

INTERIM REPORT

CONSTRUCTION SUMMARY (AS-BUILT) REPORT FOR RANKIN INLET ITIVIA SITE FUEL STORAGE AND CONTAINMENT FACILITIES – COMMISSIONING AND OPERATION OF TANK #2 MELIADINE PROJECT, NUNAVUT



PRESENTED TO
Agnico Eagle Mines Ltd.

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EXECUTIVE SUMMARY

Tetra Tech was retained by Agnico Eagle Mines Limited (Agnico Eagle) to prepare a construction summary (as-built) report for the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities at the Meliadine Gold Project, Nunavut. Tetra Tech and WSP Canada Inc. previously prepared the construction drawings and specifications as well as the design report for the Fuel Storage and Containment Facilities for the Project (AEM No 6515-E-132-004-132-REP-003). The facilities includes two (2) main fuel storage tanks located at Rankin Inlet Itivia site and four (4) fuel storage tanks located at the Meliadine site.

This interim as-built report summarizes the work executed at Rankin Inlet Itivia Site Fuel Storage and Containment Facilities where the field erected fuel storage Tank #2 (13.5 ML) was completed and commissioned and Tank #1 (20 ML) was started. Completion and commissioning will be done in 2018 as initially planned in the design report.

Tetra Tech was not involved in the construction of the Fuel Farm Facilities. The information presented in this report was provided by Agnico Eagle.

The construction monitoring and quality assurance was managed by Agnico Eagle.

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1.0 INTRODUCTION

Agnico Eagle Mines Ltd. (Agnico Eagle) retained the services of Tetra Tech and WSP Canada Inc. to carry out the planning and design works associated with the surface infrastructures for the project, which includes the fuel storage and containment facilities at the Rankin Inlet Itivia site and Meliadine site. These components are part of the Meliadine Project, a gold mine located approximately 25 km north from Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut.

Tetra Tech and WSP Canada Inc. previously prepared the design report and drawings for construction related to the Fuel Storage and Containment Facilities for the Project.

Tetra Tech was retained by Agnico Eagle to prepare a construction summary (as-built) report for the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities as well as the Rankin Itivia Culvert.

The Rankin Inlet Itivia site is located in Rankin Inlet, on the shore of Melvin Bay (part of Hudson Bay), and around a UTM (NAD83, Zone 15) coordinate of 546,070E and 6,963,760N.

As required by the Water Licence A (No. 2AM-MEL1631), this report summarizes the construction work of the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities. However, this is an interim report that summarizes the construction work of the secondary containment for the fuel farm, pumping station and ancillaries, and field erection and commissioning of Tank #2 at the Rankin Inlet Itivia site. The completion of the field erection work and commissioning for Tank #1 will be finalized in 2018. Included in this report is:

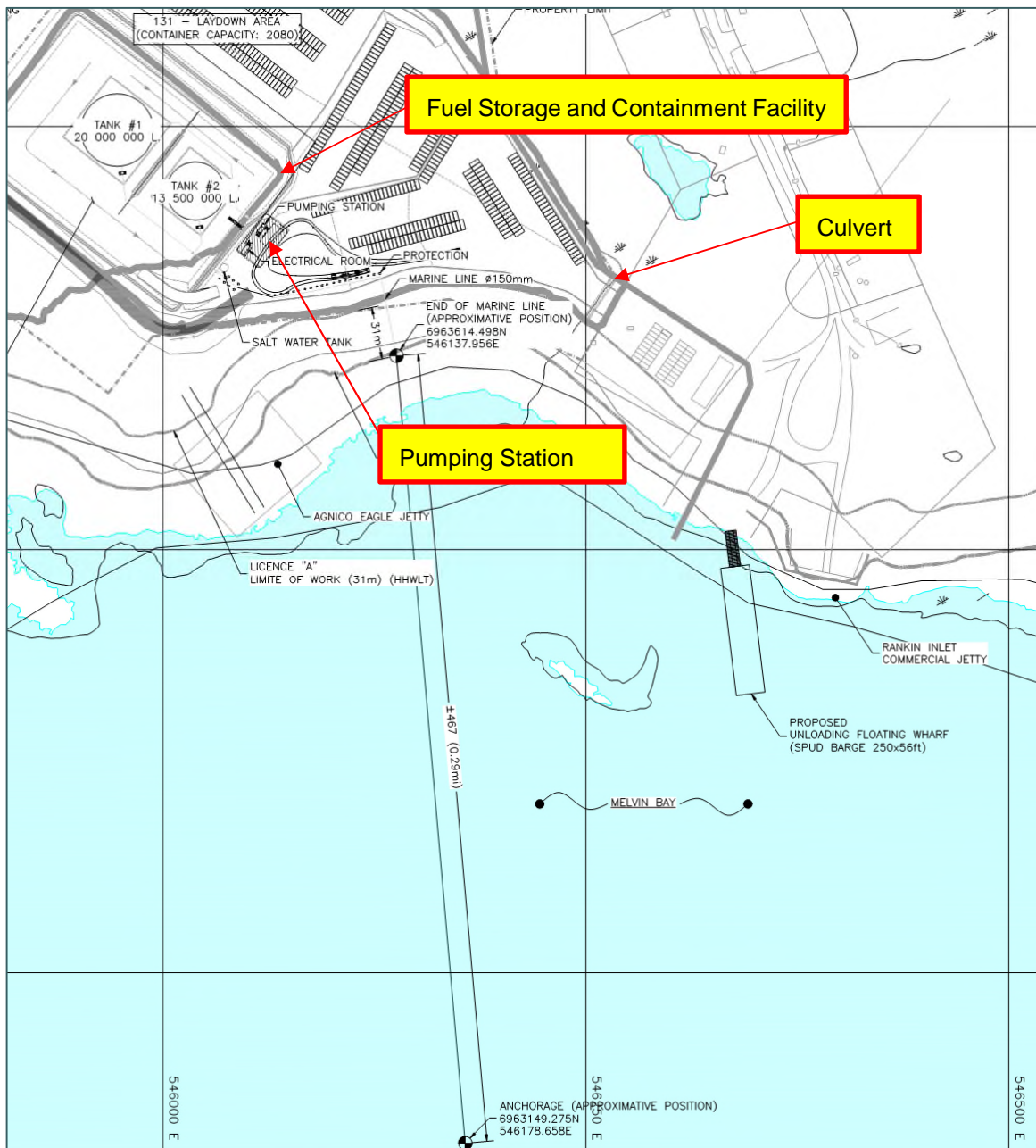
- A summary of the characteristics of the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities;
- Documentation on field decisions that deviate from original plans and non-conformance / corrective action reports;
- As-built drawings;
- Survey drawings conducted during and after the construction of the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities and Rankin Inlet Itivia Culvert;
- Photographs of the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities and Rankin Itivia Culvert;
- Inspection Reports for the Inspection Test Plan (ITP), and Handover Package of Tank #2;
- Inspection Reports and Quality Control Documents for the Offsite and Onsite Fabrication and the Fuel Modules;
- Inspection Reports for the Tank Farm Area Final Wall, Blasting Operations, Quality Control for Geomembrane Installation;
- Particle Size Summary of 30 mm minus and 20 mm minus material;

2.0 SUMMARY OF THE CONSTRUCTION

2.1 Site Location Plan

The figure below presents the site location plan for the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities, pumping station, and Rankin Inlet Itivia Culvert. Tank #2 (13.5 ML) was erected, commissioned, and is now operating while Tank #1 (20 ML) will be completed in 2018. The Rankin Itivia Culvert was installed at the southwestern portion of the laydown area where the laydown connects with the existing road.

Figure 2.1: Rankin Inlet Itivia Site Location Plan



2.2 Construction Schedule

Construction activities at the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities were conducted between March and October 2017. As shown in Picture 1 (below) taken during the construction period, both tanks were being erected but only Tank #2 was completed for service as planned. Picture 2 (below) shows the containers for the pumping and electrical stations. Construction was completed according to the milestone dates shown in Table 2.1.

Picture 1: Construction of Rankin Inlet Itivia Site Fuel Storage and Containment Facilities
(Tank #1 is in the foreground and Tank #2 is in the background)



Picture 2: Pumping and Electrical Station Containers



Table 2.1: Rankin Inlet Itivia Site Construction Milestone Dates

Item	Date
Site Preparation	April 25 th to May 2 nd
Drill/Blast	April 27 th to June 6 th
Excavation	May 1 st to June 25 th
Rock Face Scaling	June 19 th to 22 nd
Overburden Pushback and Protection Berm	July 15 th to August 1 st
Under Liner Material Placement	June 10 th to September 26 th
Containment Berm	June 24 th to September 26 th
Liner System Installation	July 14 th to October 6 th
Tank Erection	July 29 th to September 8 th
Overliner Material Placement	July 16 th to October 9 th
Marine Pipeline Installation	August 17 th to October 14 th
Miscellaneous Steel Elements to Pumping Station	September 2 nd to October 14 th
Rankin Inlet Facility Testing	September 2 nd to October 14 th
Commissioning of Tank #2	October 17 th
Piping Interrelated to Pumping Station	September 16 th to October 21 st
Electrical Construction	September 16 th to October 21 st
System Operational for Tank #2	October 21 st

2.3 As-built Drawings and Photographs

As-built drawings are presented in Appendix A.

Survey drawings conducted during and after the construction of the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities and Rankin Itivia Culvert can be found in Appendixes B and C, respectively.

Photographs of the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities and Rankin Inlet Itivia Culvert during construction are shown in Appendixes D and E, respectively.

3.0 CODES AND STANDARDS

3.1 Compliance for Field Erected Fuel Tanks

The system for Tank #2 complies with codes and standards related to the project (Federal, Territorial, Municipal, NBCC, NFCC, CEC, CSA, NFPA, and API) as well as the directives of the authorities having jurisdiction over the project, including specific codes such as R-125-95 NWT, Mine Health and Safety Act, and RRMWT 1990, C F-12 Fire Prevention Regulations. See Table 3.1 below.

Table 3.1: Rankin Inlet Itivia Site Field Erected Fuel Tanks As-built

Fuel Farm Description	Rankin Inlet Itivia Site Field Erected Fuel Tanks	
	Tank #1	Tank #2
Comply with CCME	-	Yes
Equipped with Overfill Protection	-	Yes
Underground Piping Double Wall	-	No*
Underground Piping Installed to Collect Leak into an Accessible Sump	-	Yes
Connections for Filling/Emptying Storage Tanks Kept Close	-	Yes
Material	G40.21M-260WT	G40.21M-260WT
Product	Diesel	Diesel
Volume	20 ML	13.5 ML
Diameter	43.00 m	35.10 m
Height	14 m	14 m

* A portion of the marine pipeline (single wall) intended to be aboveground was temporarily buried and the covering material had frozen. An appropriate remedial measure will be taken to remove the covering material as soon as the material is thawed in spring 2018 and there will be no risk to damage the pipe while excavating.

3.2 Compliance for Secondary Containment

The secondary containment for aboveground storage tanks complies to NFCC standards. The base and walls of the containment basin were constructed to withstand a full hydrostatic head and has a permeability of 1×10^{-13} cm/s while the required permeability is 1×10^{-6} cm/s. The tanks are located entirely within the diked area, with an impermeable membrane covered with a non-combustible material.

Table 3.2: Rankin Inlet Itivia Site Secondary Containment As-built

Parameters	Description		Compliance
Enclosed Tanks	Tank #1	Tank #2	-
Volume	20 ML	13.5 ML	-
Containment Requirement (for Tank #2 only)	14.850 ML		Yes
Containment Requirement (for both tanks)	22.000 ML		No*
Actual Containment Capacity	21.868 ML		-
Base and Wall Membrane to Withstand Hydrostatic Head	HDPE		Yes
Permeability (1E^{-6} cm/s min.)	1E^{-13} cm/s		Yes
Tanks Located Entirely Within the Diked Area	-		Yes

* See explanation in the paragraph below

As shown in Table 3.2 (above), the current total capacity of the Rankin Inlet Itivia Site Fuel Farm containment is 21 868 m³ which is sufficient to operate Tank #2 (a minimum containment capacity of 14 850 m³ is required for Tank #2). However, the dike containment volume required for both tanks to be in service (Tank #1 and Tank #2) is 22 000 m³ which indicates that an additional 132 m³ is required to meet the minimum capacity requirements. The changes in the geometry (as shown in section 5.1) compounded into a current volume capacity of 21 868 m³ calculated from the floor base to the crests of perimeter dike, which is 1 821 m³ lower than the designed capacity of 23 700 m³. A remodeling of the fill over the liner on the fuel farm floor to reach the volumetric capacity of 22 000 m³ is required prior to the completion and commissioning of Tank #1, planned mid-year 2018.

4.0 FIELD DECISIONS FOR THE FIELD ERECTED FUEL TANK #2 AND SURROUNDING FACILITIES (STRUCTURAL, MECHANICAL, AND ELECTRICAL)

4.1 Documentation on Field Decisions that Deviate from Original Plans

This section documents variations from original design which were approved by the designer and/or the field engineer on site for the field erected fuel tank and piping systems. The designed intent of the structure was not compromised with the changes to the original design.

A construction summary was prepared for the structural, and the mechanical and electrical systems see Appendix F and G, respectively.

The construction work led to slight variations from the original design in the structural, mechanical, and electrical aspects of Tank #2 of the Rankin Fuel Farm.

4.1.1 Structural

- The handrails were changed to steel angle of 55 mm x 55 mm x 6 mm instead of a pipe handrail, approved by the designer.
- As per the designer, all manholes will be painted with Thermarust paint to prevent rust damage. Painting for both tanks will be done in summer 2018.

4.1.2 Mechanical

- The inspection test for leaks in Tank #2 changed to a liquid penetrating test, as approved by the designer. Additional equipment including a 12" pressure vacuum, shell brackets, and vents were installed.
- Vent valves were installed at the top of the dike section in the pipeline for Tank #2.
- The outer housing material was substituted for NEMA 4x Aluminum or Stainless Steel rather than the specified 3R to prevent any rust damage. This change was approved by the designer.
- An OPW loading arm replaced the Emco loading arm and was approved by the designer due to the time constraints of the delivery.
- Two odor control scrubbers with a vent were installed, approved by the designer.
- Tripods were replaced by cement blocks underneath the pump and electrical stations, approved by the designer.
- Structural framing was added to the pumping station to reinforce the structure beneath the motor and pump. This addition was approved by the designer.
- The diesel marine line double walled section does not conform as per Federal regulations. Monitoring gauge and ball valves must be accessible and the double wall pipe section must be visible on both ends. All corrective actions will be done in summer 2018.
- The flexible connection scrubber ducting does not respect the piping and instrumentation diagram. At the entrance of the scrubber, only one (1) flexible ducting should be installed while at the ground level of the drop tank point, flexible ducting is missing. All corrective action will be corrected in summer 2018.

4.1.3 Electrical

- The installation of Rankin Inlet's main electrical entry and the buried cable and electrical pole were added and approved by the designer.
- Cabletray and its supports were required to be installed on instrumentation and lighting cables, approved by the engineer.
- One switch per VSD was installed per pump. The 600 V power junction boxes were removed, approved by the designer and control cables were installed between cabinets and the VSD.

- Four (4) additional unit heaters were added and four (4) $\frac{3}{4}$ hp engines to the filter containers. A 45 kVA transformer and a 120/208 V panel with 42 circuits replaced the 30 kVA transformer and the 120/208 V panel with 30 circuits, approved by the designer.
- Additional exterior lighting and fixtures were installed upon approval by the field engineer. One emergency lighting fixture and one 120 V receptacle in each operator room.
- A 4-20 mA was added to the PLC Motorized valves instead of an RTD card, approved by the designer.
- A temperature sensor was installed on Tank #2, approved by the designer.
- Grounding and bonding connections were added to the buried grid for all metallic equipment, as approved by the designer.

4.2 Maintenance, Inspection, Construction Monitoring, and Inspection Reports

The construction monitoring was managed by Agnico Eagle. Several activities were conducted during construction to ensure the quality of the work. Here is a description of the reports prepared to summarize the quality control, monitoring, and/or inspections performed during the construction of key activities.

- Inspection Test Plan dated October 29th, 2017 prepared by MTKSL, see Appendix H.
- Handover Package of Tank #2 dated October 30th, 2017 prepared by Inukshuk Construction Limited, see Appendix I. Testing was done throughout the erection of Tank #2 and the installation of the mechanical and electrical systems. See Table 4.1 for a summary of the inspections.
- Rankin Inlet Offsite and Onsite Fabrication Quality Control Documents dated June 6th, 2017 prepared by Nuqsana Promec Mining, see Appendix J. Quality control was done throughout the construction and fabrication the project, including but not limited to, the catwalk, piping, and mechanical fixtures.
- Fuel Module Quality Control Documents dated November 27th, 2017 prepared by Nuqsana Promec Mining, see Appendix K. Documentation for inspection and test plan for mechanical, piping, and also red line are included in this document.

During the first filling process of Tank #2, two (2) minor fuel leaks were observed. The first leak occurred on October 17th, fuel seeped out from the pressure test port on the fueling nozzle neck reinforcement plate. The second leak occurred on October 18th, with minor weeping between the manhole welding joint and the tank reinforcement plate. Both of these leaks were promptly reported to the installation contractor who repaired the leaks with temporary welding from the tank exterior. Regular visual inspections were made thereafter to ensure no further leaks occurred.

Two (2) Non-Compliance Reports were then completed to cover these defects, see Appendix L. At the time of writing this interim report the permanent corrective measures had not yet been finalized by the contractor. The permanent repairs will take place in the Spring of 2018 at which time Tank #2 will have to be emptied such that permanent repairs can take place from within the interior of the tank.

Table 4.1: Tank #2 As-built Inspections

Description	Test Method	Result
Floor Welding	Visual	Acceptable
Floor Welding	Vacuum Box	Acceptable
Shell to Floor Welding	Visual	Acceptable
Shell to Bottom Welding	Visual	Acceptable
Tank #2 Roundness	Visual	Acceptable
1 st Horizontal Banding	Measure	Acceptable
2 nd Horizontal Banding	Measure	Acceptable
3 rd Horizontal Banding	Measure	Acceptable
4 th Horizontal Banding	Measure	Acceptable
SR1 Vertical	Measure	Acceptable
SR2 Vertical	Measure	Acceptable
SR3 Vertical	Measure	Acceptable
SR4 Vertical	Measure	Acceptable
SR5 Vertical	Measure	Acceptable
Tank Shell Plumbness	Measure	Acceptable
1 st Horizontal and Vertical Leaks	Visual	Acceptable
2 nd Horizontal and Vertical Leaks	Visual	Acceptable
3 rd Horizontal and Vertical Leaks	Visual	Acceptable
4 th Horizontal and 4 th and 5 th Vertical Leaks	Visual	Acceptable
Compression Ring Welding	Visual	Acceptable
Tank #2 Roof Welding	Visual	Acceptable
Roof Columns Plumbness	Measure	Acceptable
Roof Structure Welding and Bolting	Visual	Acceptable
Tank Shell Plumbness	Measure	Acceptable
Shell Nozzle Welding	Visual	Acceptable
Nozzle Repad Leaks	Air Test	Acceptable
Shell Manway Welding	Visual	Acceptable
Tank #2 Shell Plumbness	Measure	Acceptable
Manway Leaks	Visual	Acceptable
Internal Column Repads and Pipe Support Welding	Visual	Acceptable
External Brackets and Cable Tray Welding	Visual	Acceptable
Roof Painter Post Welding	Visual	Acceptable
Staircase Support Bracket and Repad Welding	Visual	Acceptable
Stairs and Platforms Welding	Visual	Acceptable

5.0 FIELD DECISIONS FOR THE SECONDARY CONTAINMENT FACILITY

5.1 Documentation on Field Decisions that Deviate from Original Plans

This section documents variations from original design which were approved by the designer and/or the field engineer on site for the field erected fuel tank and piping systems. The designed intent of the structure was not compromised with the changes to the original design.

A construction summary was prepared for the Rankin Inlet Itivia Site Fuel Storage and Containment Facilities see Appendix M.

The construction work led to slight variations from the original design in the geometry of the Rankin Fuel Farm. The Rankin Inlet Itivia Site Fuel Storage Containment Facilities and Rankin Inlet Itivia Culvert geometry and characteristics were adjusted to site conditions. Table 5.1 presents the changes between the proposed and final works.

- The rock slope excavation is 1V:0.1H instead of the original 1V:0.75H. It was approved by the geotechnical engineer.

5.1.1 Tank Foundation As-built

- A slope of 1V:120H was required under the tanks, sloping from the center of the tank to the edge of the tank foundation pad.
- The average side slope of dike and pad foundation slope remained the same at 1V:2H.
- The dimensions of the Tank #1 and Tank #2 pad foundations remained the same at 45.4 m x 45.4 m and 37.5 m x 37.5 m, respectively.

5.1.2 Dike and Secondary Containment

- Within the northeast corner and extending along the east wall the bedrock elevation was found to be below 9.45 m or non-existent at the designed floor elevation. The blast was drilled to bedrock or the designed floor in this area, 4 m back from the designed highwall to allow additional berm structure to be constructed.
- The dimensions of the dike CL to CL are greater by 1.6 m length and 2.6 m width.
- The average top width of the dike crest is 1.4 m which is an increase of 0.4 m from the original 1 m design.
- The containment height was reduced by 0.08 m to a height of 1.57 m.
- The depth of fill placed over the liner was increased by 0.08 m to a depth of 0.38 m.
- The average height of the dike crest remained at 1.8 m.
- A detail for the sump area was provided by the designer.
- The rip-rap was removed from the ditch, approved by the designer. The geometry of the ditch was changed due to constructability issues and approved by the field engineer. The overall water management of the containment facility was unaffected, sloping toward the sump area where the clean water will be pumped out of the fuel farm.

Several particle size analyses were conducted for the 30 mm minus material to be used for the tank foundation and liner system. It was approved by the field engineer and the results and summary can be found in Appendix N.

Table 5.1: Rankin Inlet Itivia Site Fuel Storage and Containment Facilities Geometry and Characteristics

Item	Proposed		Actual		Difference
	Tank #1	Tank #2	Tank #1	Tank #2	
Secondary Containment Permeability (max.)	1E^{-6} cm/s		1E^{-13} cm/s		$- 10\text{E}^{-7}$ cm/s
Dike: length, width (CL to CL) (avg.)	154 m x 104.3 m		155.6 m x 106.9 m		+ 1.6 m / + 2.6 m
Dike Height (avg.)	1.8 m		1.8 m		-
Containment Height (avg.)	1.65 m		1.57 m		- 0.08 m
Dike Flat Top Width (avg.)	1.0 m		1.4 m		+ 0.4 m
Dike Embankment Slope (avg.)	1V:2H		1V:2H		-
Impervious Area	16 050 m ²		17 051 m ²		+ 1 001 m ²
Tank Foundation Pad (avg.)	45.4 m x 45.4 m	37.5 m x 37.5 m	45.4 m x 45.4 m	37.5 m x 37.5 m	-
Tank Foundation Thickness (min.)	900 mm	900 mm	950 mm	1.02 m	+ 50 mm / + 102 mm
Tank Foundation Shoulder (min.)	1.2 m	1.2 m	1.2 m	1.2 m	-
Tank Foundation Pad Embankment Slope (avg.)	1V:2H	1V:2H	1V:2H	1V:2H	-
Tank Foundation Pad Slope (avg.)	1V:120H	1V:120H	1V:120H	1V:120H	-
Tank Foundation Pad Thickness, Above Surrounding Ground (m)	0.4	0.4	0.4	0.4	-
Depth of Liner Under Fill (avg.)	0.3 m		0.38 m		+ 0.08 m
Containment Capacity (for Tank #2 only)	14 850 m ³		21 686 m ³		+ 6 836 m ³
Containment Capacity (both tanks)	22 000 m ³		21 868 m ³		- 132 m ³

5.1.3 Distance Restrictions As-built

The minimum clearances that were required or recommended were met and are listed on Table 5.2 below:

Table 5.2: Distances Restrictions

Item	Minimum Required	Tank #1	Tank #2
Distance Between Tanks	$\frac{1}{4} (D1 + D2) = 19.5 \text{ m}$ D1=43 m, D2=35.1 m	19.56 m	
Distance Between Tank and Toe of the Dike	1.50 m	15.42 m	12.43 m
Distance Between Tank and CL of the Dike	$\frac{1}{2} (\text{Height of Tank}) = 7.0 \text{ m}$ Height = 14 m	27.91 m	19.33 m
Distance Between Property Limit (that can be built upon) and Tank	Tanks with 3 000 001 gallons or more: 175 ft. = 53.34 m	54.20 m	64.26 m
Distance Between Property Limit and Exterior Toe of the Dike	3.0 m	4.27 m	
Distance Between Tank and Public Roads	60 ft. = 18.3 m	115 m	166.30 m
Distance Between Fuel Farm and High Water Line of Melvin Bay	31.0 m	37.76 m	

5.2 Commissioning, Inspection, Construction Monitoring, and Inspection Reports

The construction monitoring was managed by Agnico Eagle. Several activities were conducted during construction to ensure the quality of the work. Here is a description of the reports prepared to summarize the quality control, monitoring, and/or inspections performed during the construction of key activities.

- Visit Reports for Final Wall Inspection dated June 21st and 29th, 2017 prepared by Vanessa Smith, see Appendix O. A visual inspection was conducted and a fault was discovered in the rock which may reduce the long term stability of the wall, but overall the condition of the rock was good.
- Blasting Operation, Survey and Monitoring dated October 6th, 2017 prepared by Explotech Engineering Ltd, see Appendix P. A pre-blast and post-blast inspection were done including vibration monitoring during blasting. No notable changes were observed related to the blasting or construction operations in the surrounding buildings and facilities.
- Quality Control Final Report prepared by Texel Geosol for Nuna Kivalliq Earthworks Inc, see Appendix Q. Testing, both non-destructive and destructive, was performed to ensure the quality of the installation of the geosynthetic materials, including welding. Texel Geosol certified that all materials were installed according to the project plans and specifications.
- Inspection Test Plan dated October 29th, 2017 prepared by MTKSL, see Appendix H.

6.0 FIELD DECISIONS FOR THE RANKIN INLET ITIVIA CULVERT

6.1 Documentation on Field Decisions that Deviate from Original Plans

Particle size analyses were conducted for the 20 mm minus material to be used for the culvert bedding. It was approved by the field engineer and the results and summary can be found in Appendix R.

- The culvert dimensions were maintained at a diameter of 900 mm and length of 30 m.
- The culvert slope was decreased on site to a slope of 1.33% to follow the natural ground slope, and is still adequate to carry the water flow.
- The rip-rap around the Rankin Itivia Culvert will be installed at a later date.

Table 6.1: Rankin Itivia Culvert Geometry and Characteristics

Culvert Description	Proposed	Actual	Difference
Length	30 m	30 m	-
Diameter	900 mm	900 mm	-
Slope	3.61%	1.33%	- 2.28%
Number of pipes	2	2	-

Temporary culverts were replaced by final culverts in November 2017 as indicated in the Construction Summary of Rankin Itivia Culvert, see Appendix S.

7.0 EARTH WORKS

A shortage of granular material led to slight changes in the materials:

- The original material specified for the Rankin Inlet Itivia Site Fuel Storage Containment Facility was 200 mm minus granular material and was replaced with Class A Borrow Pit or 600 mm minus granular fill graded to a particle size of ≤ 200 mm.
- The fill thickness of the 30 mm minus granular fill over and under the liner system was changed to 300 mm and 200 mm respectively, approved by the designer. This change was to allow the heavy equipment required for construction to access the site. This change did not affect the total material quantities.
- A 100 mm layer of sand between the geotextile and geomembrane replaced the 30 mm minus in the Tank #1 containment area, minus the tank pedestal. This was due to construction constraints and to avoid potentially damaging the liner system during tank erection. The substitution was approved by the designer.

The as-built material quantities for the Rankin Inlet Fuel Storage Containment Facilities and the Rankin Inlet Itivia Culvert are presented in Table 7.1 below.

Table 7.1: As-built Material Quantities

Item	Proposed	Actual	Difference
Sand	180	1 744 m ³	+ 1 564 m ³
30 mm minus	10 590 m ³	7 073 m ³	- 3 517 m ³
50 mm minus	5 900 m ³	3 425 m ³	- 2 475 m ³
Borrow Pit CL-A or Granular Fill (Graded to < 200 mm)	7 670 m ³	4 510 m ³	- 3 160 m ³
Borrow Pit CL-A or Granular Fill (600 mm minus)	7 160 m ³	12 440 m ³	+ 5 280 m ³
Rip-rap (50 mm to 300 mm)	30 m ³	-	- 30 m ³
Total of fill	25 630 m³	25 767 m³	+ 137 m³
540 g/m ² Non-woven geotextile	33 600 m ²	34 102 m ²	+ 502 m ²
HDPE Geomembrane	16 800 m ²	17 051 m ²	+ 251 m ²
Length Culvert, 2 CSP Ø 900 mm, 2.0 mm thick	30 m	30 m	-
Excavation of Overburden	18 480 m ³	43 445 m ³	+ 24 965 m ³
Drill and Blast Excavation of Bedrock	68 400 m ³	78 500 m ³	+ 10 100 m ³

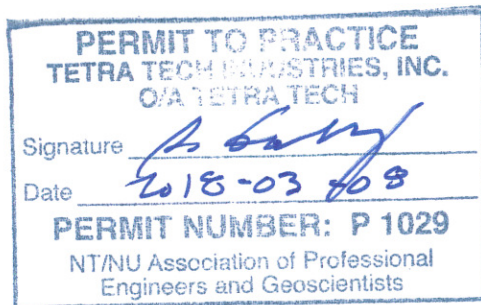
8.0 LIMITATIONS OF REPORT

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9.0 CLOSURE

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

Respectfully submitted,
Tetra Tech



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