

AS-BUILT REPORT FOR LAKE DEWATERING 2016 MELIADINE GOLD PROJECT, NUNAVUT







PRESENTED TO
AGNICO EAGLE MINES LIMITED

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EXECUTIVE SUMMARY

Tetra Tech Industries Inc. (Tetra Tech) was retained by Agnico Eagle Mines Limited (Agnico Eagle) to prepare an as-built report (construction summary) for the 2016 lake dewatering program at the Meliadine Gold Project, Nunavut. Tetra Tech previously provided technical assistance for the design and procurement of temporary dewatering pipelines, pumping stations, and a mobile water treatment plant (MWTP) with a geotube technology for the 2016 lake dewatering program.

ASDR was selected to design and supply the MWTP, the HDPE pipelines, the pump skids and to achieve all installation, commissioning, start up, operation, testing, monitoring and decommissioning activities of all equipment for the 2016 lake dewatering program.

The overall schedules for the 2016 lake dewatering are as follows:

- Installation and commissioning: MWTP, H6 and H17 equipment from August 5th to August 21st 2016; A54 equipment from October 3rd to October 6th 2016.
- Phase 1: Overall dewatering of H17 to Meliadine Lake and then H6 to H17 from August 22th to October 3rd 2016 with TSS removal treatment from September 17th to October 3rd 2016.
- Phase 2: Dewatering of A54 to H17 and H13 to H17 from October 4th to October 12th 2016.
- Decommissioning: MWTP and H17 equipment from October 4th to October 19th; A54 and H13 equipment from October 13th to October 28th.

All civil earthworks were completed before ASDR mobilization to the site. Civil earthwork is not part of this report.

All dewatering activities were done under ASDR supervision. The dewatering of H17 and the treatment of the effluent to Meliadine Lake was completed on October 3rd 2016. The remaining dewatering activities were completed on October 28th, 2016.

On-field quality control done by ASDR comprised visual observations during construction activities and hydrotesting of the pipelines. Sample laboratory testing was conducted mainly off site and consisted of toxicity tests on raw water. Effluent discharged to Meliadine Lake was sampled and tested in compliance with the Metal Mining Effluent Regulations (MMER). Exposure and reference area sampling were also conducted as prescribed by the MMER. On site treatability tests were conducted at commissioning of the MWTP in order to set the MWTP chemicals and rate of treatment before water could be released to the Meliadine Lake. All water monitoring data during operations were recorded by ASDR and submitted to Agnico Eagle.

The total suspended solids (TSS) levels at the MWTP inflow (from H17) as well as at the effluent to Meliadine Lake, were measured on site on an hourly basis. The operation criteria (or "key performance indicator" – KPI) was set at a maximum concentration of 10 mg/L of total suspended solids (TSS) at the effluent to Meliadine Lake. The TSS in the effluent was monitored continuously and if concentrations would not meet the KPI, the effluent was closed and the water from H17 was pumped in a closed circuit through the MWTP until the quality criteria were met. The treatment process was thus optimized until it generated compliant results. At no time during the dewatering operations of H17, the TSS content of the discharged water exceeded the MMER requirements.

This report summarizes the as-built information for MWTP, the pipelines and the associated pumping skids for the dewatering and treatment of H6 and H17 water (Phase 1) and dewatering of A54 and H13 (Phase 2).



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1.0 INTRODUCTION

Tetra Tech Industries Inc. (Tetra Tech) was retained by Agnico Eagle Mines Limited (Agnico Eagle) to prepare a construction summary (as-built) report for the 2016 lake dewatering program at the Meliadine Gold Project, Nunavut. Tetra Tech previously provided technical assistance for the design and procurement of temporary dewatering pipelines, pumping stations, and a mobile water treatment plant (MWTP) with a geotube technology for the 2016 lake dewatering program.

ASDR was designated to supply the MWTP, the HDPE pipelines, the pump skids and to achieve all installation, commissioning, start up, operation, testing, monitoring and decommissioning activities of all equipment during the project.

This report summarizes the as-built information for MWTP, the pipelines and the associated pumping skids for the project. Civil earthwork is not a part of this report. All dewatering activities were done under ASDR supervision only. Tetra Tech did not witness ASDR work on site.

2.0 OVERALL PROJECT SCHEDULE

The overall schedules for the 2016 lake dewatering project are as follows:

- Installation and commissioning: MWTP, H6 and H17 equipment from August 5th to August 21st 2016; A54 equipment from October 3rd to October 6th 2016.
- Phase 1: Overall dewatering of H17 to Meliadine Lake and then H6 to H17 from August 22th to October 3rd 2016 with TSS removal treatment from September 17th to October 3rd 2016.
- Phase 2: Dewatering of A54 to H17 and H13 to H17 (out of initial scope work) from October 4th to October 12th 2016.
- Decommissioning: MWTP and H17 equipment from October 4th to October 19th; A54 and H13 equipment from October 13th to October 28th.

All civil earthworks were completed before ASDR mobilization to the site. The dewatering of H17 and the treatment of the effluent to Meliadine Lake was completed on October 3rd 2016. The remaining dewatering activities was completed on October 28th 2016.

The as-built drawings for the 2016 lake dewatering project are presented in Appendix A of this report.

3.0 INSTALLATION AND COMMISSIONNING

All HDPE pipelines were delivered in 50 ft long spools welded together on site in 300 ft long pipe spools with flanges at both ends.

All pipeline routing, MWTP and pump skid locations were approved by Agnico Eagle before installation. The temporary pads and access roads for the lake dewatering project were constructed before the installation of the temporary dewatering pipelines, pump skids, and MWTP.

ASDR led the installation, commissioning, start up and operation of the MWTP pad located at southeast of the Industrial Pad, next to the northwest shore of Pond H17.

The installation work was held from August 5th to 21st (approximately 15 days). During this period, the MWTP units were positioned and installed; the Geotube pad (built by Agnico Eagle) was lined with waterproof liner to receive



the Geotubes; and the associated HDPE piping and pumping equipment was installed on site at specific locations (Ponds H6, H17, A54, Meliadine Lake and MWTP). Piping hydro-tests were executed by following the ASTM F 2164-13 specification. See Appendix B for the hydro-test results.

During the same period, two (2) diesel pump skids were installed. One located not less than 31 m from the H17 shore, near the future CP1 jetty location and the other one northwest of H6, at a distance of no less than 31m of both its shore and the shore of H7.

Pump datasheet is attached in Appendix C of this report.

On August 22nd, the dewatering operations from Pond H17 to Meliadine Lake began and were monitored 24 hours per day by the ASDR team. The commissioning phase lasted 24 hours, as no treatment of the water pumped from H17 to Meliadine Lake was required until September 16th 2016 (effluent was compliant with the Metal Mining Effluent Regulations (MMER)). Treatment operations began September 17th as raw water quality was nearing the maximum operation criteria for Total Suspended Solids (TSS).

4.0 DEWATERING - PHASE 1

Phase 1 of the dewatering program was intended to dewater Pond H6 to Pond H17 to Meliadine Lake to facilitate the construction of D-CP1 (late 2016) and CP1 jetty (winter 2017), as well as to ensure sufficient storage capacity of water collected during freshet and summer 2018. Part of Phase 1 was also the treatment of H17 raw water through the chemical treatment plant prior to discharge to Meliadine Lake.

4.1 Chemical Treatment Plant

As described in the Design Report for the chemical treatment for lake dewatering to environment (ASDR & Tetratech, August 2016) submitted as part of the 30-day Notice to Nunavut Water Board (NWB), it was initially planned that the top 0.5 to 1.0 m of freshwater in Pond H17 would be pumped to the physical filtration device (geotubes) to then be discharged into Meliadine Lake without requiring chemical treatment. The top water in H17 was of good quality and, as expected, requiring treatment for TSS only after removal of approximately 0,89m of top water. As initially planned, the main parameter that required chemical treatment is Total Suspended Solids (TSS). Therefore, the proposed chemical treatment philosophy was designed and constructed to remove TSS through a coagulating / flocculation method.

The processing sequence for TSS treatment was the following: coagulation (ferric sulfate/Fe₂(SO₄)₃ 12%), balancing pH (caustic soda/NaOH 50%), flocculation (cationic polymer 0.4%), geotubes (suspended solids captation).

4.2 Effluent quality

The quality of the effluent discharged to Meliadine Lake complied with MMER criteria throughout the dewatering process of H17. Water was monitored continuously and if TSS concentration would not meet operation target (lower than MMER criteria), the water was redirected automatically back to H17 and all equipment re-calibrated. The treatment process was thus optimized until results were compliant. Daily and weekly water quality results are shown in Appendix D.

Due to several rainfall events in September 2016, the total volume of water discharged from H17 to Meliadine Lake was larger than initially expected: a total volume of 179,413 m³ was dewatered from H17 to Meliadine Lake compared to a range of 162,000 m³ (mean precipitation year) to 201,000 m³ (wet precipitation year).



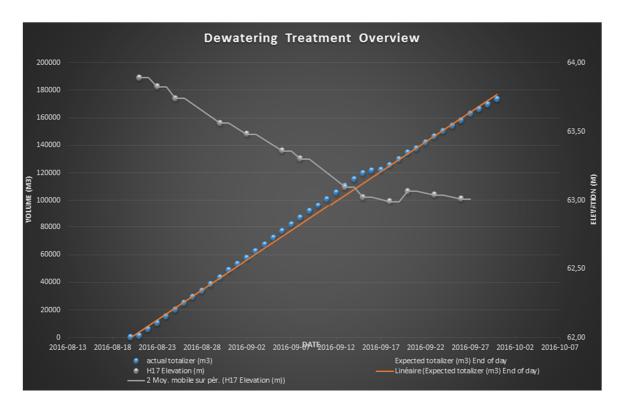


Figure 1. Illustration of the dewatering process of Pond H17 to Meliadine Lake.

To facilitate construction of Dyke D-CP1, located south of Pond H17, all water of H6 had to be transferred to H17. A volume of 22,360 m³ of water had been pumped from H6 to drain the lake for the D-CP1 construction (a range of 30,000 m³ (mean precipitation year) to 69,000 m³ (wet precipitation year) was planned).

At the end of Phase 1, the MWTP was decommissioned and prepared for shipping off-site as no further water needed to be discharged to Meliadine Lake. The pump skid used for dewatering Pond H17 was moved to Pond A54 while the pump skid at pond H6 and its HDPE pipeline remained at their original locations.

5.0 DEWATERING - PHASE 2

Once the H17 dewatering was completed, the Phase 2 of the project intended to transfer water from Pond A54 to Pond H17 in order to reduce the water level in A54 for construction of D-CP5 (late 2016) and the CP5 jetty (winter 2017). Additionally, to comply with the License A, Pond H13 was also dewatered to H17 during this phase of the dewatering program.

The pump skid from H17 was relocated on the northeast shore of Pond A54, not less than 31 m from its shore. The original HDPE pipeline running from H17 to the MWTP and Meliadine Lake was dismantled and relocated to allow the dewatering of Pond A54 towards H17. As the water in A54 was considered as contact water, none was discharged to Meliadine Lake, thus no treatment was required. Dewatering of A54 ended on October 12th when cold weather conditions caused the pipeline to freeze. A total volume of 27,600 m³ was transferred from A54 to H17 (a range of 37,000 m³ (mean precipitation year) to 43,000 m³ (wet precipitation year) was initially planned).

The pump skid at Pond H13 was first located on the northwest shore of H13 and was later moved on the west side near H12. A volume of 42,000 m³ of water was pumped from H13 to H17 between October 4th and October 12th.



As Phase 2 of the dewatering program started, construction of D-CP1 begun. Any seepage of water into the dike key trench during the construction of the dyke was pumped to H6 and then transferred to H17 on an as-needed basis.

6.0 DECOMMISSIONNING

Decommissioning activities of the MWTP started on October 3rd and decommissioning of the whole dewatering program equipment was completed on October 28th.

After treatment operation completion on Oct. 3rd 2016, dewatering of Ponds H6, A54 and H13 towards H17 were executed and were pursued until October 12th 2016 when the freezing conditions no longer permitted these pumping activities.

At the end of October, the pump skids were decommissioned and the HDPE pipelines were winterized. Equipment purchased by Agnico Eagle was left on site.

In regards to MWTP and other equipment supplied by ASDR, the lot was decommissioned, packed into seacans and sent back on the last barge on October 19th 2016. Of the lot AEM chose certain equipment for purchase and to keep at site.

7.0 CONSTRUCTION QUALITY CONTROL

After installation of all equipment, a quality control was performed by the ASDR crew to confirm the system integrity. A visual inspection was done on the MTWP process system to confirm no equipment was missing or not properly installed, a hydro test and visual inspection were done on both the MWTP process piping and the HDPE pipelines to confirm the system to be leak-free.

7.1 Deficiencies During Construction

No deficiencies were found during construction and commissioning.

8.0 LIMITATIONS

This report and its contents are intended for the sole use of Agnico Eagle Mines Limited (Agnico Eagle) and their agents. Tetra Tech Industries did not witness ASDR work on site and does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech Industries' Services Agreement. Tetra Tech Industries' General Conditions are provided in Appendix F of this report.



9.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,

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