December 30, 2019

Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Water Resources Officer
CIRNAC
P.O. Box 100
Iqaluit, NU X0A 0H0

RE: Water Licence 2AM-MRY1325 Monthly Surveillance Network Program (SNP) Report – November 2019

The following is the monthly report for November 2019 as required under Part I, Item 21 of the Type 'A' Water Licence 2AM-MRY1325 (the Licence) which states:

"The Licensee shall submit to the Board, within thirty (30) days following the month being reported, a Monthly Monitoring Report. The Report shall include:

a. All data and information required by this Part and generated by the Monitoring Program in the tables of Schedule I
b. An assessment of data to identify areas of non-compliance with regulated discharge parameters referred to in Part F"

Monitoring Program

During the month of November 2019, water samples were collected as part of the Water Licence SNP.

Table 1 presents a list of samples/monitoring required under the Licence and the details concerning which water quality samples were collected along with sample date/laboratory identification number as appropriate. Analytical water quality testing results received are presented in Table 2. Volumes consumed for domestic and industrial water purposes and the volumes of effluent discharged at the Mary River Mine Site and Milne Port are presented in Table 3.

Monitoring Program Results

A) Water Sampling and Analysis Results

Table 2 provides the analytical results related to the SNP sampling requirements for November 2019.

There was one (1) exceedance of a site specific daily grab sample. Ammonia was measured at 47.0 mg/L in the Mine Site Sewage Treatment Plant (STP) sample (MS-01B) collected on November 12, 2019; exceeding the permitted discharge limit for ammonia of 4.0 mg/L.

Prior to receipt of the external laboratory results for the sample collected on November 12, 2019, Baffinland's internal sampling identified an exceedance of the ammonia discharge criteria on November 16, 2019, and effluent discharge to the receiving environment was stopped immediately. Influent flows were transferred to other STPs onsite to limit the volume of off-spec effluent diverted to the Polishing Waste Stabilization Pond (PWSP). Process controls were adjusted to drop the ammonia level within the process. Following internal sampling to confirm the effluent met the applicable discharge criteria, discharge to the receiving environment resumed on November 20, 2019. Results of a follow-up sample collected on November 30, 2019 for external analysis confirmed a compliant ammonia concentration of 0.181 mg/L.

The exceedance was attributed to a failing membrane on one of the treatment trains at the STP. As a result, the remaining functional train was performing most of the treatment and the overall capability of the system to remove ammonia was reduced. Low aeration is also suspected to have been a contributing factor. The failing membrane was subsequently replaced and the system is functioning as designed. It is noted that internal sampling proceedures did not identify the ammonia exceedance on November 12, 2019, as a result of operator error. To address this issue, Baffinland has reviewed the discharge criteria with the STP operators, and the SOP for the STP operation is being updated.

B) Flow and Volume Measurements

Table 3 provides a breakdown of volume measurements as required by Part I, Item 9 of the Licence for November 2019. Water withdrawal for domestic purposes at MS-MRY-1 was 208.4 m^3 and 211.1 m^3 on November 8, 2019 and November 15, 2019, respectively; exceeding the permitted domestic daily withdrawal limit of 203.8 m^3 per

day. The exceedances were the result of higher plant production on those days. There were no other exceedences of the source specific daily volume withdrawal limits in November.

We trust that the information provided in this monthly report is acceptable and should you have any questions regarding this report please contact myself or Shawn Stevens (ext. 6016).

Regards,

Connor Devereaux
Environmental Superintendent

Reviewed by:

Christopher Murray
Environmental & Regulatory Compliance Manager

Attach: Tables 1, 2, and 3

Cc: Jeremy Fraser, Justin Hack (CIRNAC); Megan Lord-Hoyle, Lou Kamermans, Timothy Ray Sewell, Shawn Stevens, Sylvain Proulx, Francois Gaudreau, Brian Marshall (Baffinland); Jared Ottenhof, Chris Spencer (QIA)

Table 1: Monitoring Program Water Sampling Summary for November 2019

Monitoring Program Station	Sampling Date	Lab ID#	Comment
Milne Port			
MP-01 (Sewage Treatment Facility)	2019-11-12	L2382037-1	Volume reported daily during discharge.
MP-0101 (Field Duplicate of MP-01)	2019-11-12	L2382037-3	
MP-01a (Polishing Waste Stabilization Pond)	N/A	N/A	No flow.
MP-01B (Sewage Treatment Facility)	2019-11-12	L2382051-1	Volume reported daily during discharge.
MP-01B01 (Field Duplicate of MP-01B)	2019-11-12	L2382051-3	
MP-MRY-3 (Freshwater Intake from Km 32 Lake - Winter)	N/A	N/A	Withdrawal volume recorded daily.
MP-MRY-04 (RBC at Exploration Camp)	N/A	N/A	No flow.
MP-03 (Bulk Fuel Storage Facility Stormwater)	N/A	N/A	No flow.
MP-04 (Landfarm Facility & Snow Containment Facility)	N/A	N/A	No flow.
MP-05 Ore Stockpile Sedimentation Pond (East)	N/A	N/A	No flow.
MP-06 Ore Stockpile Sedimentation Pond (West)	N/A	N/A	No flow.
MP-MRY-12 (Bulk Sample Stockpile Area Seepage)	N/A	N/A	No flow.
MP-C-A (Downstream of Construction Area)	N/A	N/A	No flow.
MP-C-B (Downstream of Construction Area)	N/A	N/A	No flow.
MP-C-B01 (Downstream of Construction Area)	N/A	N/A	No flow.
MP-C-D (Downstream of Construction Area)	N/A	N/A	No flow.
MP-C-E (Downstream of Construction Area)	N/A	N/A	No flow.
MP-C-F (Downstream of Construction Area)	N/A	N/A	No flow.
MP-C-H (Downstream of Construction Area)	N/A	N/A	No flow.

Monitoring Program Station	Sampling Date	Lab ID#	Comment
MP-Q1-01 (Downstream of Q1 Quarry)	N/A	N/A	No flow.
MP-Q1-02 (Downstream of Q1 Quarry)	N/A	N/A	No flow.
Mary River Mine Site			
MS-01 (Sewage Treatment Facility)	2019-11-12	L2382044-1	Discharge volume reported daily.
MS-0101 (Field Duplicate of MS-01)	2019-11-12	L2382044-3	
MS-01B (Sewage Treatment Facility)	2019-11-12 2019-11-30	L2382042-1 L2395372-1	Discharge volume reported daily.
MS-MRY-1 (Freshwater Intake Camp Lake)	N/A	N/A	Withdrawal volume recorded daily.
MS-MRY-04a	N/A	N/A	No flow.
MS-MRY-04b	N/A	N/A	No flow.
MS-MRY-04c	N/A	N/A	No flow.
MS-03 (Milne Site Bulk Fuel Storage Facility Stormwater)	N/A	N/A	No flow.
MS-06 (Ore Stockpile Pond Stormwater)	N/A	N/A	No flow.
MS-08 (Mine Waste Rock Stockpile pond)	N/A	N/A	No flow.
MS-MRY-6 (Exploration Camp Bladder Farm Stormwater)	N/A	N/A	No flow.
MS-MRY-09 (Deposit 1 Surface Water Drainage)	N/A	N/A	No flow.
MS-MRY-10 (Weathered Ore Bulk Sample Stockpile)	N/A	N/A	No flow.
MS-MRY-11 (Processing Bulk Sample Stockpile)	N/A	N/A	No flow.
MS-MRY-13A (Downstream Non-Hazardous Landfill)	N/A	N/A	No flow.
MS-MRY-13B (Downstream Non-Hazardous Landfill)	N/A	N/A	No flow.
MS-C-A (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.
MS-C-B (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.
MS-C-C (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.

Monitoring Program Station	Sampling Date	Lab ID#	Comment
MS-C-D (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.
MS-C-E (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.
MS-C-F (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.
MS-C-G (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.
MS-C-H (Downstream of Construction and Borrow Areas)	N/A	N/A	No flow.
MQ-C-A (Downstream of QMR2 Quarry)	N/A	N/A	No flow.
MQ-C-B (Downstream of QMR2 Quarry)	N/A	N/A	No flow.
MQ-C-D (Downstream of QMR2 Quarry)	N/A	N/A	No flow.
Steensby Port			
Steensby Exploration Camp is presently inactive.	N/A	N/A	N/A

TABLE 2.1 - WATER QUALITY RESULTS FOR WATER LICENCE MONITORING LOCATION - MP-01

Analyte	Sample ID			MP-01	MP-0101
	ALS Laboratory Sample ID			L2382037-1	L2382037-3
	Sample Date & Time			11/12/2019 1:45:00 PM	11/12/2019 1:45:00 PM
	QA/QC Sample Type			N/A	Field Duplicate
	Units	LOR	Water Licence Criteria[1]		
pH	pH units	0.10	6.0 - 9.5	7.77	7.70
Total Suspended Solids	mg/L	2.0	120	3.5	2.1
Turbidity	NTU	0.10	-	0.75	2.63
Alkalinity, Total (as CaCO3)	mg/L	10	-	148	147
Ammonia, Total (as N)	mg/L	0.010	-	0.028	0.080
Total Kjeldahl Nitrogen	mg/L	0.15	-	1.20	<0.15
Phosphorus, Total	mg/L	0.030	-	8.35	8.24
Fecal Coliforms	CFU/100mL	0	10,000	0	0
BOD	mg/L	2.0	100	<2.0	<2.0
COD	mg/L	10	-	45	41
Oil and Grease, Total	mg/L	2.0	No Visible Sheen	5.3	<2.0

Notes:

Bold highlight indicates result that exceeded the applicable water quality criteria.

1. Type A Water Licence (2AM-MRY1325 - Amend. 1) - Table 5: Effluent Quality Discharge Limits for Sewage Treatment Facilities to the Ocean.

TABLE 2.2 - WATER QUALITY RESULTS FOR WATER LICENCE MONITORING LOCATION - MP-01B

Analyte	Sample ID			MP-01B	MP-01B01
	ALS Laboratory Sample ID			L2382051-1	L2382051-3
	Sample Date & Time			11/12/2019 2:45:00 PM	11/12/2019 2:45:00 PM
	QA/QC Sample Type			N/A	Field Duplicate
	Units	LOR	Water Licence Criteria[1]		
pH	pH units	0.10	6.0 - 9.5	7.76	7.69
Total Suspended Solids	mg/L	2.0	120	<2.0	<2.0
Total Dissolved Solids	mg/L	20	-	898	927
Turbidity	NTU	0.10	-	0.27	1.88
Alkalinity, Total (as CaCO3)	mg/L	10	-	153	153
Ammonia, Total (as N)	mg/L	0.010	-	0.031	0.027
Total Kjeldahl Nitrogen	mg/L	0.15	-	<0.15	<0.15
Phosphorus, Total	mg/L	0.045	-	11.4	12.0
Fecal Coliforms	CFU/100mL	0	10,000	0	0
BOD	mg/L	2.0	100	<2.0	<2.0
COD	mg/L	10	-	38	37
Oil and Grease, Total	mg/L	2.0	No Visible Sheen	<2.0	<2.0

Notes:

Bold highlight indicates result that exceeded the applicable water quality criteria.

1. Type A Water Licence (2AM-MRY1325 - Amend. 1) - Table 5: Effluent Quality Discharge Limits for Sewage Treatment Facilities to the Ocean

TABLE 2.3- WATER QUALITY RESULTS FOR WATER LICENCE MONITORING LOCATION - MS-01

Analyte	Sample ID			MS-01	MS-0101
	ALS Laboratory Sample ID			L2382044-1	L2382044-3
	Sample Date & Time			11/12/2019 3:00:00 PM	11/12/2019 3:00:00 PM
	QA/QC Sample Type			N/A	Field Duplicate
	Units	LOR	Water Licence Criteria[1]		
pH	pH units	0.10	6.0 - 9.5	7.28	7.35
Total Suspended Solids	mg/L	2.0	35	2.4	2.7
Turbidity	NTU	0.10	-	1.82	0.76
Alkalinity, Total (as CaCO3)	mg/L	10	-	43	44
Ammonia, Total (as N)	mg/L	0.010	4.0	0.076	0.076
Total Kjeldahl Nitrogen	mg/L	0.15	-	<0.15	<0.15
Phosphorus, Total	mg/L	0.0060	4.0	1.29	1.35
Fecal Coliforms	CFU/100mL	0	1000	0	1
BOD	mg/L	2.0	30	<2.0	<2.0
COD	mg/L	10	-	34	33
Oil and Grease, Total	mg/L	2.0	No Visible Sheen	<2.0	<2.0

Notes:

Bold highlight indicates result that exceeded the applicable water quality criteria.

1. Type A Water Licence (2AM-MRY1325 - Amend. 1) - Table 4: Effluent Quality Discharge Limits for Sewage Treatment Facilities to Freshwater Receiving Environment

TABLE 2.4- WATER QUALITY RESULTS FOR WATER LICENCE MONITORING LOCATION - MS-01B

Analyte	Sample ID			MS-01B	MS-01B
	ALS Laboratory Sample ID			L2382042-1	L2395372-1
	Sample Date & Time			11/12/2019 2:30:00 PM	11/30/2019 1:55:00 PM
	QA/QC Sample Type			N/A	N/A
	Units	LOR	Water Licence Criteria[1]		
pH	pH units	0.10	6.0 - 9.5	7.14	8.28
Total Suspended Solids	mg/L	2.0	35	<2.0	<2.0
Turbidity	NTU	0.10	-	0.34	0.27
Alkalinity, Total (as CaCO3)	mg/L	10	-	38	174
Ammonia, Total (as N)	mg/L	1.0	4.0	**47.0**	0.181
Total Kjeldahl Nitrogen	mg/L	0.90	-	40.2	<0.15
Phosphorus, Total	mg/L	0.0030	4.0	0.0193	1.16
Fecal Coliforms	CFU/100mL	0	1000	0	-
BOD	mg/L	2.0	30	<2.0	<2.0
COD	mg/L	10	-	29	24
Oil and Grease, Total	mg/L	2.0	No Visible Sheen	<2.0	<2.0

Notes:

Bold highlight indicates result that exceeded the applicable water quality criteria.

1. Type A Water Licence (2AM-MRY1325 - Amend. 1) - Table 4: Effluent Quality Discharge Limits for Sewage Treatment Facilities to Freshwater Receiving Environment

Table 3: Flow and Volume Measurements-Part I Item 11 - November 2019

DATE	Camp Lake Freshwater for Domestic Use - Daily Water (m^3) MS-MRY-1[1]	Camp Lake Freshwater for Industrial Use - Daily Water (m^3) MS-MRY-1	Treated Sewage Effluent (m^3) from MS-01 to Discharge Location #1	Treated Sewage Effluent (m^3) from MS-01B to Discharge Location #1	Sewage Sludge Removed (m^3) from Mine Site WWTPs to Incinerator	Sewage Sludge Removed (m^3) from Mine Site WWTP to PWSP at Mine Site	Km 32 Lake Milne Port Camp Daily Water (m^3) MP-MRY-3	Km 32 Lake Milne Port Camp Fresh Water Use for Industrial Purposes (m^3) MP-MRY-3	Treated Sewage Effluent (m^3) from MP-01 to Milne Port	Treated Sewage Effluent (m^3) from MP-01B to Milne Port	Sewage Sludge Removed (m^3) from Milne Port WWTP to Mine Site WWTP	Sewage Sludge Removed (m^3) from Milne Port WWTP to Incinerator	Sewage Sludge Removed (m^3) from Milne Port WWTP to PWSP at Milne Port
1-Nov-19	137.6	10.3	36.0	100.0	2.1	0.0	69.1	0.0	69.0	35.7	0.0	0.0	0.0
2-Nov-19	132.7	12.9	27.0	93.2	1.9	0.0	87.9	2.0	70.0	36.1	2.0	0.3	0.0
3-Nov-19	82.3	26.3	22.0	105.6	2.0	0.0	106.0	0.0	68.0	35.0	2.0	0.3	0.0
4-Nov-19	143.3	12.7	38.0	106.8	2.0	0.0	126.6	0.0	66.0	44.0	2.0	0.0	0.0
5-Nov-19	164.6	12.6	32.0	118.3	0.9	0.0	86.8	0.0	67.0	40.3	2.0	0.0	0.0
6-Nov-19	148.8	24.6	32.0	117.6	1.5	0.0	52.7	4.0	65.0	18.1	0.0	0.0	0.0
7-Nov-19	104.7	10.4	31.0	106.2	1.0	0.0	98.3	6.5	67.0	54.7	0.0	0.0	5.0
8-Nov-19	208.4	0.0	29.0	106.6	1.2	0.0	106.9	0.0	68.0	33.9	0.0	0.3	0.0
9-Nov-19	90.3	2.5	31.0	103.6	1.6	0.0	103.4	0.0	67.0	17.2	0.0	0.3	1.0
10-Nov-19	183.0	10.5	20.0	98.3	1.3	0.0	89.0	5.0	67.0	56.0	2.0	0.5	0.0
11-Nov-19	105.3	0.0	29.0	109.8	0.0	0.0	58.3	0.0	61.0	39.5	0.0	0.5	0.0
12-Nov-19	176.6	4.3	38.0	128.1	0.0	0.0	62.7	0.0	62.0	42.2	0.0	0.3	0.0
13-Nov-19	184.0	2.4	36.0	130.8	2.1	0.0	82.3	0.0	62.0	33.7	0.0	0.3	5.0
14-Nov-19	119.5	0.0	29.0	131.5	3.6	0.0	77.6	0.0	67.0	29.7	0.0	0.3	0.0
15-Nov-19	211.1	14.3	39.0	133.1	2.7	0.0	79.0	2.3	42.0	19.8	0.0	0.0	0.0
16-Nov-19	139.7	12.4	45.0	103.9	1.0	0.0	48.1	0.0	65.0	15.3	0.0	0.5	0.0
17-Nov-19	156.0	23.2	55.0	0.0	0.0	120.1	63.6	8.7	58.0	22.4	0.0	0.5	0.0
18-Nov-19	71.9	8.6	49.0	0.0	0.4	78.0	62.8	33.4	58.0	15.2	0.0	0.3	0.0
19-Nov-19	105.3	10.3	59.0	0.0	0.6	50.4	36.2	83.5	60.0	9.5	0.0	0.0	2.5
20-Nov-19	101.1	19.9	56.0	45.0	0.8	0.0	78.6	33.4	57.0	8.0	0.0	0.3	0.0
21-Nov-19	113.7	9.5	49.0	69.9	1.2	0.0	58.2	0.0	60.0	14.5	0.0	0.3	0.0
22-Nov-19	133.9	3.4	34.0	86.0	1.7	0.0	64.9	0.0	57.0	11.7	0.0	0.5	0.0
23-Nov-19	153.7	2.2	45.0	87.7	1.9	0.0	33.4	0.0	51.0	15.2	0.0	0.5	0.0
24-Nov-19	152.9	0.0	52.0	88.5	2.3	0.0	43.5	0.0	50.0	9.3	0.0	0.5	0.0
25-Nov-19	120.4	0.0	52.0	115.0	2.3	0.0	57.0	0.7	54.0	3.7	0.0	0.5	0.0
26-Nov-19	138.7	44.3	50.0	99.4	2.5	0.0	58.3	0.0	49.0	12.3	0.0	0.5	0.0
27-Nov-19	142.7	67.9	52.0	92.9	2.3	0.0	37.1	0.0	53.0	11.2	0.0	0.7	0.0
28-Nov-19	182.9	74.1	42.0	81.2	2.1	0.0	51.9	0.0	51.0	10.8	0.0	0.8	0.0
29-Nov-19	129.2	102.7	41.0	93.6	2.2	0.0	46.5	0.0	37.0	4.6	0.0	0.8	0.0
30-Nov-19	95.5	12.9	43.0	83.6	2.4	0.0	52.1	0.0	44.0	10.4	0.0	0.8	0.0
Total	**4129.8**	**535.0**	**1193.0**	**2736.2**	**47.6**	**248.5**	**2078.9**	**179.5**	**1772.0**	**709.9**	**10.0**	**10.8**	**13.5**

Notes:

WWTP - Waste Water Treatment Plant

PWSP - Polishing Waste Stabilization Pond

1. Exceedances of water withdrawal limit for domestic purposes at MS-MRY-1 on November 8 and November 15 were due to higher plant production on those days.