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TECHNICAL MEMO

ISSUED FOR USE

TO:	Josée Perron, YTG Assessment and Abandoned Mines	**DATE:**	January 13, 2012
C:		**MEMO NO.:**	001
FROM:	Richard Trimble, Kisa Elmer	**EBA FILE:**	W23101530

SUBJECT: Summary of Geotechnical Services at Mount Nansen Abandoned Mine Site

1.0 INTRODUCTION

Glaciation in the Dome Creek Diversion Channel at Mt Nansen mine site had completely filled the channel with ice by mid-December 2011. It was EBA's opinion and recommendation that all of this ice be removed before the creek overflows and erodes the sand terrace between the creek and the tailings/seepage collection ponds. It is particularly critical to ensure the channel is free-flowing before spring of 2012 freshet. Several sessions of ice removal may be required before such time.

On January 6, 2012, the Government of Yukon Territory contracted EBA Engineering Consultants Ltd. operating as EBA, A Tetra Tech Company (EBA) to provide geotechnical services in the following areas:

- Provide supervision of the excavation of ice build-up in Dome Creek Diversion Channel, ensuring the riprap and geotextile liner is not damaged,
- Ensure that work around the tailings pond and seepage pond is safely performed to maintain the integrity of the structures,
- Inspect the sand slope above the seepage pond towards the diversion channel to look for indications of subsurface "piping" or water seepage,
- Inspect the diversion after excavation of the ice,
- Inspect the thermosyphons in the seepage collection dam to ensure that they are still functioning properly, and;
- Provide a written report of findings and recommendations.

Erik Nyland of Boreal Engineering and Dean Hassard of Deadman Creek Enterprises were contracted to excavate ice build-up in the channel and re-establish flow into Dome Creek outlet. Denison Mines Corporation (Denison) was also contracted to remove ice buildup beneath the access bridge.

2.0 SUMMARY OF OBSERVATIONS

EBA field personnel were onsite observing the excavation of Dome Creek Diversion Channel. Excavation began January 7, 2012 and was completed January 10, 2012. The Denison steamer crew began removing ice from the west bridge beam and cutting a channel about 1 m wide from the base of the bridge to the

bottom of the diversion channel on January 8, 2012 and finished January 9, 2012. The channel provides temporary drainage under the bridge.

At the time of excavation there was no evidence that riprap or liner in the spillway had been damaged. Photographs 1 through to 8 documenting the condition of the diversion channel post excavation are included in Appendix A – Photographs.

EBA used an FLIR IR Camera to measure the thermal gradient of the thermosyphons installed under the seepage collection dam. Photograph 9 show a temperature gradient between the thermosyphons and surrounding environment. Therefore, the thermosyphons are still performing as designed.

EBA inspected four testpits excavated through snow down to original ground and found no evidence of "piping" or seepage along the sand side slopes above the seepage pond. The locations and conditions of these testpits are shown in photographs 10 and 11.

3.0 RECOMMENDATIONS

EBA recommends the following:

- In order to reduce the risk of blockages and protect the bridge abutments from the erosive forces of ice jamming during freshet, YTG should remove the remaining ice beneath the access bridge;
- Excavate the ice in the diversion channel once the ice accumulates in the ditch to half or two-thirds the height of the diversion ditch berm and before ice accumulates to the base of the access bridge;
- Continue to monitor and record daily pump rates from the seepage collections pond and verify with EDI Environmental Dynamics that the flow is accurate; and,
- Monitor thermistors and piezometers once per week until after spring freshet.

Attachments:

Appendix A - Photographs

APPENDIX A

APPENDIX A PHOTOGRAPHS

Photo 1: At Dome Creek (10-Jan-2012)

Photo 2: Between Dome Creek and the Bridge (10-Jan-2012)

Photo 3: Between Dome Creek and the Bridge (10-Jan-2012)

Photo 4: Upstream of Bridge (10-Jan-2012)

Photo 5: Ice Removal Under the Bridge (09-Jan-2012)

Photo 6: At the Bridge (10-Jan-2012)

Photo 7: Downstream of the Bridge (10-Jan-2012)

Photo 8: Downstream of the Overflow Channel (10-Jan-2012)

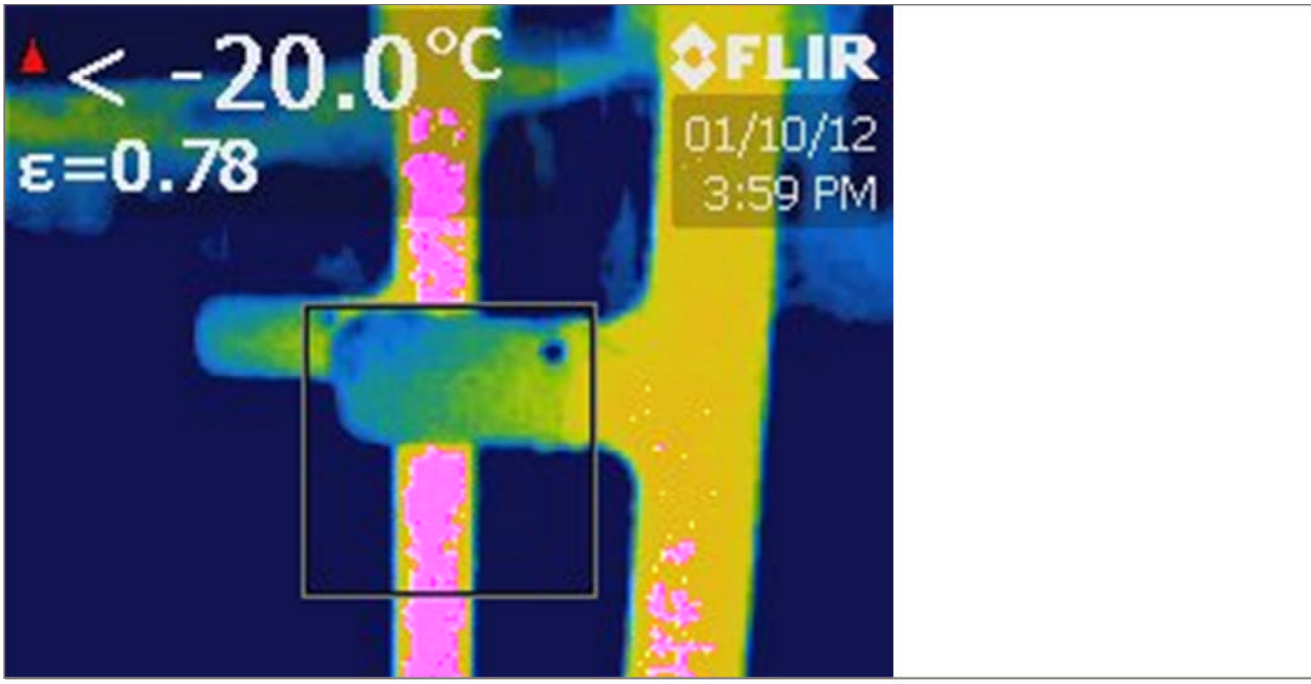

Photo 9: IR photo of North Abutment Thermosyphon radiators (10-Jan-2012)

Photo 10: Location of exploratory pits to looks for water seepage along slope between diversion ditch and seepage collection pond (10-Jan-2012)

Photo 11: No evidence of water seepage along the slope (10-Jan-2012)