Baffinland

October 23, 2015

Resource Management Officer
Nunavut Field Operations
Aboriginal Affairs and Northern Development Canada
PO Box 219
Box 100
Iqaluit, NU X0A 0H0
Justin.Hack@aandc-aancd.cg.ca

Re: Follow up July 30 – August 3, 2015 AANDC Water Licence Inspections - Water Licences Nos. 2AM-MRY1325, 8BC-MRY1416, 2BE-MRY1421 - Mary River Project

A Water Licence Inspection was conducted on July 30th to August 3rd, 2015, at Baffinland's Mary River Project by the Aboriginal Affairs and Northern Development Canada (AANDC) Water Resource Officers. During the inspection, some concerns were identified and these concerns are outlined in the attached Inspection Report that was received September 25th, 2015.

The attached Table A.1 provides a table that summarizes the Inspector's key observations and concerns along with Baffinland's responses.

Should you require further information on the above, please feel free to contact the undersigned or Allan Knight at (647) 253-0596 Ext. 6010 or Jim Millard at (902) 403-1337.

Prepared by:

Trevor Myers, B.A.(Hon.), M.Sc.
Environmental Superintendent

Reviewed by:

JamesMillard
2015-10-23
20:44-04:00

James Millard, M.Sc, P.Geo.
Environmental Manager

Attachments: - AANDC Water Licence Inspection Report, dated July 2, 2015 (5 pages).
- Table A.1 (3 pages)

cc. Bernard Laflamme, Erik Madsen, Tony Woodfine, Bikash Paul, Oliver Curran, Allan Knight, Jennifer St. Paul-Butler (Baffinland).
Erik Allain, Scott Burgess (AANDC)

Aboriginal Affairs and Northern Development Canada | Affaires autochtones et Développement du Nord Canada

WATER LICENCE INSPECTION FORM

☒ Original
☐ Follow-Up Report

Licensee	Licensee Representative
Baffinland Iron Mines Corporation (BIMC)	Jim MILLARD/Allan KNIGHT/Trevor MYERS
Licence No. / Expiry	**Representative's Title**
2AM-MRY1325	Environmental Manager
Land / Other Authorizations	**Land / Other Authorizations**
8BC-MRY1416, 2BE-MRY1421	N2014X0012, N2014Q0016, N2014C0013
Date of Inspection	**Inspector**
July 30 – August 3, 2015	Justin HACK

Activities Inspected

☒ Camp ☐ Drilling ☒ Mining ☒ Construction ☐ Reclamation ☒ Fuel Storage
☒ Roads/Hauling ☐ Other: ☐ Other:

Conditions: **A - Acceptable** **C - Concern** **U - Unacceptable** **NA – Not Applicable** **NI – Not Inspected**

Water Use	Condition	Comment	Site Conditions	Condition	Comment	Haz/Mat Management	Condition	Comment
Intake/Screen	NI		**Water Management Structures**	**C**		**Storage**	**C**	
Flow Measure. Device	NI		Culverts / Bridges	A		Spills	A	
Source:	A		Drainage	A		Spill Plan	A	
Water Use:	A		**Erosion / Sediment**	**C**				
Recirculation (y /n)	NA		**Mitigation Measures**	**C**		**Administrative**		
			Reclamation Activities	A		Records	A	
			Materials Storage	A		Reports	A	
Waste Disposal			Signage	A		Plans	A	
Waste Water	A					Notifications	A	
Solid Waste	A		**Monitoring**			**Other**		
Hazardous Waste	**C**		Sample Collection / Analysis	NI		Follow-up from previous inspection	A	

**The number in the comments field will correspond with specific comments provided below.*

Samples taken by Inspector:	Location(s):
☐ Yes ☒ No	

SECTION 1 ☒ **Comments** ☐ **Non-Compliance with Act or Licence** ☐ **Action Required**

Inspectors Statement

On July 30 to August 3 2015, a water licence inspection was conducted at the Mary River Project, Qikiqtani Region, Nunavut. All observations concerning geotechnical earthworks were verified by a third party Geotechnical Engineer that accompanied the Inspector for the Water Licence Inspection.

Sites inspected included the Mary River Mine Site, the Tote Road, the Milne Port area, Steensby Inlet, and Mid-Rail Camp.

Background

At the time of inspection, the Licensee was undertaking activities related to the construction and operation of an open-pit iron ore mine at the Milne Port (Milne Inlet), Mine site (Mary River), Tote Road. Mid-Rail Camp and Steensby Inlet were inactive at the time of inspection.

Given that different licence conditions apply to the project depending on what Phase the project is in, and that the project is in both construction and operation phases, Aboriginal Affairs and Northern Development Canada's (AANDC) Water Resource Officer's are working with the Licensee to ensure all relevant water licence conditions are being met.

Major construction activities on site included the re-grading and/or upgrades of the Tote Road, and upgrades to the Mine Haul Road.

Major activities occurring on site under the scope of the operations phase include the mining, crushing, screening and transportation of ore from Deposit 1 to the Ore Stockpile area at Milne Inlet. Shipping of ore began on August 6, 2015.

No major issues of non-compliance exist on site.

Canada

SECTION 2 ☐ **Comments** ☐ **Non-Compliance with Act or Licence** ☒ **Action Required**

Water Management Structures:

Mine Site

1. Concrete Batch Plant water storage area
    - A temporary water storage berm was constructed for the deposit of by-product from the concrete batch plant. By-product is still contained within this facility.
    - The geotechnical engineer determined that the liner performance was satisfactory.
2. Ore Crushing Sedimentation Pond and Laydown Area
    - The ore crushing and loading pad is a levelled area, followed by a side ditch with a rip-rap lining for erosion control. The ditch has an inlet to the lined sedimentation pond downstream.
    - Two sides of the sedimentation pond follow the natural drainage edge of the area and require erosion protection.
    - The liner had minor tears and punctures which need immediate repairs.
3. Jet Fuel Tank Farm Containment at Aerodrome
    - The crest and profile of the embankments are not being maintained.
    - It is recommended that the containment berms/embankments be treated as structures and their crest width and slopes and all surfaces be maintained to the design profile.
    - It is suggested that a policy preventing mobile equipment access over the crest of any embankments, berms or other lined facilities be developed, communicated to site workers and posted.
4. Bladder Tank Farm Containment
    - This is an old facility and is being decommissioned, the lined containment appears functional. No indications of water seepages were evident on the slopes or in its vicinity.
5. Bulk Fuel Storage Facility Containment
    - No indication of overflow and the geotechnical engineer confirmed there did not appear to be any structural weakness.
    - The embankment crest and some side slopes were not maintained to the design profile as required.
6. Hazardous Waste Containment
    - All of the hazardous waste containment facilities on site are lined.
    - It was noted that the crest width and profiles of some of these facilities near the aerodrome were not in good shape. There were indications of manoeuvring of tracked machinery over the embankment resulting in a disturbed embankment profile. It is recommended these containments receive maintenance.
    - It is suggested that a policy preventing mobile access over the crest of any embankments, berms or other lined facilities be developed, communicated to site workers and posted.
7. Mine Pit and Waste Rock Storage Containment Pond
    - Mine operations have started with excavation into the hill side. A pit is not yet formed.
    - A small waste rock storage pile has been created and a temporary lined collection pond placed immediately downstream of it. Unlined side ditching also directs water to the pond.
    - Excess water in the pond, once tested, is being discharged into the Mary River catchment drainage.
8. Polishing Waste and Stabilization Pond
    - The three pond system appears to perform satisfactory. No drainage or leaks were observed outside containment.
    - The geotechnical engineer highlighted that air bubbles, causing doming of the liner within the facility should be addressed.
9. Jetty at Camp Lake
    - Earth work appears to perform satisfactory.
    - The geotechnical engineer has observed no slope instability, ground instability, or bearing capacity issues.

Milne Port Site

10. Snowmelt Pond and Landfarm Water Containment Facility
    - This is a lined pond and the performance of the berms and liner appeared satisfactory. No bearing capacity, settlement or slope instability, seepage or its manifestations were visible.
11. Ore Stockpile Runoff Collection and Settling Pond (West)
    - Embankments and liner performance appeared satisfactory. No manifestations of settlement, slope instability or seepage were noted.
    - Catchment drainages into the pond should be armored with rip-rap.
12. Ore Stockpile Runoff Collection and Settling Pond (East)
    - Embankments and liner performance appeared satisfactory. No manifestations of settlement, slope instability or seepage were noted.
    - Catchment drainages into the pond should be armored with rip-rap.
    - At the time of the inspection, wind was entering below the liner and allowing it to move. This should be secured to prevent it being lifted and windblown.

- There were indications of active erosion on the terrace edge from run-off close to the Ore Settling Pond. It these are not attended to, it may lead to instability of the pond embankment.

13. Fuel Tank farm Containment
    - This is a lined and fenced facility. Water was collecting in the facility as designed.
    - The embankments and liner performance appeared satisfactory. No bearing capacity, settlement or slope instability, seepage or and its manifestations were visible.
14. Bladder Containment Area
    - This old bladder tankfarm is being decommissioned; the liner appears to be functional.
    - No sign of water seepage was evident on the downstream side of the bladder tankfarm berms.
15. Polishing Waste and Stabilization Pond
    - A lined facility. The liner and embankment performance appeared satisfactory.
    - No drainage or leakages were observed outside the containment and no signs of slope instability or excessive settlement or bearing capacity issues were identified.
16. Hazardous Waste Containment Facility
    - A lined facility. Some of the berm crest widths and profiles were not in good shape and there were indications of manoeuvring of tracked machinery over the berms.
    - It is suggested that these containments be sign-posted warning of the shallow cover material thickness over the liner. Caution should be exercised when placing heavy, sharp, or other large objects which may have the potential to puncture the liner.
    - It is suggested that a policy preventing mobile equipment access over the crest of any embankments, berms or other lined facilities be developed, communicated to site workers and posted.

Steensby Port

17. Fuel Storage Berm
    - The containment berms at Steensby Camp site were in good condition.

Mid-Rail Camp

18. No issues with water management structures present at Mid-Rail camp.

Infrastructure in the Marine Environment:

19. Ore Dock
    - No signs of surface run-off erosion/sedimentation were occurring.

Waste Water:

20. Water discharge locations
    - All discharge locations that were inspected were equipped with appropriate measures to limit erosion from the point of discharge.
    - Reports related to disposal of waste to water were not inspected.

Water Crossings and Culverts:

21. Bridges
    - The geotechnical engineer reported that all bridges and abutments appeared to be in a stable condition.
22. Culverts
    - Installations and extensions are still ongoing throughout the site.
    - All culverts inspected on site were functioning as intended.

Mitigation Measures:

23. Quarry QMR2
    - It was noted that QMR2 had locally thicker overburden and BIMC should consider additional erosion protection measures if Total Suspended Solids exceeds water licence limits.
24. Mine Haul Road
    - In general, the mine haul road surface, ditches, culverts, and runoff collection/sedimentation control ponds, silt fences along the disturbed drainage areas and side slopes appear relatively trouble-free and functional. However, there are limited sections of the haul road where soil conditions are prone to excessive wetness and silt loading which need more attention than other areas.
    - It is noted that remedial work continues to be done on this road to prevent excessive sediment loading; however, it is recommended that BIMC proactively identify areas that are more prone to silt-loading and implement appropriate sedimentation mitigation measures before disturbance occurs.
    - It was observed that significant levels of dust were created from vehicular travel on the road and deposited into water. Calcium chloride is being applied to the road to reduce this effect. Effects of this dust on water are being monitored by BIMC to prevent exceedances of water licensing criteria.
25. Tote Road
    - In general the road surfaces, ditches, culverts, and sedimentation control ponds, silt fences along the disturbed drainage and side slopes all along the road appear to be relatively trouble-free and functional.
    - However, there are some localised sections of the road where perhaps soil conditions are prone to sloughing, excessive wetness and silt loading. In particular, the location near to David Lake (KM78 to 86).

- Again, it is recommended that BIMC proactively identify areas that are more prone to silt-loading and implement appropriate sedimentation mitigation measures before disturbance occurs.
- As well, it was observed that significant levels of dust were created from vehicular travel on the road and deposited into water. Calcium chloride was being applied to the road to reduce this effect. Effects of this dust on water are being monitored by BIMC to prevent exceedances of water licensing criteria

26. Mid-Rail Camp
    - There was some damage to the tent structures from snow load and/or wind damage. Ensure that materials be secured before further wind events blow debris outside of the tents.

Materials Storage:

27. Landfill
    - It was noted that the landfill was compacted well and the surface and side slopes appear to maintain appropriate profiles.
    - There was no indication of any excessive settlements or side buldges or any seepage or slope instability or bearing capacity distress.
28. Calcium Chloride Storage Area
    - Dust suppressant salt bags are stored in large-size sacks located on a hill side near the Q1 Quarry. There were no signs of slope instability, seepage or its manifestations.
    - It is recommended that a perimeter berm/drainage ditch be installed to route the runoff away from the storage and down the slope hill to the drainage ditch along the Tote Road as a preventative measure.
29. Ore Stockpile
    - No accumulation of water was evident on site.
    - No further concerns other than the ditching concern outlined below (#36).

Erosion/Sedimentation:

Sites of Concern noted from previous Inspections:

30. Application of Calcium Chloride on roads not occurring in tandem with Water
    - At the time of the inspection, BIMC was premixing the calcium chloride and water before application.
    - This satisfies my earlier concern.
31. Storage of materials and equipment within 31m above the ordinary High Water Mark of any water body
    - BIMC has satisfied this concern. Shipping containers and crates, used for explosives storage has stopped, and excess containers have been removed from the unauthorized area.
32. Deposition of snow containing debris and sediment within 31m of water
    - All concerns relating to the snow containing debris have been addressed through an action or development of a Plan.
    - The snow containing debris near a watercourse was cleaned up at Milne Port.
    - The snow containing debris at edge of the laydown area near Site Services Building (Mary River) within 31m of a Sheardown Lake tributary has been addressed by BIMC on July 28, 2015.
        i. Silt fences have been installed around this pile and BIMC's plan is to remove this sediment when the ground is adequately frozen.
33. Construction on the Tote Road at KM76.5
    - BIMC has installed silt fences, rock berms and other structures to mitigate further releases of sediment into water at this location.
34. Pumping of water over Tote Road at KM6 causing sedimentation
    - BIMC has warned road crews about this practice during freshet events. Other water discharge locations had appropriate mitigative measures in place.
35. Erosion and Sedimentation from Construction Activities
    - Due to the size of the impacted area, erosion and sedimentation continue to be an issue during the open water season. It is recommended that a BIMC identify areas prone to siltation and implement sedimentation and erosion measures before work begins.
36. Silt fences
    - Silt fences have been addressed as requested in the previous inspection, prior to BIMC's commitment of September 15, 2015.
37. Ore Stockpile Pad Diversion Ditches at Milne Inlet
    - In the previous inspection it was noted that diversion ditches were not installed around the Ore Stockpile Pad.
    - BIMC has identified that this work will be completed by freshet 2016.
38. Ore Stockpile Settling Pond at Milne Inlet
    - In the previous inspection report, it was noted that the liner was not properly keyed-in.
    - The geotechnical engineer confirmed that the catchment drainages needed to be secured with rip-rap and the edges properly keyed-in.
    - BIMC has identified this work will be completed by freshet 2016.

Sites of Concern Managed by a Compliance Action Plan:

39. Drilling/Road Salt (Calcium Chloride)
    - Since the August 21-25 2014 Inspection, BIMC has submitted a plan to address concerns AANDC Water Resource Officers had with the storage of Calcium Chloride near the quarry site at Milne Inlet.
    - BIMC has met the deliverables as set forth in their plan.
40. Waste Ash in barrels near incinerator
    - Since the August 21-25 2014 Inspection, BIMC has submitted a plan to address concerns AANDC Water Resource Officers had with the storage of Waste Ash.
    - As of July 31, 2015 BIMC has met the deadline of disposing of the Category 1 Ash.
    - The Soil Monitoring Report and Final Summary Report of this activity are due September 30, 2015.

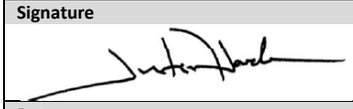
Inspector's Name	
Justin Hack	
Signature	
	
Date	
September 25, 2015	

Table A.1 - Response to AANDC Water Licence Inspection - July 30 - August 3, 2015

ITEM No.[1]	Observation or Item of Concern	Baffinland Responses
Waste Management Structures		
Mine Site		
2	***Ore Crushing Sedimentation Pond*** *- Two sides follow the natural drainage of the area and require erosion protection. Liner had minor tears and punctures which need immediate repairs*	The design engineers for these facilities and our geotechnical inspector have been notified of these observations and have been asked to develop an action plan to address the issues. Action plans will be presented in the cover letter that will accompany the second 2015 geotechnical inspection report to be provided in November 2015.
3	***Jet A Fuel Tank Containment*** *- crest and profile embankments are not being maintained.*	This issue has been brought up by supervisors to their team members and the berms are being monitored to ensure no further disturbance. Consideration is being given to the strategic installation of barriers and/or signs.
5	***Bulk Fuel Storage Facility*** *embankment crest and some side slopes were not maintained to the design profile as required.*	
6	***Hazardous Waste Containment*** *- crest width and profiles of some of these facilities near the Areodrome were not in good shape. Indications of manoeuvering of tracked machinery over the embankment resulting in a disturbed embankment profile.*	
8	***Polishing Waste Stabilizing Pond*** *- The geothechnical engineer highlighted that air bubbles, causing doming of the liner within the facility should be addressed.*	Our geotechnical Engineer has stated that there is no easy way of removing these "bubbles" and they should readily disappear when more effluent is discharged to the containment. In addition, he has stated that they are not likely a cause for concern. Therefore, at this time, there is no further action planned other than to continue to visually observe.
Milne Port Site		
11	***Ore Stockpile Runoff Collection and Settling Ponds*** *catchment drainages into the pond should be armoured with rip-rap.*	Once the drainages for the pond are fully constructed, the armouring will be installed as necessary.
12	***East Ore Stockpile Settling Pond*** *wind entering below the liner and allowing it to move.* *Indications of active erosion on the terrace edge from run-off close to the Ore Settling Pond.*	More soil ballast will be added on the south edge over the liner which appears subject to impacts from wind. Used tires may be used for this purpose as well.
16	***Hazardous Waste Containment Facility*** *crest widths and profiles were not in good shape and there were indications of manoeuvering of tracked machinery over the berms.* *It is suggested that these containments be sign posted warning of the shallow cover material thickness over the liner. Caution should be exercized when placing heavy , sharp, or other large objects which may have the potetial to puncture the liner.*	This issue has been brought up by supervisors to their team members and the berms are being monitored to ensure no further disturbance. Consideration is being given to the strategic installation of barriers and/or signs.

Mitigation Measures		
23	***QMR2*** *locally thicker overburden and install additional erosion protection measures if Total Suspended Solids exceed water licence limits.*	The quarry is still active and the unstable area noted in the inspection had already been identified and measures are planned for stabilizing. The QMR2 Quarry Management Plan and Interim Closure and Reclamation Plan includes requirements to ensure for long term stability at the time of closure. Runoff quality is monitored regularly through through the open water season for this area and sedimentation measures are implimented proactively and as required.
24	***Mine Haul Road*** *limited sections of the road are prone to excessive wetness and silt loading which need more attention than other areas.* *It is noted that remedial work continues to be done on this road to prevent excessive sediment loading; however, it is recommended that BIMC proactively identify areas that are more prone to silt loading and implement appropriate sedimentation mitigation measures before disturbance occurs.*	Noted and agreed.
25	***Tote Road*** *localised sections of the road are prone to sloughing, excessive wetness and silt loading. Inparticular, the location near to David Lake (Km78 to 86).*	Further installation of culverts and the use of armour stone in ditches that receive high levels of flow will be completed prior to Freshet 2016.
26	***Mid-Rail Camp*** *damage to the tent structures from snow load and/or wind damage. Ensure that materials be secured before further wind events blow debris outside of the tents.*	This task is scheduled to be completed during the summer, 2016, once the helicopter returns to site.
Materials Storage		
28	***Calcium chloride storage area at Q1*** *perimeter berm/drainage ditch be installed to route the runoff away from the storage and down the slope hill to the drainage along the Tote Road as a preventative measure.*	Visual monitoring and flow mapping of this area will be undertaken during Freshet 2016. Drainage measures will be implimented as appropriate.
Erosion and Sedimentation		
Sites of Concern noted from previous inspection		
30	*Application of Salt on roads - salt was being applied to the road without a water truck applying water to the salt.*	Noted.
31	*Storage of materials and equipment within 31m above the ordinary High Water Mark of any water body.* *- sealift crates at explosives magazine storage on Mine Road is within 31m of a Mary River tributary, Inspector requests plan to be provided before the next Inspection - July 30, 2015.*	This concern has been addressed.
32	*Deposition of snow containing debris and sediment within 31m of water. Deposition of large quantities of snow containing high levels of sediment and debris near water is unacceptable.* *- develop and implement a Snow Management Plan by* ***November 30, 2015*** *.* *- develop action plan for removal of sediments located near the Aerodrome drainage by* ***July 15, 2015 - remove sediments when adequately frozen.*** *- Snow containing sediment and debris near the hazardous waste berm at Milne Inlet to be removed by July 1, 2015 .* *- the deposition of sand containing debris, as a result of snow disposal, at edge of '07 Laydown is within 31m of tributary needs to be removed by July 15, 2015*	A Snow Management Plan will be developed by Nov 30, 2015. Silt fences have installed near Aerodrome drainage to prevent siltation and the sediments will be removed when conditions allow. Snow containing debris near watercourse was removed at Milne Port. Sand containing debris at edge of '07 laydown has also been addressed and erosin control measure installed as a safeguard.

35	***Construction Activities*** *- erosion and sedimentation continue to be an issue during the open water season. Areas prone to siltation need to be identified, and sedimentation and erosion measures implemented before work begins.*	Prior to the commencent of the open water season 2016, sediment and erosion contol measures will be reviewed with departments undertaking construction activities.
37	***Ore Stockpile Pad Diversion Ditches at Milne Inlet*** *- diversion ditches will be installed around the Ore Stockpile Pad completed before* ***freshet 2016.***	Drainage ditches will be constructed prior to freshet 2016
38	***Ore Stockpile Settling Pond at Milne Inlet*** *- catchment drainages need to be secured with rip-rap and the edges properly key-in completed before* ***freshet 2016*** *.*	Erosion protection measures will be implimented prior to freshet 2016.
Sites of Concern Managed by a Compliance Action Plan		
39	***Drilling/Road Salt*** *(Calcium chloride)* *- Cleanup of compromized salt bags by July 31, 2015*	It is Baffinland's understandign that all applicable deliverables have now been met as set forward in plan.
40	***Waste Ash*** *in barrels near incinerator* *- soil monitoring and final summary report due* ***September 30, 2015***	The final summary report was submitted Sept 30, 2015.

Notes:

[1] Item No. as referenced in AANDC Water Licence Inspection Report July 30 to August 3, 2015