6.0 BEST PRACTICES

6.0.1 General

When conducting planning, development, and operational activities, the following information is provided to assist the aerodrome operator in dealing with various issues such as:

a) The size and zoning of ice aerodromes should meet the aviation standards given in TP 312 – *Aerodrome Standards and Recommended Practices*.

b) Centreline and threshold markings can be made with blue or purple dye for ease of identification.

c) The thickness of an ice cover should be determined with sufficient accuracy to allow a recommended maximum load to be established. The runway should be closely inspected for ridges and depressions, which can be corrected by bulldozing and flooding respectively.

d) A runway used for the first time should be inspected after the first landing and after subsequent landings of heavier aircraft, in addition to the inspection frequencies previously recommended.

e) An aircraft may land on ice without incident, but may produce many cracks in the ice cover. The aircraft may then break through the ice when moving at a low speed during a subsequent take-off. Crack inspection should be a serious undertaking for ice aerodrome operators.

f) Wheeled aircraft should not land on un-compacted snow deeper than one-third of the wheel diameter or in accordance with the Aircraft Operations Manual (AFM).

g) Snow should be removed except for a 50 to 75 mm layer. Greater ice thickness is required when the ice is covered with deep snow, and when the ice is used less than two days after the removal of deep snow. Snow banks should not be allowed at the ends of runways. The height of snow banks at the sides of runways should not exceed one-half of the ice thickness.

h) Weight of stored materials, stationary loads and snow should not exceed the aircraft loading allowed for the condition and thickness of the ice cover.

i) Allowable weight for aircraft on skis is determined in the same manner as for wheeled aircraft.

6.0.2 Aerodrome Log

a) Aerodrome operators must maintain a log on the construction, maintenance and operation of their ice aerodromes. Following is an example of the type of information that the log is intended to record, such as:

1. location of the aerodrome;
2. name of the operator;
3. length of runway (ft);
4. width of runway (ft);
5. description of the construction of aircraft parking/unloading area;
6. runway threshold (and end) coordinates; and
7. threshold elevations (Mean Sea Level), if the runway has an IP.

b) Information regarding maintenance activities should also be recorded (log can be divided into periods of one week intervals) indicating a brief description of:

1. work done on the ice such as snow compacting or ploughing, flooding, reinforcing, any precautions taken to prevent snow drifting, etc;
2. observed ice thickness at the end of each period for built-up ice and surrounding undisturbed ice cover; and
3. annotation, if available, for the characteristics of the ice cover such as ice types, density, salinity, temperature, and strength, to mention a few.

6.0.3 Aerodrome Weather Log:

a) Aerodrome weather must be tracked on a daily bases and during aircraft operations. At least one log entry per day capturing at minimum:

1. Ceiling and visibility
2. Wind (direction and speed)
3. Altimeter setting
4. Temperature and Dewpoint

b) Additional log entries must be made during aircraft operations and during periods of rapidly changing weather parameters. This information will be used in determination of ice runway continued suitability for safe aircraft operations.

6.0.4 Ice Strip Inspection

Aerodrome Operator must complete form as shown in appendix H and forward the completed form to Nolinor Flight Operations Department prior to the beginning of the operations.

7.0 INSTRUMENT PROCEDURES

7.0.1 General

a) Aerodrome operators and/or IP sponsors intending to provide IP at a non-certified ice aerodrome should refer to AC 301-001 and AC 301-002 for further guidance.

7.0.2 Requirements for an Instrument Procedure

a) At a minimum, the aerodrome should:

1. be registered with TCCA as an aerodrome (Part III, Subpart 01 of the CARs) and as such should have a four character ICAO aerodrome location indicator and a NOTAM file provided by NAV CANADA; and

2. if operated as a private aerodrome, the aerodrome operator should if necessary annotate their published aeronautical information (CFS, WAS, CAP etc) as Prior Permission Required (PPR) to limit the number of air operators intending to use the aerodrome.

b) The runway should be landlocked or relatively immobile thereby limiting movement of reference points critical to the IP. The runway should also be assessed for ice shift on a routine basis (daily or more frequently if ambient conditions dictate) so that all horizontal and vertical movements are maintained within IP design criteria and publication/charting limits (see TP 308/GPH209 & ICAO Annex 15, Appendix 7). If limits are exceeded, NOTAM action is required.

c) The IP should:

1. be TP 308/GPH 209 criteria compliant (see Sections 803.01 and 803.02 of the CARs) despite ice shift (i.e. runway alignment, threshold coordinates, threshold elevation, etc);

2. maintain ―Publication Resolution‖ regarding all aeronautical data as found in ICAO Annex 15, Appendix 7 – *Aeronautical Data Quality Requirements*.

d) See paragraph 4.5(1) Recommendations‘ and paragraph 4.6(1) Seasonal Reconstruction‘ of this Ice Aerodrome Procedures Guide regarding IPs.

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8.0 OPERATING PROCEDURES

a) Prior to first flight of the day the ice aerodrome operator will forward a copy of the aerodrome maintenance log to Nolinor Dispatch. At the end of each flight day the flight crew will submit an ice aerodrome report to the dispatch center.

b) The ice aerodrome operator will provide Nolinor Dispatch with weather reports commencing 3 hours prior to dispatch of the first flight and up until departure from the ice aerodrome of the last flight.

Personnel must be familiar with the requirements for weather reporting at the site and will provide weather information at minimum:

- Ceiling and visibility
- Wind (direction and speed)
- Altimeter setting
- Temperature.

c) The ice aerodrome operator will communicate to the flight crew prior to arrival the latest weather information available, runway conditions and confirmation that the runway is clear of vehicle traffic and obstructions via VHF radio.

d) In the event that an aircraft is involved in an accident/incident at the site, it is imperative that Nolinor Dispatch be notified immediately. Nolinor will implement emergency response procedures.

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9.0 AIRCRAFT FLEET – Type Characteristics:

a) B-737-200

The B-737-200 is a two-engine jet aircraft designed to carry passengers and cargo on short airstrips. It is as very versatile aircraft uniquely suited to the demands of Northern Canadian flight operations. It's physical size demands special attention to be paid to the surfaces onto which it operates.

Characteristics:

Max Take Off Weight	119,500 lbs to 125,000 lbs
Max Landing Weight	103,000 lbs to 107,000 lbs
Max Zero Fuel Weight	95,000 lbs
Max Payload	20,000 lbs to 35,000 lbs
Max Pax Load	119 passengers
Fuel Capacity	34,500 lbs
Fuel Burn	6,000 lbs per hour
True Air Speed	425 kts (490 mph)

b) Convair 580

The Convair 580 is a twin-engine turbine propeller aircraft designed to carry passengers and cargo on short airstrips. It is as very versatile aircraft uniquely suited to the demands of Northern Canadian flight operations.

Characteristics:

Max Take Off Weight	58,156 lbs
Max Landing Weight	52,000 lbs to 53,000 lbs
Max Zero Fuel Weight	50,000 lbs
Max Payload	8,000 lbs to 15,000 lbs
Max Pax Load	50 passengers
Fuel Capacity	11,200 lbs
Fuel Burn	2,500 lbs per hour
True Air Speed	285 kts (328 mph)

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10.0 NOLINOR CONTACT INFORMATION

For more information, please contact Nolinor Flight Operations at:

Nolinor – Flight Operations

Telephone: 450-476-0018
Fax: 450-476-0199
Email: information@nolinor.com

For flight activity reporting and ice aerodrome reporting contact:

Nolinor - Dispatch

Telephone 450-476-0018 ext. 230
Fax: 450-476-0199
Email: information@nolinor.com

In case of an emergency contact:

Nolinor - Dispatch
Telephone: 450-476-0018 ext. 230

Secondary Emergency Contact:
Yves Bergeron, Director, Flight Operations, 514-214-4150

Flight Service Station (Arctic Radio): 866-541-4109

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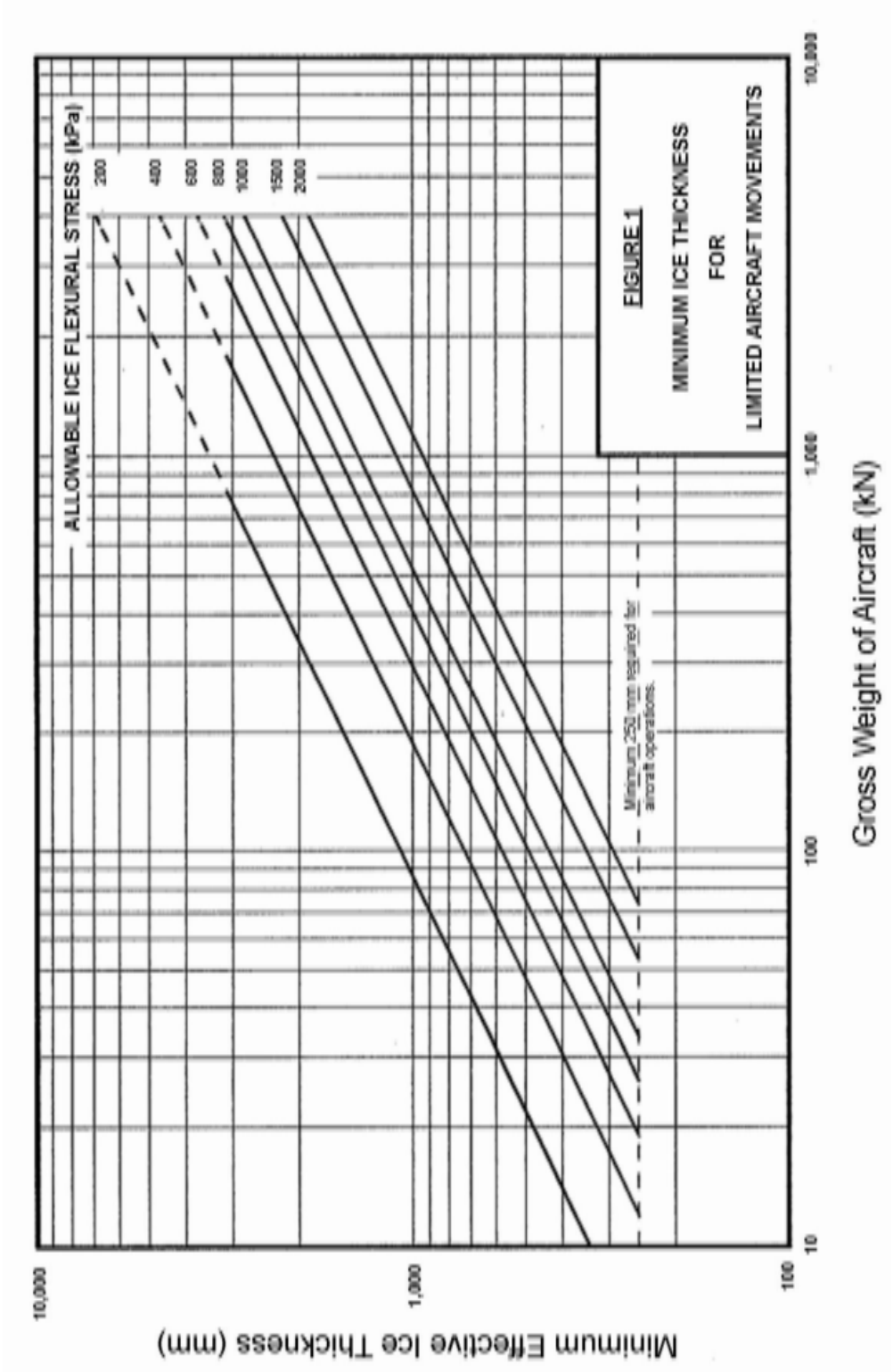
APPENDIX A — MINIMUM ICE THICKNESS FOR LIMITED AIRCRAFT MOVEMENTS



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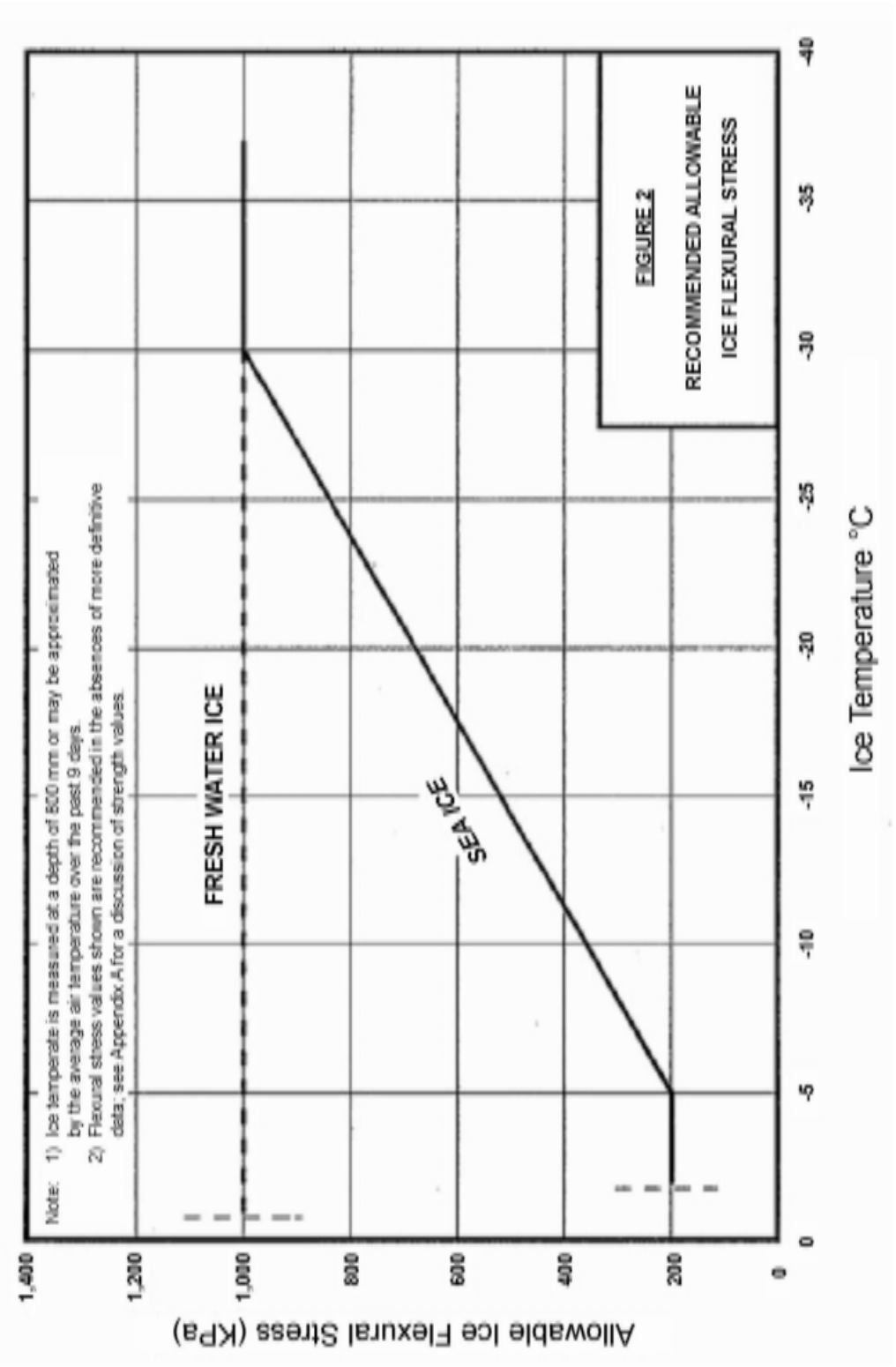
APPENDIX B — RECOMMENDED ALLOWABLE ICE FLEXURAL STRESS



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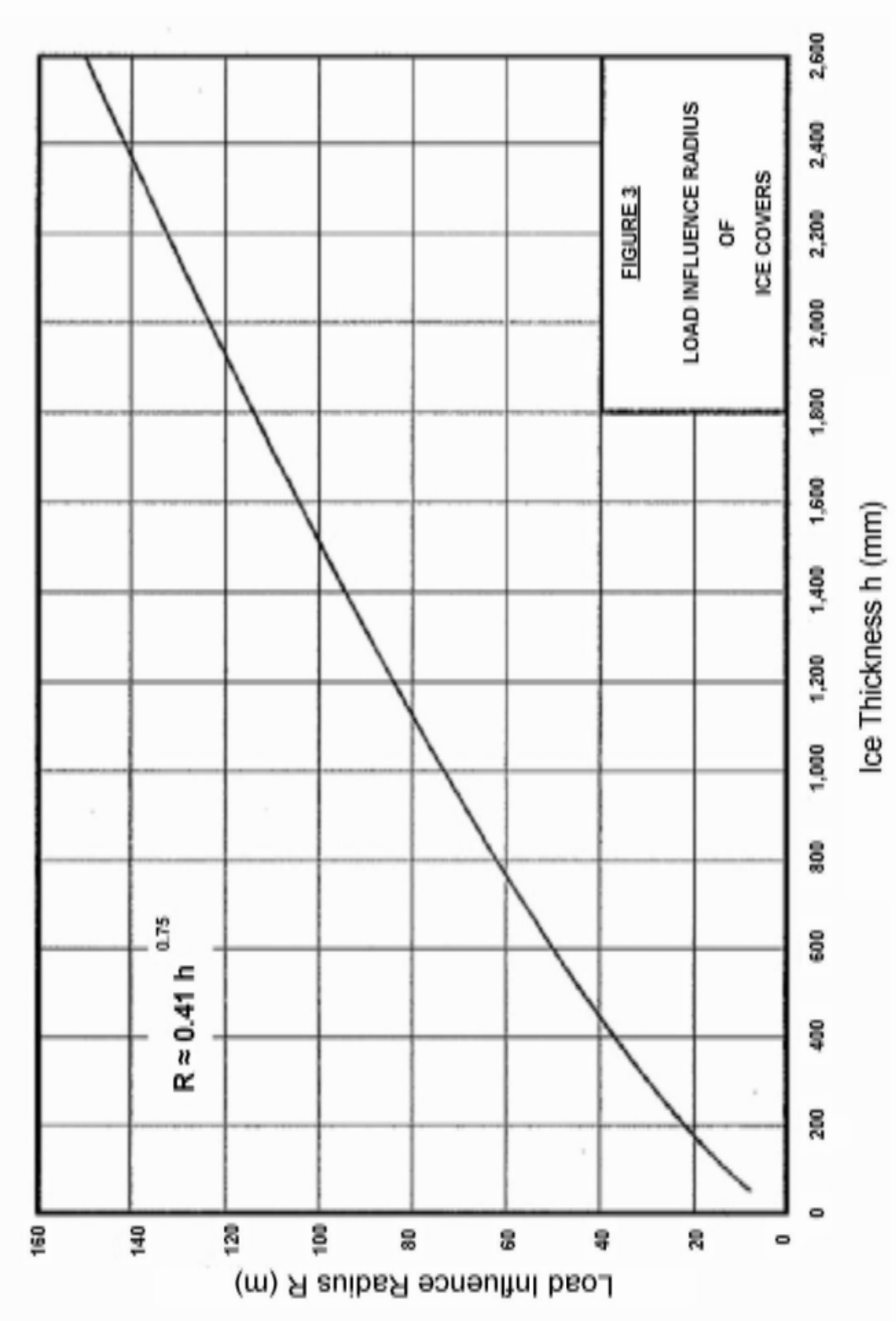
APPENDIX C — LOAD INFLUENCE RADIUS OF ICE COVERS



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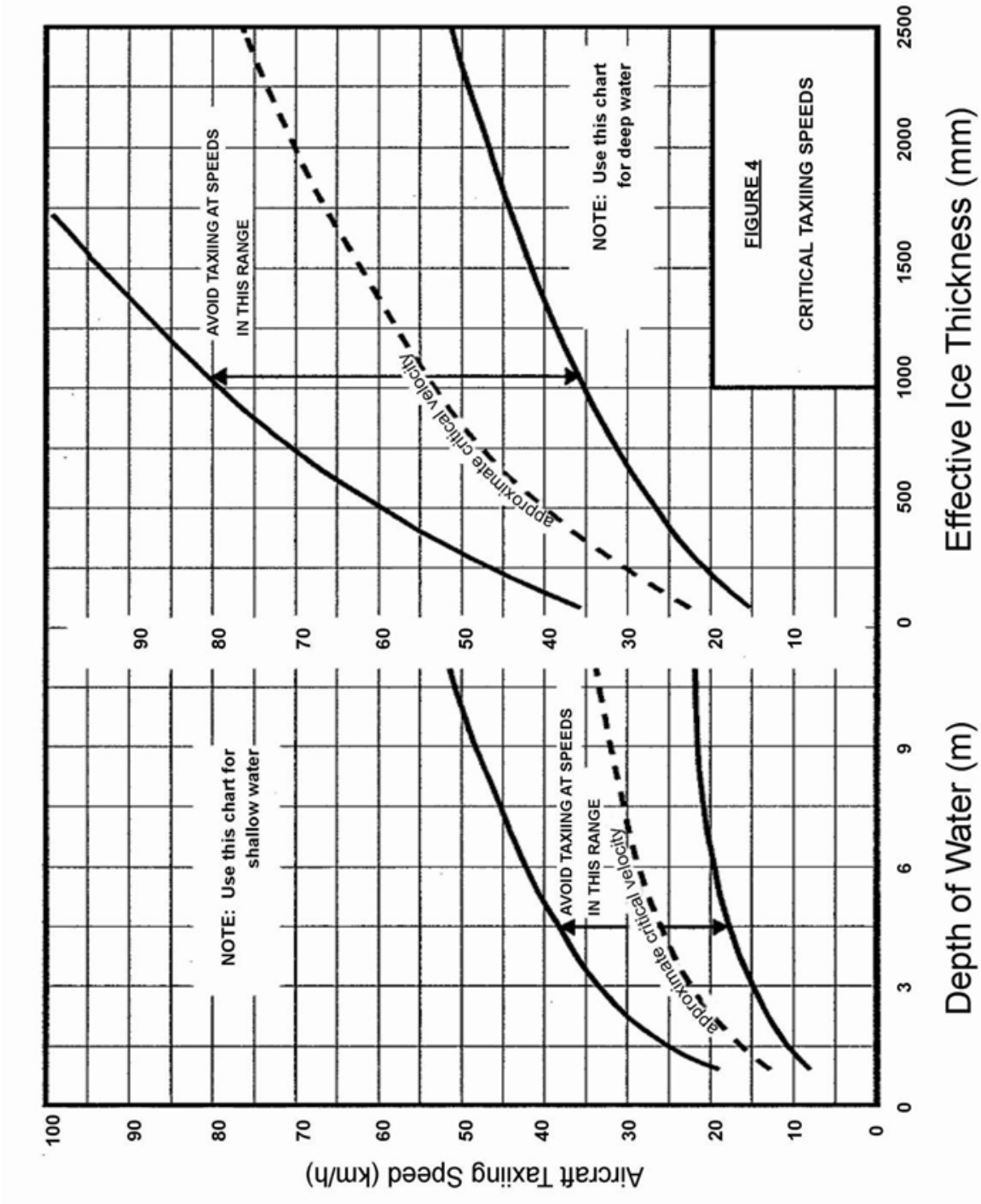
APPENDIX D — CRITICAL TAXIING SPEEDS



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APPENDIX “E” - CARS PART III

Subpart 0 - Interpretation

Interpretation

300.01 In this Part,

"aerodrome standards and recommended practices publications" - means the following documents, namely,

(a) Procedures for the Certification of Aerodromes as Airports,

(b) Aerodrome Standards and Recommended Practices, and

(c) Heliport and Helideck Standards and Recommended Practices; (publications sur les normes et pratiques recommandées pour les aérodromes)

"aeronautical information publications" - means the following documents, namely,

(a) Canada Air Pilot,

(b) Canada Flight Supplement,

(c) Water Aerodrome Supplement, and

(d) A.I.P. Canada; (publications d'information aéronautique)

"aircraft emergency" means a situation that could result in damage to an aircraft at an airport or aerodrome or injury to the persons on board the aircraft; (aéronef en état d'urgence)
(amended 2002/06/10; no previous version)

"airport certificate" - means a certificate issued pursuant to Section 302.03; (certificat d'aéroport)

"airport operations manual" - means the manual referred to in Section 302.08 and includes any amendments to the manual that are approved pursuant to subsection 302.03(2); (manuel d'exploitation d'aéroport)

"closed marking" - means a cross-shaped marking that

(a) has the form and, subject to subsection 301.04(4), the dimensions set out in Schedule I to Subpart 1, and

APPENDIX "E" - CARS PART III (cont'd)

(b) subject to subsection 301.04(8), is in a single contrasting colour, white on runways and yellow on taxiways, that is visible from an aircraft flying at an altitude of 300 m (1,000 feet) above the marking; (marque de zone fermée)
"fixed" - in respect of a light, means having a constant luminous intensity when the light is observed from a fixed point; (fixe)

"marker" - means an object displayed above ground level for the purpose of indicating an obstacle or obstruction or delineating a boundary; (balise)

"marking" - means a symbol or group of symbols displayed on the surface of a movement area for the purpose of conveying aeronautical information; (marque)

"movement", in respect of an aircraft, means a take-off or landing at an airport or aerodrome; (mouvement)
"obstacle limitation surface" -

"public way" - means any road, path or sidewalk maintained for the use of members of the public; (voie publique)

"Water Aerodrome Supplement" means a publication concerning water aerodromes that is intended to be used to supplement enroute charts and the Canada Air Pilot. (Supplément hydroaérodromes)

Subpart 1 - Aerodromes

Application

301.01 This Subpart applies in respect of all aerodromes except airports, heliports and military aerodromes.

Inspection

301.02 The operator of an aerodrome shall, without charge, at the request of a Department of Transport inspector, allow the inspector access to aerodrome facilities and provide the equipment necessary to conduct an inspection of the aerodrome.

Registration

301.03 (1) Subject to subsection (2), where the operator of an aerodrome provides the Minister with information respecting the location, markings, lighting, use and operation of the aerodrome, the Minister shall register the aerodrome and publish the information in the Canada Flight Supplement or the Water Aerodrome Supplement, as applicable.

APPENDIX "E" - CARS PART III (cont'd)

(2) The Minister may refuse to register an aerodrome where the operator of the aerodrome does not meet the requirements of Sections 301.05 to 301.09 or where using the aerodrome is likely to be hazardous to aviation safety and, in such a case, shall not publish information with respect to that aerodrome.

(3) The operator of an aerodrome registered pursuant to subsection (1) shall notify the Minister immediately after any change is made to the location, marking, lighting, use or operation of the aerodrome that affects the information published by the Minister pursuant to subsection (1).

(4) An aerodrome that is listed in the Canada Flight Supplement or the Water Aerodrome Supplement on the coming into force of this Subpart is deemed to be registered pursuant to subsection (1).

Markers and Markings

301.04 (1) When an aerodrome is closed permanently, the operator of the aerodrome shall remove all of the markers and markings installed at the aerodrome.

(2) The operator of an aerodrome, other than a water aerodrome, shall install red flags or red cones along the boundary of an unserviceable movement area.

(3) Subsections (4) to (8) do not apply in respect of any manoeuvring area or part thereof that is closed for 24 hours or less.

(4) Where a runway or part of a runway is closed, the operator of the aerodrome shall place closed markings, as set out in Schedule I to this Subpart, on the runway as follows:

(a) where the runway is greater than 1 220 m (4,000 feet) in length, a closed marking shall be located at each end of the closed runway or part thereof and additional closed markings shall be located on the closed runway or part thereof at intervals not exceeding 300 m (1,000 feet);

(b) where the runway is greater than 450 m (1,500 feet) but not greater than 1 220 m (4,000 feet) in length, a closed marking of not less than one-half the dimensions set out in that Schedule shall be located at each end of the closed runway or part thereof and an additional closed marking of the same dimensions shall be located on the closed runway or part thereof at a point equidistant from the two markings; or

(c) where the runway is 450 m (1,500 feet) or less in length, a closed marking of not less than one-half the dimensions set out in that Schedule shall be located at each end of the closed runway or part thereof.

(5) Where a taxiway or part of a taxiway is closed, the operator of the aerodrome shall place on each end of the closed taxiway, or part thereof, a closed marking with the dimensions set out in Schedule I to this Subpart.

APPENDIX "E" - CARS PART III (cont'd)

(6) Where a helicopter take-off and landing area at an aerodrome is closed, the operator of the aerodrome shall

(a) place a closed marking over the letter "H", where the letter "H" identifies the helicopter take-off and landing area, or, where no letter identifies the helicopter take-off and landing area, over the centre of the area; or

(b) comply with subsection (4), where the helicopter take-off and landing area is a runway.

(7) Where a manoeuvring area or part thereof is closed permanently, the operator of the aerodrome shall

(a) obliterate all of the markings that indicate that the manoeuvring area or part thereof is open; and

(b) subject to subsection (8), paint on the manoeuvring area or part thereof the markings required pursuant to subsections (4) to (6).

(8) Where the surface of a manoeuvring area or part thereof is snow-covered or otherwise unsuitable for painting or where the closure is not permanent, closed markings may be applied by means of a conspicuously coloured dye or may be constructed from a suitable conspicuously coloured material or product.

Warning Notices

301.05 Where low-flying or taxiing aircraft at or in the vicinity of an aerodrome are likely to be hazardous to pedestrian or vehicular traffic, the operator of the aerodrome shall immediately

(a) post notices warning of the hazard on any public way that is adjacent to the manoeuvring area; or

(b) where such a public way is not owned or controlled by the operator, inform the authorities responsible for placing markings on the public way that there is a hazard.

Wind Direction Indicator

301.06 (1) Except where the direction of the wind at an aerodrome can be determined by radio or other means such as smoke movement in the air or wind lines on water, the operator of the aerodrome shall install and maintain at the aerodrome a wind direction indicator that is

(a) of a conspicuous colour or colours;

APPENDIX "E" - CARS PART III (cont'd)

(b) in the shape of a truncated cone;

(c) visible from an aircraft flying at an altitude of 300 m (1,000 feet) above the wind direction indicator; and

(d) illuminated when the aerodrome is used at night.

(2) When an aerodrome is closed permanently, the operator of the aerodrome shall immediately remove all of the wind direction indicators installed at the aerodrome.

Lighting

301.07 (1) Subject to subsection (2), where a runway is used at night, the operator of the aerodrome shall indicate each side of the runway along its length with a line of fixed white lights that is visible in all directions from an aircraft in flight at a distance of not less than two nautical miles.

(2) Where it is not practical to provide at an aerodrome the fixed white lights referred to in subsection (1) for reasons such as the lack of an available electrical power source or insufficient air traffic, the operator of the aerodrome may, if a fixed white light is displayed at each end of the runway to indicate runway alignment, use white retro-reflective markers that are capable of reflecting aircraft lights and that are visible at a distance of not less than two nautical miles from an aircraft in flight that is aligned with the centre line of the runway.

(3) The lines of lights or retro-reflective markers required by subsection (1) or (2) shall be arranged so that

(a) the lines of lights or markers are parallel and of equal length and the transverse distance between the lines is equal to the runway width in use during the day;

(b) the distance between adjacent lights or markers in each line is the same and is not more than 60 m (200 feet);

(c) each line of lights or markers is not less than 420 m (1,377 feet) in length and contains no fewer than eight lights or markers; and

(d) each light or marker in a line of lights or markers is situated opposite to a light or marker in the line of lights or markers on the other side of the runway, so that a line connecting them forms a right angle to the centre line of the runway.

(4) Fixed white lights displayed at each end of a runway pursuant to subsection (2) shall be placed so that they are not likely to cause a hazard that could endanger persons or property.

APPENDIX "E" - CARS PART III (cont'd)

(5) Where a taxiway is used at night, the operator of the aerodrome shall indicate each side of the taxiway with a line of fixed blue lights or blue retro-reflective markers placed so that the two lines of lights or markers are parallel and the distance between adjacent lights or markers in each line is not more than 60 m (200 feet).

(6) Where a manoeuvring area or part thereof or a heliport is closed, the operator of the aerodrome shall not operate the lights or keep the retro-reflective markers thereon, except as required for maintenance of the lights and markers.

(7) Where an aerodrome is used at night, the operator of the aerodrome shall indicate an unserviceable portion of the movement area with fixed red lights, red retro-reflective markers or floodlighting.

(8) Where an aircraft parking area at an aerodrome is used at night, the operator of the aerodrome shall indicate the boundary of the area with fixed blue lights or blue retro-reflective markers, placed at intervals not exceeding 60 m (200 feet), or with floodlighting.

(9) Subject to subsection (10), where a heliport is used at night for the take-off or landing of helicopters, the operator of the heliport shall illuminate the entire take-off and landing area with floodlights or

(a) where the take-off and landing area is rectangular, shall indicate the boundary with no fewer than eight fixed yellow lights, including one light at each corner, placed so that adjacent lights are not more than 13 m (42.5 feet) apart; or

(b) where the take-off and landing area is circular, shall indicate the boundary with no fewer than five fixed yellow lights placed so that adjacent lights are not more than 13 m (42.5 feet) apart.

(10) Where it is not practical to provide at a heliport the fixed yellow lights referred to in subsection (9) for reasons such as lack of an available electrical power source or insufficient air traffic, the operator of the heliport may use yellow retro-reflective markers that are capable of reflecting aircraft lights and that are visible at a distance of not less than two nautical miles from an aircraft in flight that is aligned with the approach path, if

(a) a light source is provided to show the location of the heliport; or

(b) where there is only one path for approach and departure, two lights are used to show the approach orientation.

(11) Where the lighting required by subsections (1), (2), (5) and (7) to (10) is operated by a radio-controlled system capable of activation from an aircraft, the system shall meet the requirements set out in Schedule II to this Subpart.

APPENDIX "E" - CARS PART III (cont'd)

(12) The operator of an aerodrome may display flare pots to provide temporary lighting for the landing or take-off of aircraft.

Prohibitions

301.08 No person shall

(a) walk, stand, drive a vehicle, park a vehicle or aircraft or cause an obstruction on the movement area of an aerodrome, except in accordance with permission given

(i) by the operator of the aerodrome, and

(ii) where applicable, by the appropriate air traffic control unit or flight service station;

(b) tow an aircraft on an active movement area at night unless the aircraft displays operating wingtip, tail and anti-collision lights or is illuminated by lights mounted on the towing vehicle and directed at the aircraft;

(c) park or otherwise leave an aircraft on an active manoeuvring area at night unless the aircraft displays operating wingtip, tail and anti-collision lights or is illuminated by lanterns suspended from the wingtips, tail and nose of the aircraft;

(d) operate any vessel, or cause any obstruction, on the surface of any part of a water area of an aerodrome that is to be kept clear of obstructions in the interest of aviation safety, when ordered, by signal or otherwise, to leave or not to approach that area by the appropriate air traffic control unit or flight service station or by the operator of the aerodrome;

(e) knowingly remove, deface, extinguish or interfere with a marker, marking, light or signal that is used at an aerodrome for the purpose of air navigation, except in accordance with permission given

(i) by the operator of the aerodrome, and

(ii) where applicable, by the appropriate air traffic control unit or flight service station;

(f) at a place other than an aerodrome, knowingly display a marker, marking, light or signal that is likely to cause a person to believe that the place is an aerodrome;

(g) knowingly display at or in the vicinity of an aerodrome a marker, marking, sign, light or signal that is likely to be hazardous to aviation safety by causing glare or by causing confusion with or preventing clear visual perception of a marker, marking, sign, light or signal that is required under this Subpart;

APPENDIX "E" - CARS PART III (cont'd)

(h) allow a bird or other animal that is owned by the person or that is in the person's custody or control to be unrestrained within the boundaries of an aerodrome except for the purpose of controlling other birds or animals at the aerodrome as permitted by the operator; or

(i) discharge a firearm within or into an aerodrome without the permission of the operator of the aerodrome.
Fire Prevention

301.09 (1) Subject to subsection 301.07(12) and subsections (2) and (3), no person shall, while at an aerodrome, smoke or display an open flame

(a) on an apron;

(b) on an aircraft loading bridge or on a gallery or balcony that is contiguous to or that overhangs an apron; or

(c) in an area where smoking or the presence of an open flame is likely to create a fire hazard that could endanger persons or property.

(2) The operator of an aerodrome may, in writing, authorize maintenance or servicing operations on an apron that involve the use, production or potential development of an open flame or that involve the production or potential development of a spark where the operations are conducted in a manner that is not likely to create a fire hazard that could endanger persons or property.

(3) The operator of an aerodrome may permit smoking in an enclosed building or shelter located on an apron where such smoking is not likely to create a fire hazard that could endanger persons or property.

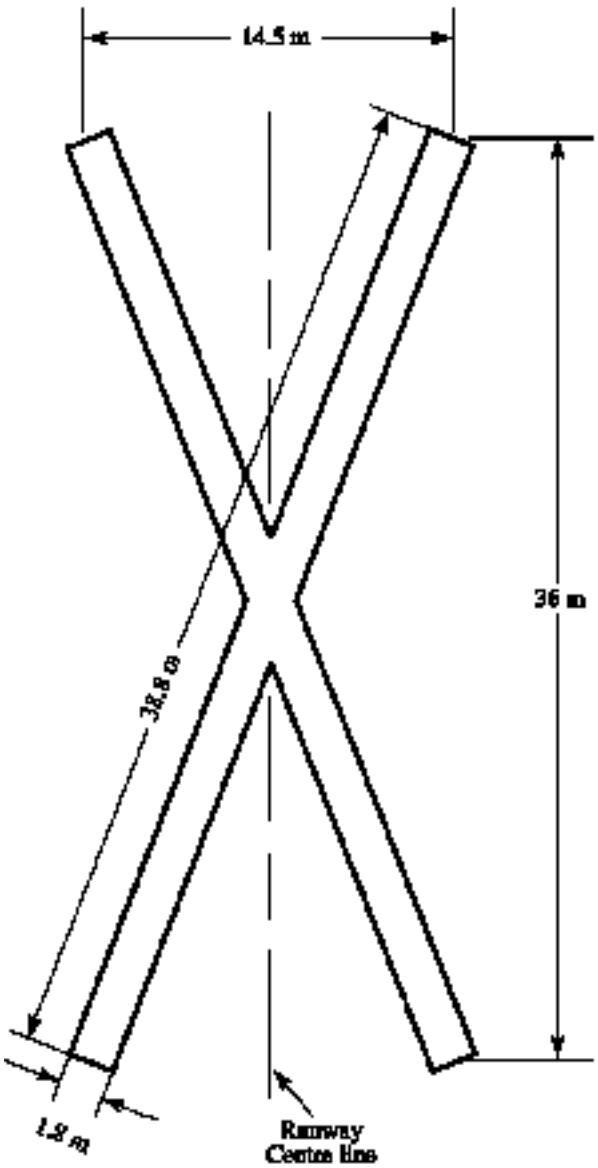
Attachments:

Schedule I - Closed Markings
Schedule II - Intensity Settings for Lighting Systems Activated by Radio Control from Aircraft

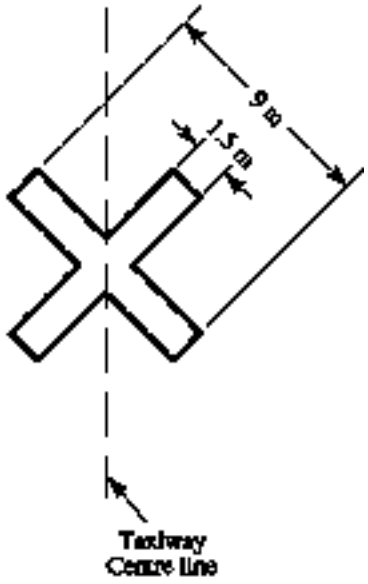
APPENDIX "E" - CARS PART III (cont'd)

CAR 301 Schedule I - Closed Markings
(Section 300.01 and subsections 301.04(4) and (5))

Closed Runway



Closed Taxiway



APPENDIX "E" - CARS PART III (cont'd)

CAR 301 Schedule II - Intensity Settings for Lighting Systems Activated by Radio Control from Aircraft (Subsection 301.07(11))

		Selected Level of Intensity (percentage of rated output of fixture)			
Visual Aid System	**Number of Intensity Settings**	**System Providing 3 Sections (type K)**			**Single Selection Systems (type J)**
		3 Clicks	**5 Clicks**	**7 Clicks**	
Medium Intensity Approach Lighting: • Fixed Lights	3	4%	20%	100%	Note 1
• Capacitor Discharge Lights	3	OFF	OFF or 10%	100%	Note 1
Omni Directional Approach Lighting Systems (ODALS)	3	6%	30%	100%	30%
Low Intensity Approach Lighting	1	100%	100%	100%	100%
Runway Edge, Threshold and End Lighting: • Medium Intensity	3	10%	30%	100%	Note 2
• Low Intensity	1	100%	100%	100%	100%
Runway Identification Lights (RILS)	1	OFF	OFF or 30%	100%	Note 3
	1	OFF	OFF or 100%	100%	
Wind Direction Indicator	1	100%	100%	100%	100%
Aerodrome Beacon	1	100%	100%	100%	100%

Note 1: Medium intensity approach lighting shall not be controlled by a system employing only one intensity selection except for Omni Directional Approach Lighting Systems (ODALS).

Note 2: These systems shall not be controlled by a system employing only one intensity selection.

Note 3: These fixtures may be set at 10%, 100% or OFF.

APPENDIX "F"

SAMPLE WEATHER REPORTING FORM

Location _____ Date _____

TIME (hh:mm)	WIND (deg/kts)	VIS (sm)	OBSCURING PHENOMENON	CEILING (ft)	TEMP (^{0}C)	DEW (^{0}C)	ALT (' of Hg)	INITIALS

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APPENDIX "G"

DAILY STRIP REPORT

STRIP NAME	**DATE**
WINDS	**VISIBILITY**
ALTIMETER	**PRECIPITATION (TYPE)**
CEILING	**OBSCURING PHENOMENON (TYPE)**
USEABLE RUNWAY LENGTH / WIDTH	
RUNWAY SURFACE CONDITION	
RAMP SURFACE CONDITION	
AIRSTRIP CONCERNS / DEFICIENCIES DIAGRAM	
NAME	**SIGNATURE**
CONTACT NUMBER: _____ DATE: _____	

APPENDIX "G" (cont'd)

SURFACE EQUIPMENT		
CAMP CONTACTS		
OBSTRUCTIONS		
RESTRICTIONS		
REPORT PREPARED BY:	**NAME:**	**PHONE:**
Disclaimer:	**The information in this strip check has been conducted in accordance with the guidelines of the Ice Aerodrome Manual Airport standards manual and is considered accurate and valid only at the time the check was conducted.**	
DATE	**SIGNATURE**	

ICE STRIP INSPECTION FORM

Operator/ Company Name		
Airport Name	**3 letter code**	

Runway Heading		**Frequency**	
Length/Width		**Obstructions**	
Coordinates		**Unit**	
Elevation		**Lights**	
Nav Aids		**Fuel Avalable**	
Ramp Area		**Equipment on site**	
Communication: VHF: **HF:**		**Tel :** **Fax :**	
Safety concerns			
Weather Phenomena			
Recommended for			
Remarks			
Recommended by			

Customer Instructions

How to measure Ice Thickness:

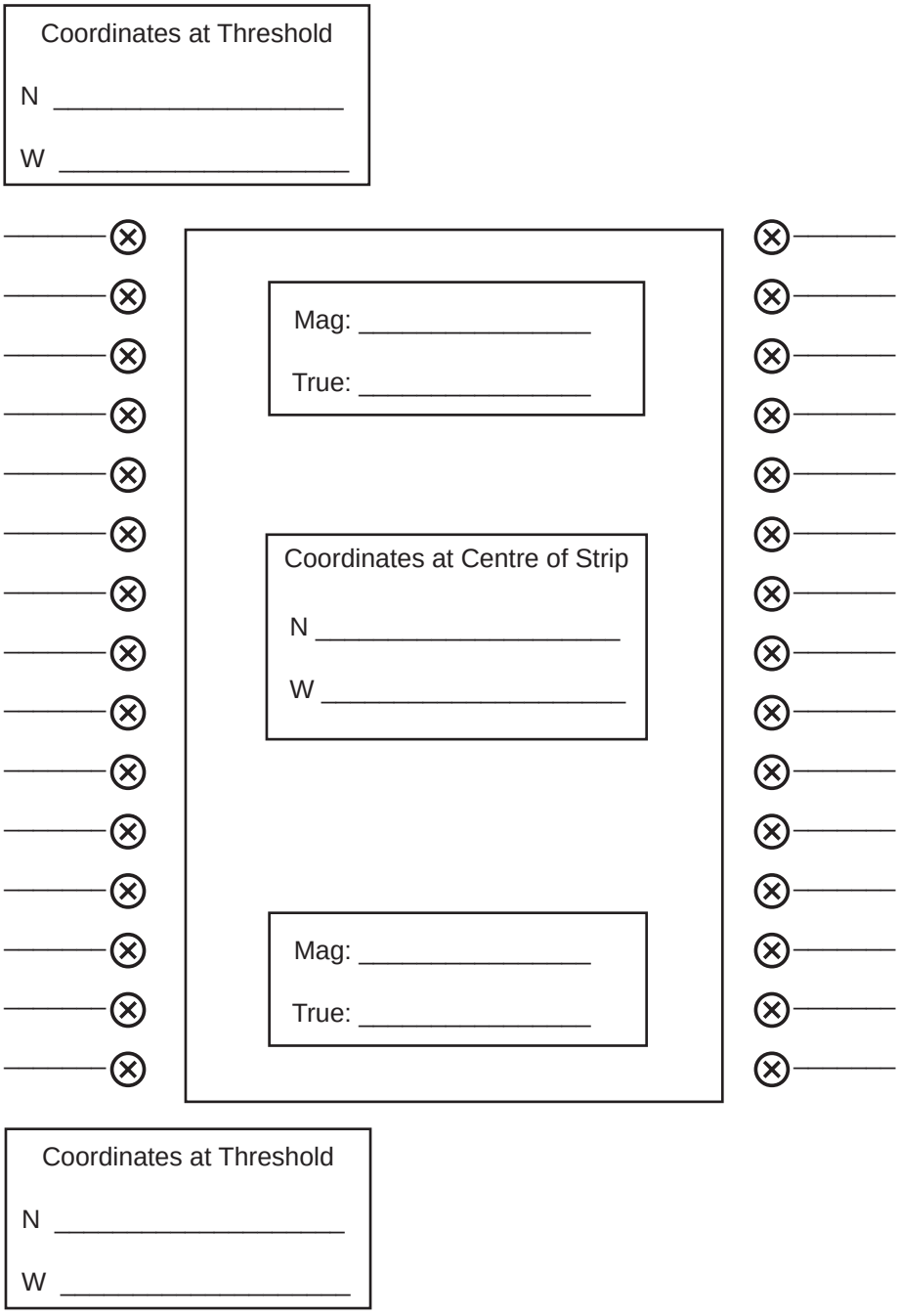
1. Drill hole to water or as far as you;
2. Measure the amount of 1)compacted snow or frozen slush (top number) and 2) sold blue ice (bottom number)
3. Write down the numbers beside the hold location on the chart as 3/40 (3" compact and 40" solid ice)

Strip Report Diagram

In addition to complete the noted items, indicate the following:

1. Thresholds (preferably via orange bags);
2. Position and Size of ramp area;
3. Obstructions

ICE STRIP INSPECTION FORM (cont'd)



Autorised Signature: _____

Printed Name _____ Date: _____

1308 Copperhead Dr.
Kamloops, BC V2E 2T4
5308 Dalhurst Cr NW
Calgary, AB, T3A 1P7

February 3, 2014

NOR-EX File: 2013-1810

Nolinor Aviation

Attention: Dave Morgan

Re: Ice Bearing Capacity Recommendations
Mary River Ice Airstrip
Mary River Project Site

Nolinor Aviation retained NOR-EX Ice Engineering Inc. to provide safe work documents, quality assurance, and site observations services for the ice airstrip (runway and apron) at the Mary River Project, Baffin Island, Nunavut. Nolinor authorized this in an agreement dated November 25, 2013.

Subsequent to this agreement, NOR-EX was requested to provide ice bearing capacity analyses for the ice airstrip and unloading operations on the ice apron. Dave Morgan of Nolinor approved this additional set of services in an e-mail dated January 27, 2014.

This document summarizes the engineering analyses undertaken by NOR-EX and provides ice bearing capacity recommendations for Nolinor's 2014 operations at the Mary River ice airstrip and apron.

NOR-EX submitted a Quality Assurance Plan for the Mary River Ice Airstrip to Nolinor on January 14, 2014.

NOR-EX's scope of services does not include the aviation aspects of the airstrip design, construction and operations, such as runway orientation, and runway surface preparation.

1 Background

Baffinland Iron Ore company is currently operating an airstrip at the Mary River Project site. However, they plan to suspend operations to repair and lengthen the runway. During these repair operations, the air traffic will be diverted to an ice airstrip under construction on a lake about 12 km northwest of the Mary River camp. The ice airstrip will be operated from early February to the end of April 2014.

Nolinor retained Nuna Logistics to provide construction supervision and GPR ice profiling of the ice airstrip from late November to late December 2013. An as-built drawing of the airstrip from December 28, 2013 is provided in Figure 1.

2 Ice Bearing Capacity Analyses

2.1 Data Inputs

According to Nolinor the aircraft operations will be confined to one air movement per day and the heaviest aircraft will be a Nolinor 737-200 with a maximum taxiing weight of 58,300 kg. The

Table 1 Summary of 737-200 Aircraft Loads Used for Take-off and Landing Ice Bearing Capacity

Item	Load Unit	Load (kg)
1a	737-200 front landing gear	11660
1b	737-200 port landing gear	23320
1c	737-200 starboard landing gear	23320
	Total	53800

We understand that Baffinland Site Services will unload the aircraft (cargo and passengers), re-fuel the 737, and board passengers in a 1 to 2 hour time frame on the ice apron adjacent to the runway. The stationary loads on the ice apron during this 1 to 2 hour time frame are summarized in Table 2.

Table 2 Summary of Loads Stationary on the Ice Apron During Unloading and Boarding

Item	Load Unit	Load (kg)
1a	737-200 front landing gear	11660
1b	737-200 port landing gear	23320
1c	737-200 starboard landing gear	23320
2	Cat950H loader	20000
3	Cube Van	4000
4	Fuel truck	24000
	Total	106300

The lake ice is natural blue ice and we have estimated the freshwater engineering properties in the analyses from the appropriate sources ((Frederking & Gold, 1976) (Masterson, 2009) (Civil Aviation, 2011):

- Elastic modulus (Young's modulus): 7000 GPa
- Poisson's ratio=0.3
- Maximum allowable ice flexural strength for aircraft landing and takeoff: 800 kPa

- Maximum allowable ice flexural strength for stationary loads on ice apron for 2 h: 730 kPa
- Maximum allowable ice flexural strength for stationary loads on ice apron for 24 h: 570 kPa

2.2 Ice Bearing Capacity Methods

Transport Canada's Advisory Circular 301-001 on ice aerodromes (Civil Aviation, 2011) is the primary reference document for the design and operations of ice aerodromes (airstrips) in Canada. Figure 2 reproduces the Appendix A – Minimum ice thickness for limited aircraft movements from this documents. We used this Figure to estimate the ice thickness for the flexural strength noted in Section 2.1

As a check on this method, we also modeled the ice cover as an thick elastic plate floating on water and estimated the ice stresses from loads modeled as circular areas in accordance with methods described in the literature (Masterson, 2009), (Hayley & Proskin, 2008) and (U.S. Army Corps of Engineers, 2002).

For the stationary load analysis we adopted the time dependent allowable stress method developed by (Frederking & Gold, 1976) to account for the creep deflection of ice under load. According to Nolinor and Baffinland site services, the turn-around time for the 737-200 on the ice apron is less than 2 hours. We also considered the situation of a mechanical malfunction that confined the 737-200 to the apron for up to 24 hours to allow time for aircraft repairs.

2.3 Results

2.3.1 Ice Runway

Based on the Transport Canada method for an allowable ice flexural stress of 800 kPa, the recommended thickness of good quality ice is 120 cm for a maximum aircraft weight of 58,300 kg.

NOR-EX analysis using the thick elastic plate theory indicates that the maximum flexural stress in 120 cm of good quality ice is 620 kPa—this is well below the allowable ice flexural stress of 800 kPa.

2.3.2 Ice Apron

There are two situations that were examined:

- 2 hour (max) unloading/boarding operation on the apron for the 737-200 aircraft, 950H loader, F550 cube van and 20000 litre fuel truck.
- 24 hour (max) 737-200 parked on the ice apron

Using the stationary load analysis method ((Frederking & Gold, 1976), NOR-EX found that 1.5 m of good quality ice to was required to keep the elastic ice stress below the estimated allowable creep stresses; results are summarized in Table 3.

Note that the Transport Canada guide recommends the maximum deflection of the ice sheet under the parked aircraft should not exceed 8% of the ice thickness. In other words, the ice deflection should not permit the water level in an observation hole in the ice to reach the top of the ice.

For this ice thickness the allowable deflection is 12 cm (or 8% of the ice thickness of 1.5 m).

Table 3 Summary of Ice Apron Analyses

Aircraft Weight (kg)	Duration (h)	Ice Thickness (cm)	Elastic Ice Stress (kPa)	Estimated allowable creep stress (kPa)
106300	2	150	550	730
58300	24	150	420	570

3 Recommendations

Considering the loads and operations noted in section 2.1 and results reported herein, NOR-EX makes the following recommendations for the ice runway and apron:

1. Ice runway ice thickness should be 120 cm of good quality ice.
2. Ice apron ice thickness should be 150 cm of good quality ice.
3. Max aircraft taxiing speed should be 40 km/h (Transport Canada--Appendix D Critical taxiing speeds)
4. 737-200 aircraft should have no other loads within 100 m (Transport Canada--Appendix C Load influence radius) if it is to be parked for more than 2 h (and no more than 24 h).
5. Ice deflection under stationary or parked loads should not exceed the ice freeboard (8% of the ice thickness for unloaded ice)
6. Ice airstrip monitoring and maintenance should be undertaken in accordance with NOR-EX's Quality Assurance Plan
7. Nolinor should develop a plan for operations for thawing temperatures if the ice runway operations extend beyond April 15, 2014.

4 Limitations

This report and the recommendations contained in it are intended for the sole use of the client. NOR-EX does not accept any responsibility for the accuracy of any of the data, the

analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than NOR-EX's client unless authorized in writing by NOR-EX. Any unauthorized use of the report is at the sole risk of the user. This report and the recommendations contained in it are intended for the referenced project site.

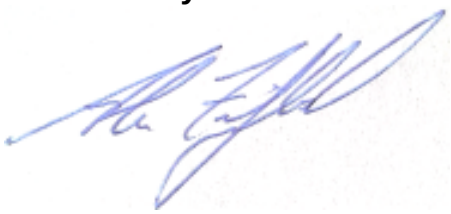
5 Closure

We trust that this letter provides you with the recommendations you need to commence the operations of the Mary River Project ice airstrip. Please contact the undersigned should you have any questions.

Respectfully submitted,

Per: NOR-EX ICE ENGINEERING INC.

Reviewed by



Samuel A. Proskin, Ph.D., P.Eng.
VP Engineering

Al Fitzgerald, P.Eng.
President

6 Bibliography

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Hayley, D., & Proskin, S. (2008). Managing the safety of ice covers used for transportation in an environment of climate warming. *4th Canadian Conference on Geohazards.* Quebec City: Canadian Geotechnical Society.

Masterson, D. (2009). State of the art of ice bearing capacity and ice construction. *Cold Regions Science and Technology , 58*, 99-112.

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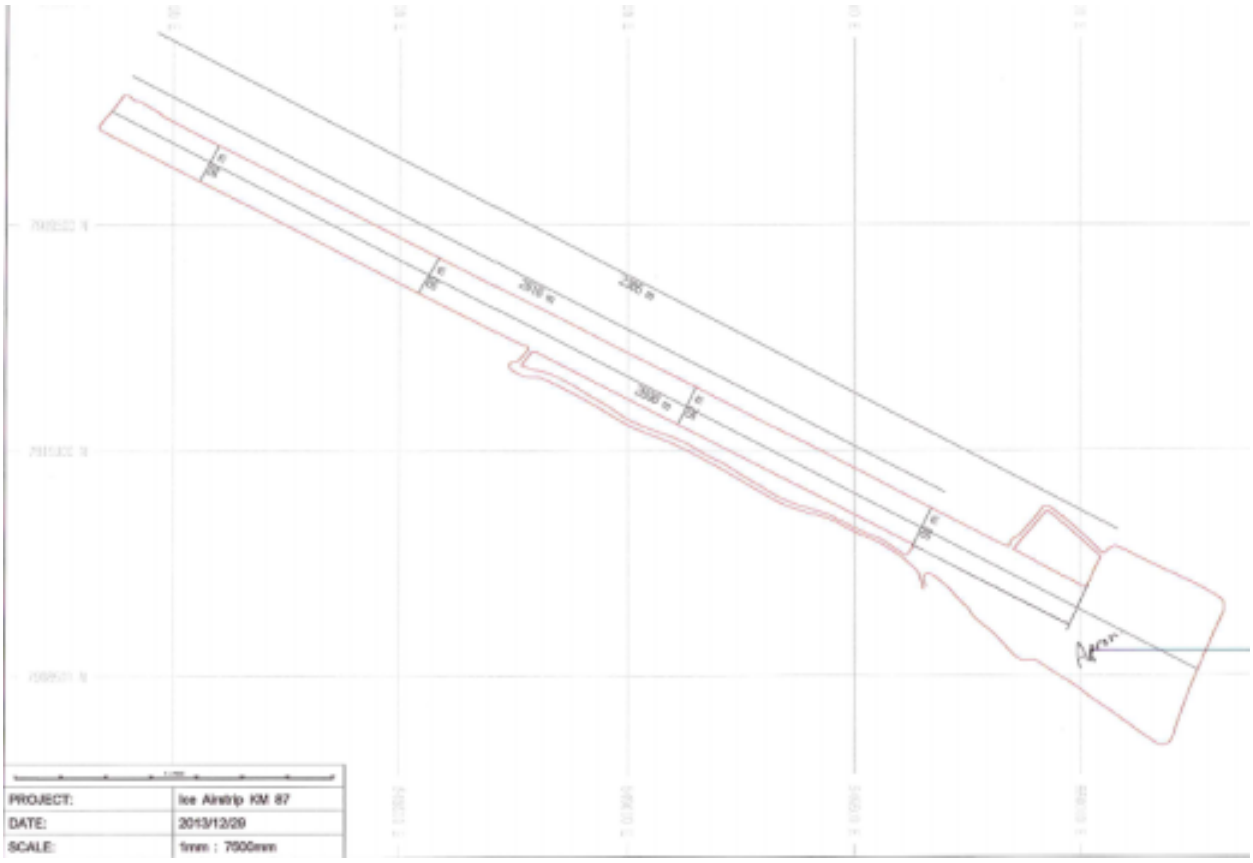

Figure 1 Mary River Ice Airstrip As-Built December 28, 2013

APPENDIX A— MINIMUM ICE THICKNESS FOR LIMITED AIRCRAFT MOVEMENTS

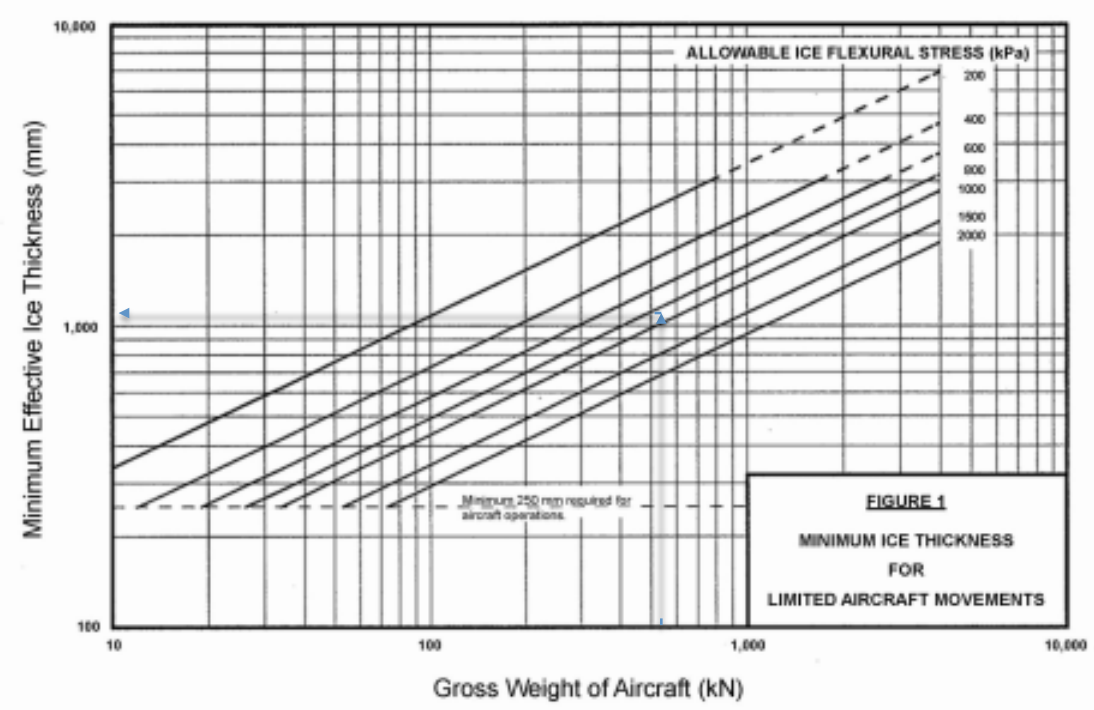

Figure 2 Ice Thickness Chart from Transport Canada Guide

Glen Hein

From: Glen Hein
Sent: Friday, February 7, 2014 12:59 PM
To: Martin van Rooy
Cc: Erik Madsen; Bikash Paul; Michael Anderson
Subject: FW: January 20 Inspection - followup to item 1
Attachments: Ice Airstrip Quality Assurance Framework.v3.IFU.pdf

Hello Martin,

As noted below, please find attached the QA/QC Framework for actions to be taken during operation of the ice strip.

Should you have any questions regarding this document please contact me or Bikash Paul.

Best Regards,

Glen Hein

Baffinland
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Oakville, ON, Canada L6H 0C3

Main: 416.364.8820 x5020
Fax: 416.364.0193
www.baffinland.com

Glen Hein
Health & Safety Manager

Cell: 416.571.3934
glen.hein@baffinland.com

From: Glen Hein
Sent: February-06-14 10:26 PM
To: Martin van Rooy
Cc: Michael Anderson; Erik Madsen; Bikash Paul
Subject: January 20 Inspection - followup to item 1

Good day Martin,

In regards to your January 20, 2014 inspection, Item 1, Baffinland hired Nolinor Aviation to develop an ice strip that meets aviation standards and the Nolinor Ice Aerodrome Manual. Nolinor hired two companies to ensure the work proceeded in a safe and acceptable manner. NUNA, with a history of building ice strips and ice roads, was responsible for building the ice strip and performing the necessary ice profiling. NOR-EX was hired to develop the safe work documents, quality assurance, and site observation services for the ice strip (runway and apron). Attached to this reply are the following documents to support the design, construction, and operation of the ice strip:

- Nolinor Ice Aerodrome Manual which sets the standards for the ice runway.
- Recent ice profile results showing a minimum ice thickness of 63.5”

- NOR-EX ice bearing analysis report recommending an ice thickness of 47" (120 cm) for the runway and 59" (150 cm) for the apron. Additional recommendations regarding taxing speed, monitoring plans, and plans for thawing temperatures will be implemented.

Baffinland also conducted a risk assessment on October 28, 2013 regarding the building, operation, and use of the ice strip. Many of the same comments you had were identified in this assessment and recommendations implemented. The decision to utilize Nolinor, NUNA, and NOR-EX – all with experience in ice strip design, construction and use provided diligence that the air strip would meet safety requirements. We will continue to utilize the expertise of NUNA during operation to ensure the strip is maintained to meet Nolinor requirements. During its operation, Baffinland Site Services personnel will perform their activities in a similar manner as at the gravel airstrip. However, additional precautions with respect to fueling, fuel storage, and de-icing, including scraping up any de-icing fluid that maybe used that falls on the ice will be implemented.

Please let me know should you have any further questions regarding the use of the ice strip. We will submit the ice strip QA/QC documentation to you shortly. We plan to have our first test landing on the ice strip on Friday February 6, 2014.

Best Regards,

Glen

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Health & Safety Manager

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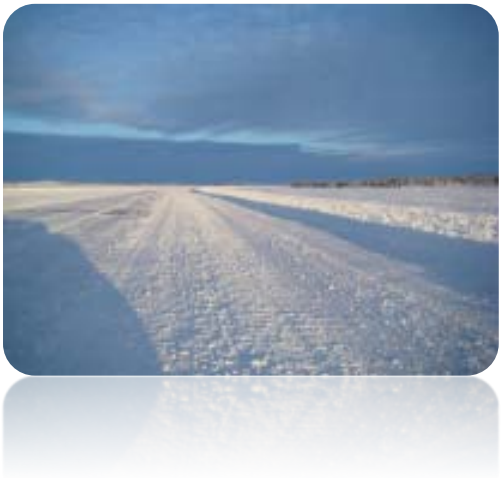
ICE AIRSTRIP QUALITY ASSURANCE FRAMEWORK

Mary River Project
Nolinor Aviation

NOR-EX Project Number: 2013-1810



Prepared For

Nolinor Aviation
11600 Louis-Bisson
Mirabel, Quebec

Respectfully Submitted By
NOR-EX Ice Engineering Inc.
1308 Copperhead Drive
Kamloops, BC, V2E 2T4

February, 2014

Table of Contents

1 Background

Nolinor Aviation (Nolinor) retained NOR-EX Ice Engineering Inc. (NOR-EX) to provide services in support of the ice airstrip construction and operations for the Mary River Project. Included in those services in provision of a Quality Assurance Framework (QAF) of the ice airstrip during operations.

NOR-EX adopts a systems approach to the design and operations of ice programs in regards to safety and risk management. This approach considers the interdependency among the design parameters used, the experience level of the construction contractors in working on ice, and the number and nature of control measures in place to mitigate and manage risk.

NOR-EX recommends the following Quality Assurance Framework (QAF) to manage the risk of ice bearing capacity failure to the operations of the ice airstrip to approved aircraft.

Transport Canada's Advisory Circular AC 301-003 provides guidelines for the operations of ice airstrips (or aerodromes as defined in the AC 301-003 (Civil Aviation 2011)). The QAF incorporates the relevant sections of the AC along with NOR-EX's industry practices in the following outline:

1. Responsibilities for Ice Airstrip Operations
2. Limited Aircraft Operations
3. Runway Maintenance
4. Runway Visual Inspection
5. Runway Ice Profiling
6. Ice Cracks
7. Thawing Temperatures
8. Verification of Aircraft Weight
9. Aircraft On-Ice Taxing
10. Aircraft Parking on Ice
11. Visual Aids to Ice Demarcation
12. Record Keeping and Notifications

2 Responsibilities for Ice Airstrip Operations

We understand that Baffinland is the operator of the ice airstrip and is supervising the site services staff responsible for maintenance and profiling of the airstrip. Baffinland is responsible for advising users whenever a facility is not serviceable.[1]

NOR-EX is responsible for recommending the QA Program and contributing to best practices for operations and maintenance. NOR-EX will also observe the ice airstrip and other aircraft movement areas on a site visit.

3 Limited Aircraft Operations

It is our understanding that ice airstrip will operate with one aircraft movement per day. This meets the definition of limited aircraft operations of AC 301-003 (up to three landings per day).

4 Runway Maintenance

Regular ice maintenance is an important element of maintaining ice integrity and it may include snow removal and ice flooding to repair cracks or damaged ice. Regular snow clearing is important because snow cover may mask cracks and will inhibit ice growth. Good snow clearing practices will reduce problems associated with snow-banks.

Snow-banks along an establish ice runway represent a particular hazard to maintenance and snow removal crews. As the ice thickness on the road increases, cracks often develop beside and underneath the snow banks because the snow is both a load on the ice and, as an insulator, it slows ice growth. Often, these cracks will propagate through the entire ice sheet and flooding within and beside the snow-banks will occur. Great care should be taken in the area of snow-banks.

We recommend the following practices for snow removal:

- Snow-banks should not be moved back, as the ice integrity under the snow is often very poor and equipment break through risk is increased greatly.
- Care should be taken to keep snow-clearing equipment from operating directly beside the existing snow-banks.
- Do not build snow banks at the ends of runways.

. [1] [1] AC 301 recommends the operator needs to issue a Notice to Airmen (NOTAM) and Aircraft Movement Surface Condition Report (AMSCR).

- Weight of stored materials, stationary loads and snow should not exceed the aircraft loading allowed for the condition and thickness of the ice cover.
- Snow should be removed except for a 50 to 75 mm layer.

Additional care is needed when the area is covered with deep snow as snow adds load to the ice. Inspect the ice for cracks and thickness if it will be used less than two days after the removal of deep snow.

Routine flooding of the ice surface is important to fill cracks and build ice in sections that may be lagging the remainder of the ice sheet. Some cracking of the ice sheet is normal and inevitable; however, large or intersecting cracks should be flooded with water to fill the cracks and prevent further ice degradation.

5 Runway Inspection

5.1 Ice Profiling

Ground Penetrating Radar (GPR) ice profiling equipment has been used for measuring ice thickness on the current ice airstrip. This will allow the thickness of an ice cover to be determined with sufficient accuracy to allow a recommended maximum load to be established. Should this equipment be unserviceable or unable to be used to confirm ice thickness, the contractor will advise Baffinland and NOR-EX immediately.

In the event that GPR ice profiling equipment is not available, manual ice thickness measurements may be taken as an alternative. In this instance, measurements should be taken along two parallel lines evenly spaced across the width of the runway. Measurements should be taken at a maximum of 100m spacing between holes. Ice thickness measurements should be recorded for each hole and the minimum thickness measured used to determine the effective ice thickness.

A GPR profile of the airstrip was conducted by Nuna Logistics on 4 February and this report indicated a minimum ice thickness of 161cm (63.5”). Based on this information, manual measurements of the ice thickness may be used as a method for monitoring ice thickness if conducted in the manner described in the above paragraph, provided daily air temperature of the airstrip remains colder than -10 Celcius. Manual measurements should occur every 7-10 days as a minimum and the results reported to NOR-EX. This recommendation is being made in consideration of the intended frequency of use of this airstrip (one flight daily) and with the restriction that other aspects of this QA program are adhered to, particularly the daily visual inspections and ice maintenance program recommended.

If, in the opinion of the icestrip supervisor, ice conditions are suspect for any reason, then additional GPR profiling should occur.

As regular daily temperatures begin to rise above -10 Celsius, GPR profiling should be conducted to confirm the effective ice thickness in place on the airstrip.

GPR profiling equipment must be calibrated at the start of each shift as a minimum. Operators should use their training and judgment to conduct more frequent calibration if they have doubts as to the ice thickness being measured. Results of equipment calibration are to be recorded on the profiling reports. Operators should consult their manufacturer for instructions on calibrating their GPR equipment.

The GPR profiling procedure during ice airstrip construction will entail three parallel lines of ice profiling will be conducted to measure ice thickness. These lines will be evenly spaced across the width and will cover the entire length of the runway. Sections of ice cover separate from the runway used for loading/unloading should be profiled in a level of detail comparable to the runway.

Once the minimum ice thickness measured reaches the operational requirement for the aircraft, profiling coverage may be reduced to two parallel lines of ice profiling to monitor ice thickness on a maintenance program. Profiling during the maintenance phase should be conducted along the airstrip every 7-10 days as a minimum. Depending on ice conditions observed, more frequent profiling may be required. The ice airstrip supervisor will provide personnel with the necessary experience to determine if ice conditions warrant more frequent profiling.

There are situations where there is a need to re-assess the ice bearing capacity--such as a increase in the load requirement for the ice or there are questions regarding the integrity of the ice cover to support loads. During re-assessment the ice profiling will be conducted in accordance with the construction procedure noted above. Profiling data relied upon for re-assessing ice bearing capacity should have been conducted within the previous two days.

The ice contractor will provide NOR-EX with copies of all centerline GPR ice profile reports as well as manual measurement reports. NOR-EX will track ice thickness growth concurrently to identify trends and anomalies in ice growth. Average daily temperature is also requested to be provided to NOR-EX from the Mary River site. This data will be correlated with ice growth to provide a historical record that may prove valuable for future planning.

5.2 Visual Observations of Ice Quality

Visual inspection of the ice sheet is an important component of the QAF. The ice supervisor's experience is the best guide to determining if repairs or other airstrip maintenance is required during operations. A competent construction supervisor who is familiar with ice practices should conduct the ice inspections.

Ice inspection should consider the following ice quality issues:

- Dry cracks wider than 10 mm and especially those that intersect with other dry cracks
- Wet cracks where water is flowing to the surface—note if they intersect dry cracks or other wet cracks

- Ridges, depressions and other abrupt changes in the ice level which can pose a hazard to an aircraft landing gear

A moderate number of dry cracks less than 10mm wide usually pose no ice bearing capacity hazard but these should be repaired by flooding before they grow into larger cracks.

We recommend the following inspection frequency:

- Inspect runway prior to an aircraft landing.
- Inspect runway after aircraft has landed for new ice cracks or previous ones that are made worse.
- Inspect ice before aircraft takeoff if there's a reasonable chance ice conditions have changed since the prior inspection (or if 24 hours has passed).
- Inspect the ice runway and parking area daily to identify any areas of concern that could affect the integrity of the ice sheet during operations

Each ice inspection must be documented in sufficient detail and kept on file by the ice contractor.

5.3 Ice Crack Effects on Ice Bearing Capacity

AC 301-003 provides a table for adjusting the load capacity for ice runways depending on the cracks conditions as set out in Table 1.

Depending on the ice crack conditions found in the inspection, the aircraft weight adjustment could vary from 0 to 75% reduction. Therefore, we recommend repairing the ice cracks to preserve the rated ice bearing capacity based on the ice thickness instead of the unrepaired crack conditions. Cracks should be repaired by flooding. The ice airstrip load capacity should be adjusted in accordance with Table 1 if the dry cracks (>2cm) or wet cracks are not repaired.

Table 1 Adjustments for Ice Cracks from AC 301-003

Type of Crack	Aircraft Weight adjustment	Ice thickness adjustment
Hairline cracks	None	None
Re-frozen cracks	None	None
Dry cracks (>2 cm wide)		
Non intersecting	Use 2/3 weight	Increase by 20%
Intersecting	Use 1/3 weight	Increase by 70%
Wet cracks		
Non-intersecting	Use ½ weight	Increase by 40%
Intersecting	Use ¼ weight	Increase by 100%

5.4 Operations at Thawing Temperatures

Air temperatures need to be monitored daily to provide a daily average air temperature to assess the effects of air temperature on ice conditions. These should be documented in the daily ice inspection report.

We recommend re-assessing the ice conditions (by profiling and inspection) and the ice bearing capacity if the daily air temperature is warmer than -1 °C.

Operations should be suspended if:

- there are four consecutive days of daily average air temperatures warmer than -1 °C
- the daily average air temperature is warmer than 4°C

5.5 Verification of Aircraft Weight

The aircrew should check their aircraft weight with the approved weight in the most recent Notice to Airmen (NOTAM) and Aircraft Movement Surface Condition Reports (AMSCR). These reports also provide the status of any snow clearing and removal activities associated with any of the aircraft movement areas.

5.6 Aircraft Taxiing Speeds on Ice

Under certain conditions of water depth and ice thickness, a taxiing aircraft will cause hydrodynamic waves under the ice cover that can overstress the ice cover. This overstressing can be critical when the aircraft is operating on ice that meets the minimum ice thickness requirement. Normally limiting the taxiing speeds below the critical speed for the water depth and ice thickness mitigates these stresses.

The water depth should be measured at 4-5 locations along the runway and this information used with the Appendix D aircraft taxiing speed chart in the AC 301-003. Avoid taxing at speeds indicated in Appendix D. Allowable taxiing speeds will vary from 10-35 km/h depending on water depth and ice thickness.

5.7 On-Ice Parking

Parking of aircraft should only be allowed in the designated area with the following limitations:

- Maximum ice deflection must be less than freeboard of the ice (8% of the effective ice thickness)
- Aircraft should be by 70 m from other loads comparable to the aircraft or open cracks.

Parking is not recommended in areas where:

- Radial or circular cracks form around the loaded area
- If ice deflection accelerates

- Ice deflection exceeds freeboard.
- If water appears on the ice cover

6 Marking Approved Operational Areas with Visual Aids

It is vital to mark areas designated for aircraft operations and those areas that are closed to aircraft operations. However care is needed to properly identify approved areas that are visible to air operators. Closed marking may be applied by means of conspicuously colored dye or constructed from a suitable colored material.

AC 301-003 provides other details.

7 Record Keeping and Reports

The operators should maintain a log on the construction, maintenance and operation of their ice airstrip. Usually it contains the following information:

- location of the aerodrome;
- name of the operator;
- length of runway (ft);
- width of runway (ft);
- description of the construction of aircraft parking/unloading area;
- runway threshold (and end) coordinates; and
- threshold elevations (Mean Sea Level), if the runway has an IP.

The maintenance activities should also be documented (logged into 1 week intervals) with:

- work done on the ice such as snow compacting or clearing, flooding, reinforcing, any precautions taken to prevent snow drifting, etc;
- observed ice thickness at the end of each period for built-up ice and surrounding undisturbed ice cover; and
- annotation, if available, for the characteristics of the ice cover such as ice types, density, salinity, temperature, and strength, to mention a few.

These reports will be required pending completion of any snow clearing and removal activities associated with any of the aircraft movement areas.

8 Limitations

This document and its contents are intended for the sole use of Nolinor. NOR-EX does not accept any responsibility for the accuracy of any of the data, the analyses or

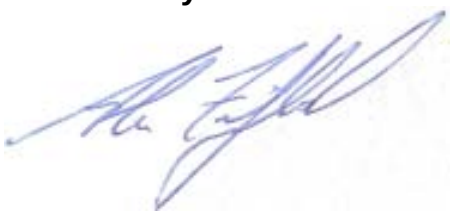
the recommendations contained or referenced in the document when the it is used or relied upon by any party other than Nolinor unless authorized in writing by NOR-EX. Any unauthorized use of the document is at the sole risk of the user.

9 Closure

We are available at your convenience to provide further information regarding the content of this document or any other areas you may wish to discuss.

Respectfully submitted
Per: NOR-EX ICE ENGINEERING INC.

Reviewed by



Samuel A. Proskin, Ph.D., P.Eng.
VP Engineering

Al Fitzgerald, P.Eng.
President

10 Works Cited

Civil Aviation. *Ice Aerodrome Development - Guidelines and Recommended Practices.* Advisory Circular AC 301-003 Issue 01, Transport Canada, Government of Canada, Ottawa: Transport Canada, 2011, 16.

Figures

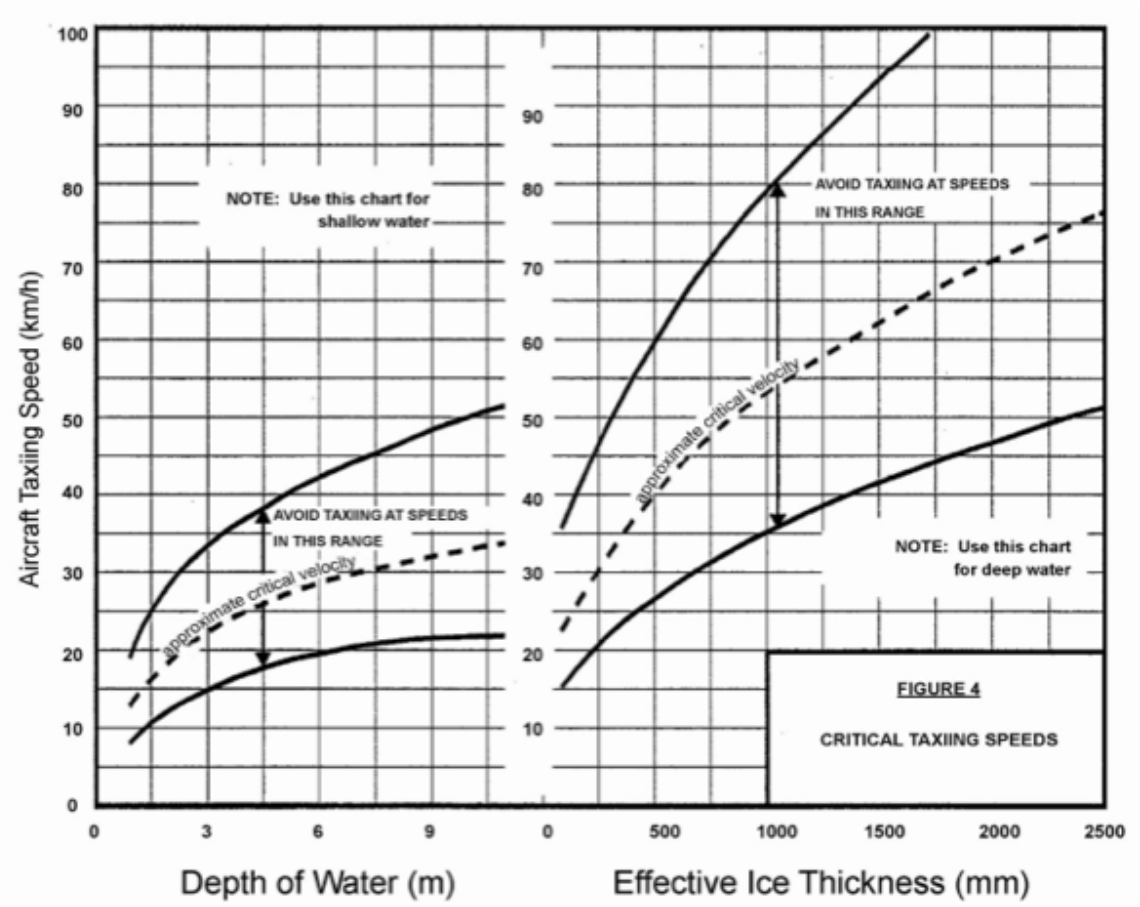


Figure 1 Critical Taxiing Speed (AC 301-003)

Glen Hein

From: Glen Hein
Sent: Wednesday, February 19, 2014 6:41 PM
To: Martin van Rooy
Cc: Michael Anderson; Erik Madsen
Subject: FW: Magazine Inventory
Attachments: 20140218 Magazine Inventory - Milne PQ0489.pdf; 20140218 Magazine Inventory - Milne PQ0475.pdf; 20140218 Magazine Inventory - Mary River AO0204.pdf; 20140218 Magazine Inventory - Mary River PQ0488.pdf; 20140218 Magazine Inventory - Mary River PQ0482.pdf; 20140218 Magazine Inventory - Mary River PQ0479.pdf; 20140218 Magazine Inventory - Mary River PQ0470.pdf; 20140218 Magazine Inventory - Mary River PQ0469.pdf; 20140218 Magazine Inventory - Mary River PQ0468.pdf; 20140218 Magazine Inventory - km63.pdf; 20140218 Magazine Inventory.xlsx

Good day Martin,

Attached are the magazine inventories and excel spreadsheet for reconciling.

Please let me know should you have any questions.

Glen

MAGAZINE INVENTORY: February 18, 2014	
Location	Milne
Magazine	PQ0489
Date	(All)

	Column Labels		
Values	**In**	**Out**	**Grand Total**
Sum of EZ Det 9m			
Sum of EZ Det 15m			
Sum of EZ Det 18m			
Sum of EZTL - 17ms 6m			
Sum of EZTL - 34ms 6m			
Sum of EZTL - 42ms 6m			
Sum of EZTL - 67ms 6m			
Sum of EZTL - 109ms 6m			
Sum of EZTL - 17ms 9m			
Sum of EZTL - 42ms 9m			
Sum of Nonel Lead In Line			
Sum of Boosters 350 gram	3877	-1035	2842
Sum of Boosters 450 gram			
Sum of Blastex 65x400 (12/cs)			
Sum of Blastex 75x400 (8/cs)	112	-74	38
Sum of Blastgel 76mm x 4kg	496	-496	0
Sum of Blastgel 81mmx4.5kg			
Sum of Blastgel 76mmx4.5kg	487	-130	357
Sum of Blastgel 83mmx4.5kg			
Sum of Blastgel 75mmx4.5kg			
Sum of Blastgel 83mmx5.9kg			

MAGAZINE INVENTORY: February 18, 2014	
Location	Milne
Magazine	PQ0475
Date	(All)

	Column Labels		
Values	**In**	**Out**	**Grand Total**
Sum of EZ Det 9m	4080	-1080	3000
Sum of EZ Det 15m	16186	-551	15635
Sum of EZ Det 18m	3150	-540	2610
Sum of EZTL - 17ms 6m	1933	-89	1844
Sum of EZTL - 34ms 6m	375	-28	347
Sum of EZTL - 42ms 6m	108	-52	56
Sum of EZTL - 67ms 6m	375	-150	225
Sum of EZTL - 109ms 6m	375	-172	203
Sum of EZTL - 17ms 9m	8040	0	8040
Sum of EZTL - 42ms 9m	8040	-387	7653
Sum of Nonel Lead In Line	687	-6	681
Sum of Boosters 350 gram			
Sum of Boosters 450 gram			
Sum of Blastex 65x400 (12/cs)			
Sum of Blastex 75x400 (8/cs)			
Sum of Blastgel 76mm x 4kg			
Sum of Blastgel 81mmx4.5kg			
Sum of Blastgel 76mmx4.5kg			
Sum of Blastgel 83mmx4.5kg			
Sum of Blastgel 75mmx4.5kg			
Sum of Blastgel 83mmx5.9kg			

MAGAZINE INVENTORY: February 18, 2014	
Location	Mary River
Magazine	PQ0488
Date	(All)

	Column Labels		
Values	**In**	**Out**	**Grand Total**
Sum of EZ Det 9m			
Sum of EZ Det 15m			
Sum of EZ Det 18m			
Sum of EZTL - 17ms 6m			
Sum of EZTL - 34ms 6m			
Sum of EZTL - 42ms 6m			
Sum of EZTL - 67ms 6m			
Sum of EZTL - 109ms 6m			
Sum of EZTL - 17ms 9m			
Sum of EZTL - 42ms 9m			
Sum of Nonel Lead In Line			
Sum of Boosters 350 gram			
Sum of Boosters 450 gram			
Sum of Blastex 65x400 (12/cs)			
Sum of Blastex 75x400 (8/cs)			
Sum of Blastgel 76mm x 4kg	2760	-2760	0
Sum of Blastgel 81mmx4.5kg			
Sum of Blastgel 76mmx4.5kg			
Sum of Blastgel 83mmx4.5kg			
Sum of Blastgel 75mmx4.5kg			
Sum of Blastgel 83mmx5.9kg		2160	2160

MAGAZINE INVENTORY: February 18, 2014	
Location	Mary River
Magazine	PQ0482
Date	(All)

	Column Labels		
Values	**In**	**Out**	**Grand Total**
Sum of EZ Det 9m			
Sum of EZ Det 15m			
Sum of EZ Det 18m			
Sum of EZTL - 17ms 6m			
Sum of EZTL - 34ms 6m			
Sum of EZTL - 42ms 6m			
Sum of EZTL - 67ms 6m			
Sum of EZTL - 109ms 6m			
Sum of EZTL - 17ms 9m			
Sum of EZTL - 42ms 9m			
Sum of Nonel Lead In Line			
Sum of Boosters 350 gram			
Sum of Boosters 450 gram			
Sum of Blastex 65x400 (12/cs)			
Sum of Blastex 75x400 (8/cs)			
Sum of Blastgel 76mm x 4kg			
Sum of Blastgel 81mmx4.5kg	4620		4620
Sum of Blastgel 76mmx4.5kg			
Sum of Blastgel 83mmx4.5kg	4597	-1473	3124
Sum of Blastgel 75mmx4.5kg			
Sum of Blastgel 83mmx5.9kg			

MAGAZINE INVENTORY: February 18, 2014	
Location	Mary River
Magazine	PQ0479
Date	(All)

	Column Labels		
Values	**In**	**Out**	**Grand Total**
Sum of EZ Det 9m			
Sum of EZ Det 15m			
Sum of EZ Det 18m			
Sum of EZTL - 17ms 6m			
Sum of EZTL - 34ms 6m			
Sum of EZTL - 42ms 6m			
Sum of EZTL - 67ms 6m			
Sum of EZTL - 109ms 6m			
Sum of EZTL - 17ms 9m			
Sum of EZTL - 42ms 9m			
Sum of Nonel Lead In Line			
Sum of Boosters 350 gram			
Sum of Boosters 450 gram	20559	-931	19628
Sum of Blastex 65x400 (12/cs)			
Sum of Blastex 75x400 (8/cs)	2317	-256	2061
Sum of Blastgel 76mm x 4kg			
Sum of Blastgel 81mmx4.5kg			
Sum of Blastgel 76mmx4.5kg			
Sum of Blastgel 83mmx4.5kg			
Sum of Blastgel 75mmx4.5kg			
Sum of Blastgel 83mmx5.9kg			

MAGAZINE INVENTORY: February 18, 2014	
Location	Mary River
Magazine	PQ0470
Date	(All)

	Column Labels		
Values	**In**	**Out**	**Grand Total**
Sum of EZ Det 9m			
Sum of EZ Det 15m			
Sum of EZ Det 18m			
Sum of EZTL - 17ms 6m			
Sum of EZTL - 34ms 6m			
Sum of EZTL - 42ms 6m			
Sum of EZTL - 67ms 6m			
Sum of EZTL - 109ms 6m			
Sum of EZTL - 17ms 9m			
Sum of EZTL - 42ms 9m			
Sum of Nonel Lead In Line			
Sum of Boosters 350 gram			
Sum of Boosters 450 gram			
Sum of Blastex 65x400 (12/cs)			
Sum of Blastex 75x400 (8/cs)			
Sum of Blastgel 76mm x 4kg	2529	-2529	0
Sum of Blastgel 81mmx4.5kg			
Sum of Blastgel 76mmx4.5kg			
Sum of Blastgel 83mmx4.5kg			
Sum of Blastgel 75mmx4.5kg			
Sum of Blastgel 83mmx5.9kg			

MAGAZINE INVENTORY: February 18, 2014	
Location	Mary River
Magazine	PQ0469
Date	(All)

	Column Labels	
Values	**In**	**Grand Total**
Sum of EZ Det 9m		
Sum of EZ Det 15m		
Sum of EZ Det 18m		
Sum of EZTL - 17ms 6m		
Sum of EZTL - 34ms 6m		
Sum of EZTL - 42ms 6m		
Sum of EZTL - 67ms 6m		
Sum of EZTL - 109ms 6m		
Sum of EZTL - 17ms 9m		
Sum of EZTL - 42ms 9m		
Sum of Nonel Lead In Line		
Sum of Boosters 350 gram		
Sum of Boosters 450 gram		
Sum of Blastex 65x400 (12/cs)		
Sum of Blastex 75x400 (8/cs)	3888	3888
Sum of Blastgel 76mm x 4kg		
Sum of Blastgel 81mmx4.5kg		
Sum of Blastgel 76mmx4.5kg		
Sum of Blastgel 83mmx4.5kg		
Sum of Blastgel 75mmx4.5kg		
Sum of Blastgel 83mmx5.9kg		

MAGAZINE INVENTORY: February 18, 2014	
Location	Mary River
Magazine	AO0204
Date	(All)

	Column Labels		
Values	**In**	**Out**	**Grand Total**
Sum of EZ Det 9m	1033	-684	349
Sum of EZ Det 15m	4524	-964	3560
Sum of EZ Det 18m	450	-79	371
Sum of EZTL - 17ms 6m	2751	-251	2500
Sum of EZTL - 34ms 6m			
Sum of EZTL - 42ms 6m			
Sum of EZTL - 67ms 6m	150		150
Sum of EZTL - 109ms 6m	150		150
Sum of EZTL - 17ms 9m			
Sum of EZTL - 42ms 9m	474	-120	354
Sum of Nonel Lead In Line	11	-3	8
Sum of Boosters 350 gram			
Sum of Boosters 450 gram			
Sum of Blastex 65x400 (12/cs)			
Sum of Blastex 75x400 (8/cs)			
Sum of Blastgel 76mm x 4kg			
Sum of Blastgel 81mmx4.5kg			
Sum of Blastgel 76mmx4.5kg			
Sum of Blastgel 83mmx4.5kg			
Sum of Blastgel 75mmx4.5kg			
Sum of Blastgel 83mmx5.9kg			

WSCC Workers' Safety & Compensation Commission | ᐃᖃᓗᐊᔨᖏᑎᓂᒃ ᐊᑕᐊᖃᖏᑐᓂᒃ ᐊᒻᒪ ᓇᓕᐅᑦᑎᐊᓂᒃ ᖃᐅᔨᓴᖏᑎᑦ

20140329

email michael.anderson@baffinland.com

Michael Anderson
Vice President Operations
Baffinland Iron Mines Corporation
120 Adelaide Street West - Suite 1016
Toronto ON M5H 1T1

Dear Mr. Anderson:

Further to the **Mine Health and Safety Act article 26** attached is my 20140329 Mary River project inspection report.

As per **MHSA article**

28. please post a copy of this inspection report in a conspicuous location, and

29. advise the chief inspector within 30 days of the remedial measures taken and the remedial measures still to be taken in respect of the inspection report.

32.(1) A person who is adversely affected by a decision or order issued by an inspector may appeal the decision or order, in writing, to the chief inspector within 30 days after its issue.

The WSCC is committed to service excellence. If you have any questions or concerns about this inspection report, please feel free to contact my supervisor Peter Bengts or myself. His phone number is 867 669 4412 or email peter.bengts@wscc.nt.ca.

Sincerely
Workers' Safety and Compensation Commission of the NWT and NU Mine Safety

Martin van Rooy
Engineer/Mines Inspector

cc OHSC c/o glen.hein@ baffinland.com

WSCC Workers' Safety & Compensation Commission | ᐃᖃᓗᐊᕐᓂᓄᑦ ᐊᑕᐊᖃᕐᑐᓂᖅ ᐊᒻᒪ ᓇᓕᐅᑦᑎᓂᖅ ᖃᐅᔨᒪᔭᐅᓂᖅ

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

Mine:	Mary River project	Location:	~950 km NW of Iqaluit
Operator:	Baffinland Iron Mines Corp.	Lat. 71-19'N	Long. 79-24'W
Manager:	Michael Anderson	Inspection Date:	20140318, 19 and 20
Address:	120 Adelaide Street West - Suite 1016 - Toronto ON M5H 1T1		

Mr. Jeff Fuller (WSCC`s electrical consultant) and Martin van Rooy (engineer/mine inspector) performed an electrical inspection of Baffinland's Milne Inlet and Mary River site, from March 18 to 20, 2014. At Milne Inlet, the generator and electrical houses 1 and 2, the camp's exterior electrical house and interior electrical room, water storage building and the emergency response building, were checked. The bridge at Km 17 and the ice landing strip were checked. At Mary River, the generator and electrical houses 1 and 2, the camp's exterior electrical rooms, the water storage building, the cap magazine and explosive storage magazine PQ-0479, were checked. The ice thickness records, of the landing strip and the explosive storage and use records were reviewed.

Stephen Boone, Pat Driscoll, Terry Gobbo, Glen Hein, Aateff Hussaini, Bikash Paul and Brian Perkins accompanied Jeff fuller and Martin van Rooy for parts of this inspection.

Noticed there are no maximum voltage signs, on the access door to some electrical equipment, warning of the voltage inside the equipment.

1 Where electrical equipment is accessible to unauthorized personnel, install signage to comply with sub-clause 4.2.7 of CSA standard M421-11.
These requirements would also apply to entrances to electrical equipment rooms.

MHSR sect 13.01.(2) *Except where otherwise required by these regulations, the electrical system and electrical equipment shall meet or exceed the requirements of CSA Standard CAN/CSA-M421-93, Use of Electricity in Mines.*

Noticed the electrical equipment covers have tape identification labels attached however, these labels can be readily removed or fall-off, creating a potential lockout hazard.

2 Permanent labeling on electrical equipment and rooms is required throughout the Milne and Mine

Date of Report 20140329 **Inspector**

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

sites.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer.

Noticed the battery terminals, on some stationary generator units, are not covered.

3 Install rubber protective boots on battery terminals or guard against inadvertent grounding or shorting of the terminals.

MHSR sect 10.16. *Every...*
and every other item that has motion or relative motion or is hot or electrically energized shall, unless it is so situated as to prevent a person from coming into accidental contact with it, be effectively enclosed, covered or guarded.

Noticed the supplier of the generator e-houses' electrical equipment had not completed all testing required, before shipping the units to site.

4 Testing of SE-330 ground fault relays in progress. Mine site complete. Milne to be tested this week.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer.

Noticed the second ground conductor, Milne generator e-house #1 switchgear ground bus, is not installed.

5 Terry Gobbo of Hatch has stated that a Field work Instruction has been approved to install this conductor and that it will be installed by the end of June 2014.

Date of Report 20140329 **Inspector**

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer.

Noticed the electrical panel C is loose because a screw is missing from the interior cover, Milne accommodation building arctic corridor walkway.

6 Replace the screw and secure the cover.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer.

Noticed an unused electric cable opening, in the fire pump transformer enclosure, Milne water building.

7 Install a KO plug in unused opening in the fire pump transformer in the Milne water building.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer.

Noticed the cable tray bonds, in the Milne water building and emergency response garage, were not connected to their respective ground grids.

8 Tie the tray bonds in the Milne water building and Emergency response Garage to their respective ground grids. (Terry Gobbo reported this complete prior to our departure from site.)

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and

Date of Report 20140329 **Inspector** _____

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

(b) constructed in accordance with a design and plans that have been certified by a professional engineer

Noticed there are no barricades installed for protection of the cables lying on the ground behind the mine site's generator e-houses and water building.

9 Place barriers to prevent damage to cables running on the ground behind Generator E-houses and water building at the mine site.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer

Noticed the ground conductors, at the mine site's generators and e-houses, are exposed and not protected from damage.

10 Ground conductors at the mine site generators and generator e-houses to be covered to prevent damage.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer

Noticed the cable trays, installed in the mine site's water building, are not bonded.

11 Install tray bonds and ground to the building service main ground.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional

Date of Report 20140329 **Inspector**

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

engineer

Noticed the mechanical connector, on the mine site's E-house 4750-BLD-001 temporary generator ground, is loose.

12 Replace the mechanical ground connector for the temporary generator ground at E-house 4750-BLD-001 with an approved compression connector or Cadweld.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer

Noticed the 600V molded case circuit breakers, installed in the E-houses, have no mechanism for locking-out the breaker.

13 Provide locking devices for 600V molded case circuit breakers at E-houses. Ensure that locking devices are available on site for all types of electrical control devices that will be used for locking and tagging.

MHSR sect 10.21.(1) *The manager shall develop a lock-out procedure for each mechanical or electrical equipment system, and the procedure shall*
(a) include the requirements of subsections (2) to (6) and sections 10.22 and 10.23;
(b) address the sources of all hazards that may be presented when a person is working on the equipment or system; and
(c) specify, before the work starts, how the equipment or system is to be checked to verify that all hazards have been neutralized and that the equipment or system is safe to work on.

Noticed the extension cords, of the power operated tools used outside, were route through the building doorways, because there are no receptacles on the exterior of the buildings.

14 Install outdoor 120V receptacles where tools or other devices are required to be used outdoors. It is a

Date of Report 20140329 **Inspector**

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

Code violation to run extension cords through doors, windows or other openings in structures.

MHSR sect 13.01.(2) *Except where otherwise required by these regulations, the electrical system and electrical equipment shall meet or exceed the requirements of CSA Standard CAN/CSA-M421-93, Use of Electricity in Mines.*

Noticed the supplier, of the E-houses' electrical equipment, had not completed all test work, before shipping the units to site.

15 Relay testing of medium voltage protection at Milne and at the mine site is not in full compliance with CSA Standard M421-11 Sub-clause 4.5.5. This item is covered in detail in response to request for permission to energize.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer.

Noticed some of the shelves, installed in the new kitchen at Milne Inlet and Mary River, were deflecting under their load.

16 Please check all shelving units and ensure each is marked with the maximum safe load, which may be stored on the shelf.

MHSR sect 10.01.(1) *All mechanical equipment used at mines shall be*
(a) designed in accordance with good engineering practice;
(b) constructed in accordance with a design and plans that have been certified by a professional engineer; and
(c) acceptable to the chief inspector.

Noticed access, to some electrical panels, fire extinguishers or eyewash stations, blocked by material(s) stored in front of it.

Date of Report 2014 03 29 **Inspector**

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

17 Please review the electrical panel, fire extinguisher or eyewash station locations and ensure their access to/from and at, is clear and not obstructed.

MHSR sect 9.04. *The manager shall develop and implement an effective housekeeping program to ensure that*
(a) all worksites and travelways are maintained in a safe condition;
(b) materials and equipment are stored in a manner so as not to endanger persons; and
(c) appropriate action is taken whenever necessary to maintain a hazard-free environment.

Noticed the Kidde fire suppression system, installed in the Milne Inlet accommodation E-house, is discharged. The mine advised its replacement is ordered. Also noticed the E-house structures have various openings that are not sealed, preventing the pressurizing of the E-house and reducing the effectiveness of the fire suppression system.

18 Please check the E-house building structures and ensure they are effectively sealed to prevent dust entry and assist in fire suppression.

MHSR sect 12.01.(1) *The manager shall ensure that a fire risk assessment is carried out not later than March 31 in each calendar year for all parts of the mine, both underground and surface, and the assessment shall*
(a) identify the potential for a fire or explosion by examining
(i) ignition sources, such as internal combustion engines, malfunctioning equipment, welding and burning and electrical equipment,
(ii) fuel sources such as combustible materials including class A ordinary combustibles and class B flammable and combustible liquids, and
(iii) the proximity of ignition sources to fuel sources, damaged equipment and accumulations of combustible materials;
(b) determine if persons may be exposed to the effect of fire;
(c) identify the need for fire protection and the type of fire protection that should be provided; and
(d) set out measures to be taken to reduce the hazard from fire, including
(i) equipment design,
(ii) adequate maintenance of equipment,
(iii) proper training,

Date of Report 20140329 **Inspector**

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

(iv) evacuation procedures,
(v) use of detection and early fire warning devices,
(vi) type of fire suppression equipment, and
(vii) means of egress from a worksite.

Noticed the long frost fighter electrical cords lying without protection across the floor, Milne Inlet water building. The cords are a potential trip hazard and an electrical hazard if cut by a falling object. The cords were rerouted away from the travelled work areas.

19 Please review the practice of allowing electrical cords, hoses and other items... to lie indiscriminately over the ground or across a floor without protection, creating a hazard.

MHSR sect 9.04. *The manager shall develop and implement an effective housekeeping program to ensure that*
(a) all worksites and travelways are maintained in a safe condition;
(b) materials and equipment are stored in a manner so as not to endanger persons; and
(c) appropriate action is taken whenever necessary to maintain a hazard-free environment.

Noticed a truck with an Explosives sign, parked in the Mary River camp's equipment parking lot. Some explosives material was on the truck however, no hazardous good placard was displayed to warn people of the explosive materials stored on the truck.

20 Please review the practise of transporting explosives and ensure
a) as previously noted in inspection report 20 July 2013, the dangerous good placards are displayed when transporting explosives, and the explosives doors are locked with a padlock when parked, to prevent unauthorized access,
b) the explosive are returned to the magazine and not parked near the camp or other susceptible site, and
c) a suitable parking area is identified, in compliance with the Quantity Distance principles, where a vehicle carrying explosives can park with its doors locked, away from the camp and other susceptible sites, in case of a blizzard or other circumstances.

Date of Report 20140329 **Inspector** _____

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

MHSA art 10.(1) *The manager shall take every reasonable measure and precaution to protect the health and safety of employees and other persons at a mine.*

Noticed the floor is heaved in explosive magazine PQ-0479 permit 2007-0211, creating a trip hazard inside the magazine.

21 Please check all magazine floors, and ensure they are free of any trip hazard and repair the magazine's floor.

MHSR sect 1.90. *Where workers are required to work, operate, maintain or service equipment, a safe means of access shall be provided as required by section 1.89.*

Date of Report 20140329 **Inspector** _____

Baffinland

April 28, 2014

Mr. Martin Van Rooy
Mine Inspector
Worker's Compensation Commission
PO Box 669
Iqaluit, Nunavut
XOA 0H0

Dear Martin,

In follow-up to your March 29, 2014 inspection report, please find below responses to each of the inspection findings.

Noticed electrical equipment is accessible to unauthorized personnel, install signage to comply with sub-clause 4.2.7 of CSA standard M421-11.

1. ***Where electrical equipment is accessible to unauthorized personnel, install signage to comply with sub-clause 4.27 of CSA standard M421-11. These requirements would also apply to entrance to electrical equipment rooms.***

Response:

Durable notice signs of sufficient size such as Brady Signs indicating highest voltage level in use will be installed where a hazard exists from inadvertent access to or interference with electrical apparatus. Due to the requirement to order and install, we are proposing completion of this action by June 15, 2014.

Noticed the electrical equipment covers have tape identification labels attached however, these labels can be readily removed or fall-off, creating a potential lockout hazard.

2. ***Permanent labeling on electrical equipment and rooms is required throughout thee Milne and Mine sites.***

Response:

A label maker (Brady or similar) will be ordered and used to produce temporary equipment identification labels on electrical equipment and rooms throughout the Milne and Mine sites by June 15, 2014. Permanent lamacoid labels will be installed by October 31, 2014.

2275 Upper Middle Road East, Suite 300 | Oakville, ON, Canada L6H 0C3 | Main: 416.364.8820 | Fax: 416.364.0193 | www.baffinland.com

Noticed the battery terminals, on some stationary generator units, are not covered..

3. ***Install rubber protective boots on battery terminals or guard against inadvertent grounding or shorting of the terminals.***

Response:

The ordering and purchase of these protective boots will be performed by Cummins as part of their punch-list with completion planned by June 15, 2014.

Noticed the supplier of the generator e-houses' electrical equipment had not completed all testing required, before shipping the units to site.

4. ***Testing of SE-330 ground fault relays in progress. Mine site complete. Milne to be tested this week.***

Response:

Testing is completed. Test reports were forwarded to your attention on March 26, 2014.

Noticed the second ground conductor, Milne generator e-house #1 switchgear ground bus, is not installed.

5. ***Terry Gobbo of Hatch has stated that Field work Instruction has been approved to install this conduct and that it will be installed by the end of June 2014.***

Response:
Installation is planned to occur by October 31, 2014 in conjunction with the installation of additional generators being delivered on the 2014 sealift. Installation will be performed sooner in the event of a planned or unplanned shutdown.

Noticed the electrical panel C is loose because a screw is missing from the interior cover, Milne accommodation building arctic corridor walkway.

6. ***Replace the screw and secure the cover.***

Response:

The screw has been replaced and the cover properly secured.

Noticed an unused electric cable opening, in the fire pump transformer enclosure, Milne water building.

7. ***Install a KO plug in unused opening in the fire pump transformer in the Milne water building.***

Response:
The appropriate sized knock-out plug was not available on site and has been ordered. It is planned to have this received and installed by June 15, 2014.

Noticed the cable tray bonds, in the Milne water building and emergency response garage, were not connected to their respective ground grids.

8. ***Tie the tray bonds in the Milne water building and Emergency response Garage to their respective ground grids. (Terry Gobbo reported this complete prior to our departure from site).***

Response:
This item was completed by ADCO the same day as the inspection.

Noticed there are no barricades installed for protection of the cables lying on the ground behind the mine site's generator e-houses and water building.

9. ***Place barriers to prevent damage to cables running on the ground behind Generator E-houses and water building at the mine site.***

Response:
Barriers have been installed at the e-houses and water building to protect the cables.

Noticed the ground conductors, at the mine site's generators and e-houses, are exposed and not protected from damage

10. ***Ground conductors at the mine site generators and generator e-houses to be covered to prevent damage.***

Response:
Installation will require additional backfill to get the design 150 mm cover over ground conductors. This will be completed prior to October 31, 2014 in conjunction with the additional generator being delivered on the 2014 sea lift.

Noticed the cable trays, installed in the mine site's water building are not bonded.

11. ***Install tray bonds and ground to the building service main ground.***

Response:
Cable tray bonding conductor was installed following the inspection.

Noticed the mechanical connector, on the mine site's E-house 4750-BLD-001 temporary generator ground, is loose.

12. ***Replace the mechanical connector for the temporary generator ground at E-house 4750-BLD-001 with an approved compression connector or Cadweld.***

Response:
The mechanical ground connector has been removed as the Twin-Pack generator has been disconnected from E-house #1.

Noticed the 600V molded case circuit breakers, installed in the E-houses, have no mechanism for locking-out the breaker.

13. ***Provide locking devices for 600V molded case circuit breakers at E-houses. Ensure that locking devices are available on site for all types of electrical control devices that will be used for locking and tagging.***

Response:
Circuit breaker toggle locks for U-Line and other panel boards have been ordered. Installation will be performed by June 15, 2014.

Noticed the extension cords, of the power operated tools used outside, were routed through the building doorways, because there are no receptacles on the exterior of the building.

14. ***Install outdoor 120V receptacles where tools or other devices are required to be used outdoors. It is a Code violation to run extension cords through doors, windows or other openings in structures.***

Response:
The parts for outside receptacle installation have been ordered and will be installed by June 30, 2014.

Noticed the supplier, of the E-houses' electrical equipment, had not completed all test work, before shipping the units to site.

15. ***Relay testing of medium voltage protection at Milne and at the Mine site is not in full compliance with CSA Standard M421-11 Sub-clause 4.5.5. This item is covered in detail in response to request for permission to energize.***

Response:
Medium voltage protection CT ratio tests and relay current injection tests were completed by Eaton technical services under Hatch supervision. The results of the testing were provided to your attention on April 21, 2014.

Noticed some shelves, installed in the new kitchen at Milne Inlet and Mary River, were deflecting under their load.

16. ***Please check all shelving units and ensure each is marked with the maximum safe load, which may be stored on the shelf.***

Response:

Shelving units were checked, along with manufacturer specifications. Signage has now been placed indicating the maximum safe load for the shelves as shown in the attached photo.

Noticed access, to some electrical panels, fire extinguishers or eyewash stations, blocked by material(s) stored in front of it.

17. ***Please review the electrical panel, fire extinguisher or eyewash station locations and ensure their access to/from and at, is clear and not obstructed.***

Response:
Locations for safety equipment were reviewed and any obstructions removed. Signage along with floor tape to designate the area in front of the equipment was installed as shown in the attached photo.

Noticed the Kidde fire suppression system, installed in the Milne Inlet accommodation E-house, is discharged. The mine advised its replacement is ordered. Also noticed the E-house structures have various openings that are not sealed, preventing the pressurizing of the E-house and reducing the effectiveness of the fire suppression system.

18. ***Please check the E-house buildings and ensure they are effectively sealed to prevent dust entry and assist in fire suppression.***

Response:
Power Generation E-House penetrations will be sealed with Rockwool firestop and/or fire stop pillows. This work will be completed by October 31, 2014.

Noticed the long frost fighter electrical cords lying without protection across the floor, Milne Inlet water building. The cords are a potential trip hazard and an electrical hazard if cut by a falling object. The cords were rerouted away from the travelled work areas.

19. ***Please review the practice of allowing electrical cords, hoses and other items… to lie indiscriminately over the ground or across the floor without protection, creating a hazard.***

Response:
The frost-fighter electrical cords were re-routed on the same day as the inspection. Each department has been reminded of proper housekeeping and in particular extension cords through a daily safety memo (attached).

Noticed a truck with an Explosive sign, parked in the Mary River camp's equipment parking lot. Some explosives material was on the truck however, no hazardous good placard was displayed to warn people of the explosive stored on the truck.

20. ***Please review the practice of transporting explosives and ensure***
    a. ***As previously noted in the inspection report 20 July 2013, the dangerous good placards are displayed when transporting explosives, and the explosives doors are locked with a padlock when parked, to prevent unauthorized access.***
    b. ***The explosive are returned to the magazine and not parked near the camp or other susceptible site and***
    c. ***A suitable parking area is identified, in compliance with the Quantity Distance principles, where a vehicle carrying explosives can park with its doors locked, away from the camp and other susceptible sites, in case of a blizzard or other circumstances.***

Response:
Baffinland now has magnetic placards that will be put on the trucks when transporting explosives. We have also installed red flashing flights on all vehicles that are equipped with explosive containers.

We have also made it clear to our personnel that explosives are to be transported between magazines and blast sites with delay. We do not anticipate another incident where a pickup carrying a stick of cartridge explosives or any other explosive is parked near camp

In the event of a blizzard or anything else that would prevent access to the main magazines we would temporarily park a vehicle at the top of QMR2 as far as possible toward the rear of the quarry, with the doors locked. This area has only one access point and is more than 500m from any permanent road or installation. Failing that we always have the second mag at Km 7 on the Tote road near Milne.

Noticed the floor is heaved in explosive magazine PQ-0479 permit 2007-0211, creating a trip hazard inside the magazine.

21. ***Please check all magazine floors, and ensure they are free of any trip hazard and repair the magazine's floor.***

Response:

Baffinland has removed the explosives from *magazine PQ-0479* and will keep it out of service, until repairs are complete. Inspections of other magazines did not identify problems with the floors

Should you have any questions regarding this submission please contact Michael Anderson by phone at 416.814.3163 or email at Michael.Anderson@Baffinland.com.

Best Regards,

Erik Madsen
Vice President
Sustainable Development, Health, Safety and Environment

cc. Michael Anderson
Glen Hein

Attachments:

Photo – signage for kitchen shelving
Photo - Signage and floor marking around safety equipment
April 16, 2014 – Safety Memo

SAFETY first, Baffinland ALWAYS

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Baffinland Daily Safety Memo April 16, 2014

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COMPRESSED GAS - Reminder that oxygen / acetylene bottles must be shut off when not in use; including going on breaks and going to lunch.

>ᑦᓚ ᑐᓂ – ᐃᖅᑲᐃᑎᑎᔪᑎ ᑐᓂ >ᓚᒥᑐᖅ ᒪᑐᐅᖅᑲᕆᐊᓕᑦ ᐊᑐᕈᐅᔪᓂᖅᓴᒪᒥᖅ ; ᒪᑐᐅᐅᓪᓗᑎᒃ ᓄᖅᖃᓴᓕᐅᐱᓕᕐᓂᐊᕋᖅᓴᒪᓕᕐᑦ ᐅᓪᓗᓂᐅᓂᐊᕋᖅᓴᒪᓕᕐᑦ

HYDRATION - Keep drinking water throughout the day. Even if you are not thirsty. Pop and coffee in moderation.

ᖃᓄᖅᓂᖅ – ᐅᑉᓗᓂᒪᖅ ᐃᒪᒥᒃ ᓇᑲᐃᓇᖅᑕᖅᓂᐊᕐᓂᓱ. ᐃᒥᑭᓱᖅᑎᑲᓗᐊᑭᕆᓕᕐᑦ. ᐃᓕᒥᑦᓂᒃ ᐊᒻᒪᓗ ᑲᕕᖅᒥᒃ ᐱᓗᐊᖅᑕᐃᓕᒪᓪᓗᓱ.

EXTENSION CORDS - Take a moment and check your work areas to ensure that power cords are tidy and elevated. Remove cords not in use.

ᐅᐊᖏᑦᑕᓪᐃᑲᑦᓴᓐ ᑯᐊᑦ – ᖃᑲᐅᓴᕆᓚᑦ ᐃᖅᑲᓇᐃᖏᖅᓴᓂᒃ ᐅᐊᖏᑦᑕᑦ/ᐃᑲᑦᓴᓐᓴᓐ ᑯᐊᑦ ᐊᖅᑭᑎᐊᖅᓯᒪᓕᓗᐊᖅᓯᓗᑦᑕ ᐊᒻᓗ ᓇᑎᖅᑎᐃᓇᓐᓕᓗᑎᒃ. ᐅᐊᖏᑦᑕᑦ ᐊᑐᖅᑕᐅᓐᓕᑐᑦ ᑐᖅᑯᖅᓯᒪᖅᑕᖅᓗᑎᒃ

When housekeeping is not in order we pose a risk to all including ourselves who must pass through our areas. Please take the time to keep your cords in an orderly manner and keep your work areas tidy and free of hazards to yourself and others

ᓴᓇᕆᑦ ᓴᓗᒪᓐᒃᓴᓗᑕ ᑭᑯᓕᓐᓂᒃ ᖃᑯᖏᓴᖅᓇᖅᑐᑎᑎᑲᔪᑦ ᓴᓇᕆᑎᓄᐊᖅᑕᖅᑕᖅᓂᐊᓐᓂᒃ. ᐊᖅᑎ ᐅᐊᖏᑦᑕᑦ–ᐃᒃᑕᐅᓐᓂᒃ ᑯᐊᑦ ᐊᖅᑭᑎᐊᖅᓯᒪᓗᓐᓂᐊᖅᓯᓗᒪᓕᕐᓂᐊᖅᓯᓗᑦᑕ ᐊᒻᓗ ᐊᑦᑕᕐᓇᖅᑕᐃᓕᒪᓗᔪ ᐃᓕᓴᓂ ᐊᒻᓗ ᓴᓇᕆᑦᓴᓗᑎᒃ ᐊᓇᖅᑐᓂᒃ.

Daily Communication – to be shared with all staff and Workers toolbox.

ᖃᑲᐅᑕᒪᖅᑲᑎᑦ–ᑕᑯᖅᐅᖅᓇᐊᓕᑦ ᐸᓲᓕᑯᓱᓂ ᐃᖅᑲᓇᐃᖅᑎᑦᓕᓱᓂᐊᓐᓕᑦ ᐊᒻᓗ ᐃᖅᑲᓇᐃᖅᑎᑐᐃᓇᖅᓂᑦ


CAUTION


DO NOT BLOCK
FIRE
EXTINGUISHER
FIRE

WSCC Workers' Safety & Compensation Commission | ᐃᖃᓗᐊᓕᖅᑎᓂᒃ ᐊᑕᐊᖅᑐᑦᑐᒃ ᐊᒻᒪ ᓇᓕᓕᐅᔪᓂᒃ ᖃᐅᔨᓴᖅᑎᑦ

20140528

email michael.anderson@baffinland.com

Michael Anderson
Vice President Operations
Baffinland Iron Mines Corporation
120 Adelaide Street West - Suite 1016
Toronto ON M5H 1T1

Dear Mr. Anderson:

Further to the **Mine Health and Safety Act article 26** attached is my 20140528 Mary River project inspection report.

As per **MHSA article**

28. please post a copy of this inspection report in a conspicuous location, and

29. advise the chief inspector within 30 days of the remedial measures taken and the remedial measures still to be taken in respect of the inspection report.

32.(1) A person who is adversely affected by a decision or order issued by an inspector may appeal the decision or order, in writing, to the chief inspector within 30 days after its issue.

The WSCC is committed to service excellence. If you have any questions or concerns about this inspection report, please feel free to contact my supervisor Peter Bengts or myself. His phone number is 867 669 4412 or email peter.bengts@wscc.nt.ca.

Sincerely
Workers' Safety and Compensation Commission of the NWT and NU Mine Safety

Martin van Rooy
Engineer/Mines Inspector

cc OHSC c/o glen.hein@ baffinland.com

WSCC Workers' Safety & Compensation Commission | ᐃᖃᓗᐃᔭᖏᑎᓂᒃ ᐊᑕᐅᖅᑐᓂᒃ ᐊᒻᒪ ᓇᓕᐅᑦᓯᒪᓂᑦ ᖃᐅᔨᓴᖅᑎᑎᓪ

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

Mine:	Mary River project	Location:	~950 km NW of Iqaluit
Operator:	Baffinland Iron Mines Corp.	Lat. 71-19'N	Long. 79-24'W
Manager:	Michael Anderson	Inspection Date:	20140520, 21 and 22
Address:	120 Adelaide Street West - Suite 1016 - Toronto ON		M5H 1T1

Mr. Martin van Rooy (engineer/mine inspector) performed a general site safety inspection of Baffinland's Milne Inlet, Tote road and Mary River sites, from May 20 to 22, 2014. At Milne Inlet, the MRT building, water treatment plant, sewage truck garage, waste storage building, heated warehouse, Toromont shop, Arctic Construction shop, batch plant, crushing and screening plant were checked. Along the Tote Road, the bridges at Km 62, Km 80, Km 97 and the ice landing strip were checked. At Mary River, the D192 blast pattern, warehouse and quarry were checked. The data available on the April 27, 2014 *Dangerous Occurrence*; Caterpillar MD6290 rotary drill failure, was reviewed.

Francisco Albor Consuegra, Sarah Canning, Marlon Coakley, Tige Collins, Dale DeGagne, Pat Driscoll, Mario Vottero accompanied Hal Finely and Martin van Rooy for parts of this inspection.

Noticed no worker representative of the Occupation Health and Safety Committee, was available at Milne Inlet, to accompany us on our inspection, as these are not present on site for this rotation. On this rotation, Mary River has all the OHSC members and on the next rotation, Milne Inlet has all the OHSC members.

1 Please review the operation of the OHSC and ensure Mary River site and the Mile Inlet site each have an operational OHSC presence on site when there are more than 15 persons on site.

MHSA art 11.(1) *Where more than 15 persons are employed at a mine, the manager shall ensure that an Occupational Health and Safety Committee is established for the mine in accordance with the regulations*

(2) *A Committee shall consist of*
(a) management members appointed by the manager; and
(b) an equal or greater number of worker members elected by the workers.

Date of Report 20140528 **Inspector**

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

MHSR sect 3.02.(1) *The Occupational Health and Safety Committee established pursuant to section 11 of the Act shall consist of at least*
(a) four members, where the number of employees at the mine is 15 or greater but less than 100;
(b) eight members, where the number of employees at the mine is 100 or greater but less than 250; and
(c) 12 members, where the number of employees at the mine is 250 or more.

Noticed there is no effective radio or phone communication available to the medic, in case of an emergency, from the remote sites checked. A broken back medical emergency was presented at each of the three bridges checked and at the D192 drill/blast site and from each site, there was a problem in contacting the medic. At the bridges, they were not aware of how a satellite phone and number worked. After being shown, the person contacted Mary River however; he was placed in a redial extension loop, until security answered the call. At the D192 drill/blast site, the drill operator tried various channels on his equipment's base radio to contact security however, there was no response and finally he had to call a code 1 to verify that the radio from his location was working. There are radio repeater stations installed along the Tote Road however, these are not working and therefore there is no direct radio communication to the Milne Inlet or Mary River site for assistance in case of an emergency.

2 Please review the emergency communication system on site and ensure there is an effective communication system from any work site including the full length of the Tote Road to Mary River and Milne Inlet first aid facility. A Satellite phone should only be used as a back up to the emergency communication system and the persons using it must be trained in its use and check in daily to verify it works.

MHSR sect 8.44. *There shall be an effective means of communication between the person in charge of the first aid facility and all worksites to be served.*

MHSR sect 8.41. *Each employee shall be made aware of the location of first aid for his or her worksite and how to call for first aid.*

Noticed at Milne Inlet and Mary River there is no dust control system installed at crushing and screening plant, to prevent dust emission from the process stream. The absence of a dust control system and the failure to pressurize the Milne crusher's operator control room exposes the operator to dust

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contamination of his working environment. The Mary River crusher supervisor advised spray-bars would be installed to minimize the dust emission from the process stream.

3 Please review the operation of the crushing and screening plant and ensure
a) a dust control system is installed to prevent the dust emission from the process stream,
b) the operators are protected in their working environment by clean filtered pressurizing air, to prevent dust from entering and contaminating their work environment, and
c) the operators are fit tested and wear respirators when exposed to the dust.

MHSR sect 9.02.(1) *Employees shall not be exposed to airborne concentrations of chemical or physical substances in excess of those specified in the 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices published by the American Conference of Governmental Industrial Hygienists.*

(2) *Where shifts are worked longer than eight hours a day or more than 40 hours a week, the airborne concentration of chemical and physical substances shall not exceed the threshold limit value established under the formula set out in Schedule 4.*

MHSR sect 9.09. *In a building where dust or other material could, by becoming airborne, result in a hazard by restricting vision causing a fire or explosion, or if the material could be potentially hazardous if inhaled or ingested, the material*
(a) shall be removed without delay by suitable means such as vacuuming, wet sweeping or wet shovelling; or
(b) shall be suppressed, if it is not practicable to remove the material.

Noticed the operating instruction placard on the SkyJack SKJ 005 scissor lift platform is in French and not in English. The equipment's maintenance copies, of the pre-operating inspection reports, for May 15 and 16 were not removed from the equipment and the hour meter readings were not recorded on the pre-operating sheets. The failure to record the hour/odometer reading on the equipment's pre-operating inspection report and to submit these reports to the maintenance department is of concern; as it prevents the maintenance department from knowing the equipment is in use. The failure to keep track of the operating hours could result in missing the manufacturer specified maintenance schedule for the safety devices on this equipment. These maintenance copies were removed and given to the

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maintenance department along with the other maintenance copies removed from other equipment parked at Milne.

4 Please ensure for all manlift type equipment,
a) the operator is trained for the equipment,
b) the pre-operating inspection report is completed and returned to the maintenance department at the end of the shift, and
c) the operating instructions attached to the equipment are in English.

MHSR sect 10.133.(1) *The manager shall ensure that a procedure is established for the safe operation, maintenance, inspection and testing of all portable or mobile platforms, scaffolding, bosun's chairs and other types of temporary work or access platforms.*

Noticed the metal frame building structure of the heated warehouse, Toromont's shop, Arctic Construction's shop at Milne Inlet did not appear connected to the site's ground/bond grid system.

5 Please check the metal frame building structures and ensure these are connected to the site's ground/bond grid system.

MHSR sect 13.01.(1) *The electrical system and electrical equipment at a mine shall be*
(a) designed in accordance with good engineering practice; and
(b) constructed in accordance with a design and plans that have been certified by a professional engineer.

Noticed and extension cord passing through an opening in the door of the Arctic Construction/Fountain Tire shop at Milne Inlet.

6 Please install 120V outdoor receptacles where tools or other devices are used outdoors. It is a Code violation to pass extension cords through doors, windows or other openings in structures.

MHSR sect 13.01.(2) *Except where otherwise required by these regulations, the electrical system and electrical equipment shall meet or exceed the requirements of CSA Standard CAN/CSA-M421-93, Use*

Date of Report 20140528 **Inspector** _____

of Electricity in Mines.

Noticed a used concrete pump truck parked at Milne Inlet however, it is not known if this unit is certified for use on site.

7 Please submit, before using the equipment, the certification of this equipment.

MHSR sect 10.128.(2) *A new or used crane, shovel, dragline, boom truck or similar type of equipment that uses a rope or cable to raise, lower or swing a load or materials during its work cycle shall not be put into service unless*
(a) a certificate has been obtained from the manufacturer or from a professional engineer competent in the design of hoisting equipment, certifying
(i) the maximum load capacity and maximum operating speed of the hoisting or lifting system, and
(ii) that all critical load-bearing components of the complete assembly and accessories have been inspected and non-destructively tested; and
(b) all the commissioning tests have been successfully completed.

(3) *In addition to the requirements of sections 10.13 to 10.15, an operator of a crane, shovel, dragline, boom truck or similar type of equipment that uses a rope or cable to raise, lower or swing a load or materials during its work cycle shall be qualified in accordance with a program acceptable to the chief inspector.*

Noticed a truck driver and three other persons wearing rings while working on site. They were advised rings must not be worn while working on site.

8 Please advise all supervisors to ensure they and the persons working under their supervision, are in compliance with Baffinland's policy on wearing of jewellery while at work.

MHSR sect 8.15.(1) *Where there is a risk of a person coming into contact with moving parts of machinery or with electrically energized equipment or where the work process is such that a similar hazard exists, the person*
(a) shall wear clothing that fits closely about the body;
(b) shall not wear dangling neckwear, bracelets, wrist-watches, rings or similar articles; and

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Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

(c) shall confine cranial and facial hair or wear it at a length which will prevent it from being snagged or caught.

(2) *Notwithstanding subsection (1), a person may wear a medic alert bracelet if the bracelet is secured with transparent rubber bands that fit snugly over the bracelet.*

Noticed a blind hill at KM 27/28 area however, there is no sign installed to advise drivers to call on their radio their approach to this blind hill.

9 Please ensure warning signs are installed at blind hills and blind corners, directing drivers to call on their radio, their approach to the blind spot on the road.

MHSA art 10.(1) *The manager shall take every reasonable measure and precaution to protect the health and safety of employees and other persons at a mine.*

Noticed D-handle shovels used at Milne Inlet's crushing and screening plant. They were removed, during our inspection and it was explained no hand trapping devices must be used near conveyors.

10 Please ensure any hand held tools and implements used near a conveyor, have no hand trapping arrangements.

MHSR sect 10.19. *The manager shall ensure that, where it is required to service or cleanup on or about any equipment or system while it is operating,*
(a) the equipment or system shall be so constructed that the servicing or cleanup may be performed without removing any protective fence or guard;
(b) only that part of the equipment or system that is vital to the process shall be energized;
(c) only qualified persons shall be employed in those operations; and
(d) the hand held tools and implements shall have no hand trapping arrangements.

Noticed the face of Mary River's upper quarry wall, was not scaled and has loose material on it. Also noticed a section of quarry wall with the face under-cut. The shift supervisor advised he would place a berm in front of the upper wall to prevent access to it.

Date of Report 20140528 **Inspector** _____

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11 Please ensure
a) the quarry walls are maintained free from loose material that could fall to a lower level and endanger personnel, and
b) personnel required to work close to the face (e.g. blasters and surveyors) are trained to inspect and identify instability in the wall.

MHSR sect 1.136.(1) *No work shall be conducted at or below a face or wall of a surface mine until that face or wall has been examined and declared safe by the shift boss.*

(2) *Nothing in subsection (1) shall prevent the shift boss from being accompanied by other persons who may be required to make the face or wall safe.*

MHSR sect 1.138. *No person shall allow any part of a face or wall of a surface mine to overhang.*

The data on the April 27, 2014 Caterpillar MD6290 Rotary Blast Hole Drill catastrophic failure was reviewed and it appears from this preliminary review, the drill rod, the drill head and a drill hose all failed in this incident.

12 Please collect all failed parts (hose, gear box, drill rod, other...) and ensure all failed parts
a) are catalogued,
b) have clear high resolution photos taken of it and its fractured surface(s), and
c) are stored in a secure location for forensic analysis.

MHSR sect 16.05. *The manager shall ensure that an investigation of the health and safety circumstances surrounding reportable incidents and the causes of dangerous occurrences, is made by persons knowledgeable in the type of work involved and by the Committee cochairpersons or their designates.*

Date of Report 20140528 **Inspector** _____

Baffinland

June 27, 2014

Mr. Martin Van Rooy
Mine Inspector
Worker's Compensation Commission
PO Box 669
Iqaluit, Nunavut
XOA 0H0

Dear Martin,

In follow-up to your May 28th inspection report, please find below responses to each of the inspection findings.

Noticed no worker representation of the Occupation Health and Safety Committee, was available at Milne Inlet, to accompany us on our inspection, as these are not present on site for this rotation. On this rotation, Mary River has all the OHSC members and on the next rotation, Milne Inlet has all the OHSC members.

1. ***Please review the operation of the OHSC and ensure Mary River site and the Milne Inlet site each have an operational OHSC presence on site when there are more than 25 persons on site.***

Response:

We recognize at present the structure of the OHSC results in a lack of representation at Mary River or Milne Inlet depending on the rotation. To address this, Baffinland will be soliciting additional OHSC members from both locations to sit on the Committee. While we will continue to hold two meetings per month, one at Mary River and one at Milne Inlet those members from the site where the meeting is not being held will either attend in person or via conference call. This process will ensure OHSC presence at both locations at all times. Baffinland proposes that these additional members will be in place at both locations by July 31, 2014.

Noticed there is no effective radio or phone communication available to the medic, in case of an emergency, from the remote sites checked. A broken back medical emergency was presented at each of the three bridges checked and at the D192 drill/blast site and from each site, there was a problem in contacting the medic. At the bridges, they were not aware of how a satellite phone and number worked. After being shown, the person contacted Mary River

however; he was placed in a redial extension loop, until security answered the call. At the D192 drill/blast site, the drill operator tried various channels on a code 1to verify that the radio from his location was working. There are radio repeater stations installed along the Tote Road however, these are not working and therefore there is no direct radio communication to the Milne Inlet or Mary River site for assistance in case of an emergency.

2. ***Please review the emergency communication system on site and ensure there is an effective communication system from any work site including the full length of the Tote Road to Mary River and Milne Inlet first aid facility. A Satellite phone should only be used as a backup to the emergency communication system and the persons using it must be trained in its use and check in daily to verify it works.***

Response:

An effective radio communication system, for use during routine and emergency situations has been designed for the project area. A permanent microwave / digital radio system is planned to be completed by the end of August or early September. This system will provide full radio communication ability between Mary River and Milne Inlet and include the tote road.

Until this system is implemented, due to the project activities, there is very frequent truck traffic on the road 24 hours per day which can assist in relaying radio messages between vehicles to communicate a Code 1 emergency to Mary River or Milne Inlet. If this relaying of messages does not work, the satellite phones will be used to communicate the emergency. Baffinland will provide additional awareness sessions with our employees and contractors on how to use the satellite phones. These sessions, previously held in February, proved effective in raising the awareness and knowledge of how to use the satellite phones. The security department will continue to perform daily checks of the satellite phones as they are returned to ensure they remain in working order.

Noticed at Milne Inlet and Mary River there is no dust control system installed at crushing and screening plant, to prevent dust emission from the process stream. The absence of a dust control system and the failure to pressurize the Milne crusher's operator control room exposes the operator to dust contamination of his working environment. The Mary River crusher supervisor advised spray-bars would be installed to minimize the dust emission from the process stream.

3. ***Please review the operation of the crushing and screening plan and ensure***
   - ***a) A dust control system is installed to prevent the dust emissions from the process stream,***
   - ***b) The operators are protected in their working environment by clean filtered pressurizing air, to prevent dust from entering and contaminating their work environment, and***
   - ***c) The operators are fit tested and wear respirators when exposed to dust.***

Response:

Dust suppression consisting of spray bars have been received and planned to be installed by the Maintenance Department shortly. With respect to the crusher control room, a design solution has been provided by Toromont to Baffinland to pressurize and resolve this issue. We are currently reviewing the scope of this work and will provide an expected date of installation under separate communication. Until the dust has been controlled through engineering means, Baffinland has been issuing respirators to the crushers operators. The health and safety department will continue to communicate the necessity of wearing the respirators and how to ensure a proper fit/seal when donning the respirator. Baffinland has ordered the quantitative fit test adaptors for our respirators which we expect to receive by July 31, 2014. At that time we will start performing fit testing on personnel required to wear respirator, with priority to crusher operators.

Noticed the operating instruction placard on the SkyJack SKJ 005 scissor lift platform is in French and not in English. The equipment's maintenance copies, of the pre-operating inspection reports, for May 15 and 16 were not removed from the equipment and the hour meter readings were not recorded on the pre-operating sheets. The failure to record the hour/odometer reading on the equipment's pre-operating inspection report and to submit these reports to the maintenance department is of concern; as it prevents the maintenance department from knowing the equipment is in use. The failure to keep track of the operating hours could result in missing the manufacturers specified maintenance schedule for the safety devices on this equipment. These maintenance copies were removed and given to the maintenance department along with the other maintenance copies removed from other equipment parked at Milne.

4. ***Please ensure for all manlift type equipment,***
   - ***a) The operator is trained for the type of equipment***
   - ***b) The pre-operating inspection report is completed and returned to the maintenance department at the end of the shift, and***
   - ***c) The operating instructions attached to the equipment are in English***

Response:

Training records were reviewed and confirmed a training matrix is in place for contractors that identify the personnel trained in use of this equipment. This will continue to be monitored by construction supervision and health and safety staff. Submission of pre-operation checks at the end of each shift to the Maintenance Department is now in place and being followed. Finally, the Maintenance Department has ordered the English operating instruction and will be installed upon arrival.

Noticed the metal frame building structure of the heated warehouse, Toromont's shop, Arctic Construction's shop at Milne Inlet did not appear connected to the site's ground/bond grid system.

5. ***Please check the metal frame building structures and ensure these are connected to the site's ground/bond grid system.***

Response:

Grounding of the foldaway buildings is not required by the CEC (these falls under Section 10 Grounding and Bonding vs. e-houses which fall under Section 36 High-Voltage Installations which requires bonding of the structure). This was discussed between Brian Perkins (Hatch) and Jeff Fuller (WSCC Electrical Consultant) during a previous inspection.

However, given the concern we propose to bond each building to the associated building ground at a single column location. This will effectively bond the building back to the facility 5 kV ground system through the feeder cable bonding conductor.

Noticed an extension cord passing through an opening in the door of the Arctic Construction/Fountain Tire shop at Milne Inlet

6. ***Please install 120V outdoor receptacles where tools or other devices are used outdoors. It is a Code violation to pass extension cords through doors, windows or other openings in structures.***

Response:

120 V outdoor receptacles have been installed outside of most doors at our facilities. Photos of several of these installations are attached.

Noticed a used concrete pump truck parked at Milne Inlet however, it is not known if this unit is certified for use on site.

7. ***Please submit, before using this equipment, the certification of this equipment.***

Response:

The concrete pump truck belonging to Arctic Construction has, to date, not been used at site. A tag was affixed to this unit (photo attached) on May 30, 2014 noting the equipment is out of service. Another tag was applied on June 24 noting the equipment requires certification and prior to use must be authorized by maintenance department. Red Engineering arrived to site on June 24th to perform certification on this unit. Upon completion a copy of this certificate will be forwarded to your attention.

Noticed a truck driver and three other persons wearing rings while working on site. The were advised rings must not be worn while working on site.

8. ***Please advise all supervisors to ensure they and the persons working under their supervision, are in compliance with Baffinland's policy on wearing of jewellery while at work.***

Response:
Baffinland had previously communicated the requirements of the Jewelry Policy upon roll-out through posters and email. Recently Baffinland issued a Daily Safety Memo (attached) to all personnel reminding them of their responsibilities for not wearing jewelry and a supervisor's responsibility for monitoring compliance to the policy.

Noticed a blind hill at KM 27/28 area however, there is no sign installed to advise drivers to call on their radio their approach to this blind hill.

9. ***Please ensure warning signs are installed at blind hills and blind corners to advise drivers to call on their radio their approach to this blind hill.***

Response:
Warning signs and radio call signs have been installed at blind hills and blind corners on the tote road, including km 27/28. Drivers have been instructed through tote road training and through daily safety talks to make radio calls at blind corners, where radio signs are posted, and wherever sight distance is low.

Noticed D-handle shovels used at Milne Inlet's crushing and screening plant. They were removed, during our inspection and it was explained no hand trapping devices must be used near conveyors.

10. ***Please ensure any hand tools and implements used near a conveyor, have no hand trapping arrangements.***

Response:
The noted D-handle shovels have been removed from the crushing and screening plan at both Mary River and Milne. A visual inspection was performed and confirmed hand trapping tools or implements are no longer present.

Noticed the face of Mary River's upper quarry wall was not scaled and has loose material on it. Also noticed a section of quarry wall with the face under-cut. The shift supervisor advised he would place a berm in front of the upper wall to prevent access to it.

11. ***Please ensure***
    a) ***The quarry walls are maintained free from loose material that could fall to a lower level and endanger personnel, and***
    b) ***Personnel required to work close to the face (e.g. blasters and surveyors) are trained to inspect and identify instability in the wall.***

Response:

A berm was placed to prevent access and working near high walls was discussed in the toolbox talks. Instructions were provided that personnel are required to stay an equal distance back from the high faces and walls as to the height of the wall (eg. 10 metre face one stays back 10 metres). Operators are also instructed to take the time to knock down overhangs and large loose (if safe to do so). If the operator can't knock down dangerous loose or overhangs it must be identified and recorded in the supervisor's log. The Mine Operations department will develop a "Working on Foot in the Pit" standard operating procedure which will outline these requirements.

The data on the April 27, 2014 Caterpillar MD6290 Rotary Blast Hole Drill catastrophic failure was reviewed and it appears from this preliminary review, the drill rod, the drill head and a drill hose all failed in this incident.

12. ***Please collect all failed parts (hose, gear, drill rod, other…) and ensure all failed parts***
    - ***a) Are catalogued***
    - ***b) Have clear high resolution photos taken of it and its fractured surface(s), and***
    - ***c) Are stored in a secure location for forensic analysis***

Response:

Failed parts from the MD6290 drill were collected and catalogued. Photos of the failed parts were taken and parts sent to Arc Metallurgical Inc, located in Calgary, Alberta for forensic analysis. Results of this analysis are still pending and will be available for review during future on-site inspections.

Should you have any questions regarding this submission please contact Michael Anderson by phone at 416.814.3163 or email at Michael.Anderson@Baffinland.com.

Best Regards,

Erik Madsen
Vice President
Sustainable Development, Health, Safety and Environment

cc. Michael Anderson
Glen Hein

Attachments:

Photo of Concrete Pumper Truck – Tagged Out
Photos of Installed Outdoor Receptacles
Daily Safety Memo – Jewelry policy

Baffinland

Figure 1: Concrete Pumper Truck Tagged Out

Figure 2: Outdoor Receptacles

SAFETY first, ᐅBaffinland ALWAYS

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Baffinland Daily Safety Memo - June 26, 2014

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Jewelry Policy - BAF-PH1-810-POL-0002

In February 2014 Baffinland implemented a Jewellery policy. The intent is to protect workers from the risk of jewelry getting caught in moving parts of machinery or contact with electricity. This procedure applies to all work (and workers) at the Port and the Mine Site – outside of the administration/camp complex or Oakville office (camp/admin. offices and Oakville offices are exempt).

LIST OF JEWELRY THAT IS NOT ACCEPTABLE

The following jewelry is not permitted to be worn at Baffinland operations:

- All Rings (finger rings)
- All open ear or nose rings (any earing other than studs)
- Any protruding body-piercing that is exposed and not protected by clothing
- Metal band watches, bracelets, or bangles
- Long chains and necklaces
- Medic-Alert necklaces that fall over the chin when bending
- All other jewelry that could become entangled in machinery, catch on moving objects or sharp protrusions or come in contact with electrical circuit

The Mines Inspector is expected to visit site in the next while and compliance to the Jewelry Policy is an issue he always reviews by inspecting worker compliance. Please keep all jewelry in your room – do not wear it in the workplace.

Figure 3: Safety Memo regarding Jewelry

20140726

email michael.anderson@baffinland.com

Michael Anderson
Vice President Operations
Baffinland Iron Mines Corporation
120 Adelaide Street West - Suite 1016
Toronto ON M5H 1T1

Dear Mr. Anderson:

Further to the **Mine Health and Safety Act article 26** attached is my 20140726 Mary River project inspection report.

As per **MHSA article**

28. please post a copy of this inspection report in a conspicuous location, and

29. advise the chief inspector within 30 days of the remedial measures taken and the remedial measures still to be taken in respect of the inspection report.

32.(1) A person who is adversely affected by a decision or order issued by an inspector may appeal the decision or order, in writing, to the chief inspector within 30 days after its issue.

The WSCC is committed to service excellence. If you have any questions or concerns about this inspection report, please feel free to contact my supervisor Peter Bengts or myself. His phone number is 867 669 4412 or email peter.bengts@wscc.nt.ca.

Sincerely
Workers' Safety and Compensation Commission of the NWT and NU Mine Safety

Martin van Rooy
Engineer/Mines Inspector

cc OHSC c/o glen.hein@baffinland.com

WSCC Workers' Safety & Compensation Commission | ᐃᖃᓗᐊᓕᖅᑎᓂᑦ ᐊᑕᐃᖅᑐᑦᑐᒃ ᐊᒻᒪ ᓇᓪᓕᐅᕆᔨᓂᒃ ᖃᐅᔨᓴᖅᓂᑦ

REPORT OF AN INSPECTOR OF MINES

Issued pursuant to Section 26(2) of the *Mine Health and Safety Act*

Mine:	Mary River project	Location:	~950 km NW of Iqaluit
Operator:	Baffinland Iron Mines Corp.	Lat. 71-19'N	Long. 79-24'W
Manager:	Michael Anderson	Inspection Date:	20140710 to 16
Address:	120 Adelaide Street West - Suite 1016 - Toronto ON		M5H 1T1

Mr. Martin van Rooy (engineer/mine inspector) conducted a general site safety inspection of Baffinland's Milne Inlet, Tote road and Mary River sites, from July 10 to 16, 2014. At Milne Inlet, the quarry, crusher, Nuna's shop, concrete batch plant, fuel storage tank and fuel bay, warehouse, Fountain tire shop, electrical shop, waste management building, water treatment plant, sewage treatment plant, yard and ship unloading area were checked. The Tote Road explosive storage area at Km 62 was checked. At Mary River, the quarry, explosive storage area, AN storage area, fresh water pumphouse, incinerator, crushing plant, warehouse, Hatch warehouse, fuel bay, water treatment plant, diamond drill, batch plant building, maintenance shop erection and emulsion plant erection were checked. The supervisors' first aid certificate expiry dates were checked and the dust sampling program results were reviewed.

Francisco Albor Consuegra, Daniel Dubroy, Randy Jones, Bikash Paul and Marvin Paul accompanied Brian Larson and Martin van Rooy for parts of this inspection.

Noticed four sea container with explosives stored at the entrance to the Milne Inlet quarry and a fifth about half full of explosives, stored on the top bench of the quarry, used as a magazine. The mine was instructed to stop the blasting work in the quarry until the four sea containers were returned to their transit storage along the Tote road and to transfer the fifth's sea container content to the Milne Inlet explosive magazine.

1 Please note, the explosives shipped in sea containers must be transferred to a *magazine* and it shall not be used as a *magazine*. The complete quantity shipped must be recorded as received in the magazine's logbook.

MHSR sect 14.01. *In this Part,*
"magazine" means a building, place or structure on the surface or underground in respect of which a

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permit to store explosives of detonators has been issued.

MHSR sect 14.02. *The manager shall*
(a) obtain an explosives magazine permit from the chief inspector before a magazine is located, erected, built and put into service or modified;
(b) ensure that a magazine is not put into service until an explosives magazine permit has been issued;
(c) ensure that a copy of the explosives magazine permit is posted inside the magazine; and
(d) ensure that the magazine meets the requirements of regulations and standards made under the Explosives Act (Canada), as amended from time to time.

Noticed the walls of the Milne Inlet quarry, were not scaled and the loose material on them could come down and injure a person. There were no berms or barricades to prevent access to these walls. The shift supervisor was advised to place a berm in front of the wall to prevent access.

2 This is a repeat infraction, see inspection report 28 May 2014 and therefore, ensure all quarry supervisors maintain walls that are free from loose material that could fall to a lower level or they provide a catchment berm to prevent access to the walls.

MHSR sect 1.136.(1) *No work shall be conducted at or below a face or wall of a surface mine until that face or wall has been examined and declared safe by the shift boss.*

(2) *Nothing in subsection (1) shall prevent the shift boss from being accompanied by other persons who may be required to make the face or wall safe.*

Noticed some operators at Milne Inlet and at Mary River had parked their equipment without using wheel chocks to prevent unintended movement. i.e. truck MTP006, Arctic Construction's 430F IT, Toromont's truck MTP021, four loaders at Nuna's shop, grader 001...

3 Please ensure each equipment operator before leaving their equipment in a parked position, blocks one of the unit's wheels with wheel chocks, to prevent unintended movement.

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MHSR sect 10.29.(1) *All rubber tired mobile equipment having a gross weight exceeding 7,000 kg and any other piece of equipment specified by the chief inspector, shall have a minimum of two wheel chocks that shall be used when the operator leaves the equipment in a stationary position.*

Noticed the service crane on maintenance truck MTP006 is modified by welding a hook to the bottom of the boom. Darryl MacKeigan advised this crane is not used, as it needs repairs.

4 Please ensure no structural modifications are made to hoisting, lifting or pulling equipment without the approval of the manufacturer or a professional engineer. Ensure before returning this crane to service, the modification made by welding the hook to the boom, are checked to verify the welding has not compromised the unit.

MHSR sect 10.130.(5) *Where at any time a bridge section, boom section or jib section of a production crane, service crane, mobile crane, shovel, excavator, dragline, boom truck or similar type of equipment is modified or repaired, the work shall be done by or under the direct supervision of the manufacturer's representative or a professional engineer competent and experienced in this type of work, and the manager shall obtain a certificate from the manufacturer's representative or the professional engineer either confirming the original load rating as shown on the rating chart for the equipment or listing the reduced load ratings.*

Noticed the Caterpillar 773 haul trucks, hauling from the Milne quarry to the crusher stockpile, are using a section of road at the crusher that is not wide enough for travel of this equipment.

5 Please ensure the traveled width of a roadway used for hauling is at least three times the width of the widest equipment for dual way traffic or twice the width for single lane traffic.

MHSR sect 1.143.(1) *The manager shall ensure that surface haulage roads are designed, constructed and maintained to provide*
(a) a travel width where dual lane traffic exists, of not less than three times, or where single lane traffic exists, of not less than two times the width of the widest haulage vehicle used on the road; and
(b) a shoulder barrier

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(i) at least 3/4 the height of the largest tire on any vehicle using the road

Radio communication with security (simulating a Code 1) from the Milne Inlet quarry, the fresh water pumping station at km 32, the diamond drill conducting condemnation drilling at the proposed waste dump and the emulsion plant construction site was checked. Very poor reception was experienced with the handheld radio from bench 1075 in the quarry and there was no radio contact made with security from the other locations. At the diamond drill site, we had to use the satellite phone to contact security and at the emulsion plant, there was no satellite phone available for back up. The emulsion plant work was shut down until they had a satellite phone to contact security in an emergency.

6 As noted in inspection report 28 May 2014 ensure before any work commences in a location, direct communication with the first aid facility is available. A Satellite phone should only be used as a back up to the emergency communication system and the persons using it must be trained in its use and check in daily with security, to verify it works.

MHSR sect 8.44. *There shall be an effective means of communication between the person in charge of the first aid facility and all worksites to be served.*

Noticed the plywood floor of magazines PQ0489 (2007-0215) Milne Inlet and PQ0469 (2007-0208) Mary River are stained with residue from the explosives stored in them.

7 Please check all magazines for staining or residue... and consult with the explosive manufacturer to determine the neutralizing agent required to clean the residue from the magazine.

MHSR sect 14.08.(1) *Each magazine shall be operated and maintained in accordance with the following rules:*
(a) the magazine shall be in the charge of an authorized person who shall carry out a weekly inspection of the magazine and record the results in a log-book;
(b) at a mine, a record shall be kept of all explosives issued and received and the inventory of the surface magazine in a log-book, and all entries shall be signed by the authorized person;
(c) the magazine shall be kept clean, dry, and free from grit at all times and any spillage shall be

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cleaned up immediately;
(d) where necessary, the shelves and floors shall be treated with a suitable neutralizing agent to remove all traces of explosive substances;
(e) the contents, including any explosives returned from a work place, shall be arranged in a tidy and organized manner;
(f) the magazine shall not contain any exposed iron or steel except in fixtures;
(g) an authorized person shall ensure that the stock of explosives is rotated so that the oldest stock of each type and size of explosive is used first.

Noticed one of the Caterpillar 773 haul trucks, had some of side lugs ripped off its rear tire. The Fountain tire representative reviewed the damage and advised he will monitor it.

8 Please consult with the tire manufacturer(s) and establish the maximum wear and or damage a tire may sustain on the front wheel and on the rear wheel of all haul trucks and trailers, before it must be removed from service. Submit a copy of these recommendations.

MHSR sect 10.40.(1) *The manager shall ensure that safety procedures and equipment are in place for the inspection of, and performance of, any work on the tires or rims of rubber tired equipment.*

(2) *No person shall work on tires or rims unless authorized by the manager to do so.*

(3) *No tire shall be installed on any damaged, broken, bent or heavily rusted rim assembly.*

(4) *No mismatched parts of rims, wheels and tires shall be used in any wheel assembly.*

(5) *No tire shall be used past the manufacturer's recommended wear.*

Noticed further to inspection report 28 May 2014, water sprays are installed at the Mary River crushing and screening plant and the dust emission has reduced. However, there is no dust control system installed at Milne Inlet, to prevent dust emission from the equipment. The crusher operator at Milne wears his respirator while in the control room, the Mary River operator does not wear his respirator in

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the control room and he must, as it is required. The control room floors are relatively clean however, a layer of dust is present on the other horizontal surfaces i.e. operator's desk, fire suppression tank... The Mary River crusher operator uses a broom to sweep the control room floor however, this causes the dust to become airborne and he was advised to use the vacuum cleaner stored in the control room, to clean-up the dust.

9 Please ensure engineering controls are implemented to prevent dust emission from the crushing and screening plants and ensure each crusher operator wears a respirator while the plant is running, for protection from the airborne dust.

MHSR sect 9.02.(1) *Employees shall not be exposed to airborne concentrations of chemical or physical substances in excess of those specified in the 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices published by the American Conference of Governmental Industrial Hygienists.*

The interior of some operator cabs, working at the crusher and quarry, were checked and found to be relatively clean. However, when the cab's vents were tapped, dust discharged out from the vent nozzles and blew out into the cab's interior. The fresh air intake chamber, for pressurizing the 992 loader 001 cab, was checked and it had a thick layer of dust in the bottom. The operator cleaned it out with his hand broom.

10 As this dust may contain silica, a hazardous substance, please ensure as part of
a) the pre-op inspection, an equipment operator checks the fresh air intake of their cab's pressurizing air system to ensure it and the filter(s) are free from dust, and
b) the routine maintenance system, the cab's pressurizing air ducting is vacuumed clean to remove any accumulated dust, in the air duct system.

MHSR sect 9.04. *The manager shall develop and implement an effective housekeeping program to ensure that*
(a) all worksites and travelways are maintained in a safe condition;
(b) materials and equipment are stored in a manner so as not to endanger persons; and
(c) appropriate action is taken whenever necessary to maintain a hazard-free environment.

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Noticed a person cutting the bottom out of a cement tote bag above the batch plant hopper. As the tote bag discharges into the hopper, the person is exposed to the plume of cement dust.

11 Please review the practice of manually cutting the bottom of the cement tote bag above the hopper and determine if fixed knife arrangement in the hopper, may be used. If the tote bag must be manually cut, ensure the operator wears a respirator for protection, while the cement is discharging into the hopper.

MHSR sect 9.02.(1) *Employees shall not be exposed to airborne concentrations of chemical or physical substances in excess of those specified in the 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices published by the American Conference of Governmental Industrial Hygienists.*

Noticed Milne's PPE storage warehouse is dark as it has only one light for this area.

12 Please check the illumination in all warehouse storage areas and install additional lights as required, to ensure the illumination level is similar to other work areas.

MHSR sect 9.43. *Subject to section 9.44 and unless otherwise specified in these regulations, the manager shall ensure that at all working places on the surface of a mine, suitable and adequate illumination is provided that meets the standards set out in the ANSI/IES Standard RP-7-1979, American National Standard Practice for Industrial Lighting.*

Noticed oxygen cylinders stored close to the flammable gas cylinders at Milne Inlet and Mary River warehouse and in Adco's yard.

13 Ensure full and empty oxygen and flammable gas cylinders are stored with at least a 6 m space between the oxygen and flammable gases cylinders.

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MHSR sect 10.136.(2) *Stored oxygen cylinders shall be kept separate from the flammable gas cylinders by*
(a) a space of at least 6 m; or
(b) a 1.5 m high non-combustible barrier with a fire resistant rating of at least 30 minutes.

Noticed the oxygen and acetylene cylinder set, in use on Toromont's service truck and in Adco's welding shop, did not have a flashback arrestor installed at their regulators. The Adco representative advised the flashback arrestor is a built-in feature of the Liquid Air ALTOP safety cap with integrated pressure regulator and ON/OFF lever.

14 Please check all oxygen/acetylene cylinder sets and install any missing flashback arrestor at the regulator. If Baffinland deems the new ALTOP cylinder satisfies the requirement of a flashback arrestor at the regulator, it should apply for a variance, for these cylinders.

MHSR sect 10.135.(1) *The manager shall ensure that a hot work procedure is established and no person shall use any electric and gas welding or cutting equipment or perform any hot work unless authorized under the procedure.*

(2) *The hot work procedure required by subsection (1) shall provide that...*
(c) before any gas welding, cutting or heating equipment is used, the person using the equipment shall ensure that it is free from defects and leaks and that...
(ii) flashback arrestors are installed on each regulator to prevent reverse gas flow,

Noticed Toromont's truck parked next to the Caterpillar 988 loader 008. There was nobody present at the equipment however; there were signs of bucket teeth replacement and work on the side of the loader. The loader's master switch was in the ON position and the equipment was not locked out and tagged. The mechanic arrived and advised the power was left on because the pump had to run and bleed the system... however, there was no warning tag attached to the master switch to explain why the power was required.

15 Please ensure all persons working with or on equipment are trained in the lockout procedure and

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apply their individual lock and tag to the lockout system, before working on the equipment. Please review the lock out procedure and ensure the requirement to work on energized equipment is addressed.

MHSR sect 10.22.(1) *Locks and tags shall be issued to each person who works on machinery or equipment that has to be locked out.*

(2) *Tags issued to individual persons shall contain space for the recording of the person's name, the type of work being performed, the date and time the work was started and the name of the supervisor in charge.*

(3) *Where equipment is to be locked out, each person working on the equipment shall be responsible for affixing his or her own lock and tag to the lock-out device and for removing them on the completion of the work.*

Noticed the out-of-service equipment at Mary River crusher room MCC, is tagged with personal lockout tags. Personal lockout tags must not be used for out-of-service equipment as the person who applies this type of tag is the only one authorized to remove it. An Out-of-Service tag must be used for out-of-service equipment, as any authorized person may remove it.

16 Please ensure Out-of-Service tags (and department locks if required) are used for out of service equipment and personal lockout tags are reserved for personal lockout protection.

MHSR sect 10.22.(2) *Tags issued to individual persons shall contain space for the recording of the person's name, the type of work being performed, the date and time the work was started and the name of the supervisor in charge.*

Noticed the drinking water filtration tank in the water treatment building at Milne Inlet and Mary River has no cover over or on top of it to prevent contaminants from falling into the drinking water. There is a fire line and sprinkler head above the tank, which if tripped, would contaminate the camp's drinking water.

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17 Please install a suitable cover over the filtration tanks to prevent contamination of the drinking water.

MHSA art 10.(1) *The manager shall take every reasonable measure and precaution to protect the health and safety of employees and other persons at a mine.*

Noticed the hammer and drill bits for the Caterpillar MD6290 drill, stored in a sea container at Milne Inlet quarry. The hammer weighs approximately 230-pound and the drill bits about 50-pounds and these are manually hauled from inside the sea container onto a truck and then onto the drill. This manual manipulation of the hammer and or drill bits is of concern because of the heavy weights involved in this awkward installation work.

18 Please review the complete bit and hammer handling cycle, to/from the storage, to/from the drill, to/from the bit grinding shop, other... to ensure effective protection is provided for any person exposed to the risk of injury from manually handling this equipment. In addition, ensure each person engaged in the bit and hammer handling cycle, receives routine training in manual lifting procedure(s).

MHSR sect 9.72.(1) *The manager shall ensure that suitable mechanical equipment is provided and used for the handling of heavy or awkward loads.*

(2) *Where the use of mechanical equipment is not practicable, the manager shall take all practical means to adapt heavy or awkward loads to facilitate lifting, holding or transporting by employees or to otherwise minimize the manual handling required.*

Noticed the Western Star haul truck operator must stands on the front wheel mudguard, to check under the engine hood i.e. oil level... as part of the pre-operating inspection. This working level is five-feet above the ground and therefore requires a guardrail, for fall protection.

19 Please install a suitable handrail system on the front wheel mudguard of this equipment and perform a detailed hazard analysis, of the routine inspections and services the operator of these haul trucks

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must perform before, during and after each shift in winter and summer conditions, to operate these units.

MHSR sect 1.91. *The manager shall provide every walkway and every working platform more than 1.5 m above the ground with*
(a) a handrail not less than 910 mm nor more than 1.07 m above the floor of the walkway or platform;
(b) a second rail placed at mid-point between the top rail and the floor of the walkway or platform, unless the space between the top rail and the floor is closed by a screen; and
(c) toeboards that extend from the floor to a height of not less than 100 mm.

MHSR sect 9.01. *In this Part,*
"hazard analysis" means the process of identifying, documenting and eliminating or minimizing potential hazards involved in performing the steps of an operation;

Noticed a gravel loaded Caterpillar 777 haul truck backing-up, during the construction of the airstrip by-pass road. He was under direction of the bulldozer operator by radio however, the berm on the edge of the road was too low, about half of the ¾ height of the haul truck tire; he was backing up more than four truck lengths and into a blind curve. The operation was stopped and the procedure revised allowing the haul truck to drive forward to dump the load on the road.

20 Please ensure all equipment operators are instructed in and comply with, the requirements of the Mine Health and Safety Act and Regulations, as it applies to their work.

MHSR sect 1.155.(1) *The driver of a haulage truck shall not*
(a) where the bank is more than 3 m high and the dumping position is within 3 m of the dump berm crest, move the vehicle backward to the dumping position or begin dumping until he or she has received from the dump person
(i) verbal directions,
(ii) standard visual signals shown in the document "Standard Hand Signals for Controlling Mobile Equipment Movement" issued by the chief inspector, or
(iii) audible signals acceptable to the chief inspector;
(b) operate the vehicle in reverse for a distance greater than four truck lengths on a dump other than

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a bin, raise or other opening referred to in paragraph 1.148(d);
(c) operate the vehicle in reverse for a distance greater than four truck lengths on a stockpile, ramp, road or a ramp or road that is under construction unless the ramp or road has a positive gradient of more than 5%; and
(d) operate the truck for a distance greater than one truck length with the box in the raised position.

Noticed at Milne Inlet the floor in the water treatment plant is moving causing the equipment installed on it to move, this is causing strain on piping and electric cables attached to the equipment. At Mary River, the embankment under the fuel module is moving causing strain on the piping and electrical cables attached to it i.e. the deformed flexible coupling on fuel-line into the module.

21 Please review the movement of these foundations and ensure their movement does not place an excessive strain on piping and electrical cables, connected to the equipment.

MHSA art 10.(1) *The manager shall take every reasonable measure and precaution to protect the health and safety of employees and other persons at a mine.*

MHSR sect 10.01.(1) *All mechanical equipment used at mines shall be*
(a) designed in accordance with good engineering practice;
(b) constructed in accordance with a design and plans that have been certified by a professional engineer; and
(c) acceptable to the chief inspector.

Noticed there is no maximum voltage warning sign, on the electrical cabinet access door, located on the outside of the Mary River fuel module.

22 Please install a sign on the cover of the cabinet, to warn of the voltage inside.

MHSR sect 13.01.(2) *Except where otherwise required by these regulations, the electrical system and electrical equipment shall meet or exceed the requirements of CSA Standard CAN/CSA-M421-93, Use of Electricity in Mines.*

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Noticed there are two vertical ladders in the Mary River batch plant building however, these are not equipped with fall protection.

23 Please ensure all vertical ladders are equipped with fall protection or removed from its installed location.

MHSR sect 1.98. *Except in an underground mine, a ladderway at an angle steeper than 70 to the horizontal shall be fixed in place and be provided with*
(a) platforms at intervals not greater than 7 m;
(b) a safety cage; or
(c) a protective device that, when used, will prevent a worker from falling.

Noticed the electrical panels in the batch plant's generator trailer, are missing plugs in some of their breaker slots.

24 Please ensure all electrical panels have their empty breaker slots covered, with proper blanks.

MHSR sect 13.01.(2) *Except where otherwise required by these regulations, the electrical system and electrical equipment shall meet or exceed the requirements of CSA Standard CAN/CSA-M421-93, Use of Electricity in Mines.*

Noticed one of the guy-wires, used to hold the wall panel upright, at the maintenance shop erection was damaged because the two Crosby cable clamps were installed wrong. The U-bolt of the Crosby clamp was used to crimp the tension side of the cable and this damages it. Arctic Construction was advised to stop the work and remove the damaged section of cable (approx. 6 feet) or replace the cable, before continuing with their erection work.

25 Please ensure all people working with wire ropes on site, receive training in the correct procedure to install Crosby cable clamps and the minimum number of cable clamps required to secure the cable

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end, to develop the required safe load capacity of the connection.

MHSR sect 10.01.(1) *All mechanical equipment used at mines shall be*
(a) designed in accordance with good engineering practice;
(b) constructed in accordance with a design and plans that have been certified by a professional engineer; and
(c) acceptable to the chief inspector.

An audit of the first aid certificate expiry dates for all supervisors on the project was conducted however; Baffinland's tracking of first aid certificates expiry dates and of all supervisor is incomplete.

26 Effective immediately please implement a system to track first aid certificate expiry dates and track all supervisors on site to ensure no person supervises without a valid St John Ambulance standard first aid certificate with CPR or an equivalent 16 hour first aid course.

MHSR sect 8.51. *At a mine*
(a) all persons engaged in supervision,
(b) all persons engaged in mine rescue,
(c) all persons who are members of fire response teams,
(d) one-fifth of the total number of the employees underground, and
(e) one-tenth of the total number of employees on the surface,
shall be trained in first aid and hold a current and valid certificate at least equivalent to the St. John Ambulance Standard First Aid certificate, and shall be trained in cardiac pulmonary resuscitation or to such other level as may be agreed to by the chief inspector

Mary River's proposed mining method was reviewed.

27 Please ensure, before starting development of the mine, the required application and information is submitted for review.

MHSR sect 17.01.(1) *An application to commence shaft sinking, underground development work or*

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the surface stripping of an open pit for the purpose of production of minerals, shall be submitted, in writing, to the chief inspector and shall include a plan of the system under which the work is to be performed.

(2) *The plan shall include*
(a) a regional map showing the location of the mine property;
(b) a plan at a scale of 1:10,000 or less, showing topographic contours, claims, leases or licences, lakes, streams, roads, landing strips and the location of all proposed mining works and related facilities and also showing the relationship to the Universal Transverse Mercator (UTM) grid;
(c) the basis of design, details of geological structure, materials handling, buildings, processing plants and facilities, stockpiles, tailings transportation and impoundment, water supply and storage facilities;
(d) for underground development, plans of present and proposed underground workings and a plan of the mine openings in relation to the surface installations;
(e) for surface mines, the methods to be followed in the construction of haulage roads;
(f) for surface mines, a traffic control plan showing the maximum allowable speeds for the vehicles in use, rules for passing, "stop" and "yield" locations, priority rules for various vehicles, rules for night operation, maximum operating grades, emergency run-off protection, shoulder barriers; and
(g) any other information required by the chief inspector.

(3) *The chief inspector shall, before approving the plan, take into consideration the safety of the public and the health and safety of the persons performing the work.*

(4) *Shaft sinking, underground development and surface stripping of an open pit shall not proceed until the plan has been approved by the chief inspector.*

Date of Report 20140726 **Inspector** _____

Baffinland

August 25, 2014

Mr. Martin Van Rooy
Mine Inspector
Worker's Compensation Commission
PO Box 669
Iqaluit, Nunavut
XOA 0H0

Dear Martin,

In follow-up to your July 26th inspection report, please find below responses to each of the inspection findings.

*Noticed **four** sea containers with explosives stored at the entrance of the Milne Inlet quarry and a fifth about half full of explosives, stored on the top bench of the quarry, used as a magazine. The mine was instructed to stop blasting work in the quarry until the four sea containers were returned to their transit storage along the tote road and to transfer the fifth's sea container to the Milne Inlet explosive magazine.*

1. ***Please note, the explosives shipped in sea containers must be transferred to a magazine and it should not be used as a magazine. The complete quantity shipped must be recorded as received in the magazines logbook.***

Response

The containers were removed to the magazines and emptied promptly. Senior Mine Ops personnel have stepped up spot checks of blasting contractors and personnel at the Milne quarry operations to ensure that all regulations are adhered to.

Noticed the walls of the Milne Inlet quarry, were not scaled and the loose material on them could come down and injure a person. There were no berms or barricades to prevent access to these walls. The shift supervisor was advised to place a berm in front of the wall to prevent access.

2. ***This is a repeat infraction, see report of 28 May 2014 and there, ensure all quarry supervisors maintain walls that are free from loose material that could fall on lower level or they provide a catchment berm to prevent access to the walls***

2275 Upper Middle Road East, Suite 300 | Oakville, ON, Canada L6H 0C3 | Main: 416.364.8820 | Fax: 416.364.0193 | www.baffinland.com

Response

Mine Operations have placed catchment berms in front of the active working face to ensure that persons do not access the area, the use of barricades and keep out signage is also being used. The use of the 390 excavator to scale loose material from the pit walls and face is continuous and ongoing.

Noticed some operators in Milne Inlet and at Mary River had parked their equipment without using wheel chocks to prevent unintended movement i.e. truck MT006, Arctic Construction 430F IT, Toromont truck MTP021, four loader at Nuna's shop, grader 001...

3. ***Please ensure each equipment operator before leaving their equipment in a parked, blocks one of the unit's wheels with wheel chocks, to prevent unintended movements.***

Response

This issue has been addressed on a regular basis through morning tool box meetings and safety memos. The most recent safety memo (August 16, 2014) has indicated that employees failing to properly chock there equipment will be ***subject to discipline.***

The Health and Safety Department has been on a daily basis been checking the departments in the field to ensure that wheel chocks are being used and recommending disciple to supervision if the policy is not being followed.

Noticed the service crane on maintenance truck MTP006 is modified by welding a hook to the bottom of the boom. Darryl MacKeigan advised this crane is not used, as it need repairs.

4. ***Please ensure no structural modifications are made to hoisting, lifting or pulling equipment without approval of the manufacturer or a professional engineer. Ensure before returning the crane to service, the modifications made by welding the hook to the boom, are checked to verify the welding has not compromised the unit.***

Response

The repair work on the Maintenance Truck (MT006) crane has been completed, but the crane continues to be locked out until the modification can be certified by Red's Engineering.

Noticed the Caterpillar 773 haul trucks, hauling from the Milne quarry to the crusher stockpile using a section of road at the crusher that is not wide enough for travel of this equipment.

5. ***Please ensure the traveled width of a roadway used for hauling is at least three times the width of the widest equipment for dual was***

Response

The haul road in question is the Milne Hill and the road to the crusher, the hill and the road have been deemed for one lane traffic, and operators are to communicate by radio when they are going up or down the hill. Trucks are to hold in the quarry or crusher area until the other haul trucks are off the haul road.

Radio communication with security (simulating a code) from Milne Inlet quarry, fresh water pumping station at km 32, the diamond drill conducting condemnation drill at the proposed waste dump and the emulsion plant construction site was checked, very poor receptions was experienced with the hand held radio from bench 1075 in the quarry, there was no radio contact made with security from the other locations. At the Diamond Drill site, we had to use a satellite phone to contact security and at the emulsion plant, there was no satellite phone available for back up. The emulsion plant work was shut down until they had a satellite phone to contact security in an emergency.

6. ***As noted in inspection report 28 May 2014 ensure before any work commences in a location, direct communication with the first aid facility is available. A Satellite phone should only be used as a backup to the emergency communication system and the persons using it must be trained in its use and check in daily with security, to verify it works.***

Response

As per May 28, 2014 inspection the radio communication system is being worked on and will be operational September 2014. This system will provide full radio communication between Mary River and Milne Inlet. In the short-term with the amount of traffic on the road messages can be relayed along the tote road by the vehicles traveling the road, most vehicle traveling the tote road are equipped with a SAT phone. The drilling operation will be looked at on a case to case

and the bases and assessed as to what type of communication will suffice. At a minimum there will be a SAT Phone placed the drill where there is not sufficient radio communication.

Noticed the plywood floor of magazine PQ0489 (2007 0215) Milne Inlet and PQ0469 (2007-0208) Mary River are stained with residue from the explosives stored in them.

7. ***Please check all magazines for staining or residue... and consult with explosives manufacturer to determine the neutralizing agent required to clean the residue from the magazines.***

Response

Mine Operations will apply floor dry to absorb the residue and will procure pallets to separate the totes of explosives from the floor. If the floor dry is not successful in removing the stained material the flooring in question may have to be replaced.

Notices one of the caterpillar 773 haul trucks, had some of side lugs ripped of its rear tire. The Fountain Tire representative reviewed the damage and advised he would monitor it.

8. ***Please consult with the tire manufacture(s) and establish the maximum wear and or damage a tire may sustain on the front wheel and on the back wheels of all haul trucks and trailers, before it must be removed from service. Submit a copy of these recommendations.***

Response

Fountain Tire Baffinland's Tire Maintainer and Supplier uses the industry standard and manufactures recommendation that when a 2700R49 and larger tire has run into the 3rd belt in its tread face, the tire is to be scheduled to have it removed. The major brands of tires have only 6 belts under the tread face and after 3 belts are worn the "structural integrity of the tire has been compromised" and tire will be removed.

The Caterpillar 777 Steering tire removal policy is at 3,500-4,000 hrs. or at 2/3 tread life remaining, whatever comes first. Steering tires are then taken for the front and then used to run out on the rear axle positions. The reason for this is to keep the steering tires in good condition so that the operator has complete control of the truck with changing underfoot conditions. It also generates enough spares so you do not have to put **New Tires** on rear axle's positions unless required because of tire shortage.

Noticed further to inspection report 28 May 2014, water sprays are installed at the Mary River crushing and screen plant and the dust emission has reduced. However, there is no dust control system installed at Milne Inlet, to prevent dust emission from the equipment. The crusher operator at Milne wears a respirator while in the control room, the Mary River operator does not wear his respirator in the control room and he must as it's required. The control room floors are relatively clean however a layer of dust is present on the horizontal surfaces i.e. operator's desk, fire suppression tank... The Mary River crusher operator uses a broom to sweep the control room floor however, this causes the dust to become airborne and he was advised to use a vacuum cleaner stored in the control room, to clean up the dust.

9. ***Please ensure engineering controls are implemented to prevent dust emission from crushing and screening plants and ensure each crusher operator wears a respirator while the plant is running for protection from the airborne dust.***

Response

Spray bars have been installed on the Milne Inlet crusher and are operational. All operators have been supplied with personal respirators and have been fit tested and instructed to use them. The Crusher Operators have been instructed to clean the Operators Cab Daily as part of their duties. Vacuum cleaners are available for use at the crushers and employees have been instructed to use them.

Baffinland continues to perform dust testing on the crusher, mobile equipment and areas of higher risk of dust exposure.

The interior of some operator cabs, working at the crusher and quarry, were checked and found to be relatively clean. However, when the cab vents were tapped, dust discharged from the vent nozzles and blew out into the cabs interior. The fresh air intake chamber, for pressurizing the 992 loader 001 cab, was checked and it had a thick layer of dust on the bottom. The operator cleaned it out with his hand broom.

10. ***As this dust may contain silica, a hazardous substance, please ensure as part of***

a) ***the pre-op inspection, an equipment operator checks the fresh air intake of their cab's pressurizing air systems to ensure I and filter(s) are free from dust, and***

b) ***The routine maintenance system, the cab's pressurizing air ducting is vacuumed clean to remove any accumulated dust, in the air duct system***

Response

Presently we inspect and change filters as required, we will modify all our PM sheets to read vacuum all filter compartments. Will make changes to Pre-Op booklets and have Logistics order new booklets to read Operator to check during Pre-Op. This concern will also be reviewed with NUNA who has a limited amount of loaders working at the project.

In the meantime operators have been instructed as part of their pre-op inspection to check the cab filter compartment for excess dust and to clean it out via a brome of shop vac.

All loaders are on a Preventive Maintenance Schedule and all filters requiring changing are changed at this time.

Noticed a person cutting the bottom out of a cement tote bag and the batch plant hopper. As the tote bag discharges in the hopper, the person is exposed to a plume of cement dust.

11. ***Please review the practice of manually cutting the bottom of the cement tote bag above the hopper and determine if the fixed knife arrangement in the hopper, may be used. If the tote bag must be manually cut, ensure the operator wears a respirator for protection, while the cement is discharging into the hopper.***

Response

The Arctic employees who are responsible for cutting the cement bags open have respirators and those employees have been fit tested.

Noticed Milne's PPE storage warehouse is dark as it only has one light for this area.

12. **Please check the illumination in all warehouse storage areas and install additional lights as required, to ensure the illumination level is similar to other work areas.**

Response

Proper lighting has been installed into the warehouse PPE storage Sea-can.

Noticed oxygen cylinders stored close to flammable gas cylinders at Milne Inlet and Mary River warehouse and in ADCO's yard.

13. ***Ensure full and empty oxygen and flammable gas cylinders are stored with at least a 6 m space between the oxygen and flammable gases cylinders.***

Response

The Warehouse Personnel and ADCO employees have been instructed to keep Oxygen Cylinders and Flammable Gas separated by a minimum of 6 meters.

Noticed the oxygen and acetylene cylinder set in use on Toromont's service truck and in Adco's welding shop, did not have a flashback arrestor installed at their regulators. The Adco representative advised that the flashback arrestor is a built-in feature of the Liquid Air ALTOP safety cap with integrated pressure regulator and ON/OFF lever.

14. ***Please check all oxygen/acetylene cylinder sets and install any missing flashback arrestor at the regulator. If Baffinland deems a new ALTOP cylinder satisfies the requirement of flashback arrestor at the regulator, it should apply for a variance for these cylinders.***

Response

Flashback arrestors have been ordered and they will be placed at the Tank and the Mixture end. Flashback Arrestors the ALL-TOP bottles have a flashback arrestor as part of the regulator system, as per Nunavut regulations we will also install flashback arrestors at the bottle end, we will also install one to the mixer end of the hoses.

Noticed Toromont's truck parked next to the Caterpillar 988 loader 008. There was nobody present at the equipment however; there were signs of bucket teeth replacement and work on the side of the loader. The loader's master switch was in the ON position and the equipment was not locked out and tagged. The mechanic arrived and advised the power was left on because the pump had to run and bleed the system... however, there was no warning tag attached to the master switch to explain why the power was required.

---

15. ***Please ensure all persons working with or on equipment are trained on the lock-out procedure apply their individual lock and tag to the lockout system, before working on the equipment. Please review the lockout procedure to ensure the requirement to work on energized equipment is addressed.***

Response

Lock out/Tag out Procedure has been reviewed with all Maintenance employees discussed at Tool Box Talks. This topic has been reviewed and discussed with all crews and Toromont Employees and so recorded. This is an ongoing review with all employees and contractors

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Noticed the out-of-service equipment at Mary River crusher room MCC, is tagged with personal lockout tags. Personal lockout tags must not be used for out-of-service equipment as the person who applies this type of tag is the only one authorized to remove it. An Out-of-service tag must be used for out-of-service equipment as any authorized person may remove it.

16. ***Please ensure Out-Of –Service tags (and department locks if required) are used for out of service equipment and personal lockout tags are reserved for personal lockout protection.***

Response

Out of service tags have been installed on the equipment in the Crusher MCC Room.

Noticed the drinking water filtration tank in the water treatment building at Milne Inlet and Mary River has no cover over top of it to prevent contaminants from falling into the drinking water. There is a fire line and sprinkler head above the tank, which if tripped, would contaminate the camp's drinking water

17. ***Please install a suitable cover over the filtration tanks to prevent contamination of the drinking water.***

Response

Upon review, Baffinland has decided not to cover the Filtration Tanks as the chance of the sprinkler head going off and contaminating the drinking is very low and highly unlikely.

Notices the hammer and drill bits for the Caterpillar MD6290 drill stored in a sea container at Milne Inlet quarry. The hammer weighs approximately 230-pounds and the drill bits about 50 – pounds and these are manually hauled form inside the sea container onto a truck and then onto the drill. This manual manipulation of the hammer and or the drill is of concern because of the heavy weights involved in this awkward installation work

18. ***Please review the complete bit and hammer handling cycle, to/from the storage, to/from the drill, to/from the bit grinding shop, other… to ensure effective protection is provided for any person exposed to high risk of injury from manually handling this equipment. In addition, ensure each person engaged in the bit and hammer handling cycle, receives routine training in manual lifting procedure(s).***

Response

Recently Mine Operations have created a position for driller helper to ensure that heavy lifting is always carried out by two people. The current installation for bit sharpening and hammer rebuild will be relocated to the maintenance shop as soon as possible which will improve conditions with proper overhead lifting devices. In the interim we will review proper lifting techniques with all mining personnel with particular attention paid to the servicing of drill hammers and bits and the personnel primarily tasked with their use. There will be no hammer rebuilds until proper lifting devices have been installed. Lifting device is also to be installed on the Caterpillar drill.

Noticed the Western Star haul truck operator must stand on the front wheel mudguard, to check under the engine hood i.e. oil level as part of the pre-operating inspection. This working level is five-feet above the ground and therefore requires a guardrail, for fall protection

19. ***Please install handrail system on the front wheel mudguard on this equipment and perform a detailed hazard analysis, of the routine inspections and services the operator of these haul trucks must perform, during and after each shift in the winter and summer conditions, o operate these units.***

Response

Baffinland Iron Mines will apply for a variance to allow for proper fluid checks with this vehicle as it is more than 5 feet above the ground. BIM will not be placing a guard along the side of the truck as that will cause a problem with the driver's line of sight.

Noticed a gravel loaded Caterpillar 777 haul truck backing-up, during the construction of the airstrip by-pass road. He was under direction of the bulldozer operator by radio however, the berm on the edge of the road was low, about half of the ¾ height of the truck tire; he was backing up more than four truck lengths and into a blind curve. The operation was stopped and the procedure revised allowing the haul truck to drive forward to dump the load on the road.

20. ***Please ensure all equipment operators are instructed in and comply with, the requirements of the Mine Health and Safety Act and Regulations, as it applies to their work.***

Response

Mine operations has been building turn outs to allow 777 Haul trucks to drive into the work area turn around and thus keep backing up to a minimal. Safety berms equal to ¾ the heights of largest tire of the equipment is in use. The berms have been installed where the equipment

has a potential to leave the roadway and not be easily recoverable. In addition a safety contact has been issued to mine operations and material handling groups on the proper use of spotters.

Noticed at Milne Inlet the floor in the water treatment plant is moving causing the equipment installed on it to move, this is causing strain on piping and electrical cables attached to equipment. At Mary River, the embankment under the fuel module is moving causing strain on the piping and electrical cables attached to it i.e. the deformed flexible coupling on fuel-line into module.

21. Please review the movement of these foundations and ensure their movement does not place an excess strain on piping and electrical cables, connected to the equipment.

Response

The floor has been backfilled to bring the grade back to "level", there have been rig-mats installed to help stabilize the equipment and were applicable flex piping has been installed to absorb minor movement until this floor finally settles out.

Noticed there is no maximum voltage warning sing, on the electrical cabinet access door, located on the outside of the Mary River fuel module.

22. Please install a sign on the cover of the cabinet, to warn of the voltage inside.

Response

The voltage signs has been installed on the electrical cabinets.

Notice there are two vertical ladders in the Mary River batch plant building however, these are not equipped with fall protection.

23. Please ensure all vertical ladders are equipped with fall protection or removed from its installed location.

Response

Both these ladder have been taped of with "Red Barricade" tape and a tag stating "out of service" This building is in the process of being transferred to Site Services and at that time the ladders will be removed.

Noticed the electrical panels in the batch plant's generator trailer, are missing plugs in some of their breaker slots.

24. Please ensure all electrical panels have their empty breaker slots covered, with proper blanks.

Response

Baffinland Electricians has gone through the Batch Plant Generator Trailer and replaced the empty breakers with blanks. The Electricians have ensured that all electrical panels have proper plugs for the blanks.

Noticed on of the guy-wires, used to hold the wall panel upright at the maintenance shop erection was damaged because the two Crosby cable clamps were installed wrong. The U-bolt of the Crosby clamp was used to crimp the tension side of the cable and this damages it. Arctic Construction was advised to stop work and remove the damaged section of the cable (approx... 6 feet) or replace the cable, before continuing with their erection work.

25. Please ensure all people working with wire rope on site, receive training in the correct procedure to install Crosby cable clamps and the minimum number of cable clamps required to secure the cable end, to develop the required safe load capacity of the connection.

Response

Arctic Construction Crews have been given training on the proper procedure of installing Crosby Clamps, reviewed the inspection of guide cables and to cut off any cable that has been kinked or damaged.

An audit was of the first aid certificates expiry dates for all supervisors on the project was conducted however; Baffinland's tracking of the first aid certificates expiry dates is incomplete.

26. Effective immediately please implement a system to track first aid certificates expiry dates and track all supervisors on site to ensure no person supervises without a valid St John Ambulance Standard First Aid certificate with CPR or an equivalent 16 hour first aid course.

Response

The Baffinland Training Department have purchased a training data base which will match up Supervisor II / F.A. certification and the associated expiry dates for the F.A. Reports can be generated monthly with a three month lead- time on expiry dates. The data base will be implemented by October 10, 2014

Mary River's proposed mining method was reviewed

27. Please ensure, before starting development of the mine, the required application and information is submitted for review.

Response

A report meeting the requirements of Section 1.04 was submitted on August 14, 2014.

Should you have any questions regarding this submission please contact Michael Anderson by phone at 416.814.3163 or email at Michael.Anderson@Baffinland.com.

Best Regards,

Erik Madsen
Vice President
Sustainable Development, Health, Safety and Environment

cc. Michael Anderson
Glen Hein

Glen Hein

From: Jennifer St. Paul Butler
Sent: Thursday, August 14, 2014 3:16 PM
To: Martin.vanRooy@wscc.nu.ca; peter.bengts@wscc.nt.ca
Cc: Erik Madsen; Oliver Curran; Francisco Albor Consuegra; Michael Anderson; Glen Hein; Tony Woodfine
Subject: Notice of Intention to Start Work
Attachments: Cover Letter (Intention to commence Operations August 14, 2014).pdf

On behalf of Erik Madsen, please find the attached cover letter as notice of intention to start work, required under the Mines Safety Act.

The file size of attachments are too large for email and will be transmitted via ftp. If you have not used our file transmission site before, when you receive the link in your inbox, click “Forgot Password” and the system will issue you a new one.

Thank you,

Baffinland

Jennifer St. Paul Butler | Environmental Analyst
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