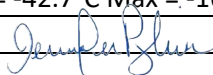


## MONTHLY DIKE PERFORMANCE REPORT

Dike: D-CP1	
<b>Date:</b> January 2019	<b>Temps:</b> Min = -42.7°C Max = -16.8°C Mean = -33.5°C
<b>Season:</b> Ice	<b>Signature:</b> 

### MONITORING/INSPECTION SUMMARY

	Daily	Weekly	Monthly
Ground Temperature Readings			✓
Survey Monuments			Attempted
Water/Ice Elevations			✓
Visual Inspection			

### GROUND TEMPERATURES

- The average temperature across all horizontal beads within the key trench is **-5.74°C** (February 6, 2019). The overall average temperature has continued to decrease over the past month (since January 7) by **-0.78°C** at an average rate of change of -0.03°C/day. This cooling is now observed in all beads throughout the key trench.
- No comparison to this time last year is available, as readings were not obtained in early 2018 due to the extreme cold and snow.
- Vertical GTC's show that the dike continues to be frozen to depth at all cable locations, with temperatures continuing to cool throughout the month. Seasonal warming continues below elevations 2 - 4 m below the maximum key trench depth.

### SURVEY MONUMENTS

- A survey of the monuments was attempted February 7, 2019. However, it was discovered that the control pile at the south abutment was damaged (bent) by snow clearing operations and that the embedded monument on the top of the pile was destroyed.

### WATER/ICE ELEVATIONS

- The elevation of upstream ice surveyed February 5, 2019 is **64.83 m**, which is 1.26 m above the last surveyed elevation of 63.57 m (November 3, 2018). It is noted that the current upstream water/ice elevation at D-CP1 is 0.73 m above the maximum operating level before freshet as per the OMS.
- In addition to ice elevations directly in front of D-CP1, survey also obtained the ice elevation directly in front of Culvert 3 at the former H7 area (64.5 m). The highest as-built invert elevation of the downstream of Culvert 3 system (900 mm diameter culverts) is 64.13 m.
- It is understood that the water into the former H6/H7 basins at CP1 is coming from two sources: trucked STP discharge from Exploration Camp (daily rate of 50 m<sup>3</sup> to 75 m<sup>3</sup>/day) and treated water from the SWTP (daily rate of up to 100 m<sup>3</sup>/day). It is also understood that the SWTP discharge is at an exit temperature of **+60°C**.
- Not only could the introduction of this water have a negative impact on the freeze-back of the dike and underlying permafrost, but discharge at this location re-introduces the risk of blocking the Culvert 3 system. As the water management system around Portal 2 has not yet been constructed, a build-up of freshet flows upstream of Culvert 3 could be detrimental to this area.

### VISUAL INSPECTIONS

- No visual inspections were undertaken in January.

## MONTHLY DIKE PERFORMANCE REPORT

### RECOMMENDATIONS

- It is strongly recommended that the discharge of both water sources occur away from D-CP1 and closer to Jetty 1 (former H17 basin) as soon as possible. As of the writing of this report, discussions with Environment and E&I have identified alternate locations for the STP discharge from Exploration Camp. Operational personnel from the SWTP have been notified of concerns surrounding the hot water discharge location, but whether or not action will be taken and when is uncertain at this time.
- A new monument was installed on the damaged control pile at D-CP1 and survey is in the process of re-calibrating the readings. Several attempts will be made over the next couple of weeks and survey readings will be provided for the February report.