachment 1

Baffinland Response to QIA 2021 July Environmental Inspection Report

Table 1 – Baffinland Responses to QIA 2021 July Environmental Inspection Report

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
1.	KM106 Stockpile (Photo 1)	Potential contact water flowing towards Mary River without apparent interception; it is unclear whether the water reached Mary River or its tributaries. Reddish grey colour suggests high total suspended solids (TSS) and iron.	Baffinland to a) confirm with water chemistry whether observed flow is considered contact or noncontact water, b) confirm whether the observed water reached Mary River or its tributaries, and c) implement mitigations to prevent flow of uncontrolled contact water into receiving environment (if it is considered contact water). Written and photographic documentation to be provided to QIA as evidence of implemented mitigation(s).	October 30, 2021.	Baffinland completes weekly inspections of the water management infrastructure at the KM106 ROM stockpile during open water season, as per Baffinland's Type A Water License. There has been no contact water from the facility observed exiting the facility at the location noted by QIA. The discoloured snowpack observed is dust-entrained snow from the adjacent haul road. Any run-off from this snowpack would be non-contact water. Photo 1 in Attachment 2 shows the facility water management infrastructure that would prevent any contact water exiting the facility, and the dry tundra that is upstream of the observed discoloured snowpack and runoff. Photo 1A in Attachment 2 is an aerial photo of the facility. Baffinland monitors the water quality of the nearest water body, Mary River, under the Core Receiving Environment Monitoring Program and is reported in the NWB QIA Annual Reports.
2.	Historical Waste Rock Facility (WRF) Final Discharge Point (FDP) (Photo 2)	Tundra and underlying permafrost appear scoured/degraded with settled materials, iron precipitate and metals staining as a result of discharges from historical WRF FDP.	Baffinland to scarify or regrade historical FDP flow path by closure at the latest, or as part of ongoing progressive reclamation. This closure activity should be incorporated into the next iteration of the interim closure and reclamation plan (ICRP) as well as Waste Rock Management Plan (WRMP).	As part of ongoing progressive reclamation or at closure. Edits to the ICRP and WRMP to be included as part of the next annual	As the area of concern is within the approved project footprint for the WRF at the end of life (closure) of the project, BIM does not plan to include this terrestrial area as part of progressive reclamation, and will not require rehabilitation during closure. Therefore, the area does not warrant to be incorporated into the next iteration of the ICRP or the WRMP.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
				report (March 30, 2022).	
3.	Existing WRF FDP (Photo 3)	Apparent formation of a preferential flow path on the tundra as far as approximately 140 m downgradient of the existing WRF FDP. This is not an immediate concern as the discharges did not reach fish bearing habitat but does suggest discharges are impacting the tundra.	Baffinland to readjust the FDP such that it does not continue to degrade the tundra in the receiving environment, and submit a plan to the QIA, NIRB and NWB detailing how the impacts from ongoing discharges to the tundra will be reduced in the future Baffinland to further commit to scarifying or regrading the WRF FDP flow path at closure. This closure activity should be incorporated into the next iteration of the ICRP as well as the WRMP. If the WRF FDP is moved ahead of closure, the impacted area should be scarified as part of progressive reclamation.	Re-adjust FDP and submit FDP management plan to QIA prior to Freshet 2022. Edits to the ICRP and FDP management plan to be included as part of the next annual report (March 30, 2022).	The historical apparent preferential pathway for overland surface runoff prior to construction was selected as the outfall location of the WRF Pond discharge to ensure treated effluent was conveyed to the Mary River receiving environment. Photo 2 in Attachment 2 depicts this area in 2017 prior to a discharge commencing from the referenced Final Discharge Point (FDP). The Metal and Diamond Mining Effluent Regulations (MDMER) regulated FDP is the sample port located along the discharge line at the WRF WTP. Baffinland does not maintain an 'FDP management plan'. Discharges from the WRF Pond are conducted as per Baffinland's Fresh Water Supply and Sewage Water Management Plan (FWSSWMP). As stated in response to item #2, scarifying or regrading of this area is not warranted.
4.	General	Debris and damage observed throughout the site. Some appears to be the result of wind and snow, but other debris appears to be the result poor site hygiene. Observations include: 1. Visible damage to the WRF Water Treatment Facility cover (Photo 4). 2. Open drum filled with oily	Baffinland to complete site wide housekeeping and tidying. Baffinland to implement the following corrective actions: 1. Baffinland to repair the WRF cover. 2. Dispose of oily liquid and confirm whether any spilled onto the ground. If a spill occurred, Baffinland to prepare and submit a spill report to the NU/NWT Spill Report Line. 3. Clean up the noted debris.	1. Prior to freeze up, 2021. 2. October 30, 2021. 3. October 30, 2021. 4. October 30, 2021. 5. March 30, 2021.	Concerns regarding housekeeping are noted. Baffinland continues to improve upon housekeeping and debris management, as demonstrated by Photo 3 and Photo 4 in Attachment 2. 1. The WRF WTP has been dismantled for the 2021-22 winter. If the same building is used in 2022 the WTP cover will be inspected and repaired as needed during the commissioning stage in spring 2022 (see Photo 5 in Attachment 2).

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
		liquid without secondary containment (Photo 6) 3. West dyno snow stockpile with visible debris (Photo 9). 4. Degrading insulation along old pipeline to Camp Lake Jetty (Photo 12). 5. Deteriorating Weatherhaven facilities (Photo 13). 6. Duststop ponding in heavy equipment tracks near KM97 Borrow Pit (Photo 15). 7. Metal debris pile near MP- 06 (Photo 20). 8. Potential oil spill at northwest corner of power generation station under construction (Photo 23). 9. Soda Ash on ground near west side of 380-person camp (Photo 25). 10. Potential spills from parked vehicles at 380-person camp parking lot (Photo 26). 11. Residual drilling lubricant leading down the slope of Deposit 3 and old drilling platform (Photo 29).	4. Remove and dispose of old pipeline if it is no longer in use, and remove all detrital insulation from the tundra. 5. Repair Weatherhaven facilities or decommission them. 6. Impacted area to be excavated and disposed of in landfarm. 7. Clean up noted debris 8. Soil to be tested to confirm whether hydrocarbons are present. If present, soil is to be excavated and disposed of in landfarm. 9. Soda ash to be cleaned and a spill reported to the NU/NWT Spill Report Line. 10. Soil to be tested to confirm whether hydrocarbons are present. If present, soil is to be excavated and disposed of in landfarm. 11. Soil to be tested to confirm whether hydrocarbons are present. If present, soil is to be excavated and disposed of in landfarm. Baffinland to provide written and photographic documentation of soil test results to QIA and any follow up documentation as appropriate.	6. October 30, 2021. 7. October 30, 2021	2. The open drum and its contents have been discarded as hazardous waste (see Photo 6 in Attachment 2). There was no substance or volume released that would require reporting to the NT-NU spill line. 3. As per Baffinland's Snow Management Plan (SMP), clean up and removal of debris is an ongoing task as snow melts throughout the year and debris surfaces. Routine work is completed by operations personnel (see Photo 7 in Attachment 2). 4. Baffinland maintains that the pipeline may be used in the future and will therefore leave the pipeline in place until such time. Baffinland completes routine cleanup of the surrounding tundra as depicted in Photo 8 of Attachment 2. 5. Baffinland plans to continue to use this infrastructure and maintains these facilities as required. For example, as shown in the QIA's Photo 13 of the inspection report, plywood was added to certain areas of an adjacent weatherhaven tent. Baffinland is also procuring replacement canvas for numerous tents across both sites as part of ongoing maintenance. 6. The supplier has changed the name from Duststop® to DUST/BLOKR®. Duststop® is an approved substance for use on roadways as per the Government of Nunavut Environment Guideline for Dust Suppression. This substance is non-toxic and, as per Baffinland's Type A Water Licence, routine

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
					monitoring of the water quality in the referenced area including monthly acute lethality testing is conducted to ensure the water quality it is not acutely toxic. The results from this monitoring confirm it is non-hazardous and therefore no remedial measures are required. All water quality results from this area will be presented in the NWB QIA Annual Report for Operations. 7. This scrap metal has been cleaned up (see Photo 9 in Attachment 2). 8. Baffinland has investigated the observed potential oil spill at the new GE Generator Building pad. There was no odour detected or source of oil identified to suggest the discoloured soil to be an oil spill. There are drain lines to prevent rain water from collection in the equipment berms until this new building can be fully closed in, and no hazardous products or equipment are stored here currently. 9. The soda ash was cleaned up and is outlined in Photo 10 of Attachment 2. This release was not reportable to the NT-NU spill line as the volume of substance released did not meet the thresholds outlined in the *Spill Contingency Planning and Reporting Regulations*. 10. Surficial staining observed at the 380 camp parking lot area was cleaned up and placed in secondary containment within the hazardous waste berm for backhaul off site. Photo 11 of the area is included Attachment 2.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
					11. The discoloured tundra in the referenced photo is sediment deposition from drill cuttings at MR3-20-283 & 287, and not drilling lubricant; therefore no soil testing is required. In concordance with Baffinland's Type B Water Licence, each year the small volume of drilling wastes (i.e. cuttings) generated from drilling programs are deposited in boreholes and/or sumps, as well as captured by sedimentation and erosion control measures (e.g. silt fencing) near exploration borehole locations. A photo of the silt fence that was in place during the time of drilling operations at this location is included as Photo 12 in Attachment 2. Baffinland commits to ensuring drill holes are properly remediated in accordance with the Exploration Closure and Reclamation Plan, and residual drill cuttings are remediated following exploration drilling activities.
5.	WRF Sedimentation Pond (Photo 5)	Visible edge of WRF Sedimentation Pond liner at inflow from collection ditch. It is unclear if the sedimentation pond is adequately keyed into the ground such that collected contact water does not flow beneath the liner circumventing collection and treatment.	Baffinland to confirm what portions of the Sedimentation Pond liner are adequately keyed into the ground such that contact water in the collection ditches do not flow beneath it, and rekey liner into the ground where required with photographic documentation of the repairs. At a minimum, the exposed portions of the liner should occur below the apex of the slope draining into the pond.	October 30, 2021.	Details on the design of the WRF Pond and its associated water management infrastructure can be found in the Construction Summary Report package for the Waste Rock Facility Pond Expansion and Drainage System that was completed in 2020, and reported in the 2020 NWB QIA Annual Report. This includes the design of the liner and key in at the referenced area. This facility is routinely inspected as per Baffinland's Type A Water License. A geotechnical inspection of the WRF Facility was completed in June 2021, and the 2021 Geotechnical Report No. 1 noted the drainage ditches are well maintained, having stable slopes and the pond is lined with

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
					exposed new HDPE liner that is secured in place in anchor trenches, extending down into the permafrost.
6.	Crusher Facility (Photo 7)	Ponding water beneath crusher facility suggests vibrations from the operations may be melting the permafrost	Baffinland to confirm the source of the ponding water beneath the crusher facility. Baffinland to further confirm whether crusher pad is performing as intended to mitigate impacts to underlying permafrost. Secondary containment or diversion of standing water to appropriate containment facilities may be required around the crusher to mitigate ongoing degradation of local permafrost. Baffinland to investigate the water source and provide a summary of the findings and potential follow up activities in a memo appended to the Annual Report.	Investigation memorandum to be included with the 2021 Annual Report (March 31, 2022). Site improvements as necessary to be completed prior to Freshet 2022.	Due to the nature of the activity taking place on the Ore Crusher Pad, it is expected that the pooling of water will occur on occasion. Baffinland's Ore Crusher Pad Regrading technical memorandum was submitted to CIRNAC, NWB and QIA as part of the Water Licence 2AM-MRY1325 September 2019 Inspection - Follow Up document on May 15, 2020 and subsequent 2019 NWB QIA Annual Report for Operations. This technical memorandum documents the routine grading of the Ore Crusher Pad to assist in mitigating standing water by ensuring water is directed toward ponds, ditches or sumps for onward pumping to the pond. The technical memorandum details the frequency and work to be completed. Pooled water that cannot be eliminated through routing regrading, in addition to the implementation of stockpiling practices, is actively pumped from the pad directly to the pond.
7.	Historical Tank Farm TK-001 to TK-004 (Photo 8)	Ponded water observed in secondary containment of historical tank farm with oily residue at surface.	Baffinland to draw down ponded water prior to freeze up. Photographic evidence to be provided demonstrating that dewatering has been completed. Baffinland to further confirm sizing of secondary containment relatively to the historical tank farm, and confirm which	Prior to freeze up in 2021.	Baffinland drew down the ponded water in MS-03 Bulk Fuel Facility in August 2021. Baffinland continues to treat and/or separate the water contained within the Bulk Fuel Facility MS-03, consistent with the approved Fresh Water Supply, Sewage and Wastewater Management Plan. This water management occurs annually.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
			management plan outlines the requirement that ponding water in secondary containment infrastructure is drawn down in a timely manner.		This facility is also inspected regularly as per Baffinland's Type A Water License. Details on the sizing of the secondary containment can be found in the Construction Summary Report: Mine Site Tank Farm & Dispensing Package.
8.	East Dyno Snow Stockpile (Photo 10)	Ponded water observed with colouration indicating elevated iron and TSS.	Baffinland to clarify East Dyno Snow Stockpile is intended for contact or non-contact snow. If the water is intended as noncontact water, Baffinland to collect and submit water chemistry. Ponding water should be drawn down and disposed of as contact or non-contact water depending on results of water chemistry. Snow stockpile may require secondary containment if it was intended as contact snow stockpile or is determined as one based on water chemistry results.	October 30, 2021.	Baffinland's East Dyno Snow Stockpile is for snow originating from general site infrastructure, roads and laydowns (see Baffinland's Snow Management Plan, Appendix B). Any snow from the Crusher Pad remains on the crusher pad (see Baffinland's Snow Management Plan, Appendix E). Baffinland further clarifies that site water is not classified as contact versus non-contact based off water quality but rather its interaction with Project infrastructure. Runoff from this snow stockpile location is monitored through our Surveillance Network Program (SNP), as described in Baffinland's Snow Management Plan Section 5. The SNP station 'MS-C-G' is the receiving environment water body and thus the location where water quality monitoring occurs. These water quality results are reported in Baffinland's monthly NWB Water License reports, and annual NWB QIA annual report.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
9.	Landfill (Photo 11)	Large area with ponding water towards Camp Lake. Edge of ponding water appears to flow past barriers towards Sheardown Lake.	Baffinland to confirm whether water has flowed from the landfill into Sheardown Lake and provide water chemistry for landfill ponding water to confirm whether potential deleterious effects may have occurred. Baffinland to report the outflow as a spill to the NU/NWT Spill Report Line if an uncontrolled / unintended discharge to Sheardown Lake occurred. Baffinland to further improve containment of ponding water proximal to the landfill such that only controlled discharges occur. Photographic evidence and written summary of mitigation measures taken to be submitted to QIA.	Prior to freshet 2022.	The observed large pond of water is a depression adjacent to the landfill that seasonally collects stormwater runoff from nearby areas that will eventually be filled in as the landfill expands withinthe fence line. Water from the landfill is free-draining to the receiving environment and there is no containment facility for this runoff. Only inert, non-combustible waste is deposited at the landfill, which is detailed in Baffinland's Waste Management Plan. Internal water quality monitoring was completed at the time of the July Inspection at the request of QIA, and the internal Total Oil and Grease results were all non-detect using a desktop O&G analyzer. In addition, there was no odour or visual sheen and thus no indication of any non-compliant water quality of surface water in the vicinity of the landfill. Water quality monitoring stations downstream of the landfill include two Surveillance Network Program stations, reported in the monthly NWB Water License reports and NWB QIA Annual Report for Operations, and detailed in Baffinland's Fresh Water Supply, Sewage, and Wastewater Management Plan and Surface Water and Aquatic Ecosystem Management Plan. Baffinland also has groundwater monitoring wells downstream of the landfill, where water quality monitoring is reported in the NWB QIA Annual Report for Operations

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
10.	PWSP-03 (Photo 14)	Edge of liner visible above the water in center bottom of the pond suggests a potential gap in the liner where contact water may escape the containment. The bubble in the liner increases the likelihood that portion of the liner may become damaged, allowing contact water to escape the containment.	Baffinland to draw down the PWSP-03 and repair the liner. Baffinland to submit photographic evidence of remedial actions taken to QIA.	October 30, 2021.	As outlined in previous Geotechnical Reports submitted to the NWB and QIA including the most recent 2021 Report, a relatively common non-issue in water storage ponds is the appearance of so-called “whales” within the ponds. Whales are sections of the liners which have risen (float) above the surface of shallow water, particularly in shallow ponds, where the weight of water above the liner is minimal. As reported in the 2021 Geotechnical Inspection Report No. 1, this type of small “whales” was visible during the June 2021 inspection at PWSP pond #3, as shown in Figures 11 and 12 of the referenced report. The presence of "whales" (liner bubbles) is attributed to suspected potential gas generation beneath the liners due to decomposition of organics in topsoil layer that may have been left in place beneath the liner during construction. Similar “whales” were noticed and recorded during previous inspections in the past; however, no damage to the liner or seepage from the ponds was visible, including during the current survey/inspection.
11.	Tote road near KM97 bridge (Photo 16)	Erosion visible along tote road near KM97 bridge. Baffinland appears to have tried to mitigate the impacts of the erosion to the nearby watercourse by installing silt fences; the silt fences have been overcome by accumulated sediment and are no longer functional.	Baffinland to replace the silt fencing to mitigate erosion of the tote road near the KM97 bridge. The silt fence should be extended to the toe of tote road bank, and at least 10 m away from the tote road, with edges of silt fence installed in an arc facing upstream to capture all runoff. Baffinland to provide photographic evidence of corrective actions to QIA and establish a weekly monitoring schedule for	Prior to Freshet 2022. Erosion and Sediment Control monitoring reports should be included in Annual Reports going forward.	Baffinland has placed rip-rap amouring along the bank of the road at this location in lieu of new silt fencing (see Photo 13 in Attachment 2). Baffinland will continue to monitor this water course as part of the Tote Road Monitoring Program, detailed in the Roads Management Plan.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
			Erosion and Sediment Control fencing during runoff periods.		
12.	West bank foundation of KM97 bridge (Photo 17)	Three stacked concrete blocks do not appear to have any backfill supporting them. The misalignment suggests longitudinal forces on the bridge are causing the blocks to shift over time increasing the longer- term potential for stability issues with his portion of the infrastructure.	While we understand Baffinland has employed an engineer to inspect the bridge and produce a summary report of their findings, we suggest a periodic inspection schedule to assess any developing stability issues. We recommend Baffinland employ an engineer to inspect the bridge and produce a new summary report every 2 years. The report is to include recommended mitigations and a timeline in which they must be implemented to prevent structural issues with the bridge.	New inspection to occur as soon as feasible if no inspection has occurred within 2 years, and every 2 years thereafter. Reports to be submitted as part of the Annual Reports following each inspection.	An inspection of the bridges occurred in 2021. The inspector confirmed that there is no issue with the precast concrete blocks observed by QIA to be misaligned. The important piece is that there is a gap between the abutment/fill and bridges timber deck to allow for expansion. It was also noted through visual observations by the inspector that the blocks are stable (other than the ability of sliding somewhat on the top of each-other) and no stability issue is currently present at the abutment. Bridge inspections occur annually, and include an assessment of any developing stability issues on the bridges as well as recommended mitigation measures and timelines.
13.	KM86 Snow stockpile (Photo 18)	Snow stockpile at KM86 does not appear to have delineation markers.	Add delineators to snow stockpile ahead. Baffinland to provide photographic evidence of completion.	October 30, 2021.	Baffinland has completed the installation of delineators at the approved snow stockpile locations for the 2021-2022 winter. Photo 14 of the KM 86 snow stockpile is in Attachment 2.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
14.	KM80 Telecom Seacan (Photo 19)	Apparent smoke damage on telecommunications seacan from exhaust.	Baffinland to evaluate the extent of the damage to the seacan, implement repairs if needed and readjust exhaust manifold to reduce damage and fire risk to infrastructure. Baffinland to submit photographic evidence of remedial actions taken and mitigations implemented.	October 30, 2021.	The black marks noted by QIA on the Communication Towers is not smoke damage, but rather discoloration from the exhaust. The design of the diesel generator's exhaust hood results in black discoloration of the outside of the seacan wall over time. Baffinland has completed a routine clean-up of the seacan walls (see Photo 15 in Attachment 2).
15.	Q1 ditch leading to LP2 Snow Stockpile area (Photo 21)	Qikiqtaaluk Sana demobilizing equipment for transfer to QMR2. Baffinland indicated during inspection that no further quarry activities are planned for 2021. Debris was present in general area and on connecting laydown. A liner keyed into the ditch is visible in the bottom left of photo.	Baffinland or Qikiqtaaluk Sana to remove keyed liner and debris as part of demobilization activities and progressive reclamation if no further quarry activities are planned for the area. Baffinland to summarize progress of site demobilization and progressive reclamation in the 2021 Annual Report.	Demobilization progress summary to be included with 2021 Annual Report (March 31, 2022).	The liner visible in the report photo is geotextile. This is part of the water management infrastructure for the quarry, to cover the sandy substrate in the ditches and slopes, before rip-rap is placed on top of it. It will remain in place to be ready for 2022 open water season. The ditch will be inspected prior to Freshet 2022 to ensure all geotextile is covered. Q Sana operations are done for 2021 at the Q1 quarry. The quarry area and nearby laydowns were cleaned during the demobilization process, and the area remains in a stable state for the winter. See Photo 16 of the current status in Attachment 2.
16.	Drainage downgradient of ore stockpile (Photo 22).	Iron staining visible in drainage pathway of recent (Spring 2021) berm failure and spill of contact water during transfer from MP- 03 to MP-05. Pebble sized rocks visible in drainage pathway indicate ephemeral flows with sufficient energy to mobilize loose material.	Baffinland to collect soil samples from the spillway and submit results to QIA for review. If elevated concentrations of metals are present in the upper 5 cm of soil, we recommend Baffinland a) install a silt fence at the end of the flow path to limit mobilization of materials as a result of precipitation and melting snow, and b) excavate the surface 10	Soil sampling results to be submitted to QIA by October 30, 2021. Silt fence to be installed by and excavations	Discoloration noted by QIA is from fugitive dust settling in this valley. The release referenced was not acutely toxic and therefor no contamination of the drainage occurred as a result of this release of compliant contact water to the same receiving environment. Additional information was provided in follow up spill report 21-280. To clarify, the transfer of water was from Pond 3 to

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
		Fish bearing habitat visible in the background.	cm of impacted soils prior to freshet 2022 to mitigate potential impacts to the receiving environment.	completed, if necessary, prior to Freshet 2022.	MP-06. Also note that there is no spillway in the referenced photos provided by QIA or in the vicinity of this area. Historic monitoring of a decommissioned SNP station, MP-C-G, shows the drainage pathway hasn't visibly changed and it should be noted no recent flow observed in this area due to development of the ore stockpile and associated diversion berms. Baffinland will monitor this area in Freshet 2022 for installation of silt fencing as required.
17.	Fuel drums out of secondary containment	Multiple fuel drums were observed out of secondary containment: 1. LP3 helipad (Photo 24) 2. Qikiqtaaluk Sana laydown at KM5 (Photo 27A) 3. Mine site helipad (Photo 27B)	Baffinland to move all fuel drums such to within secondary containment structures and provide photographic evidence that all drums have been moved. All future drums to remain within secondary containment structures when not in immediate use.	October 30, 2021.	Baffinland's contractor, Qikiqtaaluk Sana, was in the process of reorganizing supplies and seacans for sealift backhaul during the time of the inspection. The hazardous products have since been placed in secondary containment, and Baffinland has reiterated the importance of timely moving of hazardous products into secondary containment with the contractor. See Photo 17 B in Attachment 2 for a current photo of the Qikiqtaaluk Sana laydown. Baffinland has removed all fuel drums from the heli pad that were not in secondary containment, and has reviewed secondary containment requirements of hazardous products with the contractor. See Photo 17 A in Attachment 2 for a current photo of the Mine Site helipad.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
18.	Uncapped drill hole at Deposit 3 (Photo 28)	Uncapped drill hole visible at Deposit 3. It is unclear if the drill hole has been plugged.	Baffinland to confirm whether the drill hole requires plugging with bentonite or equivalent compound. If required, Baffinland to plug and cap the drill hole, and provide photographic evidence of completion to QIA as this relates to the pertinent Water Licence.	Capping and, if needed, plugging of drill hole to be completed by October 30, 2021.	The referenced drill hole, MR3-20-283 & 287, is located on Deposit 3 and not within the Commercial Lease boundary. No artesian flow was encountered, therefore no permanent seal was required as per Baffinland's Type B Water License. See Photo 18 included in Attachment 2, which confirm that all the casing and anchoring rods, were removed or cut off near the ground surface and capped with wood at MR3-20-283 & 287.
19.	Muster station building inundated by contact water (Photo 30)	Muster station building inundated by contact water approximately 150 mm (6 in) deep. Live wires running through contact water.	Baffinland to a) dewater area around muster station, b) provide details of plan to either remove live wires from the area or prevent future build ups of water in the area, c) implement the plan and d) submit both the plan and photographic evidence it has been implemented to QIA.	October 30, 2021.	Baffinland uses Teck 90 cabling to run all power outdoors throughout the site. Teck 90 cable is rated for total submersion in water, direct earth burial and Class II Division 2, Class III, Divisions 1 & 2 hazardous locations per the Canadian Electrical Code. There is no requirement to remove these cables from the area. As an extra measure, Baffinland placed a jersey barrier barricade to eliminate any potential interaction with the cables.
20.	Site of KM105 proposed sedimentation pond (Photo 31)	Pooling water without an outlet and no dewatering infrastructure visible.	Baffinland to describe how water in the sedimentation pond will be managed and provide a timeline when the proposed sedimentation pond will be constructed.	September 30, 2021.	As per Baffinland's Surface Water Aquatic Ecosystem Management Plan (SWAEMP) and Environmental Protection Plan (EPP), water was diverted around the active construction area via pumping during construction of the Km 105 water management infrastructure. Photo 19 showing this activity during the 2021 construction season is in Attachment 2.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
	Emergency Controlled Discharge from MS-08 Investigation and Summary of Findings		Respond to conclusions and recommendations from report. 1. Waste Rock Seepage. Relatively little waste rock seepage is expected if Baffinland's lift placement strategy is successful in ensuring the infrastructure in completely frozen. While our inspection did not identify visible seepage coming from the WRF, we recommend Baffinland provide an assessment of waste rock seepage observed at in 2021 and an evaluation of whether more seepage has been observed than predicted as a precaution. If additional seepage has reported to the WRF Pond than anticipated, we recommend Baffinland provide a management plan for QIA and regulator review, and implement the proposed management activities to limit the volume of future waste rock seepage. 2. Snow Management. The water balance and water management strategy assumes that Baffinland limits the snowpack melting within the WRF Pond Catchment to 0.5 m. As snow melt is the primary input to the WRF Pond during freshet, Baffinland should provide an evaluation of how successful snow management activities were in the 2020-2021 winter, and describe the measures that will be taken to ensure	October 30, 2021.	1. Current monitoring in relation to the WRF as outlined in the Phase 1 Waste Rock Management Plan includes: • Geochemistry sampling • Water quality monitoring of the WRF pile seepage and discharge effluent • Thermistor data collection • Water volume tracking Through implementation of the Phase 1 Waste Rock Management Plan and existing monitoring, BIM will continue to review and use thermistor data to evaluate if there are thawed zones in the WRF that could contribute to increase in seepage. These steps are outlined in the Phase 1 Waste Rock Management Plan. 2. Equipment was dedicated to snow removal at the WRF prior to the melt occurring in spring 2021. An unusually late season storm resulted in higher accumulation of snow immediately prior to a precipitation event resulting in rapid snow melt. An additional excavator and auxiliary loader have been added to the fleet in summer 2021 which will increase capacity for snow removal. As per the Snow Management Plan Baffinland will ensure snow is removed following the 0.5m criteria and continue with routine removal during the melt. 3. Baffinland observed non-contact entering the facility in June 2021 during an inspection. Equipment was dispatched to divert non-

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
			0.5 m or less deep snowpack in the WRF Pond Catchment in the future. 3. Noncontact Water Management. Given Baffinland highlighted recent precipitation events as a contributing factor to the Emergency Discharge Event despite relatively standard preceding precipitation, we are concerned that the berms around the facility intended to prevent noncontact runoff from reporting to the WRF Pond may not have functioned as intended. We therefore recommend Baffinland provide an evaluation of the noncontact water diversion infrastructure to determine whether they are functioning as intended. The berm infrastructure should be improved if noncontact runoff was a contributing factor to the Emergency Discharge Event. 4. WRF Pond Size. An Emergency Discharge Event was required despite relatively standard snow and rain fall. Baffinland should provide an assessment of the current storage capacity of the pond after the upgrade, including consideration of sediment accumulation in the pond. Feasibility of upgrading the Pond's capacity as part of current site water management or as part of Phase 2 of the Project currently under review by the NIRB would also be		contact water away from entering the facility. These diversion structures will be routinely monitored prior to and during Freshet 2022 to ensure non-contact does not enter the facility. 4. Baffinland maintains that the current design criteria and pond size is sufficient for the current life of this infrastructure and associated catchment area. Golder Associates carried out a hydrological study in 2018 to support the design of this water management infrastructure based on local hydrometric and meteorological data and updated the design criteria and WRF pond capacity accordingly. Baffinland will review these criteria for future infrastructure as part of the WRF expansion engineering scope. One of the causes identified after the event was delays in the commissioning of the water treatment plant and the ability to commence treatment and discharge to the receiving environment as the water level in the pond continued to rise. Commissioning of the water treatment plan was delayed due to internal structure damage as result of the inflatable building collapsing in the winter. Moving forward Baffinland has procured a rigid structure building that will house the water treatment plant and will minimize commissioning requirements prior to the open water season.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
			prudent. As a matter of diligence and future planning, Baffinland should revisit the water balance model for the WRF and provide an assessment as to whether the current event design criteria of the Pond is sufficient to accommodate more extreme weather events without the need for future Emergency Discharges. 5. Discharge Approach. Ongoing discharges to the receiving environment are permitted under the Project's Water Licence. However, damage to the permafrost and formation of preferential flow paths should be avoided. Baffinland should therefore revisit the discharge approach so that ongoing discharges via the final discharge point to the receiving environment no longer damages the tundra through the formation of preferential flow paths. 6. Closure. The current closure plan only considers the WRF itself and not the terrestrial receiving environment. The next iteration of the Waste Rock Management Plan (i.e., Version 4) and Interim Closure and Reclamation Plans should include provisions to address the impacts observed in the terrestrial receiving environment as a result of discharges from the WRF.		It should be noted that no non-compliant discharges from the WRF Pond FDP MS-08 to the receiving environment occurred and all water was compliant with applicable discharge criteria outlined in Baffinland's Type A water licence. 5. The referenced area was a historical preferential pathway for overland surface runoff prior to the discharge from this facility occurred. Photo 2 in Attachment 2 depicts this area prior to commencing discharge in 2018. Baffinland will be adding additional rip rap for energy dissipation at the outfall of the discharge line prior to the discharge commencing in 2022. 6. Baffinland does not plan to include terrestrial areas outside the project footprint in the ICRP. As the area of concern is within the approved project footprint for the WRF at the end of life (closure) of the project, Baffinland does not plan to include this terrestrial area as part of progressive reclamation, and will not require rehabilitation during closure. Therefore, the referenced area does not warrant to be incorporated into the next iteration of the ICRP or the WRMP.

Attachment 2

Photos

Photo 1 - KM106 Stockpile Water Management Infrastructure - 17 JULY 2021

Photo 1 A) – Arial View of KM106 Stockpile Water Management Infrastructure - 07 JULY 2021

Photo 2 – Overview of area prior to discharge commencing from FDP MS-08 – 19 AUG 2017

Photo 3 – Site Waste Clean Up Activities – 18 JULY 2021

Photo 4 – Site Waste Clean Up Activities – 18 JULY 2021

Photo 5 – Former Location of WRF WTP - 17 OCTOBER 2021

Photo 6 – Open Drum Removed and Disposed as Hazardous Waste - 19 OCTOBER 2021

Photo 7 – Snow Stockpile Clean Up Activities to Remove Debris - 7 JULY 2021

Photo 8 – Tundra Cleanup - 5 JULY 2021

Photo 9 – Scrap Metal Debris Pile Location (Post-Cleanup) - 18 OCTOBER 2021

Photo 10 – Soda Ash Location at 380-Person Camp (Post-Cleanup) - 30 OCTOBER 2021

Photo 11 – 380-Person Camp (Staining Cleanup) - 21 SEPTEMBER 2021

Photo 12 – Silt Fence at MR3-20-283 & 287 Location - 26 JULY 2021

Photo 13 – Tote Road KM97 Bridge - 26 JULY 2021

Photo 14 – KM86 Snow Stockpile Delineators - 23 OCTOBER 2021

Photo 15 – Telecom Seacan - 21 JULY 2021

Photo 16 - Q1 ditch leading to LP2 Snow Stockpile Area – 17 OCTOBER 2021

Photo 17 A) – Mine Site Helipad 28 OCTOBER 2021

Photo 17 B) – Qikiqtaaluk Sana Laydown - 16 SEPTEMBER 2021

Photo 18 – MR3-20-283 & 287 (Drill Holes) 21 JULY 2021

Photo 19 – Pumps at KM105 Dam Construction diverting water around active area

Hugh Karpik
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Qikiqtani Inuit Association
P.O. Box 1340
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RE: 2021 October Environmental Inspection – Information Request

Baffinland Iron Mines Corporation (Baffinland) provides the Qikiqtani Inuit Association (QIA) with the following response to the inspection requests[1], consistent with the Commercial Lease No. Q13C301.

The attached Table 1 provides Baffinland's responses to QIA's requests.

Should you have any additional concerns or questions regarding the attached responses, please do not hesitate to contact the undersigned at your convenience.

Regards,

Kendra Button
Environmental Superintendent

Cc: Megan Lord-Hoyle, Lou Kamermans, Tim Sewell, Shawn Stevens, Connor Devereaux, Amanda McKenzie (Baffinland)

Attachments

Attachment 1 – Baffinland Responses to QIA Information Requests

[1] QIA (2021) Re: 2021 October Environmental Inspection – Information Request. Letter dated October 8, 2021.

Attachment 1

Baffinland Response to QIA Information Request

Table 1 – Baffinland Responses to QIA Information Requests for Environmental Inspection

#	QIA Information Request	Baffinland Response
1	Baffinland to provide a list of all water management ponds that are to be drawn down ahead of freeze up this year, and provide a map of where each location is.	Baffinland has completed all discharges from water management ponds for 2021, and does not have any further plans to draw the ponds down further prior to freeze up this year. The locations for the existing water management ponds are referenced in both the *Surface Water and Aquatic Ecosystem Management Plan – Rev 7 – Appendix C – Site Drainage and Monitoring Figures* and in the *Freshwater and Sewage Supply Management Plan – Rev 8 – Appendix A.* Both management plans can be found in the download library on Baffinland's website located here: https://www.baffinland.com/media-centre/document-portal/
2	Baffinland to provide a list of all contact and non contact snow stockpile areas intended for use in the 2021-2022 winter, and provide a map of where each is located.	All snow stockpiles intended for use in 2021-22 are outlined in the Snow Management Plan – Rev. 4. Please refer to Figures 1-10 for the snow stockpile areas intended for use. The Snow Management Plan – Rev. 4 can be found in the download library on Baffinland's website located here: https://www.baffinland.com/media-centre/document-portal/
3	Baffinland to provide the instructions issued to on site staff detailing what activities are required prior to freeze up this year.	Baffinland Departments work closely with site staff to provide direction and implement actions onsite prior to freeze up. Some examples of existing documents that are used to train onsite staff and supervisors responsible for preparing site prior to freeze up are included below, copies can be provided onsite: • Departmental Winter Readiness Checklists to assess site, building, road, asset and inventory preparation and dewatering requirements • Winter Preparation Safety Memos, Safety Alerts and Presentations • Routine Inspections detailed in BAF-PH1-830-P16-0026 - Surface Water and Aquatic Ecosystem Management Plan, Section 9.1 • BAF-PH1-830-P16-0002 - Snow Management Plan • BAF-PH1-370-PRO-0006 - Tote Road Winter Snow Removal and Maintenance Procedure • BAF-PH1-810-PRO-0001 - Whiteout and Wind Storm Conditions

Chris Spencer
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RE: QIA 2021 October Environmental Inspection Report

Baffinland Iron Mines Corporation (Baffinland) provides the Qikiqtani Inuit Association (QIA) with the following response to the inspection requests[1], consistent with the Commercial Lease No. Q13C301.

The attached Table 1 provides Baffinland's responses to the 2021 October Environmental Inspection Report.

Should you have any additional concerns or questions regarding the attached responses, please to not hesitate to contact the undersigned at your convenience.

Regards,

Connor Devereaux
Environmental Manager

Cc: Megan Lord-Hoyle, Lou Kamermans, Tim Sewell, Kendra Button (Baffinland)

Attachments

Attachment 1 – Baffinland Responses to QIA 2021 October Environmental Inspection Report

Attachment 2 - Baffinland Follow-Up Photos

[1] QIA (2021) Re: Baffinland Iron Mines Corporation's Mary River Project – Qikiqtani Inuit Association October 2021 General Site Inspection Findings and Recommendations. Letter dated February 21, 2022.

Attachment 1

Baffinland Response to QIA 2021 October Environmental Inspection Report

Table 1 – Baffinland Responses to QIA 2021 October Environmental Inspection Report

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
9	Snow stockpile delineator at southeast corner of Mary River Weatherhaven snow stockpile	Snow stockpile is flimsy and not reinforced with rebar.	Baffinland to reinforce snow stockpile delineator at southeast corner of Mary River Weatherhaven snow stockpile. Baffinland to confirm when delineator has been reinforced and provide photographic evidence that all delineators are in good order.	March 31, 2022	The delineators at the weatherhaven snow stockpile have been reinforced and verified to be in good working order. See Photo 1 in Attachment 2 showing the Weatherhaven snow stockpile with reinforced delineator.
10	Snow stockpile at Mary River Warehouse	1. Snow stockpile extends outside several delineators (Photo 10). 2. Some delineators appear flimsy or broken (Photo 11) 3. Wooden debris observed in snow stockpile (Photo 12). Snow stockpiles should be free of debris and garbage.	1. Baffinland to ensure snow stockpile is constrained within the delineators and provide photographic evidence of compliance. 2. Baffinland to repair all snow stockpile delineators. 3. Baffinland to remove wooden debris from snow stockpile, provide photographic evidence no debris remains and remind operators that snow stockpiles should be free of debris.	March 31, 2022	Delineators that were accessible at the warehouse snow stockpile were in good working order. Photo 2 in Attachment 2 shows the warehouse snow stockpile. Upon investigation, the snow stockpile has been found to extend slightly past the visual flag boundary. The boundary of the Warehouse Snow Stockpile has been updated in Snow Management Plan Revision 5 to include the entire previously disturbed area. As per Baffinland's Snow Management Plan, clean up and removal of debris is an ongoing task as snow melts throughout the year and debris surfaces. Routine work is completed by operations personnel and is routinely inspected during internal Compliance Inspections.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
12	MP-06 East Cell (Photo 14)	1. Pond has not been fully drawn down increasing the risk for uncontrolled discharge during freshet. Note MP-06 west cell was more successfully dewatered. Both cells are shown in Photo 15 to provide an example of how dewatering the east cell could be improved. 2. Spillway has debris in flow path limiting its use and creating potential hazards should it be required.	1. Baffinland to report any overtopping of referenced infrastructure during freshet and improve dewatering in future years. 2. Baffinland to clear materials from MP-06 flow path.	1. July 31, 2022 2. March 31, 2022	Material previously blocking the flow path of MP-06 has been removed. See Photo 3 in Attachment 2 showing the MP-06 spillway with the flow path clear of debris.
14	Partially decommissioned Matrix building at Milne Port (Photo 17)	Matrix building is partially decommissioned but ongoing work to remove the infrastructure was not apparent. The Matrix building has been left in a state of disrepair and may	Baffinland to provide a schedule as to when the Matrix building is expected to be fully decommissioned. Decommissioning should be completed by the end of summer 2022 to limit exposure to harsher winter conditions.	Decommissioning schedule to be provided by March 31, 2022. Decommissioning to be completed prior to freeze-up 2022.	See photos 4A to 4C in attachment 2 showing the progress made in decommissioning the Matrix building and site. Baffinland is committed to completing the decommissioning of the site prior to the 2022 fall freeze-up.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
		become a source of ongoing debris to the tundra.			
16	Milne Port Ore pad snow stockpile (Photo 19)	Ore pad snow stockpile was not regraded and prepared for winter prior to freshet 2021, limiting operators' capacity to place snow within the delineators.	1. Baffinland to provide photographic evidence prior to freshet 2022 that snow placed within the ore pad snow stockpile was confined to areas within the delineators. 2. Baffinland to include evidence within the annual reports that all snow stockpiles have been prepared (graded) prior to freeze up each year.	1. March 31, 2022 2. Evidence that snow stockpiles are appropriately prepared each year to be included in subsequent annual reports.	See photo 5 in attachment 2 showing the current condition as of March 25 of the snow stockpile on the ore pad. Management of snow accumulation and approved snow stockpiles across the Project is conducted in accordance with Baffinland's approved Snow Management Plan (SMP). As per the SMP, clean up and removal of debris is an ongoing task that occurs throughout the year as snow melts and debris surfaces. Routine work is completed by operations personnel.
17	Milne Port Landfarm	No acute issues identified at Milne Port Landfarm. However, Baffinland staff noted that limited remediation has occurred to date due to the "limited warm season" despite the Mary River project	Baffinland to develop a remediation research plan to begin remediation test plots for the Landfarm.	Remediation research plan to be included with 2022 Annual Report.	Baffinland has retained a third party consultant to develop a remediation research plan for hydrocarbon impacted soils at the Milne Port Landfarm Facility. Details of the remediation research plan will be provided in the 2022 NWB QIA Annual Report for Operations.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
		operating for several years.			
21	General	Debris and damage observed throughout the site. Some appears to be the result of wind and snow, but other debris appears to be the result poor site hygiene. Observations include: 1. Broken sign left on tundra near polishing waste stabilization pond at Mary River Site (Photo 29). 2. Barrels have been knocked over and some general site disarray at Milne Port Barge Dock and Hazardous Waste Berm area (Photo 30). 3. Errant debris along shore at Milne Port (Photo 31). 4. Stakes not removed following completion of	Baffinland to complete site wide housekeeping and tidying. Baffinland to implement the following corrective actions: 1. Baffinland to replace sign and dispose of the broken sign. 2. Baffinland to complete general site tidying at the Barge Dock and Hazardous Waste Berm area. 3. Baffinland to complete shoreline walk and remove all garbage. 4. Baffinland to remove stakes from Barge Landing Area and ensure staff clean up following future surveys. 5. Baffinland to remove fabric from pond as soon as possible while the pond thaws to allow for consistent dewatering and report any overtopping of the infrastructure that occurs during freshet 2022.	1. May 31, 2022 2. May 31, 2022 3. May 31, 2022 4. May 31, 2022 5. May 31, 2022 Reporting to be included in 2022 annual report if necessary. 6. March 31, 2022 Photographic evidence fuel barrels have been removed at the conclusion of the operating season to be provided in future annual reports. 7. May 31, 2022	Fuel drums at the Milne Port helipad located outside of secondary containment were removed from the area and placed within appropriate secondary containment. See Photo 6 in Attachment 2 for a current photo of the Milne Port helipad with the fuel drums removed. In the future, fuel will be removed from the helipad and stored in appropriate secondary containment at the close of the active helicopter season.

#	Project Location	Description of Concern or Finding	Recommended Action	Completion Deadline	Baffinland Response
		survey at Barge Landing Area (Photo 32). 5. Errant fabric debris frozen into remaining water in Milne Port polishing waste stabilization pond which can clog dewatering infrastructure during freshet (Photo 33). 6. Fuel barrels at the Milne Port Helicopter Pad stored without secondary containment (Photo 34). No fuel barrels should be present at Helicopter Pads in October given the safe operating helicopter season has concluded. 7. General debris and garbage left on ground near 380 Person Camp at Milne Port (Photo 35).	6. Baffinland to remove the fuel barrels from the Helicopter Pad and provide photographic evidence as part of future annual reports that all fuel barrels have been removed from Helicopter Pads following the conclusion of the safe operating season. 7. Baffinland to remove general garbage near 380 Person Camp and provide photographic evidence of compliance.		

Attachment 2

Photos

Photo 1– MS Weatherhaven Snow Stockpile with repaired and reinforced rebar - 26 Mar 2022

Photo 2– MS Warehouse Snow Stockpile showing stockpile extending slightly to the south west past the previously established boundaries. – 28 Mar 2022

Photo 3– MP-06 spillway free of debris – 28 Mar 2022

Photo 4A – Milne Port Matrix laydown - 23 Mar 2022

Photo 4B – Milne Port Matrix laydown – 22 Mar 2022

Photo 4C – Milne Port Matrix laydown – 22 Mar 2022

Photo 5– Snow Stockpile on the Ore Pad – 25 Mar 2022

Photo 6– Fuel drums removed from the helipad - 25 Mar 2022