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**March 27, 2020**

Licensing
Nunavut Water Board
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**Re: February 2020 – Monthly Monitoring Report for Water Licence 2AM-DOH1335**

This report is comprised of the monitoring requirements set out in Part I and Schedule I of water licence 2AM-DOH1335 Amendment 2 (the licence), and additional requirements from CIRNAC.

During the subject period of this report, the focus of activities at Doris North was underground mining, construction, ore processing, water management and environmental compliance.

Dewatering of the Tailings Impoundment Area (TIA) and the Doris underground workings through the Robert's Bay Discharge System began February 1, 2020. Dewatering of the underground workings through the mill tailings system to the TIA also continued in February.

Development of the Madrid North Portal continued in February. Mining activities continued in the Naartok East Crown Pillar Recovery Trench under this licence during the month.

Monitoring locations associated with Madrid infrastructure (MMS) will be established with the Inspector as per Part I Item 3 as construction of Madrid facilities are completed. Sampling locations monitored under this licence (seasonally or when facilities are operational) are provided in Figure 4 through Figure 6 at the end of this report.

## Site Wide Water Quality Monitoring Program (Part I Item 3 and Schedule I)

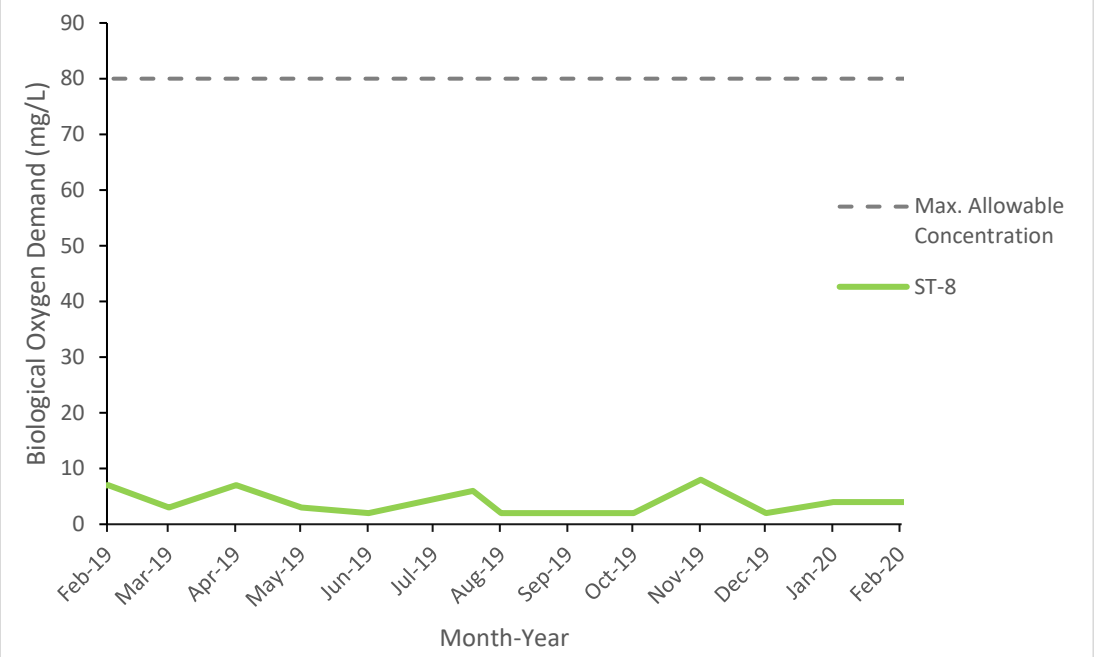
Water quality sampling was conducted in February at monitoring stations identified in Schedule I of the licence (ST-1 through ST-13, TL-1 through TL-12 and MMS-1 through MMS-10). Water quality samples were not collected for monitoring stations that were inactive during the month being reported (e.g., facilities that had not yet been constructed, were frozen during the month, or were not operationally active).

All parameters were compared to the applicable effluent quality limits outlined in Part D and Part F of the licence. No exceedances of effluent quality limits were observed in

any samples collected this month. Results of all water quality monitoring are provided in Appendix A attached to this report.

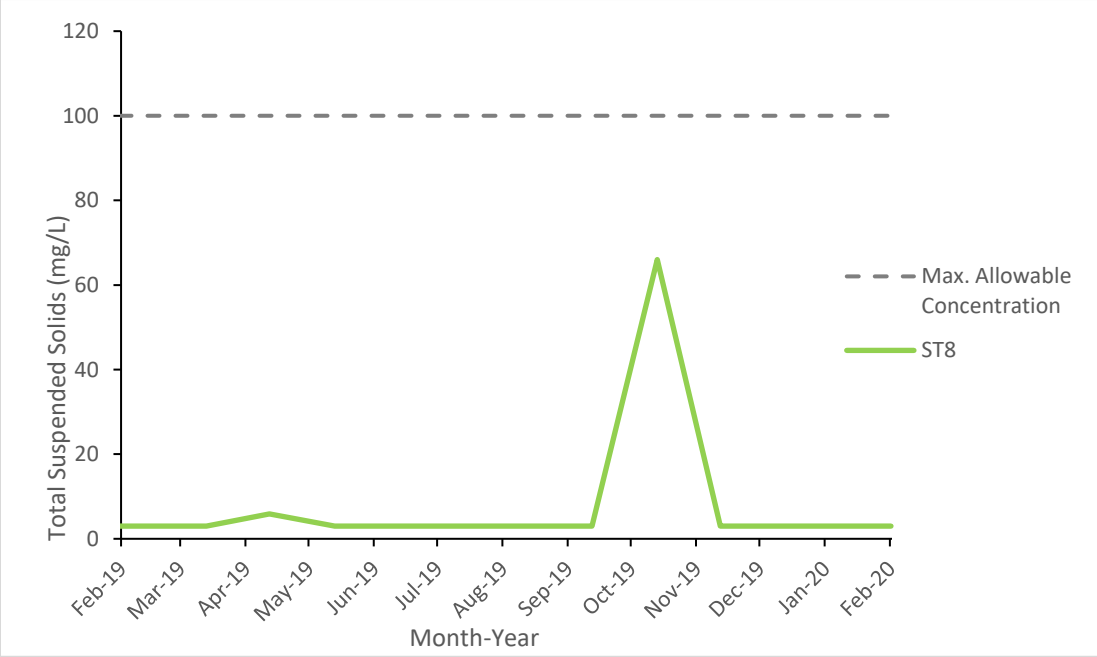
Figure 1 and 2 illustrates effluent quality characteristics for parameters of interest at select monitoring stations.

**Figure 1. Biological Oxygen Demand Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8)**




Note: Maximum Average Concentration as per Part F Item 4(b).

**Figure 2. Total Suspended Solids Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8)**




Note: Maximum Average Concentration as per Part F Item 4(b).

## Flow and Volume Measurements (Part F, Part I and Schedule I)

**Table 1. Effluent discharge, February 2020**

| Facility | Station Code | Discharge Volume ($m^3$) | Exceedances of Discharge Criteria | Discharge Location | Licence Reference |
|---|---|---|---|---|---|
| Doris Sedimentation Pond * | ST-1 | 0 | N/A | Tailings Impoundment Area | Part F Item 17 |
| Doris Contact Water Pond #1 | ST-2 | 0 | N/A | Tailings Impoundment Area | Part F Item 17, 18(a) |
| Non-Hazardous Landfill Sump | ST-3 | 0 | 0 | Facility not constructed | Part F Item 18(a) |
| Landfarm Sump | ST-4 | 0 | 0 | Tailings Impoundment Area | Part F Item 18(b) |
| Doris Plant Site Fuel Storage Area | ST-5 | 0 | 0 | Tailings Impoundment Area | Part F Item 18(b) |
| Rob Bay Single 5ML Fuel Storage Area | ST-6a | 0 | 0 | Tundra Discharge 13W 432904 7563494 | Part F Item 18(b) |
| Rob Bay Fuel Storage and Containment Berm | ST-6b | 0 | 0 | Tailings Impoundment Area | Part F Item 18(b) |
| Doris Sewage Treatment Plant, Effluent | ST-8 | 1,371 | 0 | Tundra Discharge 13W 432933 7559057 | Part F Item 5(b-c) |
| Doris Sewage Treatment Plant, Sludge | N/A | 35.0 | N/A | Tailings Impoundment Area | Part I Item 5(f) |
| Doris Reagent and Cyanide Storage Facility Sump | ST-11 | 0 | N/A | Tailings Impoundment Area | Part F Item 17 |
| Doris Contact Water Pond #2 | ST-13 | 0 | N/A | Facility not constructed | Part F Item 17 |
| Doris Mine Water Discharge | TL-12 | 54,254 | N/A | Robert's Bay; Tailings Impoundment Area | |
| Madrid North Contact Water Pond | MMS-1 | 0 | 0 | Tailings Impoundment Area | Part F Item 17, 18(a) |
| Madrid South Primary Contact Water Pond | MMS-2 | 0 | N/A | Facility not constructed | Part F Item 17, 18(a) |
| Madrid South Secondary Contact Water Pond | MMS-3 | 0 | N/A | Facility not constructed | Part F Item 17, 18(a) |
| Madrid South Fuel Storage Facility | MMS-5 | 0 | 0 | Facility not constructed | Part F Item 18(b) |
| Madrid North Connector | MMS-7 | 0 | N/A | No dewatering occurring at this time | |
| Madrid North Fuel Storage Facility | MMS-8 | 0 | 0 | Facility not constructed | Part F Item 18(b) |
| Madrid Mine Water Discharge | MMS-10 | 0 | N/A | Facility not constructed | |

Records of visual monitoring of discharge to tundra are maintained on file as per Part I Item 11.

* Note: Volume reported includes effluent transferred from the Doris Contact Water Pond #1, Landfarm Sump, Doris Plant Site Fuel Storage Area, Rob Bay Fuel Storage and Containment Berm and Doris Mine Water Discharge.

**Table 2. Discharge from TIA to Roberts Bay, February 2020**

| Month | Number of days of discharge | Discharge Volume ($m^3$) | Exceedances of Discharge Criteria* |
|---|---|---|---|
| January | 0 | 0 | 0 |
| February | 29 | 154,211 | 0 |
| **Annual Cumulative** | **29** | **154,211** | **0** |

* Discharge criteria as outlined in *Metal and Diamond Mining Effluent Regulations*.
Acute Lethality testing conducted as outlined in Part F Item 22 and Part I Item 14

**Table 3. Water usage, February 2020**

| Month | Windy Lake (ST-7A) | Doris Lake (ST-7) | | | | | Total Usage |
|---|---|---|---|---|---|---|---|
| | Domestic Water ($m^3$) | Domestic Water ($m^3$) | Surface Exploration ($m^3$) | Industrial Usage* ($m^3$) | Dust Suppression ($m^3$) | Winter Track ($m^3$) | |
| January | 1,492 | 0 | 0 | 289 | 0 | 93 | 1,874 |
| February | 1,448 | 0 | 76 | 138 | 0 | 445 | 2,107 |
| **Annual Total** | 2,940 | 0 | 76 | 427 | 0 | 538 | 3,981 |
| **Annual Allowance** | **43,800** | | | **1,930,000** | | **60,000** | **2,033,800** |

As permitted by water licence 2AM-DOH1335 Part E Item 1 and Part I Item 5(a)(b).
* Includes industrial uses such as mining, core processing, concrete batching, etc.

**Table 4. Volume of Reclaim Water from the TIA for Process Water, February 2020**

| Month | Reclaim Water ($m^3$) * |
|---|---|
| January | 76,601 |
| February | 64,317 |
| **Annual Cumulative** | **140,918** |

* As per Part E Item 5 and Part I Item 5(c)
Numbers rounded to the nearest cubic meter.

**Table 5. Doris Waste Rock and Ore Volumes, February 2020**

| Month | Waste Rock Management | | | | | Underground Void Space | | | Ore Processing and Tailings Management | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Produced from Mining Activity (tonnes) | Backfilled Directly to Mine (tonnes) | Returned Underground from Temporary Waste Rock Pile* (tonnes) | Moved to Temporary Waste Rock Pile (tonnes)* | Cumulative on Temporary Waste Rock Pile (tonnes)* | Volume Created from Mining Activities (tonnes) | Cumulative Volume Available for Backfill (tonnes) | Cumulative Volume Available for Backfill ($m^3$) | Quantity of Ore Processed** (tonnes) | Total Dry Tailings Placed in TIA** (tonnes) | Total Dry Detoxified Tailings Placed Underground** (tonnes) |
| **December Balance** | - | - | - | - | 781,072 | - | 1,547,057 | 682,081 | - | - | - |
| January | 28,787 | 19,646 | 2,040 | 9,141 | 781,072 | 26,949 | 1,547,057 | 682,081 | 29,858 | 28,606 | 1,229 |
| February | 17,050 | 18,344 | 2,640 | -1,294 | 777,138 | 23,033 | 1,524,024 | 691,250 | 29,195 | 27,569 | 1,622 |
| **Cumulative Total** | 45,837 | 37,990 | 4,680 | 7,847 | 777,138 | 49,982 | 1,524,024 | 691,250 | 59,053 | 56,175 | 2,851 |

* As per Part I Item 5(d)(e)

** As per Part I Item 6

Note: Void space created from mining activities is determined as the sum of the initial void space as calculated in March 2017 and void space created each month from mining activities. A negative volume of void space created in a month indicates that a higher volume of waste rock and detoxified tailings was returned underground compared to the volume of void space created from new mining activities.

**Table 6. Madrid North Waste Rock and Ore Volumes, February 2020**

| Month | Waste Rock Management | | | | | | Underground Void Space | | | Ore Processing |
|---|---|---|---|---|---|---|---|---|---|---|
| | Produced from Mining Activity (tonnes) | Backfilled Directly to Mine (tonnes) | Returned Underground from Temporary Waste Rock Pile* (tonnes) | Moved to Temporary Waste Rock Pile (tonnes)* | Used for Construction (tonnes) | Cumulative on Temporary Waste Rock Pile (tonnes)* | Volume Created from Mining Activities (tonnes) | Cumulative Volume Available for Backfill (tonnes) | Cumulative Volume Available for Backfill ($m^3$) | Quantity of Ore Processed** (tonnes) |
| **December Balance** | - | - | - | - | - | - | - | - | - | - |
| January | 65,213 | 749 | 0 | 60,206 | 4,258 | 309,506 | 85,898 | 447,547 | 159,838 | 21,658 |
| February | 35,380 | 0 | 0 | 30,926 | 4,454 | 340,432 | 20,473 | 468,020 | 180,311 | 21,945 |
| **Cumulative Total** | 100,593 | 749 | 0 | 91,132 | 8,712 | 340,432 | 106,371 | 468,020 | 180,311 | 21,945 |

* As per Part I Item 5(d)(e)

** As per Part I Item 6

Note: Void space created from mining activities is determined as the sum of the initial void space created each month from mining activities. A negative volume of void space created in a month indicates that a higher volume of waste rock was returned underground compared to the volume of void space created from new mining activities.

**Table 7. Doris Lake Water Level (ST-12), February 2020**

| Month | Minimum Water Level (masl) | Maximum Water Level (masl) | Mean Water Level (masl) | Monthly Water Level Variation (masl)* | Comparison of Mean Water Level from Month to Month (masl)^ |
|---|---|---|---|---|---|
| January | 21.712 | 21.748 | 21.726 | -0.088 | -0.103 |
| February | 21.698 | 21.729 | 21.713 | 0.031 | -0.013 |

* Monthly Water Level Variation is calculated as the difference between the Maximum Water Level and the Minimum Water Level measured during the month.

^ Comparison of the change in water level from month to month. This value is calculated by subtracting the Mean Water Level of the current month from the Mean Water Level of the previous month (e.g. February Mean Water level - January Mean Water level). A positive value from this calculation indicates a rise in water level since the previous month; a negative value from this calculation indicates a drop in water level since the previous month.

## Waste Management (Part F Item 10 and 11)

No offsite waste disposal occurred in February.

## Summary of Assessments of Water Balance and Water Quality Model (Part F Item 24 and Part I Item 12 c)

Average monthly water quality, hydrologic, and climatic monitoring data were collected while in operations during February. Data will contribute to the assessment of the water and load balance model, and will be compared to the predicted water quality and elevation within the TIA and will be reported in the annual report for 2020.

## Thermal Monitoring (Part I Items 7, 8 and Schedule I)

Thermal monitoring undertaken as per Part I Items 7, 8 and Schedule I is reported in the annual Geotechnical Report.

## Site Freshet and Precipitation Conditions (Part I Item 12(d))

Visual monitoring was conducted during major rain events and periods of sustained precipitation in February.

The Diversion Berm and associated check dam were observed to be functioning as designed and diverting non-contact water around the Doris site infrastructure. Photos of this infrastructure are provided in Figure 3 below.

Inspections were completed of site culverts throughout the month of February. No issues were identified with these water management structures as they were observed to be frozen.

**Figure 3. Diversion berm dry during February 2020**

**Incident Reporting**

Spill #2020-030 – On February 1, 2020, final commissioning of the Roberts Bay discharge pipeline began to initiate pumping of treated underground mine water and excess water from the Tailings Impoundment Area (TIA) to Rob Bay. Pumping of treated mine water through the system began from the main pump house with no issues identified along the pipeline. When the pump located at the TIA was started, a leak was identified emanating from a flange on an elbow section of the pipeline located approximately 75m south of the main pump house and 20m east of the heli pad. Bolts on the flange were found to be loose and an estimated 500L of water was released at this location.

An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes:

- Contraction/temperature change occurred in between the time of initial installation of the pipeline (summer) and commissioning of the pipeline. This caused the bolts of the flange to become loose.
- No insulation kit had been installed on the elbow or flange during initial installation which likely increased the impact of this contraction/temperature change.
- Verification of torque on the flange bolts was not identified on the pre-commissioning checklist and was not performed prior to start of commissioning.

Monitoring of the pipeline was actively being conducted during the commissioning process. Crews in the area immediately identified the leak and tightened the bolts on the flange to minimize the release. Bolts on all other flanges of the pipeline were checked to verify bolts were torqued to specification.

Snow surrounding the area of the flange was removed and placed in the Tailings Impoundment Area for disposal.

The following corrective/preventative actions were identified to reduce the likelihood of a reoccurrence:

- An SOP for commissioning surface pipelines will be developed to identify all items that must be confirmed prior to start up, including confirmation of bolt torque on all flanges.
- Insulation kit and protective housing installed at flange location.
- A preventative maintenance program to routinely inspect flanges on the pipeline will be initiated.

Spill #2020-035 – On February 9, 2020, while performing daily inspections near an outside

storage magazine, the Environmental Projects Technician identified a spill of less than 1kg of ANFO explosives pellets on the snow covered gravel pad. The impacted area was less than 1m$^2$ and no material was released tundra or any water body.

The incident occurred when the blasting contractor was removing a 500kg bag of ANFO explosives from the magazine in advance of a planned blast. While removing the bag, the bag contacted a protruding nail from a pallet and a small tear in the bag developed. ANFO pellets were released to the ground.

An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes:

- Failure to identify the nail protruding from a pallet prior to removal of the bag.
- Inadequate procedures related to the removal of ANFO bags from containment, which would have identified the hazard.

Authorized personnel cleaned up the impacted area. The pellets were shoveled into pails and utilized in the next scheduled blast.

The following corrective/preventative actions were identified to reduce the likelihood of a reoccurrence:

- Improved task planning to be completed by Supervisor to identify all potential risks associated with handling ANFO explosives pellets.
- Workers shall conduct Field Level Risk Assessment to identify all hazards prior to handling ANFO explosives pellets, and develop mitigation measures to minimize those hazards prior to beginning the task.

Spill #2020-058 – Underground workings at the Doris-Madrid Project are dewatered to allow for continued mining activities. In this process, mine water is pumped from an underground sump to the water treatment facility (740 Building), where the water is treated. Water treatment in this facility is accomplished in multiple stages. In the first stage, lamella clarifier tanks are used to promote the settling and filtration of solids present in the water.

The 740 Building is inspected regularly by operators to ensure optimal function. On February 21, 2020, an operator was completing an inspection of the 740 Building, and observed partially treated effluent overflowing onto the ground from the containment underneath the lamella clarifier tank. The operator discovered that the feed box to the clarifier tank was unable to accept the water and as such, excess effluent was deposited into the concrete containment and onto the adjacent crush pad.

An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes:

- Lack of an alarm to inform control room operator when flow exceeds system rated capacity
- Lack of remote observation capability during times when facility is unattended
- Inadequate volume capacity of the facility's secondary spill containment
- Incorrect underground valve installed outside of system design
- Lack of an alarm to inform control room operator that pumping from the underground sump has commenced

Immediately, flow from the underground was stopped. Spilled effluent, contained in the concrete berm, was pumped back into the lamella clarifier tank for treatment. The feed box was cleaned to remove mud from the underflow of the baffle. The contaminated crush material was deposited into the Tailings Impoundment Facility.

In order to reduce the likelihood of a reoccurrence, the incident investigation concluded with the following preventative actions for future work at this water treatment facility:

- Install alarm system programmed to sound when flow into the wastewater treatment plant exceeds 80$m^3$/hr.
- Install camera inside the 740 Building water treatment facility to provide real time remote observation from the control room
- Increase the volume capacity of the secondary containment area
- Install proper valve underground to ensure system design functionality
- Install proper sump with a level switch control to inform control room when it has commenced operation

Should there be any questions regarding this monthly report, please contact enviro@tmacresources.com.

Yours sincerely,

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Jerome Girard, Mine General Manager, TMAC

**Figure 4. 2AM-DOH1335 SNP Monitoring Locations**

**Figure 5. 2AM-DOH1335 SNP Monitoring Locations**

**Figure 6. 2AM-DOH1335 SNP Monitoring Locations**