Appendix 18

# Baker Lake Bulk Fuel Storage Facility: Environment Performance Monitoring Plan Version 5



### MEADOWBANK GOLD PROJECT

## Baker Lake Bulk Fuel Storage Facility: Environmental Performance Monitoring Plan

In Accordance with Water License 2AM-MEA1526

Prepared by: Agnico Eagle Mines Limited – Meadowbank Division

> Version 5 January 2020

### **EXECUTIVE SUMMARY**

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is currently operating the Meadowbank Gold Project approximately 70 km north of the Hamlet of Baker Lake. Agnico is also operating the Amaruq property, approximately 150 kilometers (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine, in the Kivalliq Region of Nunavut. The Whale Tail deposit is being mined and ore is hauled by truck to the approved infrastructure at Meadowbank Mine for milling. Agnico Eagle received approval on January 2019 to add two (2) 10 million liters diesel fuel storage tanks to the Marshalling Area Bulk Fuel Storage Facility in Baker Lake. Agnico has built and commissioned, in 2019, one of the two approved tank (Tank 7) and will add in Spring/Summer of 2020 the second approved tank (Tank 8). As part of the project, a total of eight (8) 10 million litres fuel storage tanks for diesel (including tank 8 to be constructed in 2020) and eighteen (18) 100,000L fuel storage tank for Jet-A will receive and store bulk shipments of fuel for the Meadowbank Project at the Baker Lake Marshalling Area.

To adequately assess the environmental performance of the bulk fuel storage tank at Meadowbank this report provides: a summary of the design, installation, operation and maintenance that follows the CCME (2003) Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum and Allied Petroleum Products; a summary of the location and environmental setting; a summary of the NWB Type A water license requirements; and an environmental assessment to support the recommended environmental monitoring for the ongoing evaluation of the secondary containment.

#### **IMPLEMENTATION SCHEDULE**

As required by Water License 2AM-MEA1526, Part B, Item 11, the proposed implementation schedule for this Plan is outlined below.

This Plan will be immediately implemented (January 2020) subject to any modifications proposed by the NWB as a result of the review and approval process.

### **DISTRIBUTION LIST**

- Agnico Eagle General Mine Manager
- Agnico Eagle Environment Superintendent
- Agnico Eagle Environment General Supervisor
- Agnico Eagle Environmental Coordinator
- Agnico Eagle Environmental Technician
- Agnico Eagle Energy and Infrastructures Superintendent

### **DOCUMENT CONTROL**

Version	Date (YMD)	Section	Page	Revision
1	09/12/22			Comprehensive plan for Baker Lake Bulk Fuel Storage Facility
2	11/12/13			Update all items related to the Baker Lake Fuel Storage Installations: Final Report of Phase 3 (2010)
3	30/06/2014			Add Jet-A Tank information and 2014 comprehensive review
4	2018/08/16			Text updated to reflect proposal to add 2 diesel fuel tanks.
5	2020/01/17	1		Add Tank 7 information
		2		Deleted as it's a duplicate of Section 4 and 5.1
		Figure 1-2		Update Figure to add Tank 7 information +
		3		Adjust condition Part H Item 4 as per the Water License
		4.1		Add Tank 7 information
		5.1		Update with current monitoring / inspection
		6		Update reference section

Prepared By: Environmental Department

Approved by:

Robin Allard Environment General Supervisor

### **Table of Contents**

SECTIO	N 1.	INTRODUCTION
SECTIO	N 2.	ENVIRONMENTAL SETTING
2.1	ТОР	20GRAPHY
2.2	GEC	0LOGY
2.3	FLO	RA AND FAUNA
2.4	SUB	SURFACE CONDITIONS
2.5	WAT	FER QUALITY
SECTION	٧3.	NWB TYPE A WATER LICENSE CONDITIONS 6
SECTION	N 4.	ENVIRONMENTAL PERFORMANCE ASSESSMEnT 8
4.1	DES	K-TOP REPORT REVIEW
4.2	SEC	ONDARY CONTAINMENT VISUAL INSPECTION9
4.3	ENV	IRONMENTAL ASSESSMENT
4.3.	1	Terrestrial Environment9
4.3.	2	Surface Water
4.3.	3	Groundwater 10
SECTION	N 5.	PERFORMANCE MONITORING PLAN11
5.1	VISU	JAL AND OPERATIONAL INSPECTIONS 11
5.2	ROL	JTINE CONTACT WATER MONITORING11
5.3	EVE	NT MONITORING 12
5.3.	1	Soil Sampling12
5.3.	2	Water Sampling
5.3.	3	Assessment of the Need for Groundwater Well Installation 12
SECTIO	N 6.	REFERENCES

### LIST OF FIGURES

Figure 1-1: General Location of Baker Lake Bulk Fuel Storage Facilities	2
Figure 1-2: Baker Lake Bulk Fuel Storage Facility Site Layout	3

### LIST OF APPENDICES

- Appendix A1: Baker Lake Fuel Storage Installations: Interim Report Following Construction of Phase 1 (2007) and Phase 2-A (2008)
- Appendix A2: Baker Lake Fuel Storage Installations: Final Report Following Construction of Phase 2- B (2009)
- Appendix A3: Baker Lake Fuel Storage Installations tank #5 and #6: Final Report following the construction of Phase 3 (2010)
- Appendix A4: Baker Lake Fuel Storage Installations: As-built Report (AEM 2013)
- Appendix A5: Construction Summary Report: Baker Lake Fuel Storage Tank 7 and Containment Facilities (2020)

### SECTION 1. INTRODUCTION

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is currently operating the Meadowbank Gold Project approximately 70 km north of the Hamlet of Baker Lake. Agnico is also operating the Amaruq property, approximately 150 kilometers (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine, in the Kivalliq Region of Nunavut. The Whale Tail deposit is being mined and ore is hauled by truck to the approved infrastructure at Meadowbank Mine for milling.

The Baker Lake Bulk Fuel Storage Tank Facility is located east of the hamlet of Baker Lake, on the north shore of Baker Lake. The GPS coordinates of these facilities is NAD 83 15W E 356874 N 7134486. A general site location is provided in Figure 1.1. A site layout of the infrastructure and tanks is provided in Figure 1.2.

In 2007-2008, four (4) 10 million diesel tank were constructed. Following the amendment No.1 - Marshalling Area Bulk Fuel Storage Facility Expansion Water Licence 2AM-MEA0815 Type A, two (2) more 10 million liters bulk fuel storage tank (#5 and #6) were constructed in 2010. This amendment also permitted the construction, in 2013, of Jet A Fuel tanks.

Following a modification to the Water License 2AM-MEA1526, Agnico Eagle received approval on January 2019, to add two (2) 10 million liters diesel fuel storage tanks to the Marshalling Area Bulk Fuel Storage Facility in Baker Lake. Agnico has built and commissioned, in 2019, one of the two approved tank (Tank 7) and will add in Spring/Summer of 2020 the second approved tank (Tank 8).

As part of the project, a total of eight (8) 10 million litres fuel storage tanks for diesel (including tank 8 to be constructed in 2020) and eighteen (18) 100,000L fuel storage tank for Jet-A will receive and store bulk shipments of fuel for the Meadowbank Project at the Baker Lake Marshalling Area.

To adequately assess the environmental performance of the bulk fuel storage tank at Meadowbank this report provides: a summary of the design, installation, operation and maintenance that follows the CCME (2003) Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum and Allied Petroleum Products; a summary of the location and environmental setting; a summary of the NWB Type A water license requirements; and an environmental assessment to support the recommended environmental monitoring for the ongoing evaluation of the secondary containment.

Baker Lake Bulk Fuel Storage Facility: Environmental Performance Monitoring Plan Version 5, January 2020

#### Figure 1-1: General Location of Baker Lake Bulk Fuel Storage Facilities



2

Baker Lake Bulk Fuel Storage Facility: Environmental Performance Monitoring Plan Version 5, January 2020



Figure 1-2: Baker Lake Bulk Fuel Storage Facility Site Layout

### SECTION 2. ENVIRONMENTAL SETTING

### 2.1 TOPOGRAPHY

The bulk fuel storage area is located east of the Hamlet of Baker Lake, approximately 350 m north of Baker Lake. The storage facility sits on a low terrace parallel with the shoreline of the lake. There is a gradual slope (5 to 10% grade) toward Baker Lake with an approximate elevation change of 35 m from the bulk fuel storage facility to the Baker Lake shoreline.

The Baker Lake shoreline is gently sloping, well-drained and is lined with marine gravels, sands and boulders.

### 2.2 GEOLOGY

The regional surficial geology is characterized by sandy till, bedrock outcrops, felsenmeer (ice-shattered bedrock) and shallow lakes (Golder, 2007). The most common soil type in this region is glacial till. Marine beach deposits are found along the north shore of Baker Lake.

The soil near the bulk fuel storage facility is comprised of silts, sands, gravels, cobble and boulders and frost-susceptible glacial till overlying weathered bedrock (Golder, 2007). The soil thickness is typically less than 1.4 m with permafrost or bedrock encountered at less than 2 m. Approximately 60% of the surface area surrounding the bulk fuel storage facility is comprised of bedrock outcrop.

### 2.3 FLORA AND FAUNA

There are no trees and few shrubs in the area surrounding the bulk fuel storage facility. The site is covered by low-lying vegetation; predominated by grassy hummocks, dwarf willow, sedge, green moss and lichen.

Arctic ground squirrels, ptarmigan and songbirds are inhabitants in the area surrounding the bulk fuel storage facility. Lake cisco, lake trout, arctic char, lake whitefish, round whitefish, slimy sculpin and stickleback are predominant species found in Baker Lake.

### 2.4 SUBSURFACE CONDITIONS

Test pits excavated in 2005 near the bulk fuel storage facility and between the tanks and the shoreline indicate a saturated top layer (0.2 m) of organic material (primarily green moss) (Golder, 2005; 2007). A layer of grey to black medium sand is present up to 0.7 m thickness throughout the area, below which a saturated, grey brown, sand and silt layer is found.

Bedrock is exposed at shallow depths throughout the site in locations where topsoil or till soils are present (Golder, 2005). Bedrock is encountered at a maximum depth of 1.4 m. As predicted by the soil conditions, seepage flows in test pits indicate high site drainage.

### 2.5 WATER QUALITY

Baker Lake water quality closely resembles distilled water as many conventional water chemistry parameters are at or below detection limits (BAER, 2005). The water column is generally well mixed and the water chemistry homogenous. During the open water season there is limited vertical stratification in temperature and dissolved oxygen, with observed higher salinity in the bottom strata.

### SECTION 3. NWB TYPE A WATER LICENSE CONDITIONS

The Nunavut Water Board (NWB) Type A Water License 2AM-MEA1526 requirements related to the bulk fuel storage facility in Baker Lake are provided below. Agnico Eagle is committed to achieving all of these requirements.

#### Part F: Conditions Applying to Waste Disposal and Management

8. The Discharge of Effluent to land from fuel containment facilities at the Baker Lake Bulk Fuel Storage Facility and Meadowbank Fuel Storage Facility (ST-37 through ST-40), shall not exceed the following Effluent quality limits:

Parameter	Maximum Average Concentration (MAC)	Maximum Concentration of any single Grab sample	
pH	6.0 to 9.5	6.0 to 9.5	
Total Arsenic (mg/L)	**0.5	1.0	
Total Copper (mg/L)	**0.3	0.6	
Total Nickel (mg/L)	**0.5	1.0	
Total Zine (mg/L)	*0.5	1.0	
Total Suspended Solids (mg/L)	*15	30	
Ammonia (mg/L)	6.0	6.0	
Benzene (µg/L)	370	370	
Toluene (µg/L)	2	2	
Ethylbenzene (µg/L)	90	90	
Lead (mg/L)	0.1	0.1	
Oil and Grease (mg/L)	5 and no visible sheen	5 and no visible sheen	

\* Environmental Guideline for Industrial Waste Discharges in the NWT, 2004

\*\* Metal Mines Effluent Regulations (MMER)

9. The Licensee shall, under Part F, Item 8, discharge Effluent in such a manner as to minimize surface erosion at a distance of at least thirty-one (31) metres above the ordinary High Water Mark of any Water body, where direct flow into a Water body is not possible and no additional impacts are created, or as otherwise approved by the Board in writing.

11. The Licensee shall confirm compliance with Effluent quality limits in Part F, Items 3, 4 and 8 prior to Discharge.

12. The Licensee shall provide at least ten (10) days' notice to the Inspector prior to any planned Discharges from any facilities. The notice shall include an estimated volume proposed for Discharge and the receiving location.

#### Part H: Conditions Applying to Emergency Response and Contingency Planning

2. The License shall prevent any chemicals, petroleum product or unauthorized Wastes associated

with the project from entering Water.

3. The License shall provide secondary containment for fuel and chemical storage as required by applicable standards and acceptable industry practice

4. The License shall perform weekly inspections of petroleum products storage and containment facilities, fuel tanks and connectors, for leaks and settlement and shall keep a written log of inspections to be made available to an Inspector upon request. More frequent inspections may be requested by an Inspectors.

### SECTION 4. ENVIRONMENTAL PERFORMANCE ASSESSMENT

To adequately assess the environmental performance of the bulk fuel storage tanks and facilities, a desktop review of the design and installation reports were completed. In addition, a consultant performed a geotechnical inspection to annually evaluate the site drainage, secondary containment and performed an environmental assessment of the bulk fuel storage facility.

### 4.1 DESK-TOP REPORT REVIEW

The installation/construction reports (Agnico Eagle, 2009a, b; Agnico Eagle, 2010; Agnico Eagle 2011, Agnico Eagle 2020 for diesel tank and Agnico Eagle, 2013 for Jet-A tanks; attached in Appendix A) indicated the use of best management practices during the installation of the aboveground fuel storage tanks.

During the summer of 2007, Agnico Eagle built bulk fuel tanks #1 and #2. Under the supervision of Hatch Engineering, the construction of the secondary containment berm was completed. Enviroline Services Inc. was hired in October 2007 to install the HDPE membrane liner in accordance with CCME (2003) specifications; this liner was subsequently covered with a surface layer of crushed stone. Tanks were commissioned in 2007.

Bulk fuel storage tanks #3 and #4 were completed in October 2008. Under the supervision of Stavibel Engineering, the secondary containment berms were constructed and the HDPE membrane liner was designed and installed for bulk fuel storage tanks #3 and #4 under the supervision of Luc Croisetière and Agnico Eagle. Works were completed for these tanks in July 2009 and tanks were commissioned the same year.

Bulk fuel storage tank #5 and #6 were completed in October 2010. Under the supervision of Stavibel Engineering, the construction of the secondary containment berms for tanks #5 and #6 was completed. Enviroline Services Inc. was hired in May 2010 to install the HDPE membrane liner. Tanks were commissioned the same year.

Construction of the built bulk fuel storage tank #7 was completed in September 2019. Under the supervision of Agnico Eagle the secondary containment berms were constructed. The HDPE membrane liner was installed and tested by Geosynthetiques ZTG Inc. for bulk fuel storage tanks #7.

All of the aboveground storage tanks were field erected. For the diesel tank, construction activity was supervised by Hatch Engineering, Stavibel Engineering and Agnico Eagle and included qualified steel fabricators and installers. Following the diesel tank construction, X-Ray testing of horizontal and vertical welds was completed. For tank #7, to attest welds quality, inspectors relied on visual inspection, magnetic particulate tests and high penetration oil tests. All of the welds met the specifications outlined in the API Standard 650 (Agnico Eagle, 2009a, b, 2020).

In 2013, the Jet-A tanks, the secondary containment enclosure and installation of the HDPE liner in accordance with CCME (2003) specifications was completed and commissioned. Stavibel Engineering provided the design, planning and construction oversight related to the installation of infrastructure of Agnico Eagle's Jet A Fuel Storage facility which consists of 100,000 liters double walled tanks, associated piping

and pumping systems and secondary requirement. SM Construction had installed the Jet-A tanks and Texcel was hired in July 2013 to install the HDPE secondary containment membrane liner. After construction, all tanks were cleaned and washed inside and pressure tests were performed as per specifications.

A secondary containment volume calculation using Autocad Civil 3D was completed to provide verification on the liquid storage capacity of the storage tank system. The CCME Environmental Code of Practice for Aboveground Storage Tanks (2003) states:

a storage tank system that consists of more than one storage tank which should have a volumetric capacity of not less than the sum of the capacity of the largest storage tank located in the contained space and 10% of the capacity of the largest tank or the aggregate capacity of all other storage tanks located in the contained space.

In accordance with the CCME (2003) code of practice, the Baker Lake bulk fuel storage tanks meet the volumetric requirements for a storage tank system.

Upon Tanks #8 construction completion, this environmental performance monitoring plan will be revised to include construction details.

### 4.2 SECONDARY CONTAINMENT VISUAL INSPECTION

A consultant performs a geotechnical inspection annually and inspects the bulk fuel secondary containment structures, the report is sent to NWB annually as per requirement of the Water Licence.

### 4.3 ENVIRONMENTAL ASSESSMENT

The management of site drainage, surface water collection and water/fuel removal within the secondary containment area is an important measure in the protection of the terrestrial environment, surface water and ground water from potential sources of contamination. The environmental protection objectives, strategy and an evaluation of the potential of leaks or seepage to contaminate the terrestrial environment, surface water and ground water are provided in the following sections. Much of the environmental protection strategies focus on the control of contact water. In this report contact water is defined as any water that may be physically or chemically affected by the nearby operational activities.

#### 4.3.1 Terrestrial Environment

The primary objective of the terrestrial management plan is to minimize any adverse impacts to the terrestrial (soil, flora and fauna) environment. To meet this objective, bulk fuel storage facility structures have been constructed to minimize the operational footprint and control contact run-off water within the secondary containment area. Due to the site grading, all water that comes into contact with the bulk fuel storage facility is intercepted and directed into the impermeable HDPE lined secondary containment area.

The ground beneath the secondary containment area has been adequately graded to ensure berm stability.

#### 4.3.2 Surface Water

The objective of water management around the bulk fuel storage facility is to minimize impacts on the quantity and quality of surface water and groundwater. To meet this objective, the bulk fuel storage facility

structures have been constructed to intercept and direct contact run-off water to the impermeable HDPE lined secondary containment area. As there is a high volume of fuel transfer and activity around the modular fuel dispenser, the pad below the modular fuel dispenser and refueling station is lined and sloped toward the secondary containment berm.

Seepage flows in test pits indicate high site drainage due to the high soil porosity. Therefore, should contact water reach the natural environment, the ultimate fate of the contaminants is likely to be in shallow groundwater or surface water (Golder, 2007).

#### 4.3.3 Groundwater

It is not expected that groundwater would be impacted as there is no direct pathway for contaminated water to seep from the bulk fuel storage facility. Due to the site grading, all contact water from the bulk fuel storage facility is directed inside the HDPE lined secondary containment area. Should the integrity of the liner become compromised, there could be leakage into the below grade soil; this would likely present the greatest source of hydrocarbon contamination to impact groundwater and receiving water.

### SECTION 5. PERFORMANCE MONITORING PLAN

The environmental performance monitoring plan is a tiered approach with an emphasis on visual and operational inspections; routine surface water sampling to control and monitor the quality of the contact water; and event monitoring (in the case of a spill emergency or occurrence). Management of the bulk fuel storage facility will be guided by the monitoring results.

### 5.1 VISUAL AND OPERATIONAL INSPECTIONS

Visual and operational inspections are a central component of the environmental performance monitoring plan. Visual inspections of the secondary containment structure are important because if the integrity of the berm walls or liner is compromised this presents the greatest potential for leaks or seepage into groundwater and ultimately the receiving environment.

Weekly inspections are logged and reported by the Environmental Department as well as monthly inspection by the Energy and Infrastructure Department. Inspection of the facilities included: tank and piping condition, secondary containment berm structure and integrity, indicators of liner damage, precipitation/ run-off accumulation, evidence of tampering or misuse, any structural abnormalities and visible sheens on contact water pools and crush material inside the secondary containment. Environmental staff follow-up with operations staff and advise the supervisor if any non-conformity is observed. A weekly written log is completed and available upon request.

Inventory control of transfer and weekly volume inspections using manual or electronic dip reconciliation are conducted by Meadowbank staff. Weekly visual inspections and inventory reconciliation are used to evaluate and determine bulk fuel tank leakage.

An annual geotechnical inspection is also conducted annually by a third party to evaluate the site drainage, secondary containment and performed an environmental assessment of the bulk fuel storage facility. Corrective action/ maintenance may be necessary following the inspection to ensure optimal performance of the facility. The bulk fuel storage facility is maintained in accordance with best management practices.

The bulk fuel tanks are filled during barge season on an annual basis. During the period of re-filling there is the greatest risk of over-filling. Through regular visual inspections, inventory control and monitored fuel transfer, the risk is significantly reduced. The fuel transfer from ship to shore is detailed in the Oil Pollution Emergency Plan (OPEP) and the Product Transfer Area Assessment – Baker Lake Oil Handling Facility. In the case of a spill, the spill contingency plan will be followed.

### 5.2 ROUTINE CONTACT WATER MONITORING

Due to snow accumulation, melting and precipitation, contact water will unavoidably collect inside the secondary containment area. Contact water from inside the secondary containment area will be sampled as described in Section 3 above prior to its release into the terrestrial environment. During water discharge, piping will be directed onto the nearby tundra at least 31 m above the ordinary High Water Mark, to allow for natural attenuation and drainage (i.e. surface water will never be pumped directly into Baker Lake).

During visual inspections, the quantity of contact water collected inside the secondary containment area will be evaluated. When water withdrawal is deemed necessary, water samples will be collected and analyzed for the parameters: pH, Total Arsenic, Total Copper, Total Lead, Total Nickel, Total Zinc, Total Suspended Solids, Ammonia, Total Cyanide, Benzene, Toluene, Ethylbenzene, Lead, and Oil and Grease. If the contact water exceeds the licensed limits detailed in Section 3 above, the portable oil-water separator will be used to treat the water or water will be pumped and disposed at the Meadowbank Tailings Storage Facility. Prior to withdrawal, samples will be analyzed at a certified laboratory.

In addition, water samples from Baker Lake are collected as part of the Core Receiving Environment Management Program (CREMP). The results of these analyzes are included in the annual report. These samples are used to evaluate the performance of the overall water management plan for the Baker Lake Marshalling Area.

### 5.3 EVENT MONITORING

In the event of a spill occurrence at the bulk fuel storage facility, the spill contingency plan and the OPEP will be followed. As a follow-up to the spill response, the environmental staff will conduct an environmental assessment to determine the extent of impacts of the spill occurrence on the nearby environment. This will include the identification of the potential environmental pathways of concern that may result in impacts to surface water (i.e. Baker Lake near-shore surface water), soil or groundwater.

### 5.3.1 Soil Sampling

Following the unlikely event where a spill is not contained within the secondary containment area, soil sampling may be required to locate and prevent further impact to the terrestrial and aquatic receiving environment. Depending on the quantity of the spill, the organic surface soils and silt-containing till below the surface are a likely sink for hydrocarbons, thus soil samples will be taken at selected locations to horizontally and vertically delineate the impacted areas. Furthermore, the soil samples will provide valuable information used to determine the necessity of installing groundwater wells.

### 5.3.2 Water Sampling

Following a spill event, an environmental assessment could be conducted. Similar to routine contact water sampling (inside the secondary containment area), water samples will be collected and analyzed for the following parameters: pH, Total Arsenic, Total Copper, Total Lead, Total Nickel, Total Zinc, Total Suspended Solids, Ammonia, Benzene, Toluene, Ethylbenzene, Xylene, and Oil and Grease.

As part of the CREMP (CREMP), receiving environment surface and at- depth water samples will be taken in Baker Lake and analyzed for the same parameters as listed above.

#### 5.3.3 Assessment of the Need for Groundwater Well Installation

Following a spill event, if soil sample results identify elevated concentrations of contaminants (i.e. exceeding the CCME Canada-Wide Standard (CWS) for Petroleum Hydrocarbons (PHC) in Soil, 2008) and/or if water samples identify elevated receiving environment water samples (i.e. exceeding licensed limits caused as a result of the spill event), an assessment of the need for groundwater wells will be conducted. The assessment, and if required, design for installation, monitoring and maintenance of vertical ground water monitoring wells will be in accordance with CCME (2003) procedures.

### SECTION 6. REFERENCES

Agnico Eagle (2009a). Baker Lake Fuel Storage Installations: Interim Report of Phase 1 (2007) and Phase 2- A (2008). April 2009.

Agnico Eagle (2009b). Baker Lake Fuel Storage Installations: Final Report of Phase 2-B (2009). December 2009.

Agnico Eagle (2010). Baker Lake Fuel Storage Installations: Final Report of Phase 3 (2010). January 2011.

Agnico Eagle (2015). Core-Receiving Environment Monitoring Program: Meadowbank Gold Project. November 2015.

Agnico Eagle (2020). Construction Summary Report: Baker Lake Fuel Storage Tank 7 and Containment Facilities. January 2020.

BAER (2005). Meadowbank Gold Project Baseline Aquatic Ecosystem Report. October 2005.

CCME (2008). Canadian Council of Ministers of the Environment: Canada Wide Standards for Petroleum Hydrocarbons in Soil. PN 1398. January 2008.

CCME (2003). Canadian Council of Ministers of the Environment: Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products. PN 1326

Golder Associates Ltd. (2007). Water Use and Management Plan: Baker Lake Marshalling Area Meadowbank Gold Project. March 2007.

Golder Associates Ltd (2005). Field Geotechnical Investigations Baker Lake Staging Area, Meadowbank Gold Project. Report N. 05-1413-040.

Appendix A1

Baker Lake Diesel Fuel Storage Installations: Interim Report Following Construction of Phase 1 (2007) and Phase 2-A (2008)



### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

### **BAKER LAKE FUEL STORAGE INSTALLATIONS**

### **INTERIM REPORT**

### FOLLOWING THE CONSTRUCTION

OF

PHASE 1 (2007) PHASE 2-A (2008)



### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

### **BAKER LAKE FUEL STORAGE INSTALLATIONS**

### **INTERIM REPORT**

### FOLLOWING THE CONSTRUCTION

OF

PHASE 1 (2007) PHASE 2-A (2008)

PREPARED BY :



Patrick Giard, P.Eng., CCE Supervisor, Construction Department AGNICO-EAGLE MINES LTD, *Meadowbank Division* 



### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

### **BAKER LAKE FUEL STORAGE INSTALLATIONS**

### INTERIM REPORT FOLLOWING THE CONSTRUCTION OF PHASE 1 (2007) AND PHASE 2-A (2008)

### TABLE OF CONTENTS

### **EXECUTIVE SUMMARY**

**DESCRIPTION OF THE MANDATE** 

- A DOCUMENTATION READILY AVAILABLE
- **B** ADDITIONAL COLLECTION OF INFORMATION
- <u>C</u> REVISION OF CONSTRUCTION DRAWINGS
- **D** VERIFICATIONS TO STORAGE CAPACITY WITHIN BERMS

#### APPENDIX 1 : DRAWINGS

VD2259-BKL-001	VD2259-BKL-002	VD2259-BKL-003	VD2259-BKL-004
VD2259-BKL-005	VD2259-BKL-006	VD2259-BKL-007	VD2259-BKL-008
VD2259-BKL-009	VD2259-BKL-010	VD2259-BKL-011	VD2259-BKL-012

VENDOR DRAWINGS FROM CHAMCO INDUSTRIES LTD

#### **APPENDIX 2**

SAFE FILL LEVEL FOR ALL FUEL TANKS

### EXECUTIVE SUMMARY

Agnico-Eagle Mines Limited is currently in the process of building a gold mining project in the Kivalliq region of Nunavut, about 70 km north of Baker Lake.

The yearly operations of this mining operation requires the storage of a minimum of forty million (40 000 000) liters of diesel fuel, which represents four (4) bulk fuel storage tanks, each with a nominal capacity of ten million (10 000 000) liters.

### <u>PHASE 1</u>

During the summer of 2007, Agnico-Eagle Mines Limited has built the first two (2) bulk fuel tanks, with a combined capacity twenty million (20 000 000) liters of diesel fuel. An impervious enclosure was built around it in order to provide secondary containment around the fuel tanks. These first two (2) bulk fuel tanks were then in condition to be filled.

### PHASE 2-A

During the summer of 2008, Agnico-Eagle Mines Limited has built another two (2) bulk fuel tanks, for a total combined capacity of forty million (40 000 000) liters of diesel fuel. Only a portion of the enclosure was built around it, with the final purpose being to provide secondary containment around the fuel tanks. These other two (2) bulk fuel tanks were completed in late October 2008, and they remain empty as of April 2009.

#### PHASE 2-B

During 2009, Agnico-Eagle Mines Limited plans to complete the installation of an impermeable HDPE membrane, which will provide adequate secondary containment around the fuel tanks. This will allow to fill up all four (4) bulk fuel tanks in the summer of 2009, once the piping installation has been completed

### **DESCRIPTION OF THE MANDATE**

Agnico-Eagle Mines has given a mandate to the undersigned in order to verify the compliance with applicable regulations of its fuel storage installations in Baker Lake, Nunavut.

According to the terms of reference, the mandate consists summarily in the following activities.

- A. Review and compilation of the available documentation ;
- B. Collection of any information that may be missing ;
- C. REVISION OF CONSTRUCTION DRAWINGS
  - a. Preparation of AS BUILT drawings of the construction of PHASE 1;
  - b. Preparation of AS BUILT drawings of the construction of PHASE 2-A ;
  - c. Preparation of *IFC* drawings for the construction of PHASE 2-B;
- D. Verifications to the storage capacity within the existing containment berms of PHASE 1 and verifications for PHASE 2 in regards to the applicable regulations.

### A. DOCUMENTATION READILY AVAILABLE

### **GOLDER ASSOCIATES** - Vancouver Office

For the Baker Lake bulk fuel storage facilities, this firm has produced some construction specifications on 2006-04-28, which were given reference SP-GAL-03 under their project number 06-1413-009.

### NISHI-KHON / SNC-LAVALIN LTD - Vancouver Office

For the Baker Lake bulk fuel storage facilities, this firm has produced a set of drawings issued **for construction** on 2007-08-03, under their project number 017202. Some specifications for fuel piping and valves were also issued.

EARTHWORK DRAWINGS	017202-1000-41D1-0006	17202-1000-46ES-1001A	017202-8000-46DC-9150
017202-1000-41D1-0001	FUEL PIPING DRAWINGS	17202-1000-46ES-1001B	017202-8000-46DC-9152
017202-1000-41D1-0002	017202-1000-41D1-0007	ELECTRICAL DRAWINGS	017202-8000-46DC-9153
017202-1000-41D1-0003	017202-1000-46D4-1004	017202-1000-46D6-1001	017202-8000-46DC-9156
017202-1000-41D1-0004	017202-1000-46D4-1005	017202-1000-47D2-2001	017202-8000-46DC-9157
017202-1000-41D1-0005	017202-1000-46D4-1006	017202-8000-47DA-9004	017202-8000-46DC-9166

### GEM STEEL EDMONTON LTD

This vendor has submitted a set of drawings issued **for review**, which consist in four (4) structural drawings showing the details of a fuel tank of 10 million liters nominal capacity. The original design of this fuel tank is shown on revision A of drawings BL-2007-1, BL-2007-2, BL-2007-3, and BL-2007-4.

### CHAMCO INDUSTRIES LTD

This vendor has submitted a set of preliminary drawings issued **for approval** under their project number 1014938ABS, consisting of the following drawings .These documents have all been reviewed by HATCH.

DRAWING NUMBER	H325174-M268-VD-0040	H325174-M268-VD-0041	H325174-M268-VD-0010
H325174-M268-VD-0011	H325174-M268-VD-0012	H325174-M268-VD-0013	H325174-M268-VD-0014
H325174-M268-VD-0015	H325174-M268-VD-0016	H325174-M268-VD-0017	H325174-M268-VD-0019
H325174-M268-VD-0020	H325174-M268-VD-0021	H325174-M268-VD-0029	H325174-M268-VD-0030
H325174-M268-VD-0031	H325174-M268-VD-0032	H325174-M268-VD-0033	H325174-M268-VD-0034
H325174-M268-VD-0035	H325174-M268-VD-0036	H325174-M268-VD-0037	H325174-M268-VD-0039

### B. ADDITIONAL COLLECTION OF INFORMATION

### HATCH - Vancouver Office

Role during construction phase : Field Supervision during construction of PHASE 1 (2007).

Mr. Marlon Coakley and Jim Bonia, which were HATCH employees at the time, have supervised the construction of the fuel containment area around tanks #1 and #2, in phase 1 of this project. A specialized crew coming from Saskatoon (Enviroline Service inc.) was hired in October 2007 to install an HDPE membrane over the berms. This HDPE membrane has been covered with a layer of about 150 mm thickness of crushed stone. During August 2008, some additional HDPE membrane was installed under the tanks #3 and #4, but the final installation of the impermeable enclosure for phase 2-B remains to be done in 2009.

### GEM STEEL EDMONTON LTD

<u>Role during construction phase</u> : Fabrication and field assembly of 10 M liters fuel tanks

Construction of phase 1 ( tanks #1 and #2 ) took place from September to November 2007, with a crew of about 16 workers. During this time, a crew has welded a pipeline towards a booster pump and installed flanged connections and gate valves between fuel tank #1 and the fuel dispensing module manufactured by CHAMCO. The connection of the booster pump to the barge, using hoses, allowed for fuel tank #1 to be filled up in 2007. During August 2008, tanks #1 and #2 were also filled up with fuel by barge delivery.

Construction of phase 2-A ( tanks #3 and #4 ) took place from August to October 2008. Following each phase of this field work, a crew from ACUREN has proceeded to X-RAY testing of horizontal and vertical welds according to specifications described in the latest edition of API Standard 650. According to the report made by ACUREN, no repairs of defective welds were required, either on the tank shell or nozzles.

### MOSHER ENGINEERING LTD

Role during construction phase :

Welding of pipelines and support brackets between the 10 M liters tanks and the sea hose connection.

In September 2008, a crew of four (4) workers has extended a pipeline towards the barge landing and installed pipes with flanged connections and gate valves between fuel tank #2 and the fuel dispensing module manufactured by CHAMCO. They have also installed check valves on both the inlet and outlet nozzles of tank #2, as well as a pressure relief valve set at 75 psi to bypass the gate valve on the outlet of tank #2.

This safety feature against thermal expansion of fuel inside the pipeline towards the fuel dispensing module remains to be installed on tank #1. The grade of material that was used for this pipeline was A333 cold temperature rated steel.

### CHAMCO INDUSTRIES LTD

<u>Role during construction phase</u> : Manufacturing of the fuel dispensing module.

This fuel dispensing module was manufactured in 2006 and sent to the Meadowbank site. A representative from CHAMCO was present during the commissioning. Possibly due to vibrations during transport, there were many flanged connections that needed tightening.

### C. REVISION OF CONSTRUCTION DRAWINGS

AEM has hired STAVIBEL Engineering Services, a firm based in Val-d'Or, in order to complete the drawings that were used in producing this report. Those twelve (12) drawings are enclosed in **Appendix 1** of this report.

Drawing VD2259-BKL-001 shows the general layout of fuel storage area. It has been compiled using surveying data collected by a crew from NUNA.

Drawing VD2259-BKL-002 shows the fuel storage area and existing piping for PHASE 1. It has been compiled using surveying data collected by NUNA.

Drawing VD2259-BKL-003 shows the fuel storage area and location of a sump for collection of surface water, to be built in PHASE 2-B. It shows the limits of the HDPE membrane that has been installed in 2008 under the fuel tanks.

Drawings VD2259-BKL-004, 005, and 006 show cross-sections of the containment area in PHASE 2 (to be completed in 2009). These cross-sections are derived from surfaces that were generated using the *Autocad Civil 3D* software, and are also based on information collected from existing land surveys. This drawing file was also used to verify containment volumes, as it is described further in section D.

Drawing VD2259-BKL-007 is an as-built version of structural drawing BL2007-1, which was designed and issued by Gem Steel Edmonton Limited. This drawing has been updated to reflect nozzle orientations that were noted during a visit. No significant changes were noted, except those made to the nozzle schedule.

Drawing VD2259-BKL-008 shows the proposed piping for PHASE 2. It contains a schedule of valves and fittings that remain to be installed.

Drawing VD2259-BKL-009 shows the location of the existing pipeline and sea hose connection with the barge for fuel unloading. Also, a spill containment sump is proposed on this drawing.

Drawing VD2259-BKL-010 is a process and instrumentation diagram. It shows the details of the existing and proposed piping, along with further details for the fuel dispensing module.

Drawing VD2259-BKL-011 is a general layout that shows the location of existing grounding wire and proposed layout to extend this grounding into PHASE 2.

Drawing VD2259-BKL-012 shows the details of the barge and laydown areas, along with the details of a ditch and culvert for diversion of surface water run-off.

Also enclosed are two (2) vendor drawings from CHAMCO INDUSTRIES LTD, which shows the piping details inside the fuel dispensing module.

### D. VERIFICATIONS TO STORAGE CAPACITY WITHIN BERMS

STAVIBEL Engineering Services has completed verifications on the liquid storage capacity inside the containment berms, which create an impermeable enclosure around tank #1 and #2.

The method used was a volume calculation using Autocad CIVIL 3D software.

The maximum storage capacity of fuel tank #1 is 10 515 000 litres of diesel fuel at a standard temperature of fifteen degrees Celcius (15 °C).

The maximum storage capacity of fuel tank #2 is 10 480 000 litres of diesel fuel at a standard temperature of fifteen degrees Celcius (15 °C).

It has been verified using the above software that the impermeable enclosure built in PHASE 1 will effectively hold one hundred percent (100 %) of the maximum storage capacity of the biggest tank, plus ten percent (10 %) of the maximum storage capacity of the other tank. This calculation has been summarized in a worksheet that is shown on PAGE 8, hereunder.

The containment volume for tanks #1 and #2 is 11 586 cubic meters, of which 367 cubic meters were occupied by accumulation of surface water as of 2008-10-31.

Thus, the lowest point of the HDPE membrane that sits atop the containment area is sufficiently high ( at elevation 33.86 m ) to meet the above criteria.

A worst case scenario has been simulated, and consists in either a rupture of the first course of side plates in the tank shell, or a failure in the outlet piping, when either one of fuel tanks is 100% full.

This simulation shows that, in such a worst case scenario, the hydraulic balancing level inside the containment area would not exceed the point with the lowest elevation on the surrounding berms, providing that there is no substantial accumulation of surface water inside. There is a no additional safety margin.

However, with the upcoming completion in phase 2-B (summer 2009) of the impermeable enclosure around tanks #3 and #4, a breach will be made into the berm dividing the two containment areas. This is also shown on a sketch, hereby.

When phase 2-b is completed in summer of 2009, the containment volume for tanks #3 and #4 will be 10 855 cubic meters As a result, the new containment requirement of 130% of the biggest tank volume (or 13 647 cubic meters), expressed while considering all four (4) tanks as a whole, will then be exceeded.

#### **DESIGN REVIEW - FOR FUEL SPILL CONTAINMENT BERMS AT BAKER LAKE**

	<u>diam</u>	<u>rim el.</u>	<u>radius</u>	<u>surface</u>	top el.	<u>height</u>	
EQUIPMENT #	<u>(ft)</u>	<u>(m)</u>	<u>(m)</u>	<u>(m2)</u>	<u>(m)</u>	<u>(m)</u>	<u>volume (m3)</u>
740-TK-044 TANK # 1	110	32.99	16.764	882.89	44.90	11.910	10 515
740-TK-044 <b>TANK # 2</b>	110	33.03	16.764	882.89	44.90	11.870	10 480

Let's say berms are 5' 3" higher than the average tank floor (so 1.60 m total height) with variable slopes and that the tanks are sitting on cones made of crushed stone of 20 m diameter x 1.0 m height.

	<u>Volume</u>
Secondary Containment Requirement	11 563 m3
according to ref. PN-1326, Section 3.9.1(1) 2-b-ii	110%

DESIGN OF BERM DIMENSIONS							
	height	width	length	surface			cumulative volume
elevation	(m)	(m)	(m)	(m2)			(m3)
32.00	0.00	64.0	104.0	6656.00	slope ratio N-S		0
32.66	0.66	69.3	107.6	7452.03	horizontal	vertical	4656
32.76	0.76	70.1	108.1	7575.93	4.0	1	5407
32.86	0.86	70.9	108.6	7700.69			6171
32.96	0.96	71.7	109.2	7826.31	slope ratio E-W		6947
33.06	1.06	72.5	109.7	7952.80	horizontal	vertical	7736
33.16	1.16	73.3	110.3	8080.15	2.7	1	8538
33.26	1.26	74.1	110.8	8208.36			9352
33.36	1.36	74.9	111.3	8337.44			10 180
33.46	1.46	75.7	111.9	8467.38			11 020
33.56	1.56	76.5	112.4	8598.19			11 873
33.66	1.66	77.3	113.0	8729.86			12 739
33.76	1.76	78.1	113.5	8862.39			13 619
33.86	1.86	78.9	114.0	8995.79	GROS	S CONTAINMENT	14 512
34.00							CUBIC METERS

#### containment volume to be substracted for the two (2) cones made of crushed stone

volume (m3)	height (m)	surface (m2)	radius (m)	number	perimeter (m)	
-2680	1.01	1262.93	20.05	2	126.0	CONES
-246	variable			1		RAMP

#### containment volume to be substracted for accumulation of surface water

	elevation	volume (m3)
water level as of November		()
2008	31.70	-367.0

	<u>Volume</u>
NET CONTAINMENT	11 219 m3 or 107%



# **APPENDIX** 1

# AS BUILT DRAWINGS for PHASE 2-A

# IFC DRAWINGS (10) for PHASE 2-B

VD2259-BKL-001	VD2259-BKL-002	VD2259-BKL-003	VD2259-BKL-004
VD2259-BKL-005	VD2259-BKL-006	VD2259-BKL-007	VD2259-BKL-008
VD2259-BKL-009	VD2259-BKL-010	VD2259-BKL-011	VD2259-BKL-012

# Plus two (2) drawings from CHAMCO INDUSTRIES LTD Vendor ref. # CUP1014938-22 CUP1014938-25



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°	
	REFERENCE DRAWINGS
	1 09-05-07 FOR CONSTRUCTION F.A. P.A. NOV. BOT DOCUMENT F.A. P.A. REVISIONS
	AGNICO-EAGLE MEADOWBANK DIVISION MEA AGNICO-EAGLE - MEADOWBANK DIVISION BAKER LAKE AREA 740 GENERAL LAYOUT
	Offset  FRANCIS  ROSE, TECH  SOCE  SOCE










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# **APPENDIX 2**

### SAFE FILL LEVELS FOR ALL FUEL TANKS

TEMPERATURE OF FUEL in the barge at discharge	MAXIMUM FUEL LEVEL to be read on the VAREC float level					
	TANK #1	TANK #2	TANK #3	TANK #4		
0°C	<mark>11.68 m</mark>	<mark>11.64 m</mark>	<mark>11.70 m</mark>	<mark>11.70 m</mark>		
+ 5°C	<mark>11.73 m</mark>	<mark>11.69 m</mark>	<mark>11.75 m</mark>	<mark>11.75 m</mark>		
+10°C	<mark>11.79 m</mark>	<mark>11.75 m</mark>	<mark>11.81 m</mark>	<mark>11.81 m</mark>		
+15°C	11.84 m	11.80 m	<mark>11.86 m</mark>	<mark>11.86 m</mark>		

NOTE : EACH TANK HAS A SLIGHTLY DIFFERENT ELEVATION, SO CARE MUST BE TAKEN DURING HYDRAULIC BALANCING OF TANKS, ESPECIALLY WHEN THOSE ARE FULL. Appendix A2

Baker Lake Diesel Fuel Storage Installations: Final Report Following Construction of Phase 2-B (2009)



### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

### **BAKER LAKE FUEL STORAGE INSTALLATIONS**

### **FINAL REPORT**

FOLLOWING THE CONSTRUCTION

OF

PHASE 2-B (2009)



### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

### **BAKER LAKE FUEL STORAGE INSTALLATIONS**

### **FINAL REPORT**

### FOLLOWING THE CONSTRUCTION

OF

PHASE 2-B (2009)

PREPARED BY :

Patrick Giard, P.Eng., CCE



2009-12-07

### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

### **BAKER LAKE FUEL STORAGE INSTALLATIONS**

### **FINAL REPORT**

### FOLLOWING THE CONSTRUCTION

### TABLE OF CONTENTS

1.0	EXEC	UTIVE SUMMARY	. 2
2.0	SECC	NDARY CONTAINMENT BERMS	. 3
	2.1	Final completion of berm enclosure	. 3
	2.2	Breach in middle berm	. 3
3.0	HDPE	MEMBRANE WELDING	. 3
4.0	GEO		. 4
5.0	SCRE	ENED SAND COVER	. 4
6.0	WELD	ING OF PIPELINE	. 4
7.0	PRESS	SURE TESTING OF PIPELINE	. 5
	7.1	Selection of test method and suitable air pressure for testing	. 5
	7.2	Results of air pressure testing of fuel piping	. 6

### APPENDIX 1 : AS-BUILT DRAWINGS

VD2259-BKL-001 (revision 2), VD2259-BKL-008 (revision 3)

### **APPENDIX 2**

QUALITY CONTROL DOCS : HDPE welding log and instrument qualification

### **1.0 EXECUTIVE SUMMARY**

Agnico-Eagle Mines Limited has undertaken construction of a gold mining project in the Kivalliq region of Nunavut, about 70 km north of Baker Lake.

The yearly operations of this mining operation requires the storage of a minimum of forty million (40 000 000) liters of diesel fuel, which represents four (4) bulk fuel storage tanks, each with a nominal capacity of ten million (10 000 000) liters.

### PHASE 1 ( 2007 )

During the summer of 2007, Agnico-Eagle Mines Limited has built the first two (2) bulk fuel tanks, with a combined capacity twenty million (20 000 000) liters of diesel fuel. An impervious enclosure was built around it in order to provide secondary containment around the fuel tanks. These first two (2) bulk fuel tanks were then in condition to be filled.

### PHASE 2-A ( 2008 )

During the summer of 2008, Agnico-Eagle Mines Limited has built another two (2) bulk fuel tanks, for a total combined capacity of forty million (40 000 000) liters of diesel fuel. Only a portion of the enclosure was built around it, with the final purpose being to provide secondary containment around the fuel tanks. These other two (2) bulk fuel tanks were completed in late October 2008, and they have remained empty during the winter of 2008-09.

### **PHASE 2-B** (2009)

During 2009, Agnico-Eagle Mines Limited has completed the installation of an impermeable HDPE membrane, which provides adequate secondary containment around the fuel tanks. This has allowed to fill up all four (4) bulk fuel tanks in the summer of 2009, with the piping installation towards tanks 3 and 4 being completed.

### PHASE 3

Consideration is currently being given to an expansion project for the fuel storage facilities in Baker Lake. The scale of the project has been defined in a set of drawings and technical specifications, which will be used for the permitting process.

### 2.0 SECONDARY CONTAINMENT BERMS

### 2.1 Final completion of berm enclosure

During the construction of fuel tanks 3 and 4 there was a small part of the secondary containment enclosure built in 2008 had been left open to provide easy access.

The granular material and rock fill that was used for civil works was taken from an approved quarry, which has been demonstrated not to produce Acid Rock Drainage and to be non-Metal Leaching.

Given that theses fuel tanks were to be filled up in August 2009, the berm enclosure was fully completed in July 2009, exactly as shown on the construction drawings and at a minimal crest elevation of 34.20 m.

### 2.2 Breach in middle berm

Once the berm enclosure was fully completed, a breach was made in the middle berm between fuel tanks 2 and 3. At that moment, fuel tanks 1 and 2 had been fully drawn with truck tankers, and were totally empty. Meanwhile, the mine operations relied on the fuels tanks located at the Meadowbank site.

The breach section in this midside berm was capped with an HDPE membrane at the 33.00 m elevation mark, which is the same as the tank rim elevation. This HDPE membrane was welded to the existing ones on the berm crests, thus ensuring an impermeable transition from one side to the other of both secondary containment areas. An access ramp was built over this breach to provide vehicle access inside the secondary containment area around fuel tanks 3 and 4.

### 3.0 HDPE MEMBRANE WELDING

A specialized crew from Saskatchewan was mobilized to Baker Lake for the completion of the HDPE membrane installation. The contractor was Enviroline Services inc.

During July 2008, or prior to the construction of fuel tanks 3 and 4, some HDPE panels were laid out under the fuel tanks. The edges of this HDPE membrane had been protected with plywood sheets and covered with a layer of screened sand.

The work that took place in 2009 was to weld some HDPE membrane rolls to those existing panels, and extend all those HDPE membrane rolls right up to the berm crest. The membrane was anchored into a trench, as indicated on the construction drawings.

Detailed reports of wedge welder seam logs and qualification tests, as well as logs for extrusion welder and qualification tests are enclosed herein, in Appendix 1.

### 4.0 GEOTEXTILE INSTALLATION

As indicated on the construction drawings, a geotextile was placed directly under and over the HDPE membrane, as a means to reduce the risk of puncturing this membrane.

### 5.0 SCREENED SAND COVER

As indicated on the construction drawings, a layer of screened sand was placed directly under and over the geotextile, as an additional means to reduce the risk of puncturing the HDPE membrane. This sand was screened at the Blueberry Hill pit and hauled to the worksite by local truckers.

### 6.0 WELDING OF PIPELINE

A crew from the ABF Mines contractor, composed of a qualified welder and a pipefitter, have completed the extension of the barge discharge pipeline towards tanks 3 and 4.

Also, some additional piping was installed from the tank 3 and 4 towards the fuel dispensing module, thus allowing to draw fuel from these tanks, after barge delivery.

Some pressure release valves were installed on each of these pipelines, with a discharge pressure set at 75 psi and piped back into the fuel tanks. This constitutes a protection feature against the effects of thermal expansion of fuel which was indicated on the construction drawings.

Another feature of the modifications implemented in 2009 is the installation of some swing check valves at the N2 nipple outlets of all fuel tanks. This will most likely help the fuel dispensing pump keeps its prime when the fuel levels get low in the tanks.

The only exception to the complete compliance of these installations with the piping drawings is that the containment sump for the fuel sea hose connection shown on section A of drawing 017202-1000-46D4-1004 from SNC-Lavalin has not been installed.

The flanges and gaskets that were use for mechanical joints are rated for 150 psi.

### 7.0 PRESSURE TESTING OF PIPELINE

### 7.1 Selection of test method and suitable air pressure for testing

The purpose of the leak detection program is to proof the fuel delivery system in a nondestructive manner. Fuel pipelines were pressure tested with a non-inert gas, given that no petroleum product had ever entered the pipelines prior to testing.

Section 6.2 of CCME PN\_1326 states that the testing pressure must be greater than 350 kPa (50.8 psi), but without exceeding the manufacturer specifications for flanges and gaskets of 1034 kPa (150 psi). For that purpose, an evaluation was made of the maximum operating pressure at the fuel sea hose connection of the barge discharge pipeline. The results are as follows :

Expected discharge flow rate : 0.090 m<sup>3</sup>/s

Maximum operating pressure = static pressure + velocity pressure + friction loss

Maximum operating pressure = 29.64 m + 1.24 m + 35.80 m = 94.7 psi

Whereas static pressure = elevation of ( tank overflow - pump intake ) x 0.8396 static pressure = ( 44.90 m - 9.60 m ) x diesel fuel density @ 2°C

Whereas friction loss was evaluated to be :

Pressure Loss (psi): 50.95 psi Head Loss (ft): 139.83 ft of diesel fuel

for the barge discharge pipeline

Fluid: diesel fuel

Pipe/Tubing ID (in): 6" or 150 mm

Flow Rate (USGPM): 1426.5 USGPM or 0.090 m<sup>3</sup>/s

Dynamic Viscosity of diesel fuel (cP): 5.0 cP

Specific Gravity (water=1): 0.8396 at 35°F

**Temperature (F):** 35°F or 2°C

Pipe Roughness (ft): 0.00015

Fluid Velocity (ft/sec): 16.19 ft/s or 4.93 m/s

Friction Factor: 0.019

Piping Length (ft): 900

Pressure Loss (psi): 50.84 psi

Head Loss (ft): 139.88 ft or 42.64 m of diesel fuel @ 0.8396

### 7.2 Results of air pressure testing of fuel piping

The test pressure has been set at 690 kPa (100 psi), and the stabilization of pressure due to ambient temperature was noted after pressurization at 100 psi was achieved for testing. The piping system was not considered to be leaking due to a pressure variation occurrence of less than 2% within at least two (2) hours, after noted stabilization of air pressure. Detailed results are stated hereunder.

### TESTING DAY ONE

Section of piping tested	100 mm pipe		from TANK 3 to TANK 4		
DATE OF TESTING :	2009-07-24		Air temperature : N		N/A
TEST STARTED AT :	07:55 AM		TEST WAS ENDED AT :		02:57 PM
INITIAL PRESSURE	99 PSI	FI	NAL PRESSURE READING		102 PSI

Section of piping tested	150 mm pipe		from TANK 3 to TANK 4		
DATE OF TESTING :	2009-07-24		Air temperature :	N/A	
TEST STARTED AT :	10:25 AM		TEST WAS ENDED AT :	02:55	5 PM
INITIAL PRESSURE	99 PSI	FI	NAL PRESSURE READING	102	PSI

### TESTING DAY TWO

Section of piping tested	100 mm pipe		from TANK 2 to TANK 3		
DATE OF TESTING :	2009-07-25		Air temperature :	Air temperature : 18°C	
TEST STARTED AT :	01:08 PM		TEST WAS ENDED AT :		VOID TEST
INITIAL PRESSURE	100 PSI	FI	NAL PRESSURE READING		NIL

The cause of air pressure drop was located (missing gasket) and testing resumed.

Section of piping tested	100 mm pipe		from TANK 2 to TANK 3		
DATE OF TESTING :	2009-07-25		Air temperature :		18°C
TEST STARTED AT :	02:12 PM		TEST WAS ENDED AT :		06:15 PM
INITIAL PRESSURE	100 PSI	SI FINAL PRESSURE READING			100 PSI

### TESTING DAY THREE

Section of piping tested	150 mm pipe		from TANK 2 to TANK 3		
DATE OF TESTING :	2009-07-26		Air temperature :	15°C	
TEST STARTED AT :	09:30 AM		TEST WAS ENDED AT :		VOID TEST
INITIAL PRESSURE	100 PSI	FI	NAL PRESSURE READING		80 PSI

The cause of air pressure drop was located (tightening bolts) and testing resumed.

Section of piping tested	100 mm pipe		from TANK 2 to TANK 3		
DATE OF TESTING :	2009-07-26		Air temperature :		18°C
TEST STARTED AT :	11:45 AM		TEST WAS ENDED AT :		04:25 PM
INITIAL PRESSURE	100 PSI	FINAL PRESSURE READING			101 PSI



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AGNICO EAGLE MINES LTD MEADOWBANK DIVISION PROJECT REF. VD2415-000

# BAKER LAKE: TANK FARM

IMPERMEABLE ENCLOSURE AROUND TANKS # 3 AND # 4 CONTRACTOR : ENVIROLINE SERVICES INC.

1) AS BUILT Contents

- 2) WEDGE WELDER SEAM LOG
- 3) WEDGE WELDER QUALIFICATIONS
- 4) EXTRUSION LOG
- 5) EXTRUSION WELDER QUALIFICATIONS

JULY 08, 2009 Enviroline Services Supervisor DEREK PROVOST PA ENVIROLINE 2009/07/08 PATRICK GIARD, P. Eng.



gerrices inc.

# x 7539 Saskathor, S.L. S7X 414 Tel. 305 242 8836 Fax 306 249 6771 Email: Mybarbes@hemo.com

# dge Welder Seam Log

	60							Comments	T.1. 7009	and and and a										
	Pressure	l Pressure	ments			7/09	Date	Tested	20	5	06	02	5	70	20	20		20	03	
	Drive	Dwel	Com			0/	Date	Welded	10	,	10	C		10	0	10		10	20	
						1	60 psi 60	Start Finish	10 10	00 00										
		n°C.			Informatio	AND BRUT PARTY	-Test	Finish	100.1	01.0	5:351		20.00	51.9	4 34	11 -1		1:17	11:47	
	N	un. un			Tating	1 County	Ait	Start	1.57	40.9	5:303		5:5	6:40	6:29		L. 07	21:1	2421	11 1 1 1
	Tech	ador Ten		cuge ca			Tret	Outside		114			117	71	0 11		21	21		110
	2	AB		M			Deal	Incide		121	100	101	R	117	0		01	119		1
								Vice Grin	AND DONA	7		2	1			2			2	>
		RM	AKE					Mela	nande (	35%	-	+			+	+			+	_
	1	TANK FF	DAKER	60 Mil		nformation		HDPE	lecn. I am	DA7 400		_			+					
)		set	tion	crial		Fusion II	đ	:	u #		+	-			F	S	٩	t,		-

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# IX 1539 Saskathoon, S.K. STK 414. Tol. 305 242 8836 Fax 306 249 6121 Email: évitateos@home.com

# dge Welder Seam Log

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		C Lech.	MM				TITA U	Duccent C	~~~
IAKE	2	Vedge Ten	ap.	400°C			Dave	Il Pressure	
	4	Vedge Gal	0				Con	ments	
						Ξ.			
			Testing.	Informati	un		/		
F17/11	Paad	Teat	Air	Text .	60 DS	si 60	Date	1/04 Date	
Speed Vise Grit	n Inside	Outside	Start	Finish .	Start F	Finish	Welded	Tested	Comments
36% 1/	911	121	8:16	12:8	60	60	64	8	July 2009
	117	123	8:22	8:27	-	-	05	5	
	211	119	2:25	08:2	_		مر	05	
	108	117	15:2	95.2			05	50	
	114	119	2:37	24:2			ος	٥٢	
	121	121	2:49	h5:2			05	સ્ટ	
	118	120	2:55	3:00			02	06	
	13	118	6:10	6:15			05	06	
	117	114	6:16	12:9			05	96	
2	117	113	22:9	6:27			8	. 90	
	9	117	6:28	6:33			70	06	
	211	611	6:15	02.9			90	06	
3	113	171	12:9	6:26			06	99	
	12	120	6:27	6:32			66	ઝ	
>	117	116	6:33	6:38			90	06	
3	114		6:39	14:9		-	06	90	
	111		54:9	6:50			90	90	
	10	170	15:9	6:56			0.6	07	
1	113	114	13:9	20:1			90	07	
		01.	7:02	1.00	11		4.0	107	

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# je Welder Seam Log

RaveRs         Lift         Wedge demp.         HOPC         Lowent ressure           60         will         reating luformation         Testing luformation         Comments           Tech         Tenta         Air Test         60         bit $-/\sigma^{-}/\sigma^{q}$ Par         HDrs         Needer cap         Start         Finish         Start         Finish         Start         Finish         Start         Comments           Tech         Teng         Speed Vise Grip         Insele         Outside         Start         Finish         Start         Comments           Tech         Teng         Speed Vise Grip         Insele         Outside         Start         Finish         Start         Comments           Tech         Teng         Speed Vise Grip         Insele         Outside         Start         Comments           Tech         119         116         2:35         2:41         0	TANK FARM		QC Tech.	Ŵ				ALA	e Fressure	90
$\int_{O}$ Mill         Testing Information         Testing Information           Information         Testing Information         Testing Information         Testing Information           Information         Pred Test         Air Test         60 psi 60         Date         Date $-\sqrt{\sigma^2}/\sigma^4$ Information         Pred Test         Air Test         60 psi 60         Dist         Date $-\sqrt{\sigma^2}/\sigma^4$ Phy $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ Phy $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ Phy $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ $\gamma$ <td>RAKER LAKE</td> <td></td> <td>Wedge len</td> <td>ap. 40</td> <td>D°C</td> <td></td> <td></td> <td>DAVE</td> <td>u rressure</td> <td></td>	RAKER LAKE		Wedge len	ap. 40	D°C			DAVE	u rressure	
Terting Information           Terting Information           Terth         Tamp Speed Vae Grip         Preal Test         Air Test         60         Date         Date $/0^{-7}/6^{4}$ Terth         Tamp Speed Vae Grip         Inside         Outside         Start Finish         Nelded         Tested $/0^{-7}/6^{4}$ DAP         400         357         U         109         114         118         213         214         60         66         66 $/0^{-7}/6^{4}$ DAP         400         357         U         119         118         213         214         60         66         66 $/0^{-7}/6^{4}$ III         UI         116         118         2142         2141         66         06	60 Mil		Wedge Gal					Com	ments	
Tering Information           Tering Information           Tering Information           Term Speed Weel Grip Inside         Contracts         Air Test         60         95         06<										
HDFE Weld         Peel Teet         Air Teet         60         90         Date $-/\sigma^{-1}(\sigma q)$ Tech.         Temp Speed Vasa Grip         Iside         Outside         Start         Finish.         Start Finish.         Neided         Tested         Comments $7hY$ $400$ $357$ . $\sqrt{10q}$ $11q$ $5:6$ $7:1q$ $60$ $66$	nformation			Testing	Informatio	a				
Tech.         Temp Speed Vise Grip         Inside         Start         Finish.         Start         Finish.         Start         Finish.         Comments $\overline{DAP}$ $\overline{400}$ $\overline{357.}$ $\overline{107}$ $\overline{114}$ $\overline{118}$ $\overline{118}$ $\overline{114}$ $\overline{118}$ $\overline{114}$ $\overline{118}$ $\overline{213}$ $\overline{2141}$ $\overline{2141}$ $\overline{206}$ $\overline{06}$ $06$	HDPE Weld	Pe	el Test	Air	Test	60 psi	99	Date	Date $-/0$	60/L
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Tech. Temp Speed Vis	se Grip Inside	Outside	Start	Finish .	Start Fli	nish 1	Nelded	Tested	Comments
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	DAP 400 35%	109	114	59:5	7:14	60	60	Ś	90	July 2009
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			118	2:30	2:35	_		.90	06	_
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		115	116	92:29	14:2			06	06	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		114	118	2h:2	74.2	_		06	06	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		V 113	211	8h:2	2:23			90	00	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		211 /	111	3.00	3:05			96	0%	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		113	113	3:06	11:2			96	90	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		110	115	21:5	2:17			06	06	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		116	117	6:20	6:25			06	08	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		811	118	6:26	6:31			96	08	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		211 /	116	28:9	6:37			20	08	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		21	117	6:38	6:43		_	07	08	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		11	118	6:44	64:9		_	07	43	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		<u> </u>	116	05:9	6:55			07	08	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		<u>     115</u>	118	6:56	10:2			07	08	
80 20 20 20 20 20 20 20 20 20 20 20 20 20		V / 116	1 115	90:2	11:2			07	08	
80 10 11 11 11 112 112 112 07 08 80 10 10 112 112 112 112 112 10 07 08		211 /	118	7:12	7:L		-	07	03	
80 10 1 12 1:30 1:35 1 02 08 11 1 1 1 1 1 1:30 1:35 1 20 08		V, 10	9 119	7:13	7:23			07	08	
1 1 1 1 1 1 1 1 1 1:30 7:35 V V 07 08		11/2	1 114	42:L	7:29	_		10	08	
	IN N N	11	2 117	1:30	7:35	$\rightarrow$	$\rightarrow$	07	08	

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# le Welder Seam Log

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Drive Pressure

00						Commettis	July 2009																					
DITTVE F Tressure	Dwell Pressure	COmments			ste Date	Ided Tested	20	2.0	67		50		4 04	20	20	20 2	20		707	3 03	6 07	7 07	2 63	7 07	7 68			
			E		psi Dz	Start Finish We	60 60 02	20 1 1	1 1 1 2 2		0 3	50	0	60	02	0			0	0	0	0	0	0	V V 0			
άW	. '400°C		Tradius Informatio	ANNA NAME AND A	Air Test	Start Finish.	11:20 11:34		11.11 95.11	16-11 26-11	1:24 1:29	1:30 1:35	6:55 7:00	7:00 7:05		11-1 71-1	<7.7 Q1.7	62:1 h2:2	2h:11 2h:11	11:00 11:05	1:10 1:12	1:25 1:30	2:31 2:36	1:30 1:35	8:00 8:02			
OC Tech.	Wedge Tem	Wedge Gap			Paal Test	ide Outside		11/1	711 6	9 114	7 116	3 114	101	100		7 117	18 117	15 121	17 119	11 117	11/ 117.	110	111 114	117 171	110 117			
						d Vince Grin Ine	" IND ASIA D	6 1 1	= / /		= /	2					7	5	1		,					+		5°~
A. 7. 1	DALTO AKE	ho mi)		a laformation	1.	HDPE Wei	Tech. Temp spee	DAP 400C35°																				

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# Wedge Welder Qualifiication Data

		Wedge Welder #	C4
Date	July 1, 2009	Travel Speed	35%
Project	7 Tault form	Drive Pressure	* 60
Work Area	-> Bakir Lake	Dwell Pressure	*
Material	60 mil	Wedge Setting	*
QC tech.	MD	Wedge Temp.	400°C
Welder/Operator	DAY	Sheet Temp.	X
Test Identification	A. M.	Testing Temp.	14° C
Test Location	ON: SITE		

	Vice Grip Peel	
	Inside	Track
Outside Track		
		/

	11 m 1	Insi	ide Track	() sents
Outs	ide I rack	T b/Inch	% Separation	Comments
b/Inch	%Separation	Lonnon	0	<u>Y:</u>
8	0			P
04	0	107		P
1/2	0	16		P
07	· D	122	0	P
02	0	104	0	

	5.70	
L.b/Inch	% Enlongation	P
181	*	P

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# Wedge Welder Qualifiication Data

		Wedge Welder #	CY
Date	July 2, 2009	Travel Speed	40%
Project	Batter Late	Drive Pressure	60
Work Area	Tank Farm	Dwell Pressure	
Material	60 mil	Wedge Setting	
QC tech.	MP	Wedge Temp.	400°C
Welder/Operator	DAP	Sheet Temp.	
Test Identification	<u>R.M.</u>	Testing Temp.	13°C
Test Location	ON SITE		

# Destructive Testing Results

	Mine Grin Peel	
1	Vice Orip i cer	ide Track
Outside Track		
- V		

		Tensor	meter Peel	
	11. Track	Ins	ide Track	Comments
Outs	Ide Hack	L.b/Inch	% Separation	2
Lb/Inch	%Separation	107	0	·
114	0	101	0	P
11/-	0	109	0	Р
110	0	112	0	P
111		114	0	2
114		11 H	0	

107 - 117

Seam Tensile

			Comme	nts
I b/Inch	% E	nlongation	P	
Dormon			P	
79				:
16,8				

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# Wedge Welder Qualifiication Data

×		Wedge Welder #	<u>C4</u>
Date	July 02, 2009	Travel Speed	35%
Project	Baker Lake	Drive Pressure	60
Work Area	Tank Farm	Dwell Pressure	
Material	60 mil	Wedge Setting	
QC tech.	MD	Wedge Temp.	400°C
Welder/Operator	DAP	Sheet Temp.	
Test Identification	P.M.	Testing Temp.	18°C
Test Location	ON SITE		

	Vice Grin Peel	
		Inside Track
Outside Track		
		/
	and an and a second	

		Tensor	neter Peel	
		Inst	ide Track	Comments
Outs	side Track	T b/Inch	% Separation	Comments
b/Inch	%Separation		0	P
113	0	116	0	P
112	0	115		p
116	0	114	0	p
119		111	0	
110	0	112	0	¥
110	0	12		

	Seam Tensile	
Lb/Inch	% Enlongation	Comments
181		<u>P</u>

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# Wedge Welder Qualifiication Data

		Wedge Welder #	C4
Date	July 03, 2009	Travel Speed	35%
Project	Baker Lake	Drive Pressure	60
Work Area	Tank Farm	Dwell Pressure	
Material	60 mil	Wedge Setting	
QC tech.	MP	Wedge Temp.	400°C
Welder/Operator	DAP	Sheet Temp.	
Test Identification	A.M.	Testing Temp.	13°C
Test Location	ON SITE		

	Vice Grin Peel
	Inside Track
Outside Track	

	Tensor	meter Peel	
	Inst	ide Track	()
Outside Track	T h/Inch	% Separation	Comments
Inch %Separation		0	<u>P</u>
2. 0	109	0	P
1 0	111	0	P
	107	0	P
5 0	109	0	
3		6	

	Seam Tensile	
I b/Inch	% Enlongation	Comments
183		P
185		

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Wedge Welder Qualifiication Data

		Wedge Welder #	CH
Date	July 04, 2009	Travel Speed	350/
Project	Baker Lake	Drive Pressure	60
Work Area	Tank Farm	Dwell Pressure	
Material	60 mil	Wedge Setting	
QC tech.	MP	Wedge Temp.	400°C
Welder/Operator	DAP	Sheet Temp.	
Test Identification	A.M	Testing Temp.	12°C
Test Location	ON SITE		

iside Track
/

		Tensor	meter Peel	
	1 de Track	Insi	ide Track	
Outs	100 Ildex	L.b/Inch	% Separation	Comments
ich	%Separation	118	6	P
	- 0	110	Ď	P
)	0		0	P
	0	119		P
	0	112		P
1	0	119		

	Seam Tensile	
Lb/Inch	% Enlongation	Comments
191		P

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Wedge Welder Qualifiication Data

		Wedge Welder #	C4
Date	July 02 2009	Travel Speed	350/0
Project	Batter Lake	Drive Pressure	60
Work Area	Tank Farm	Dwell Pressure	V=
Material	60 mil	Wedge Setting	
QC tech.	MD	Wedge Temp.	400°C
Welder/Operator	VAY	Sheet Temp.	
Test Identification	P.M.	Testing Temp.	18°C
Test Location	ON SITE		

V1	ce Grip Peel
	Inside Track
Outside Track	

		Tensor	meter Peel	
Outo	ide Track	Inst	ide Track	<u>O</u>
1 /T h	0/Senaration	Lb/Inch	% Separation	Comments
Jb/Inch	7000000000	113	0	P
119	0	119	0	P
6	0	115	0	<u> </u>
8	0	· ) 114	0	- F
12	· 0	119	0	P
12	0	116		1

	Seam Tensile	
L.b/Inch	% Enlongation	Comments
77	200	P
31	- 200	
# enviroline services Inc.

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# Wedge Welder Qualifiication Data

		Wedge Welder #	04
Date	July 02, 2009	Travel Speed	35%
Project	Baker Late	Drive Pressure	60
Work Area	Tank Farm	Dwell Pressure	
Material	60 Mai	Wedge Setting	
QC tech.	Mp	Wedge Temp.	400°C
Welder/Operator	DAP	Sheet Temp.	· · · · · · · · · · · · · · · · · · ·
Test Identification	A.M.	Testing Temp.	14°C
Test Location	ON SITE		

#### Destructive Testing Results

	Vice Grip Peel
	Inside Track
Outside Track	
0	

		Tensor	neter Peel	
	1. Track	Ins	de Track	() septe
Outsic	le I rack	I b/Inch	% Separation	Comments
Inch	%Separation			P
	· D	118	0	9
<u>.</u>	Δ	112	0	2
2	0	110	0	<u>_</u>
7	0	11/	0	F
19	0	116	0	μ
10	. 6	115	0	

		Comments
T h/Inch	% Enlongation	Comments
	2.0.0	

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# Wedge Welder Qualifiication Data

	2.4	Wedge Welder #	C4
Date	July 06, 2009	Travel Speed	35%
Project	Batter Latte	Drive Pressure	60
Work Area	Tank Farm	Dwell Pressure	
Material	60 mil	Wedge Setting	
QC tech.	Mp	Wedge Temp.	400°C
Welder/Operator	DAP	Sheet Temp.	
Test Identification	A.M.	Testing Temp.	14°C
Test Location	ON SITE		

#### **Destructive Testing Results**

	Vice Grip Peel	
	Inside T	rack
Outside Track		/
V	L	/

		Tensot	neter Peel	
0 : 11 Tm	alt	Insi	de Track	Commonts
Outside I ra	UK	I b/Inch	% Separation	Comments
b/Inch %S	eparation		0	P
116	0		0	P
113	0		0	P
	0	119		P
	6	121	0	þ
119	0	113	0	

	Seam Tensile	
Lb/Inch	% Enlongation	Comments P P

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# Wedge Welder Qualifiication Data

		Wedge Welder #	<u>C4</u>
Date	July 07, 2009	Travel Speed	350%
Project	Batter Lake	Drive Pressure	60
Work Area	Tank tarm	Dwell Pressure	
Material	60 mil	Wedge Setting	
QC tech.	MP	Wedge Temp.	400°C
Welder/Operator	DAP	Sheet Temp.	
Test Identification	A.M.	Testing Temp.	12°C
Test Location	ON SITE		

# Destructive Testing Results

	Mine Grin Peel	
	Vice Orip Teer Inside Track	
Outside Track		

		Tensom	eter Peel	
		Inside	e Track	Comments
Outside Track		T b/Inch	% Separation	Comments
h/Inch %Se	paration		0	P
7 1	)	117	0	P
1 1	)	116		
7	5	111		P
6	2	117	0	,p
17		113	0	
1 6 7 4	2 0 0	 	0 0	1

Dunn rom

		Comments
T h/Inch	% Enlongation	D
1.0/1101	200	P
80	200	
184	200	

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# Wedge Welder Qualifiication Data

		Wedge Welder #	<u> </u>
Date	July 07, 2009	Travel Speed	35%
Project	Balier Lake	Drive Pressure	60
Work Area	Tonk tarm	Dwell Pressure	
Material	60 mil	Wedge Setting	
QC tech.	MP	Wedge Temp.	400°C
Welder/Operator	PAP	Sheet Temp.	
Test Identification	P.M	Testing Temp.	16°C
Test Location	ON SITE		

#### Destructive Testing Results

	Vice Grip Peel	
	Inside Track	
Outside Track		

Tensometer Peel Inside Track Comments Outside Track % Separation Lb/Inch %Separation Lb/Inch 0 112 D 0 0 112 111 D 117 Ô 0 116 0 114 0 121 D 0 116 112 6 15

	% Enlongation	Comments
Lb/Inch	1.00	P
181	200	1

**ENVIROLING** services Inc.

# P0 box 7539 Saskatoon SK. S7K 4L4 Tel 306 242 8836 Fax 306 249 6721 email:enviroline@sasktel.net

# Extrusion Welding Log

		Comments																			
	mil HDPE		st Vac Pik QC	te Test Test	67 J MJ	107 5	21 1	2 10	107 L	101 5	5	10	1 1 101			104					
OC Tech. MD	Material: 60 mil		Tes	Date Operator Dat	Va DAD OY	17/09 1 02/	7/00 02/	7/09 03	21/ng 01/	04	100		1 60/20	07/01	07/04	01/06 N 01					
				Weld		2 7 2 2 2 10	0 5 0 5	DETRET #1 02/0	5 21 5 21	5 23 53	5 28 04/0	ther #2 04/v	5 34 05 /0	5 36 05/	\$ 55 07/1	of the 4 4 07/					
	roject: BAKER LAKE	Vork Area: TANK FARM			Extrusion # Type	1 Patch	2	0		2	e	7 (6		0	<u> </u>	11 60					

#### **ENVIROLINE** Services Inc. RO Box 7539 Saskatoon SK. S7K 414 1 306 242 8836 Fax 306 249 6721 email enviroline@ sasktel.net

# Extrusion Welding Qualification Data

		Extruder#	X2-2
Date	July 1, 09	Operator	DRP
Project	Baker Lalse	Preheat Temp.	280°C
QC Tech:	Mp	Barrel Temp.	245°C
Material	60 mil	Shoe Height	/4"
Test Identification	P.M.	Weld Type	tiat
Temp.	20		

# Destructive Testing Results

#### Vice Grip Peel

	Comments
+ Type of failure	
)	

#### Tensometer Peel

		Comments
T b/Inch	% Separation	P
LD/IIIcii	0	P
196	0	<u> </u>
115	0	P
115	0	P
107		P
114	0	

	Seam Tensile	
	% Enlongation	Comments
Lb/inch	200	P
181	200	P

-

:10

#### **ENVIROLINE** Services Inc. **PO Box 7539 Saskatdon SK. S7K 414** 1 306 242 8836 Fax 306 249 6721 email enviroline@ sasktel.net

# Extrusion Welding Qualification Data

		Extruder#	XL=L
Date	July 2, 2009	Operator	DAP
Project	Baker Lake	Preheat Temp.	2.80°C
OC Tech:	MP	Barrel Temp.	245°C
Material	60 mil	Shoe Height	1/4"
Test Identification	A.M.	Weld Type	Flat
Temp.	00		

1

Destructive Testing Results

#### Vice Grip Peel

	Comments
Type of failure	

Lat	DOP
Tancomelel	L C C L
1 CHSUIII000	12

	lion	Comments
	% Separation	2
Lb/Inch	0	
113		P
	0	?
17	0	8
116	0	1
115	0	Y
<u> </u>	0	
16		

1	Comments
Lb/inch	7 AD 2
1 179	200Y
)	

#### enviroline services Inc. PO Box 7539 Saskatdon SK. S7K 414 1 **306 242 8836 Fax 306 249 6721 email enviroline@ sasktel.net**

Extrusion Welding Qualification Data

Extrusion words		Extruder#	X2-2
Date	July 03 200	Operator Preheat Temp.	PAP 280°C
QC Tech: Material	MD 60 m;1	Barrel Temp. Shoe Height	230°C
Test Identification	A.M. 10°	Weld Type	Flat
10mp.	Destructive	Testing Results	a <sup>8</sup> a

		~ 1
~	Cuin	Dee
VICE	(TT10)	TUU.
VILU	Orip	

	0 monts
	Comments
Type of failure	
Турос-	
त 	

Tensometer Peel

	of G constion	Comments
T1 Urah	% Separation	P
Lb/Inch	Ó	P
117	0	P
114	0	P
112	. 0	
12	0	
118		
	Seam Tensile	
Sultanta Sultanta		Comments
	% Enlongation	P
Lb/inch	200	P
1. 183	200	1

177

#### **CONVITOLINC** Services Inc. RO Box 7539 Saskatoon SK. S7K 414 3 306 242 8836 Fax 306 249 6721 email enviroline@ sasktel.net

# Extrusion Welding Qualification Data

		Extruder#	X2-2
Date	July 4 2009	Operator	DAP
Project	Bater Lake	Preheat Temp.	280°C
QC Tech:	MD	Barrel Temp.	245°C
Material	60 mil	Shoe Height	1/4 "
Test Identification	AM	Weld Type	Hat
Temp.	190	2	

# Destructive Testing Results

1000	~ '	n
Tino	( trin	Pee
VICE	UIIP	100
1 100		

	Comments
Thurs of failure	Comment
Type of failure	

			D	
1	001	noto	rP	eel
IPT	1901		1 1	UUI
IUI.	1001.	11000		

	0/ Generation	Comments
Lb/Inch	% Separation	P
(17	0	P
114	8	P
116	0	P
112	0	P
3	0	

0	D/ T 1-montion	Comments
T 1 / -1	% Enlongation	D
Lb/inch	2.00	P
100	200	P
183	0-7	

#### **ENVITOLINE** Services Inc. **PO Box 7539 Saskatdon SK. S7K 414** 1 306 242 8836 Fax 306 249 6721 email enviroline@ sasktel.net

# Extrusion Welding Qualification Data

1)

	1. E Dood	Extruder#	X2-2
Date	July 5 6004	Operator	DAP
Project	Bater Lake	Preheat Temp.	270°C
QC Tech:	MP	Barrel Temp.	Z35°C
Material	60 mil	Shoe Height	1/411
Test Identification	A.M.	Weld Type	Flat
Temp.	70		

Destructive Testing Results

Vice Grip Peel

	Comments
	Comments
Type of failure	
)	
)./	
2	

Tensometer Peel

	a/ Generation	Comments
Lb/Inch	% Separation	P
10	0	p
117	0	P
109	0	P P
	Ò	

	Comments
Lb/inch % Enlongation	P
1 178 200	P
173	

#### **ENVITOLINE** Services Inc. **PO Box 7539 Saskatdon SX. S7X 414** 1 306 242 8836 Fax 306 249 6721 email enviroline@ sasktel.net

# Extrusion Welding Qualification Data

	10.00	Extruder#	X2-2
Date	Dunly 6, 2009	Operator	DAP
Project	Daker Lake	Preheat Temp.	272°C
QC Tech:	MP	Barrel Temp.	238°C
Material	60 mil	Shoe Height	1/411
Test Identification	A.M.	Weld Type	Flat
Temp.	1°C		1

Destructive Testing Results

Vice Grip Peel

	Comments
Type of failure	
Type c.	
	1

Tensometer Peel

		Comments
3 5	% Separation	Commente
Lb/Inch	- 0	/
114		P
<u> </u>	6	6
115	0	0
113	D	Y
112	D	P
	0	
111		

e/ Enlongation	Comments
Lb/inch % Efficingation	P
181 200	P
176	

#### **ENVIRONE Services Inc.** PC Box 7539 Saskatoon SK. S7K 414 1 306 242 8836 Fax 306 249 6721 email enviroline@ sasktel.net

# Extrusion Welding Qualification Data

		Extruder#	X2-2
Date	July Z, 09	Operator	DAP
Project	Batter Late	Preheat Temp.	27000
QC Tech:	MP	Barrel Temp.	239°C
Material	60 mil	Shoe Height	/4"
Test Identification	A.M.	Weld Type	Flat
Temp.	7.0		

# Destructive Testing Results

2000/01	~ .	n -1
Ting	( thin	Pee
VICE	(IIII)	1 001
100	- 1	

	Comments
Type of failure	
)	

#### Tensometer Peel

	% Separation	Comments
Lb/Inch	0	P
115	0	P
15	0	P
114	0	

	1 tion	Comments
I b/inch	% Enlongation	Р
	200	P
	200	

**Appendix A3** 

Baker Lake Diesel Fuel Storage Installations: Final Report Following Construction of Phase 3 (2010)



#### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

#### BAKER LAKE FUEL STORAGE INSTALLATIONS TANK # 5 AND # 6

2010

#### FINAL REPORT

#### FOLLOWING THE CONSTRUCTION

OF

PHASE 3 (2010)



#### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

#### **BAKER LAKE FUEL STORAGE INSTALLATIONS**

#### FINAL REPORT

#### FOLLOWING THE CONSTRUCTION

OF

PHASE 3 (2010)

PREPARED BY :

ente ----

France Bérubé,Eng..Jr Civil STAVIBEL

OFESS JGINEE S.M. BEAULE LICENSEE 2011-02-23 NWTINU

Serge Beaulé, Eng. associate Head Department Civil STAVIBEL

#### AGNICO-EAGLE MINES LTD MEADOWBANK DIVISION

#### BAKER LAKE FUEL STORAGE INSTALLATIONS TANK # 5 AND # 6

#### FINAL REPORT

#### FOLLOWING THE CONSTRUCTION PHASE 3 (2010)

#### TABLE OF CONTENTS

Α.	DESCRIPTION OF MANDATE	1
B.	DOCUMENTATION READILY AVAILABLE	2
GOLD	DER ASSOCIATES – Vancouver office (phase 1, 2, 3)	2
NISHI	-KHON/SNC LAVALIN LTD – Vancouver office (phase 1, 2)	2
GEM	STEEL EDMONTON LTD (phase 1, 2, 3)	2
CHA	MCO INDUSTRIES LTD (phase 1, 2)	2
C.	STAVIBEL, ROUYN-NORANDA OFFICE (PHASE 3)	3
D.	ADDITIONAL COLLECTION OF INFORMATION	4
E.	REVISION OF CONSTRUCTION DRAWINGS	5
F.	VERIFICATION TO STORAGE CAPACITY WITHIN BERMS	6
DESIG	GN REVIEW – FOR FUEL SPILL CONTAINMENT BERMS AT BAKER LAKE	7

APPENDIX 1 : DRAWINGS APPENDIX 2 : SAFE FILL LEVEL FOR ALL FUEL TANK

#### A. DESCRIPTION OF MANDATE

Agnico-Eagle Mines has given a mandate to Stavibel, engineering services in order to verify the compliance with applicable regulations of its fuel storage installations in Baker Lake, Nunavut.

Accord to the terms of reference, the mandate consists summarily in the following activities.

- A. Review and compilation of the available documentation;
- B. Collection of any information that may be missing;
- C. REVISION OF CONSTRUCTION DRAWINGS
  - Preparation of « AS BUILT » drawing of the construction tank #5 and #6, of phase 3.
- D. Verifications to the storage capacity within the existing containment berms of phase 3.

#### **B. DOCUMENTATION READILY AVAILABLE**

#### GOLDER ASSOCIATES - Vancouver office (phase 1, 2, 3)

For the Baker Lake bulk fuel storage facilities, this firm has produced some construction specifications on 2006-04-25, which were given reference SP-GAL-03 under their project number 06-1413-009.

#### NISHI-KHON/SNC LAVALIN LTD - Vancouver office (phase 1, 2)

For the Baker Lake bulk fuel facilities, this firm has produced a set of drawings issued **for construction** on 2007-08-03, under their project number 017202. Some specifications for fuel piping and valves were also issued.

EARTHWORK DRAWINGS	017202-1000-41D1-0006	17202-1000-46ES-1001A	017202-8000-46DC-9150
017202-1000-41D1-0001	FUEL PIPING DRAWINGS	17202-1000-46ES-1001B	017202-8000-46DC-9152
017202-1000-41D1-0002	017202-1000-41D1-0007	ELECTRICAL DRAWINGS	017202-8000-46DC-9153
017202-1000-41D1-0003	017202-1000-46D4-1004	017202-1000-46D6-1001	017202-8000-46DC-9156
017202-1000-41D1-0004	017202-1000-46D4-1005	017202-1000-47D2-2001	017202-8000-46DC-9157
017202-1000-41D1-0005	017202-1000-46D4-1006	017202-8000-47DA-9004	017202-8000-46DC-9166

#### GEM STEEL EDMONTON LTD (phase 1, 2, 3)

This vendor has submitted a set of « AS BUILT »drawings issued for the completion and permitting, which consist in four (4) structural drawings showing the details of a fuel tank of 10 million liters nominal capacity. These fuel tanks are shown on revision 1 of drawings BL-2010-1, BL210-2, BL-2010-3 and BL-2010-4.

#### CHAMCO INDUSTRIES LTD (phase 1, 2)

This vendor has submitted a set of drawings issued **for construction** under their project number 1014938ABS, consisting of the following drawings. These documents have all been received by HATCH and approved.

DRAWING NUMBER	H325174-M268-VD-0040	H325174-M268-VD-0041	H325174-M268-VD-0010
H325174-M268-VD-0011	H325174-M268-VD-0012	H325174-M268-VD-0013	H325174-M268-VD-0014
H325174-M268-VD-0015	H325174-M268-VD-0016	H325174-M268-VD-0017	H325174-M268-VD-0019
H325174-M268-VD-0020	H325174-M268-VD-0021	H325174-M268-VD-0029	H325174-M268-VD-0030
H325174-M268-VD-0031	H325174-M268-VD-0032	H325174-M268-VD-0033	H325174-M268-VD-0034
H325174-M268-VD-0035	H325174-M268-VD-0036	H325174-M268-VD-0037	H325174-M268-VD-0039

#### C. STAVIBEL, ROUYN-NORANDA OFFICE (phase 3)

This firm has produced a set of construction and has built drawings consisting of the following drawings.

Fuel tanks of phase 3 are shown on these drawing as well as the earthwork, the piping and electrical grounding details.

#### Earthwork drawings

DRAWING NUMBER
740-C-0123
740-C-0124
740-C-0125

#### Fuel piping drawings

DRAWING NUMBER
740-M-0100

#### **Electrical drawings**

DRAWING NUMBER
740-E-0120

#### D. ADDITIONAL COLLECTION OF INFORMATION

#### TECHNIC EXPERT INC.

Role during construction phase #3: Field supervision during construction of phase 3 (2010)

Mr. Luc Croisetière, which is a civil consultant at the time and Julie Bacon (AEM employee), have supervised the construction of the fuel containment area around tank #5 and #6, in phase 3 of this project. A specialized crew coming from Saskatoon (Enviroline Service inc.) was hired in May 2010 to install an HDPE membrane over the berms. This HDPE membrane has been covered with a minimum layer of about 150 mm thickness of crushed stone.

The installation of the liners has been done and completed on October 5<sup>th</sup> 2010 before the blizzard and show arrival. Also, before any fuel fill in these new set of tank.

#### QAMANITTUAP, SANA, GILBERT GOUP.

Role during construction phase #3

In early May 2010, and considering a short window of time for the 2010 tanks construction, (2) diamond drills and (1) crew of blasters were required 24 hr/day considering an estimated  $\pm$  125 000 tons of rock to blast, excavate and haul to a dump area. The bottom final floor was cutted at the elevation  $\pm$  35.5 and completely on slip rock.

#### GEM STEEL EDMONTON LTD

<u>Role during construction phase #3</u>: Fabrication and field assembly of 10 M liters fuel tanks

Construction of phase 3 (tanks #5 and #6) took place from July to September 2010, with a crew of about 16 workers.

Following phase 3 of this field word, a crew from ACUREN has proceeded to X-RAY testing of horizontal and vertical welds according to specifications described in the latest edition of API Standard 650. According to the report made by ACUREN, minor repairs of defective welds were required, either on the tank shell or nozzles.

#### SM CONSTRUCTION INC.

Role during construction phase #3

As the connection and pipe were already built in 2009 for the phase 3 futur development a crew of 4 welders have installed pipeline from existing tank #4 to reach tank #5 and #6. This work have been completed on September 30<sup>th</sup> 2010. The tank fuel filling planned in mid-october 2010.

#### E. REVISION OF CONSTRUCTION DRAWINGS

AEM has hired Stavibel Engineering Services, a firm based in Rouyn-Noranda, in order to complete the drawings that were used in producing this report. Those drawings are enclosed in Appendix 1 of this report.

**Drawing 740-C-0123** shows the general layout of fuel storage area. It has been compiled using surveying data by a crew from NUNA and Agnico Eagle.

**Drawing 740-C-0124** shows the cross sections of the containment area of phase 3. They are generated using AutoCad CIVIL 3D software and based on the informations collected by Agnico Eagle.

**Drawing 740-C-0125** shows the details of the HDPE membrane, its limits and the components of the phase3.

**Drawing 740-M-0100 G** shows the general of the piping layout and also the specification of the main equipment (valves, check valves, etc.)

**Drawing 740-E-0120** shows the layout and the details of the electrical grounding of fuel storage area. It's based on the informations collected by Agnico Eagle.

Drawing BL2010-01 shows the general tank elevation of the fuel storage tanks.

Drawing BL2010-02 shows the roof and the nozzle plan of the fuel storage tanks.

Drawing BL2010-03 shows the details of the assembly of the fuel storage tanks.

**Drawing BL2010-04** shows also the details of the assembly of the fuel storage tanks.

#### F. VERIFICATION TO STORAGE CAPACITY WITHIN BERMS

Stavibel Engineering Services has completed verifications on the liquid storage capacity inside the containment berms, which create an impermeable enclosure around tank #5 and #6.

The method used was volume calculation using AutoCad CIVIL 3D software.

The maximum storage capacity of fuel tanks #5 and #6 is 15 500 m<sup>3</sup> of diesel fuel at a standard temperature of fifteen degrees Celcius (15 °C).

It has been verified using the above software that the impermeable enclosure built in phase 3 will effectively hold 100% of the maximum storage capacity of the biggest tank, plus 10% of the maximum storage of the other tank. This calculation has been summarized in a worksheet that is shown on page 7, here under.

The containment volume for tanks #3 and #4 is 15 500 m<sup>3</sup>.

Thus, the lowest point of the HDPE membrane that sits atop the containment area is sufficiently high (at elevation 39.3 m) to meet the above criteria.

A worst case scenario has been simulated, and consists in either a rupture of the first course of side plates in the tank shell, or a failure in the outlet piping, when either one of fuel tank is 100% full.

This simulation shows that, in such a worst case scenario, the hydraulic balancing level inside the containment area would not exceed the point with the lowest elevation (39.3 m) on the surrounding berms, which is located on the south-west side. On north-east side, the berm gives more elevation at an elevation of approximative  $\pm 45$  m.

The containment volume for tanks #5 and #6 is 15 500 m<sup>3</sup> as a result, this new containment requirement of 110% of the biggest tank volume (or 11 843 m<sup>3</sup>), expressed while considering all two (2) tanks as a whole, will then be exceeded by 45%.

#### DESIGN REVIEW – FOR FUEL SPILL CONTAINMENT BERMS AT BAKER LAKE

ÉQUIPEMENTS	DIAM (ft)	RIM EL. (m)	Radius (m)	Surface (m²)	TOP EL. (m)	Height (m)	Volume (m <sup>3</sup> )
740-TK-044- <b>TANK</b> #5	110	*37.846	16.764	882.89	50.04	12.195	10.767
740-TK-044- <b>TANK</b> #5	110	*37.831	16.764	882.89	50.03	12.195	10.767

Let's say berms are 5' 3" higher than the average tank floor (so 1.60 m total height) with variable slopes and that the tanks are sitting on cones made of crushed stone of 20 m diameter x 1.0 m height.

\*Average tank #5 = (37.839 + 37.846 + 37.848 + 37.852)/4 = 37.846 \*Average tank #6 = (37.835 + 37.825 + 37.830 + 37.833)/4 = 37.831

Secondary Containment Requirement  $\rightarrow 11\,843\,\mathrm{m}^3$ 

according to ref. PN-1326, Section 3.9.1 (1) 2-b-ii  $\rightarrow$  110%

Containment volume to be substracted for the two (2) cones made of crushed stone: already reducted from AutoCad 3D

<u>Volume</u> NET CONTAINMENT 15 500 m<sup>3</sup> or 144% > 110%

#### **APPENDIX 1**

#### AS BUILT DRAWINGS FOR PHASE 3

DRAWINGS NUMBER					
Earthwork drawings	Fuel piping drawing	GEM Steel drawings	BL2010-4		
740-C-0123	740-M-0100	BL2010-1			
740-C-0124	Electrical drawings	BL2010-2			
740-C-0125	740-E-0120	BL2010-3			

#### IFC DRAWING FOR PHASE 3

DRAWINGS NUMBER					
Earthwork drawings	Fuel piping drawing	GEM Steel drawings	BL2010-4		
740-C-0123	740-M-0100	BL2010-1			
740-C-0124	Electrical drawings	BL2010-2			
740-C-0125	740-E-0120	BL2010-3			



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-4.979 HA			TEL QUE CONSTRUIT AS BUILT AS DATE : 21/01-2011	E
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			C       21-01-2011 AS BOILT       0-1.3.       3.5.         B       20-07-2010 APPROVAL       J-F.S.       S.B.         A       16-07-2010 APPROVAL       J-F.S.       S.B.         REV.       DATE       DESCRIPTION       PAR/BY APP.       CLIENT         REVISIONS       Stavibel inc.       150, rue Gamble Ouest       Rouyn-Noranda (Québec) J9X 2R7       Tél.: 819 764-5181 Téléc.: 819 797-0158         Courriel:       stavibel-rn@stavibel.qc.ca       www.stavibel.qc.ca       www.stavibel.qc.ca	
			Projet No. : - TTTRE / TTTLE AGNICO-EAGLE - MEADOWBANK DIVISION BAKER LAKE AREA 740 TANK #5 AND #6 GENERAL LAYOUT	В
			DESSINE PAR DRAWN BYJ-F SYLVESTRE, TECH.DATE 2010-07-20VERIFIE PAR CHECKED BYFRANCE BÉRUBÉ, ING. JR.2010-07-20APPROUVÉ PAR APPROVED BYSERGE BEAULÉ, ING.2010-07-20ÉCHELLE SCALE1:1000DATE 30-06-2010NO. DESSIN DRAWING NO. $740-0-0123$	A
	0m 25m 50m GRAPHICAL SCALE	75m	NO. PROJET PROJECT NO. MEAD-I-400 C 1/3	





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FORMAT ARCHD



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	5'		'4	<b>.</b>		5 	3		2		
				Piping	Symbol	Equipment	Detalis	Туре	Models	Diameter	Quantity
					Ø	Gate Valve	Integrally reinforced extended body gate, female socket weld outboard end; API STD 602; forged carbon steel; ASTM A 105/A 105M; OS&Y welded bonnet or bolted bonnet with flexible graphite-filled spiral wound gasket; trim #8; flexible graphite packing; metal tagged V903; Class 800	NA	Velan W-DD-2-17-4W-02-TY (1") or equivalent	1"	2
				Filling of Tank 740-TK-048 Tank 740-TK-049	Ø	Gate Valve	Class 150; flanged, raised-face; API STD 600; carbon steel body, ASTM A 105/A 105M or ASTM A 216/A 216M Grade WCB; OS&Y solid or flexible wedge; bolted bonnet with stainless steel reinforced flexible graphite bonnet gasket; trim #8; flexible graphite packing; metal tagged VGA01; full port.	NA	Velan F-DD-0-06-4C-02-TY (6") or equivalent	6"	7
					w	Flanged Mettalic flexible tube	- Flanges: Class 150, raised face and ANSI B16.5; - Metallic flexible tube: 18" length in Stainless Steel	NA	CONNECTALL AA1-096-0180 or equivalent	6"	4
					國	Motorized Valve	<ul> <li>- 6" direct mount split body ball valve;</li> <li>- Body materieal: Carbon Steel Body;</li> <li>- SS 316 Trim, Seat Reinforced TFE Seats;</li> <li>- Flanges: Class 150 raised face and ANSI B16.5;</li> <li>C/W: Actuator Electric Serie XE (XE-6900) ATEX certified for</li> <li>Flame Proof Eexd IIB T4 + Heater</li> </ul>	NA	Matheson valves D9C-F1-600-XHE1-XX 6.00	6"	2
						Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	1" 6"	- as required
						Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	1" 6"	- as required
					Ø	Gate Valve	Class 150; flanged, raised-face; API STD 600; carbon steel body, ASTM A 105/A 105M or ASTM A 216/A 216M Grade WCB; OS&Y solid or flexible wedge; bolted bonnet with stainless steel reinforced flexible graphite bonnet gasket; trim #8; flexible graphite packing; metal tagged VGA01; full port.	NA	Velan F-DD-0-06-4C-02-TY (4") or equivalent	4"	7
				Distribution from Tank 740-TK-048 Tank 740-TK-049	Ø	Gate Valve	Integrally reinforced extended body gate, female socket weld outboard end; API STD 602; forged carbon steel; ASTM A 105/A 105M; OS&Y welded bonnet or bolted bonnet with flexible graphite-filled spiral wound gasket; trim #8; flexible graphite packing; metal tagged V903; Class 800	NA	Velan W-DD-2-17-4W-02-TY (1") or equivalent	1"	2
					w	Flanged Mettalic flexible tube	- Flanges: Class 150, raised face and ANSI B16.5; - Metallic flexible tube: 18" length in Stainless Steel	NA	CONNECTALL AA1-064-0150 or equivalent	4"	4
					2	Check valve	<ul> <li>Cast steel flanged check valve ;</li> <li>Body material: Low temperature cast carbon steel to ASTM A352, grade LCB;</li> <li>Trim material: Disc - Stainless steel, 13% Cr Seat - Stainless steel, 13% Cr;</li> <li>Valve: Face to face dimensions to ANSI B16.10;</li> <li>Flanges: Class 150, raised face and ANSI B16.5.</li> </ul>	CKF1 <sup>(1)</sup>	Kitz 150 SCOBL or equivalent	4"	3
					₽	Motorized Valve	<ul> <li>- 4" direct mount split body ball valve;</li> <li>- Body materieal: Carbon Steel Body;</li> <li>- SS 316 Trim, Seat Reinforced TFE Seats;</li> <li>- Flanges: Class 150 raised face and ANSI B16.5;</li> <li>C/W: Actuator Electric Serie XE (XE-2640) ATEX certifled for Flame Proof Eexd IIB T4 + Heater</li> </ul>	NA	Matheson valves D9C-F1-400-XEE-1-XX 4.00	4"	2
						Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	1" 4"	- as required
 						Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	1" 4"	- as required
					þ	Gate Valve	Integrally reinforced extended body gate, female socket weld outboard end; API STD 602; forged carbon steel; ASTM A 105/A 105M; OS&Y welded bonnet or bolted bonnet with flexible graphite-filled spiral wound gasket; trim #8; flexible graphite packing; metal tagged V903; Class 800	NA	Velan W-DD-2-17-4W-02-TY (ゾ") or equivalent	Ж <sup>и</sup>	8
				Overpressure line filling tank 740-TK-048	w	Flanged Mettalic flexible tube	- Flanges: Class 150, raised face and ANSI B16.5; - Metallic flexible tube: 18" length in Stainless Steel	NA	CONNECTALL AA-B1B1-HHH-0180-0150 or equivalent	Х"	4
				filling tank 740-TK-049	Â	Pressure safety valve	- Stainless steel; - Set pressure at 75 PSi	NA	Swagelok SS-RL4M8F8-BU	"Х	2
						Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	%"	as required
						Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	%"	as required
				<sup>(1)</sup> Reference to "PIPE AND	VALVE SPECIFICATIO	N" #0 17202-0000-46E	S-1001 by SNC Lavalin 15 <sup>th</sup> august 2007	• · ·			



PIPING DETAILS

4

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<sup>(1)</sup> Reference to "PIPE AND VALVE SPECIFICATION" #0 17202-0000-46ES-1001 by SNC Lavalin 15<sup>th</sup> august 2007



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50	100	150	200	250	300mm	
	5		4		3	

Piping	Symbol	Equipment	Details	Type	Models	Diameter	Quantity
	X	Gate Valve	Class 150; flanged, face to face dimension ANSI B16.10, End flange dimension ANSI B16.5, API STD 600; carbon steel body, ASTM A 352-LCC	NA	Beric Class 150	1"	2
Filling of Tank 740-TK-048 Tank 740-TK-049	Χ	Gate Valve	Class 150; flanged, face to face dimension ANSI B16.10, End flange dimension ANSI B16.5, API STD 600; carbon steel body, ASTM A 352-LCC	NA	Beric Class 150	6"	4
Tank 740-TK-049	Ś	Flanged Mettalic flexible tube	<ul> <li>Flanges: Class 150, raised face and ANSI B16.5, carbon steel;</li> <li>Metallic flexible tube: 18" length in Stainless Steel</li> </ul>	NA	CONNECTALL AAB1B1LLL0240	6''	2
		Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	1" 6"	as required
		Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	1" 6"	as required
	X	Gate Valve	Class 150; flanged, face to face dimension ANSI B16.10, End flange dimension ANSI B16.5, API STD 600; carbon steel body, ASTM A 352-LCC	NA	Beric Class 150	4"	4
Distribution from Tank 740-TK-048 Tank 740-TK-049	Χ	Gate Valve	Class 150; flanged, face to face dimension ANSI B16.10, End flange dimension ANSI B16.5, API STD 600; carbon steel body, ASTM A 352-LCC	NA	Beric Class 150	1"	4
	Ś	Flanged Mettalic flexible tube	<ul> <li>Flanges: Class 150, raised face and ANSI B16.5, carbon steel;</li> <li>Metallic flexible tube: 18" length in Stainless Steel</li> </ul>	NA	CONNECTALL AAB1B1WWW0240	4"	2
	2	Check valve	Class 150; flanged, face to face dimension ANSI B16.10, End flange dimension ANSI B16.5, ANSI B16.34 (CONFORMS TO THE APPLICABLE REQUIREMENTS OF API 600), carbon steel body, ASTM A 352-LCC	NA	Beric Class 150	4"	2
	Xa	Motorized Valve	<ul> <li>Ball valve class 150;</li> <li>Body materieal: Carbon Steel Body;</li> <li>Reinforced TFE Seats;</li> <li>Flanges: Class 150 raised face and ANSI B16.5;</li> <li>C/W: Actuator Electric Serie XE (XE-2640) ATEX certified for Flame Proof Eexd IIB T4 + Heater</li> </ul>	NA	TRIAC Actuator electric XE-2640 C/W Ball valve classe 150	4"	1
		Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	1" 4"	as required
		Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	1" 4"	as required
	Χ	Gate Valve	Class 150; flanged, face to face dimension ANSI B16.10, End flange dimension ANSI B16.5, API STD 600; carbon steel body, ASTM A 352-LCC	NA	Beric Class 150	2"	4
	Χ	Gate Valve	Class 150; flanged, face to face dimension ANSI B16.10, End flange dimension ANSI B16.5, API STD 600; carbon steel body, ASTM A 352-LCC	NA	Beric Class 150	1"	2
Overpressure line		Check valve	-Carbon steel; - Set pressure at 25 PSI;	NA	Check All UN-3 (U3)	1"	1
filling tank 740-TK-048 filling tank 740-TK-049	Â	Pressure safety valve	-Carbon steel; - Set pressure at 80 PSI; - 16 USGPM capacity; - Temperature range: -50 to 750F	NA	FARRIS Serie 2700	1"	1
		Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	1/2"	as required
		Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	1⁄2"	as required



PIPING DETAILS

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FORMAT	ARCHD

PLAN CLÉ KEY PLAN	
RAMO AND	
NATURALDITCH	
	G
NOTES GENERAL / GENERAL NOTES	
AT THE BOTTOM OF THE TANK 2-MOTORIZED VALVES ARE INSTALLED BUT	
NOT RECORDED. THEY ARE IN OPEN POSITION.	
	F
	-
LINGOMANION G-CONTRIBUE ESI LA PROPRETE DE ADRICO-FARE LIEE EL TOTTE INTERNATION G-CONTRIBUE SUR DEMANDE. SANS AUTORSATION ECORTE PREALBLE, TOTTE TRANSMISSION DE COPRES) À AUTRI ET TOTTE UTULISATION AUTRE QUE CELLE POUR LAQUELE L'INFORMATION EST PRETÉE Sont Interdites. © Agnico-Fare Liée The information meteron is the property of Agnico-Fare LD, and must be returned upon request. Without written permission,	
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TITRE / TITLE # DWG	
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AGNICO-EAGLE	
1         31-01-2011         AS         FIELD         K.F         JM.C           0         2010-08-12         FOR         CONSTRUCTION         MA.BÉD         JM.C           B         2010-07-20         FOR         APPROVAL         V.Cre.         JM.C	С
A     2010-07-16     FOR     APPROVAL     V.Cre.     JM.C       REV.     DATE     DESCRIPTION     PAR/BY     APP.     CLIENT	
REVISIONS	
AGNICO-EAGLE - MEADOWBANK DIVISION BAKER LAKE AREA 740	В
TANK #5 AND #6 FUEL DISTRIBUTION PIPING	
LAYOUT AND DETAILS	
DESSINÉ PAR DRAWN BY VICKY CRÊTE, TECH. DATE 2010-07-16	
VERIFIÉ PAR CHECKED BY J-M CHARRON, Ing. 2010-08-20	
APPROUVÉ PAR APPROVED BY J–M CHARRON, Ing. 2010–08–20	
ÉCHELLE DATE SCALE N/A	^
NO. DESSIN DRAWING NO. 740-M-0100	A
NO. PROJET REVISION FEUILLE / SHT PROJECT NO.	
MEAD-I-400 1 1/1	
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FILE NO. VD2622-001(MEAD-I-400)01.dwg



 50	100	150	200	250	1	300mm					<del></del>
	5'		'4	<b>.</b>		5 	3		2		
				Piping	Symbol	Equipment	Detalis	Туре	Models	Diameter	Quantity
					Ø	Gate Valve	Integrally reinforced extended body gate, female socket weld outboard end; API STD 602; forged carbon steel; ASTM A 105/A 105M; OS&Y welded bonnet or bolted bonnet with flexible graphite-filled spiral wound gasket; trim #8; flexible graphite packing; metal tagged V903; Class 800	NA	Velan W-DD-2-17-4W-02-TY (1") or equivalent	1"	2
				Filling of Tank 740-TK-048 Tank 740-TK-049	Ø	Gate Valve	Class 150; flanged, raised-face; API STD 600; carbon steel body, ASTM A 105/A 105M or ASTM A 216/A 216M Grade WCB; OS&Y solid or flexible wedge; bolted bonnet with stainless steel reinforced flexible graphite bonnet gasket; trim #8; flexible graphite packing; metal tagged VGA01; full port.	NA	Velan F-DD-0-06-4C-02-TY (6") or equivalent	6"	7
					w	Flanged Mettalic flexible tube	- Flanges: Class 150, raised face and ANSI B16.5; - Metallic flexible tube: 18" length in Stainless Steel	NA	CONNECTALL AA1-096-0180 or equivalent	6"	4
					國	Motorized Valve	<ul> <li>- 6" direct mount split body ball valve;</li> <li>- Body materieal: Carbon Steel Body;</li> <li>- SS 316 Trim, Seat Reinforced TFE Seats;</li> <li>- Flanges: Class 150 raised face and ANSI B16.5;</li> <li>C/W: Actuator Electric Serie XE (XE-6900) ATEX certified for</li> <li>Flame Proof Eexd IIB T4 + Heater</li> </ul>	NA	Matheson valves D9C-F1-600-XHE1-XX 6.00	6"	2
						Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	1" 6"	- as required
						Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	1" 6"	- as required
					Ø	Gate Valve	Class 150; flanged, raised-face; API STD 600; carbon steel body, ASTM A 105/A 105M or ASTM A 216/A 216M Grade WCB; OS&Y solid or flexible wedge; bolted bonnet with stainless steel reinforced flexible graphite bonnet gasket; trim #8; flexible graphite packing; metal tagged VGA01; full port.	NA	Velan F-DD-0-06-4C-02-TY (4") or equivalent	<b>4</b> "	7
				Distribution from Tank 740-TK-048 Tank 740-TK-049	Ø	Gate Valve	Integrally reinforced extended body gate, female socket weld outboard end; API STD 602; forged carbon steel; ASTM A 105/A 105M; OS&Y welded bonnet or bolted bonnet with flexible graphite-filled spiral wound gasket; trim #8; flexible graphite packing; metal tagged V903; Class 800	NA	Velan W-DD-2-17-4W-02-TY (1") or equivalent	1"	2
					w	Flanged Mettalic flexible tube	- Flanges: Class 150, raised face and ANSI B16.5; - Metallic flexible tube: 18" length in Stainless Steel	NA	CONNECTALL AA1-064-0150 or equivalent	4"	4
					2	Check valve	<ul> <li>Cast steel flanged check valve ;</li> <li>Body material: Low temperature cast carbon steel to ASTM A352, grade LCB;</li> <li>Trim material: Disc - Stainless steel, 13% Cr Seat - Stainless steel, 13% Cr;</li> <li>Valve: Face to face dimensions to ANSI B16.10;</li> <li>Flanges: Class 150, raised face and ANSI B16.5.</li> </ul>	CKF1 <sup>(1)</sup>	Kitz 150 SCOBL or equivalent	4"	3
					₽	Motorized Valve	<ul> <li>- 4" direct mount split body ball valve;</li> <li>- Body materieal: Carbon Steel Body;</li> <li>- SS 316 Trim, Seat Reinforced TFE Seats;</li> <li>- Flanges: Class 150 raised face and ANSI B16.5;</li> <li>C/W: Actuator Electric Serie XE (XE-2640) ATEX certifled for Flame Proof Eexd IIB T4 + Heater</li> </ul>	NA	Matheson valves D9C-F1-400-XEE-1-XX 4.00	4"	2
						Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	1" 4"	- as required
 						Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	1" 4"	- as required
					þ	Gate Valve	Integrally reinforced extended body gate, female socket weld outboard end; API STD 602; forged carbon steel; ASTM A 105/A 105M; OS&Y welded bonnet or bolted bonnet with flexible graphite-filled spiral wound gasket; trim #8; flexible graphite packing; metal tagged V903; Class 800	NA	Velan W-DD-2-17-4W-02-TY (ゾ") or equivalent	Ж <sup>и</sup>	8
				Overpressure line filling tank 740-TK-048	w	Flanged Mettalic flexible tube	- Flanges: Class 150, raised face and ANSI B16.5; - Metallic flexible tube: 18" length in Stainless Steel	NA	CONNECTALL AA-B1B1-HHH-0180-0150 or equivalent	Х"	4
				filling tank 740-TK-049	Â	Pressure safety valve	- Stainless steel; - Set pressure at 75 PSi	NA	Swagelok SS-RL4M8F8-BU	%"	2
						Gasket	Composition: Aramid fibers with a nitril binder Tickness: 1/8"	NA	Garlock Blue guard Style 3000	%"	as required
						Piping	Carbon steel piping sch. 40 ASTM A53 gr.B seamless	NA	NA	%"	as required
				<sup>(1)</sup> Reference to "PIPE AND	VALVE SPECIFICATIO	N" #0 17202-0000-46E	S-1001 by SNC Lavalin 15 <sup>th</sup> august 2007	• · ·			



PIPING DETAILS

4

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<sup>(1)</sup> Reference to "PIPE AND VALVE SPECIFICATION" #0 17202-0000-46ES-1001 by SNC Lavalin 15<sup>th</sup> august 2007



2

#### **APPENDIX 2**

#### SAFE FILL LEVELS FOR ALL FUEL TANKS

TEMPERATUE OF FUEL	MAXIMUM FUEL LEVEL To be read on the VAREC float level					
in the barge at discharge	TANK # 5	TANK #6				
0 °C	9,63	9,63				
+ 5 °C	9,67	9,67				
+ 10 °C	9,72	9,72				
+ 15 °C	9,76	9,76				

NOTE: EACH TANK HAS A SLIGHTLY DIFFERENT ELEVATION, SO CARE MUST BE TAKEN DURING HYDRAULIC BALANCING OF TANKS, ESPECIALLY WHEN THOSE ARE FULL Appendix A4

Baker Lake Jet-A Fuel Storage Installations: As-built Report (Agnico Eagle (2013)



#### **AGNICO EAGLE MINES LTD**

**MEADOWBANK DIVISION** 

#### **BAKER LAKE JET A FUEL STORAGE INSTALLATIONS**

#### 2013

#### AS BUILT CONSTRUCTION REPORT

**PREPARED BY:** 

**Yanick Simard** 

Project General Foreman

AEM.

**APPROVED BY:** 



#### AGNICO EAGLE MINES LTD

#### MEADOWBANK DIVISION

#### BAKER LAKE JET A FUEL STORAGE INSTALLATIONS

#### 2013

#### AS BUILT CONSTRUCTION REPORT

#### TABLE OF CONTENTS

1.	DESCRIPTION OF CONSTRUCTION ACTIVITIES	1
2.	DESCRIPTION OF THE FUEL CONTAINEMENT PAD CONSTRUCTION STEPS	2
2.1	Excavation of the existing area	2
2.2	Construction of the pad Phase 1	2
2.3	Installation of the bituminous liner	3
2.4	Construction of the pad Phase 2	3
3.	DESCRIPTION OF THE FACILITIES AND MECHANICAL PARTS ASSEMBLING	4
3.1	New tanks placement and installation of the pump house	4
3.2	Piping connection and electrical assembling phase 1	4
3.2	Piping connection and electrical assembling Phase 2	5

APPENDIX 1: DRAWINGS

APPENDIX 2: STAVIBEL'S CONSTRUCTION DAILY REPORTS APPENDIX 3: SM'S TECHNICAL DATA SHEETS & DRAWINGS DOCUMENT

#### 1- DESCRIPTION OF CONSTRUCTION ACTIVITIES

Agnico Eagle mines has contracted Stavibel Engineering Services to design the Jet A fuel storage facilities located in Baker Lake, Nunavut, complying with specifications required by environmental and governmental regulations, namely Environment Canada's Fuel Tank Storage Regulations and the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.

Stavibel provided the design, planning and construction oversight related to the installation of infrastructure of AEM's new Jet A Fuel Storage facility which consists of 20 – 100,000L double walled tanks, associated piping and pumping systems and secondary requirement. AEM prepared a site survey to ensure proper measurements and elevation of the existing area.

The main activities related to the construction were scheduled as follow:

- I: AEM sent surveyed data of the existing area to Stavibel
- II: Stavibel sent first design plans for comments
- III: AEM moved the existing tanks and prepared the field for the construction
- IV: Construction of the infrastructure pad
- V: Assembling of all the installation of tanks and mechanical infrastructure.
#### 2- DESCRIPTION OF THE FUEL CONTAINEMENT PAD CONSTRUCTION STEPS

**2.1 EXCAVATION OF THE EXISTING AREA**. July 14<sup>th</sup> 2013.

<u>Quality control and quality approval</u>: Stavibel

Construction contractor: Quamanittuap-Sana (FGL)

General supervision and foreman: AEM

Starting with test pits, the presence of water was observed in the excavation area. It was then decided to increase the elevation of the pad by +300mm. Presence of contaminated soil was found as well; it was removed, analyzed by environmental department and sent to the soil landfarm at Meadowbank. The total amount was 128m3. All non-contaminated soil and rock that was removed and was placed aside to be used during the backfilling of the pad. (1) 365 CAT excavator, (1) D6 CAT dozer, (1) operator and (1) surveyor were necessary for the initial phase.

**2.2 CONSTRUCTION OF THE PAD PHASE 1.** July 15<sup>th</sup> – July 25<sup>th</sup> 2013.

<u>Quality control and quality approval</u>: Stavibel

Construction contractor: Quamanittuap-Sana (FGL)

Material transportation: BLCS

General supervision and foreman: AEM

During this phase of the project, a (1) 365 CAT excavator, (1) 320 CAT excavator, (1)Komatsu 39PX dozer, (1) Hamm 3625 compactor and (1) 740 CAT haul truck were utilized. In addition, staff included were (1) operator plus (1) surveyor. The first step was to backfill the pad up to the determined level with 0-200mm NPAG rock, and then enlarge the road south of the pad. Excess water (clean) was drained in order to construct the containment berms around the pad as showed in appendix 1 B. Once the rock pad was at the determined elevation, crushed 0-20mm NPAG material was placed on top of the berms. Correctives measures around the pad were undertaken due to some instability in the area where the fuel cabinet would be installed. Crushed 0-20mm NPAG material was placed on the top of the pad, compacted to prepare for the installation of the bituminous liner. Excavation in the surrounding ditches was completed in accordance with design specifications. A total amount of 1217m3 of NPAG 0-200mm and 455m3 of NPAG 0-20mm was used to complete this phase of the construction.

#### 2.3 INSTALATION OF THE BITOUMINOUS LINER.

July 25<sup>th</sup> – July 27<sup>th</sup> 2013

<u>Quality control and quality approval</u>: Stavibel

Construction contractor: Quamanittuap-Sana (FGL)

Liner crew: Texcel

General supervision and foreman: AEM

Equipment and manpower used included (1) 365 CAT excavator to unroll the liner and we had (1) operator, (1) surveyor, (2) liner installers and (3) laborers from Baker Lake. The liner was installed over a two day period. After installation, any holes that resulted were repaired and conformity tests were undertaken (pressure and tension). In addition, soft geotextile was placed under and over the liner to prevent puncturing that could occur while walking on the liner or during placement of the covering granular material. It was calculated that 2400m2 of bituminous liner and 2625m2 of soft geotextile was placed.

## 2.4 **CONSTRUCTION OF THE TANK PAD PHASE 2.** July 27<sup>th</sup>- July 31<sup>st</sup> 2013

Quality control and quality approval:StavibelConstruction contractor:Quamanittuap-Sana (FGL)Material transportation:BLCSGeneral supervision and foreman:AEM

Phase 2 of construction of the pad was to place crushed 0-20mm NPAG over the bituminous liner (previously covered with geotextile). The following equipment and manpower were used, (1) 365 CAT excavator, (1) 307 Cat excavator, (1) 39 PX Komatsu bulldozer, (1) 740 CAT haul truck, (1) Hamm 3625 compactor, (1) operator and (1) surveyor. During this phase the contractor's (BLCS) was out of service due to mechanical issues so the 0-20mm NPAG layer was screened to maintain quality. Any materials that screened larger than 0-20mm were removed by hand. A total of 728m3 of 0-20mm NPAG granular material were used to build the 300mm thick layer of liner protection. A slopped trench was excavated (1000mm up to ground level) to place an 8 inches steel conduit for electrical cable necessary to operate the pump house.

• FURTHER INFORMATION, PICTURES AND PLANS FOR THOSE STEPS CAN BE FOUND IN THE APPENDIX 1 AND 2

3.

### 3- DESCRIPTION OF THE FACILITIES AND MECHANICAL PARTS ASSEMBLING.

### **3.1** NEW TANKS PLACEMENT AND INSTALATION OF THE PUMP HOUSE. Aug 5<sup>th</sup> –Aug 12<sup>th</sup> 2013

Installation crew: SM Construction

Field supervisor: Quamanittuap-Sana (FGL)

Crane and operator: J.M Francoeur

General supervision and foreman: AEM

20, double walled, 100,000L fuel storage tanks meeting CCME ULC requirements were placed on the pad described in Sec 2 above. Equipment and manpower used during this phase included (1) 35tns MCR crane, (6) technicians, (1) welder and (1) electrician. The tanks were placed according to the design specifications, ie level. Once the tanks placement was completed, foot bridges were installed as well as the pump house. \* See figure at page 523 in SM'S manual, appendix 3

# **3.2 PIPING CONNECTION AND ELECTRICAL ASSEMBLING PHASE 1.** Aug 12<sup>th</sup> – Aug 19<sup>th</sup> 2013

Installation crew: SM Construction

Field supervisor: Quamanittuap-Sana (FGL)

General supervision and foreman: AEM

During this phase (6) technicians and (1) welder assembled the 4 inch pipe and connections between the tanks and pump house. Also (1) electrician started the installation of electrical cables and control panels for the facility. All piping, pumps, electrical connections, etc. conformed to all applicable codes, specifications and regulations. \* See SM'S manual under the technical data section, Pp. 3 to 512, APPENDIX 3.

#### 3.3 PIPING CONNECTION AND ELECTRICAL ASSEMBLING PHASE 2.

Installation crew: SM Construction

Field supervisor: Quamanittuap-Sana (FGL)

General supervision and foreman: AEM

For the final phase of the project, (6) technicians and (1) welder completed assembling and installation of the pipe connections between the tanks and inside the pump house. An (1) electrician connected all of the main cables, the panels and computers inside the pump hose. Hi-level alarms were also placed on all tanks and were tested as per specifications. All alarms were noted to be functional. After installation, all tanks were cleaned and washed inside and pressure tested as per specifications. During the pressure test, one tank indicated a loss of pressure. A small crack was found between the inside two layers of the tank. This might have occurred during the placement of this tank. It was decided not to add fuel to this tank this year. Repairs will be undertaken prior to re-fueling. At this point the tanks were ready to use for fuel storage.

• FURTHER INFORMATIONS, PARTS DESCRIPTIONS, PHOTOGRAPH, INSTALLATION AND ELECTRICAL PLANS CAN BE FOUND IN APPENDIX 3.

# **APPENDIX 1.**

# DRAWINGS.

# A. DESIGN PLAN FOR COMMENTS:

Drawing number: 61-740-230-211\_A

# **B. AS BUILT DRAWINGS:**

Drawing number:	BAKER FF 1	PLANIMETRICAL VIEW
	BAKER FF 2	SECTION VIEW



General Page 2







# **APPENDIX 2.**

# STAVIBEL'S CONSTRUCTION DAILY REPORT.

DESCRIPTION OF THE FUEL CONTAINEMENT PAD CONSTRUCTION STEPS.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-14		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-01	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	10 à 16°C Wind : 5 à 15 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
1 Shovel CAT 365C L	FGL	11
Operator	FGL	12
Surveyor	FGL	9
10 tons roller compactor	BLCS	0
Bulldozer CAT D6 (DOZ09)	AEM	1
Field inspector	Stavibel	12

- **7h à 9h** Shovel 365 moves from Baker Lake to the Fuel Farm.
- 9h à 10h Shovel 365 makes pit test at the North extremity of the projected pond.
- 10h à 12h Shovel 365 removes the 0-20mm crushed stone in place.
- 13h à 17h30 Shovel 365 stockpiles the contaminated material outside the projected pond.
- 17h30 à 18h30 <u>Bulldozer D6</u> profiles the infra.

## **Comments :**

- Visit of Jean-François Béland (AEM foreman) and Dany Pageault (FGL superintendant) de 12h à 16h30
- After 3 test pits in the excavation zone, we found the presence of water and frozen material above the proposed elevation of the excavation. We need to increase the elevation of the project of 300mm.
- Presence of contaminated material and organic soil. The materials are stockpile and will be analyse by the environnment. Thereafter, they will indicate how to dispose of it.





• Photo #1 – 3 test pits. Smell of Jet-A fuel and water arrival.







• Photo #2 – Excavation and stockpile of the contaminated material until the final level of the infra.



Par :

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-15		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-02	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 17°C Wind : 5 à 30 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working	Volume
		hours	(m3)
1 Shovel CAT 365C L	FGL	7	
Opérator	FGL	12	
Surveyor	FGL	12	
Roller compactor	BLCS	1.9	
Bulldozer CAT D6T (DOZ09)	AEM	5	
Shovel 330C	BLCS	8.5	
2 articulated trucks CAT 740	BLCS	8.5	576
Field inspector	Stavibel	12	

- 6h30 à 18h30 Shovel 365 and Bulldozer D6T backfill with blasted rock 0-200 mm from quarry #1.
- 9h30 à 18h30 Loader 966 et 2 trucks haul the blasted rock 0-200 mm from quarry #1.
- 6h30 à 18h30 <u>Compactor</u> compacts the blasted rock when required.

## **Comments :**

- Attempt to cover the stockpile of contaminated material with tarps after the request of the environment. Unfortunately the wind make this operation impossible.
- The water accumulations are pumped before backfilling above.





• Photo #1 – Overview of the infra. Some water accumulations caused by the thaw of the material in place. A small ditch will be make to try to drain this water during night.



TP Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-16		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-03	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 17°C Wind : 5 à 30 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working	Volume
		hours	(m3)
1 Shovel CAT 365C L	FGL	11	
Operator	FGL	12	
Surveyor	FGL	12	
Roller compactor Protec Boxer 114	BLCS	0	
Bulldozer CAT D6T (DOZ09)	AEM	0	
Shovel CAT 330C	BLCS	11	
2 Articulated trucks CAT 740	BLCS	11	816
Field inspector	Stavibel	12	

- 6h30 à 18h30 Loader 966 and 2 trucks haul the blasted rock 0-200 mm from quarry #1.
- **6h30 à 12h00** Shovel 365 widens the road on the south side of the pond Sud with blasted rock 0-200 mm from quarry #1.
- 6h30 à 18h30 Shovel 365 backfills with blasted rock 0-200 mm from quarry #1.

## **Comments :**

• Beginning of haulage of the contaminated material to the mine (4 loads per day).





• Photo #1 – Windening of the road on the south side of the pond







• Photo #2 – Drainage of the water on north side of the pad. The ground is more stable at the end of the day.



acille Par :

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-17		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-04	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 17°C Wind : 30 à 70 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working	Volume (m3)
		hours	
1 Shovel CAT 365C L	FGL	11	
Operator	FGL	12	
Surveyor	FGL	12	
Loader CAT 966H + operator	AEM	10	
Roller compactor Protec Boxer 114	BLCS	2.54	
Bulldozer CAT D6T (DOZ09)	AEM	0	
Shovel CAT 330C	BLCS	5	
2 articulated trucks CAT 740	BLCS	11	muck : 254.4
			0-20mm : 272.5
Fiel inspector	Stavibel	12	

- 6h30 à 18h30 Shovel 365 builds the mini dikes with blasted rock 0-200 mm.
- **6h30 à 11h30** Shovel 330 and 2 trucks (BLCS) haul the blasted rock 0-200 mm from quarry #1.
- **7h30 à 10h15** <u>Loader 966</u> separates the contaminated and the non-contaminated material.
- 10h15 à 18h30 Loader 966 builds the mini dikes.
- **13h à 18h** <u>2 trucks 740 (BLCS)</u> haul the 0-20mm.

## **Comments :**

- Haulage of the contaminated material to the mine (4 loads of 10 wheeler per day).
- The non-contaminated material that containt a bit of organic soil is stockpile in order to do the access road for the pump house.





• Photo #1 – Construction of the mini dikes around the pad. Stockpile of the 0-20mm on the pad.







• Photo #2 – Loading of the contaminated material.



acel Par :

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-18		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-05	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	5 à 10°C Wind : 30 à 50 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
1 Shovel CAT 365C L	FGL	9
Operator	FGL	12
Surveyor	FGL	12
Loader CAT 966H + operator	AEM	8
Roller compactor Protec Boxer 114	BLCS	0
Bulldozer CAT D6T (DOZ09)	AEM	0
Field inspector	Stavibel	12

- 6h30 à 12h00 Shovel 365 builds the mini dikes with blasted rock 0-200 mm.
- 6h30 à 15h30 Loader 966 loads the contaminated material, moves the contaminated stockpile that disturbed the construction of the ditch and moves the sea-cans.
  13h à 15h Shovel 365 stands by for mechanical problems.
- 151 a 151  $\underline{\text{510VC1 505}}$  stands by 101 mechanical problems.
- 15h à 18h30 Shovel 365 puts the 0-20mm on the mini dike.

## **Comments :**

- Haulage of the contaminated material to the mine (6 loads of 10 wheeler per day).
- The crushed stone 0-20mm is stockpile and survey. The results give 18,17 m3/trucks instead of 24m3 as specified in the spec of the truck. Here are the adjusted volumes for the last days :

	2013-07-15		2013-07-16		2013-07-17		Cumulatif	
	load	volume (m3)	load	volume (m3)	load	volume (m3)	load	volume (m3)
Muck quarry 1	24	436,048	34	617,7347	14	254,3613	72	1308,144
0-3/4" BLCS		0		0	15	272,53	15	272,53





• Photo #1 – Placing the crushed stone 0-20mm on the mini dike.







• Photo #2 – Moving the contaminated stockpile to make the drainage ditch behind the north dike.



TRI Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-19				
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-06			
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée			
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 18°C Wind : 20 à 30 km/h			

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
1 Shovel CAT 365C L	FGL	11
Opérateur	FGL	12
Arpenteur	FGL	12
Rouleau compacteur Protec Boxer 114	BLCS	1.21
Chargeur CAT 966H + opérateur	AEM	3.5
Camion 10 roues + opérateur	AEM	5.5
Bulldozer CAT D6T (DOZ09)	AEM	0
Surveillant de chantier	Stavibel	12

- **6h30 à 12h00** Shovel 365 loads the truck with the non-contaminated material that contain organic soil.
- **6h30 à 12h00** <u>10 wheels truck</u> hauls the material containing organic soil for the construction of the access road for the pump house.
- 6h30 à 10h00 <u>Loader 966</u> moves the concrete blocks and other small jobs.
- 13h à 18h30 Shovel 365 builds the mini dike and the infra on the north side of the pad.

## **Comments :**

• Haulage of the contaminated material to the mine (6 loads of 10 wheeler per day).





• Photo #1 – Loading the truck with the non-contaminated material that contain organic soil for the construction of the access road for the pump house.







• Photo #2 – Reparation of an instability on the North-East side of the pad.



acille Par :

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-20				
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-07			
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée			
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 18°C Wind : 5 à 10 km/h			

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	2
Shovel CAT 320	FGL	5
Bulldozer Komat'su 39px	FGL	4
Operator	FGL	12
Surveyor	FGL	12
Roller compactor Protec Boxer 114	BLCS	0.4
Truck CAT 740	BLCS	114.1 m3
Bulldozer CAT D6T (DOZ09)	AEM	0
Field inspector	Stavibel	12

- 6h30 à 8h30 Shovel 365 builds the mini dike.
- **8h30 à 10h30** Shovel 320 is moving from Baker Lake to the field.
- 10h30 à 14h30 Shovel 320 builds the mini dike and profile the ditch.
- **14h30 à 18h30** <u>Bulldozer 39px</u> places the 0-20mm crushed stone.
- **14h30 à 18h30** <u>Truck CAT 740</u> places the 0-20mm crushed stone.

## **Comments :**

• Survey of a load of 0-20mm crushed stone to confirm the volume. Recalculation of the volumes with  $16.3m^3/load$ .

	2013-07-15		2013-07-16		2013-07-17		2013-07-20		Cumulative	
	load	volume								
Muck quarry 1	24	391,2	34	554,2	14	228,2			72	1173,6
0-3/4" BLCS		0		0	15	244,5	7	114,1	15	407,5





• Photo #1 – There is frost in the north ditch that prevent the excavation to the desired elevation.







• Photo #2 - A bit of water on the pad because of the ditch that is to high. No instability.







• Photo #3 – Placing the 0-20mm crushed stone.



acell Par :

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-21				
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-08			
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée			
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 18°C Wind : 5 à 10 km/h			

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	0
Shovel CAT 320	FGL	9
Bulldozer Komat'su 39px	FGL	2
Operator	FGL	12
Surveyor	FGL	12
Roller compacter Hamm 3625	FGL	2
Truck CAT 740	BLCS	48.9 m3
Bulldozer CAT D6T (DOZ09)	AEM	0
Field inspector	Stavibel	12

- **6h30 à 15h30** Shovel 320 builds the dike, builds the access road and places the concrete blocks for the pump house.
- **15h30 à 17h30** <u>Bulldozer 39px</u> places the 0-20mm crushed stone.
- 17h30 à 18h30 <u>Shovel 320</u> digs the ditch.
- **15h30 à 17h00** <u>Truck CAT 740</u> hauls the 0-20mm crushed stone.

## **Comments :**

• Volumes of material hauled by BLCS :

	2013-07-15		2013-07-15 2013-07-16		2013	2013-07-17 20		2013-07-20		2013-07-21		Cumulative	
	load	volume	load	volume	load	volume	load	volume	load	volume	load	volume	
Muck quarry 1	24	391,2	34	554,2	14	228,2					72	1173,6	
0-3/4" BLCS		0		0	15	244,5	7	114,1	3	48,9	15	407,5	





• Photo #1 – Placing the 0-20mm crushed stone. All the 0-20mm is on the field at the end of the day.







• Photo #2 – Excavation of the north ditch at the good elevation to drain the pad infra.



acell Par :

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-22				
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-09			
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée			
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 15°C Wind : 5 à 10 km/h			

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	0
Shovel CAT 320	FGL	2.5
Bulldozer Komat'su 39px	FGL	0
Operator	FGL	5.5
Surveyor	FGL	5.5
Roller compactor Hamm 3625	FGL	0
Field inspector	Stavibel	12

• 16h à 18h30 Shovel 320 digs the ditch around the pad.

#### **Comments :**

- Cross shift. No activity on the field before 16h. I make a roundtrip to Meadowbank to go get the new operator and surveyor.
- Volumes of material hauled by BLCS :

	2013	3-07-15	2013	3-07-16	2013	3-07-17	2013	3-07-20	201	3-07-21	Cum	ulative
	load	volume										
Muck quarry 1	24	391,2	34	554,2	14	228,2					72	1173,6
0-3/4" BLCS		0		0	15	244,5	7	114,1	3	48,9	15	407,5





• Photo #1 – Excavation of the north ditch to the frost. There is a groundwater artery.



acel Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-23				
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-10			
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée			
Verified by :	Richard Marcoux, ing.	Temperature :	8 à 15°C Wind : 5 à 10 km/h			

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working		
		hours		
Shovel CAT 365C L	FGL	0		
Shovel CAT 320	FGL	9		
Bulldozer Komat'su 39px	FGL	1		
Operator	FGL	12		
Surveyor	FGL	12		
Roller compactor Hamm 3625	FGL	5		
Truck CAT 740	BLCS	32.6 m3		
Field inspector	Stavibel	12		

- **6h30 à 11h** Shovel 320 places the 0-20mm crushed stone.
- 8h à 9h <u>Truck CAT 740</u> hauls the 0-20mm cruched stone.
- **11h à 12h** Bulldozer 39px places the 0-20mm cruched stone.
- 12h à 15h Shovel 320 finishes the mini dike and builds the key for the membrane.
- 15h à 18h30 Shovel 320 builds the acces road for the pump house.

## **Comments :**

• Volumes of material hauled by BLCS :

	2013-07-15		15 2013-07-16 2013-07-17		2013-07-20		2013-07-21		2013-07-23		Cumulative			
	load	volume	load	volume	load	volume	load	volume	load	volume	load	volume	load	volume
Muck	24	391,2	34	554,2	14	228,2							72	1173,6
0-3/4"					15	244,5	7	114,1	3	48,9	2	32,6	15	440,1




• Photo #1 – Overview of the pond ready for the geotextile and the bituminous geomembrane.







• Photo #2 – Small key trench for the membrane.







• Photo #3 – Construction of the access road for the pump house.







• Photo #4 – Arrival of 11 tanks of 100 000L and 2 tanks of 50 000L on the barge.



Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-24		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-11	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 23°C Wind : 5 à 20 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	0
Shovel CAT 320	FGL	0
Bulldozer Komat'su D39px	FGL	1
Operator	FGL	12
Surveyor	FGL	12
Roller compactor Hamm 3625	FGL	0
3 labours	FGL	4
2 membrane installers	Texcel	3.5
Shovel CAT 307	AEM	4.5
Field inspector	Stavibel	12

- 6h30 à 7h30 Stand by
- **7h30 à 12h** Shovel 307 cleans the membrane in previson of the reparations between the existing diesel tanks #1 and 2.
- 8h à 12h <u>3 labours</u> place the crushed stone 0-20 mm crushed stone to make sure the foundation for the bituminous geomembrane is flat.
- 17h à 18h Bulldozer 39px places the 0-20mm crushed stone on the access road for the pump house.

#### **Comments:**

• The membrane installers arrive at 15h.

Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-25		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-12	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 24°C Wind : 5 à 20 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	9
Shovel CAT 320	FGL	0
Bulldozer Komat'su 39px	FGL	0
Roller compactor Hamm 3625	FGL	0
Operator	FGL	12
Surveyor	FGL	12
3 Labours	FGL	12
Vibratory plate (small)	BLCS	1 jour
2 membrane installers	Texcel	12
Field inspector	Stavibel	12

- **6h30 à 11h30** Shovel 365 places the geotextile and failed attempt for the installation of the bituminous geomembrane.
- 11h30 à 16h30 Stand by
- 16h30 à 20h Shovel 365 places the bituminous geomembrane.

#### **Comments :**

• Impossible to place the membrane with the membrane rack available. Waiting for the rack with bearings to roll out the membrane from 11h30 to 16h30. The wasted time is catched up after souper.





• Photo #1 – Compaction of the slopes with the vibratory plate to avoid rock punching in the membrane.







• Photo #2 – Placing the geotextile and the bituminous geomembrane.



Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-26		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-13	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 26°C Wind: 5 à 20 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	4.5
Shovel CAT 320	FGL	0
Bulldozer Komat'su 39px	FGL	0
Roller compactor Hamm 3625	FGL	0
Operator	FGL	12
Surveyor	FGL	12
3 labours	FGL	12
2 membrane installers	Texel	12
Field inspector	Stavibel	12

- 6h30 à 18h30 <u>4 labours (FGL) et 2 labours (Texcel)</u> place the bituminous geomembrane.
- **6h30 à 9h** Shovel 365 places the bituminous geomembrane.
- 9h à 12h Shovel 320 works on another project for the diesel fuel tanks.
- 13h à 15h Shovel 365 places the bituminous geomembrane.
- **15h à 16h** Shovel 320 works on another project for the diesel fuel tanks.
- 16h à 18h30 Shovel 365 places the bituminous geomembrane.

**Comments :** 





• Photo #1 – Placing the bituminous geomembrane with a geotextile under.







• Photo #2 – Reparation of hole in the bituminous geomembrane.



acel Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-27		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-14	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 23°C Wind : 0 à 10 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working hours
Shovel CAT 365C L	FGL	5.5
Shovel CAT 320	FGL	0
Bulldozer Komat'su 39px	FGL	0
Roller compactor Hamm 3625	FGL	0
Operator	FGL	12
Surveyor	FGL	12
3 Labours	FGL	4
Generator 6000 W	BLCS	1 jour
Truck Cat 740	BLCS	55.2 m3
2 membrane installers	Texel	6.5
Field inspector	Stavibel	12

- **6h30 à 12h** Shovel 365 et 2 labours (Texcel) place the bituminous geomembrane.
- **6h30 à 10h30** <u>3 labours (FGL)</u> place the bituminous geomembrane.
- 13h à 15h <u>2 labours (Texcel)</u> test the resistance of the welds in the bituminous geomembrane.
- 13h à 18h30 <u>Operator and surveyor (FGL)</u> stand by.
- 17h à 18h30 <u>Truck CAT 740</u> hauls the 0-20mm crushed stone.

#### **Comments :**

- Inspection of the membrane.
- The 0-20 mm crushed stone produce by BLCS for the pad above the bituminous geomembrane is non- compliant. It contains particules up to 1-1/2". The material is rescreened and the placing of the 0-20 mm crushed stone begins at the end of the day.
- I inspect the membrane before filling above to make sure that no hole and no punching remains. Small rocks are detected under the membrane. Pieces of membrane are added on it.





• Survey of a load of 0-20 mm crushed stone. The result is 18.4 m3/load. Here are the corrected quantities according to this new volume:

	0-3/4"		Μι	ick quarry 1
	load	volume (m3)	load	volume (m3)
2013-07-15			24	441,6
2013-07-16			34	625,6
2013-07-17	15	276	14	257,6
2013-07-20	7	128,8		
2013-07-21	3	55,2		
2013-07-23	2	36,8		
2013-07-27	3	55,2		
Cumulative	30	552	72	1324,8





• Photo #1 – Installing the bituminous geomembrane with a geotextile under.







• Photo #2 – Sampling of Colétanche in place to test the welds resistance with the tensometer. The results are compliant according to the Texel membrane installers.







• Photo #3 – Inspection of the membrane. Small proeminent rocks (10mm and less) are detected at some place under the membrane. A second tickness of colétanche is added on these spots to make sure there will not be any punching.



Par :

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-28		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-15	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 23°C Wind : 0 à 10 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	8
Shovel CAT 320	FGL	0
Bulldozer Komat'su 39px	FGL	2
Roller compactor Hamm 3625	FGL	0
Operator	FGL	12
Surveyor	FGL	12
Truck Cat 740	BLCS	239.2 m3
Shovel Cat 307	AEM	1
Field inspector	Stavibel	12

- **6h30 à 18h30** Shovel 365, Shovel 320 et Bulldozer 39px (alternating) place the 0-20mm crushed stone on the bituminous geomembrane.
- 8h à 18h30 <u>Truck CAT 740</u> hauls the 0-20mm crushed stone.

#### **Comments :**

- After comparison of the specs of the shovel CAT 307 and the bulldozer Komat'su 39px, we decide to use the bulldozer instead of the shovel 307. The ground pressure is 33.34 kPa (with the bulldozer) instead of 32.3 kPa (with the shovel).
- Big waiting time for the BLCS material. Only 1 truck. Around 2 loads/hour.





• Summary of the volumes hauled by BLCS (18.4  $m^3$ /load) :

	0-3/4"		Μι	ick quarry 1
	load	volume (m3)	load	volume (m3)
2013-07-15			24	441,6
2013-07-16			34	625,6
2013-07-17	15	276	14	257,6
2013-07-20	7	128,8		
2013-07-21	3	55,2		
2013-07-23	2	36,8		
2013-07-27	3	55,2		
2013-07-28	13	239,2		
Cumulative	43	791,2	72	1324,8





• Photo #1 – Sreening of the 0-20mm and loading of the trucks at the Nuna Pad (BLCS).







• Photo #2 – Placing the 0-20mm above the bituminous geomembrane. A geotextile is place before.



Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-29		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-16	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 17°C Wind : 20 à 30 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	7.5
Shovel CAT 320	FGL	0
Bulldozer Komat'su 39px	FGL	3.5
Rolle compactor Hamm 3625	FGL	0
Operator	FGL	12
Surveyor	FGL	12
Truck Cat 740	BLCS	257.6 m3
Shovel Cat 307	AEM	0
Field inspector	Stavibel	12

- 6h30 à 18h30 Shovel 365 et Bulldozer 39px (alterning) place the 0-20mm on the bituminous geomembrane.
- 7h à 18h30 <u>Camion CAT 740</u> hauls the 0-20mm.

#### **Comments :**

- Big waiting time for the BLCS material. Only 1 truck. About 40 minutes between loads.
- The BLCS crusher is out of use. The 0-20mm will be make entirely by the screener.





• Summary of the volumes hauled by BLCS (18.4 m<sup>3</sup>/load) :

	0-3/4"		Muck quarry 1	
	load	volume (m3)	load	volume (m3)
2013-07-15			24	441,6
2013-07-16			34	625,6
2013-07-17	15	276	14	257,6
2013-07-20	7	128,8		
2013-07-21	3	55,2		
2013-07-23	2	36,8		
2013-07-27	3	55,2		
2013-07-28	13	239,2		
2013-07-29	14	257,6		
Cumulative	57	1048,8	72	1324,8





• Photo #1 – Lot of particules bigger than 20mm in the 0-20mm brought by BLCS. We advise BLCS to check the sreener. Indeed, there was a gap on the side of the sreen because of a missing inner bar. After the reparation of the screener, there is still presence of particules up to 100mm in the material from an unknow source. We remove them by hand on the field, but there is still a lot of rocks around 1 1/2" big.







• Photo #2 – Placing the 0-20mm above the bituminous geomembrane. A geotextile is placed before.



Par:

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-30		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-17	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 17°C Wind : 20 à 30 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	7
Shovel CAT 320	FGL	0
Bulldozer Komat'su 39px	FGL	4
Roller compactor Hamm 3625	FGL	0
Operator	FGL	12
Surveyor	FGL	12
Truck Cat 740	BLCS	202.4 m3
Shovel Cat 307	AEM	0
Field inspector	Stavibel	12

- 6h30 à 18h30 <u>Shovel 365 and Bulldozer 39px (alterning)</u> place the 0-20mm on the bituminous geomembrane.
- 8h à 18h00 <u>Truck CAT 740</u> hauls the 0-20mm.

#### **Comments :**

- Big waiting time for the BLCS material. Only 1 truck. About 40 minutes between loads.
- The BLCS crusher is out of use. The 0-20mm will be make entirely by the screener.
- Taking of 2 samples of 0-20mm on the field and 1 more sample in the BLSC stockpile at the Nuna Pad.





• Summary of the volumes hauled by BLCS (18.4 m<sup>3</sup>/load) :

	0-3/4"		Muck quarry 1	
	load	volume (m3)	load	volume (m3)
2013-07-15			24	441,6
2013-07-16			34	625,6
2013-07-17	15	276	14	257,6
2013-07-20	7	128,8		
2013-07-21	3	55,2		
2013-07-23	2	36,8		
2013-07-27	3	55,2		
2013-07-28	13	239,2		
2013-07-29	14	257,6		
2013-07-30	11	202,4		
Cumulative	68	1251,2	72	1324,8





• Photo #1 – I mesured the mesh size of the BLCS screener. The opening of 30mm explain the presence of particules higher than 20 mm. BLCS affirmed that they don't have a smaller screen on July 27th when they change the screen. Also, there is still several rocks up to 100 mm in the 0-20 mm. We remove them by hand on the field.









• Photo #2 – Placing the 0-20mm above the bituminous geomembrane. A geotextile is placed before.







• Photo #3 – Compaction test with the roller compacter Hamm 3625 on low vibration directly on the 0-20mm uncompacted and without any covering above. Not any hole nor any deformation are noticed on the bituminous geomembrane. The decision is taken to use the roller compactor for the compaction of the pad above the Colétanche membrane.



Par:

acile

Michaël Racine, tech.





Title of project :	Baker Lake Jet-A Fuel Farm	Date : 2013-07-31		
Project # :	OP-84541-J /VD3356	Doc #:	VD3356-003-RV-18	
Prepared by :	Michaël Racine	Contractor :	Fernand Gilbert Ltée	
Verified by :	Richard Marcoux, ing.	Temperature :	15 à 17°C Wind : 20 à 30 km/h	

Object : Contractor's schedule (approximative hours)

Labour and machinery	Company	Working
		hours
Shovel CAT 365C L	FGL	5
Shovel CAT 320	FGL	4.5
Bulldozer Komat'su 39px	FGL	1.5
Roller compactor Hamm 3625	FGL	2
Operator	FGL	12
Surveyor	FGL	12
Truck Cat 740	BLCS	33.8 m3
Water tanker	Hamlet	2
Shovel Cat 307	AEM	0
Field inspector	Stavibel	12

- **6h30 à 10h** Shovel 365 and Bulldozer 39px (alterning) place the 0-20mm on the bituminous geomembrane.
- 8h30 à 10h30 <u>Water tanker</u> moistens the 0-20mm using a total of 15234 L of water.
- 10h30 à 13h30 <u>Compactor</u> compacts the pad of 0-20mm.
- 10h à 14h Shovel 365 moves the contaminated stockpile to profile better the ditch.
- 14h à 18h30 <u>Shovel 320</u> backfills the small key trench for the bituminous geomembrane and installs a steel pipe for the electric wire feeding the pump house.

#### **Comments :**

• Departure of the field inspector (myself) on August 1<sup>st</sup> around 7h.





• Survey of 42 loads of 0-20mm in place uncompacted. Here is the summary of the volumes haules by BLCS (estimate with an average of 16.9 m<sup>3</sup>/load) :

	0-3/4"		Muck quarry 1	
	load	volume (m3)	load	volume (m3)
2013-07-15			24	405,6
2013-07-16			34	574,6
2013-07-17	15	253,5	14	236,6
2013-07-20	7	118,3		
2013-07-21	3	50,7		
2013-07-23	2	33,8		
2013-07-27	3	50,7		
2013-07-28	13	219,7		
2013-07-29	14	236,6		
2013-07-30	11	185,9		
2013-07-31	2	33,8		
Cumulative	70	1183	72	1216,8





• Photo #1 – Moistening and compaction of the 0-20mm. Compaction: 2 static passes, 1 vibratory pass in each direction and 2 last static passes.







• Photo #2 – Installation of a steel pipe with a rope inside in prevision of passing the electric wire to the pump house.







• Photo #3 – Overview of the second containment system ready to take the Jet-A tanks.



aci Par :

Michaël Racine, tech.

**Appendix A5** 

**Construction Summary Report: Baker Lake Fuel Storage Tank** 7 and Containment Facilities (2020)





# CONSTRUCTION SUMMARY REPORT Baker Lake Fuel Storage Tank 7 and Containment Facilities

Agnico Eagle Mines Ltd

# Report

653281-0004-40ER-0005\_0 January 17, 2020

Authorized Signatory:



**Israël Gagnon,** P.Eng., MBA Mechanical engineer
# EXECUTIVE SUMMARY

SNC Lavalin Stavibel Inc. was retained by Agnico Eagle Mines Limited to prepare a construction summary (as built) report for the fuel storage tank and containment facilities of the Meadowbank Gold Project, Nunavut. SNC Lavalin Stavibel Inc. previously prepared the construction drawings and specifications as well as the design report for the fuel storage tank and containment facilities.

SNC Lavalin Stavibel Inc. wasn't involved in the construction of the fuel storage tank and containment facilities, the information presented in this report was provided in part by Agnico Eagle.

The construction of the fuel storage tank and containment facilities were completed in September 2019. The construction monitoring and quality assurance was managed by Agnico Eagle.

This report summarizes the construction as-built information for the fuel storage tank and containment facilities.





## Table of contents

1.	Introduction 4									
2.	Construction Summary									
	2.1 Site location plan									
	2.2 Fuel tank size	э	5							
	2.3 Tank Foundations Design									
	2.4 Berms Design									
	2.5 Secondary Containment Capacity									
	2.6 Secondary Containment Imperviousness									
	2.7 Secondary C	ontainment Drainage	.7							
2.8 Drawings and photographs										
2.9 Time line										
3.		7								
3.1 Equipment and controls										
3.2 Piping										
4.	Mitigation measu	re	8							
5.	nitoring and inspection test plan	8								
	5.1 Membrane		8							
	5.2 Tank weld									
App	pendices									
	Appendix A	Final Construction drawings								
	Appendix B	As built drawings								

- Appendix C Photographs
- Appendix D Fuel tank handover package

CONSTRUCTION SUMMARY REPORT Baker Lake Fuel Storage Tank 7 and Containment Facilities Agnico Eagle Mines Ltd | Réf. client : [Client Reference] 653281-0004-40ER-0005\_0



#### 1. Introduction

This document presents the fuel storage tank 7 and containment facilities construction summary report required by the Water Licence 2AM-MEA1526 Part D Item 14 and Part G Item 4. As required by Water Licence Schedule D, this report contains the final design and construction drawings, a summary of construction activities including pictures recorded before, during and after construction. The as-built drawings, detailed explanation of field decision to reflect any deviations from the original construction drawings/plans and how such deviations may affect performance of engineered structures, a discussion of the mitigation measures implemented during construction and its effectiveness are also presented.

#### 2. Construction Summary

#### 2.1 Site location plan

Agnico Eagle is developing the Whale Tail Project in the Kivalliq Region of Nunavut (65°24'25" N, 96°41'50" W). The 99,878-hectare Amaruq property is located on Inuit-owned and federal crown land, approximately 55 km north of the Meadowbank mine. The Meadowbank mine is accessible from Baker Lake, located 70 kilometers to the south. The Baker Lake Bulk Fuel Storage Tank Facility is located east of the hamlet of Baker Lake, on the north shore of Baker Lake.



Figure 1 – Baker Lake Fuel Farm Site Overview (tank 7 in construction)



#### 2.2 Fuel tank size

Baker Lake fuel farm now includes seven (7) fuel storage tank. This report is base on the seventh tank built in spring/summer 2019.

The Table 1 below presents the tank main dimensions.

Fuel farm Description	Baker Lake fuel tank 7								
Product	Diesel								
Volume (liter)	10 M								
Diameter (m)	33.5								
Height (m)	12.2								

Table 1 -	<ul> <li>Description</li> </ul>	of the	fuel farm

The detailed design of the Fuel Farm is presented in drawings in Appendix A.

#### 2.3 Tank Foundations Design

The tank foundation pad is built 2 meters lower than the surrounding ground with a minimum total thickness of 800 mm of compacted material which includes the liner system. A 3 m shoulder surround the tank with a slope of 1V:2H away from the tank. The embankments of the foundation pad are no steeper than 1V:2H.

The Table 2 below presents the design parameters for the tank foundations.

Tank Foundation Pad								
Tank Diameter (m)	33.5							
Tank foundation pad top (m)	2x 18.0 x 18.0							
Tank foundation pad average thickness, above surrounding ground (m)	1.2							
Slope on shoulder	1V:2H							
Embankment slope	1V:2H							

Table 2 – Design parameters for the tank foundations

#### 2.4 Berms Design

The storage tank is enclosed inside berms to contain accidental spillage of fuel product. The berms are made of granular material and are made impervious with a geomembrane.

The design parameters for the berms surrounding the fuel tank are presented in the table below.



#### Table 3 - Design parameters for fuel farm Berms

Tank Farm Berms									
Berms length (distance between the outer sides of the Berms) (m)	125								
Berms width (distance between the outer sides of the Berms) (m)	71								
Berms height (min) (m)	3								
Containment height (m)	2								
Berms flat top width (m)	1.5								
Berms embankment slope	1V:2H								
Impervious area (m <sup>2</sup> )	10 000								

#### 2.5 Secondary Containment Capacity

The required capacity of the fuel farms new section was calculated based on the following codes and regulations:

- National Fire Code of Canada (NFCC);
- National Fire Protection Association (NFPA); and
- Design Rationale for Fuel Storage and Distribution Facility (DRFS).

As per the latest edition of NFCC, art. 4.3.7.3, the required secondary containment capacity for a fuel farm must have a volumetric capacity of not less than the sum of:

- A) The capacity of the largest storage tank located in the contained space, and;
- B) 10% of the greater of:

i. The capacity specified in Clause (A), or;

ii. The aggregate capacity of all other storage Tanks located in the contained space.

The volume occupied by the Tank foundation is considered in the total secondary containment capacity. The height of the secondary containment capacity is 300 mm lower than the berms' maximum elevation. Based on the above-mentioned, the secondary containment capacity requirements and the available capacity for fuel farms are summarized in the Table 4.

#### Table 4 – Fuel farm new section containment capacity

New section								
Volume (liter)	20 M (2X 10M)							
Required Containment Capacity (liter)	11 M							
Available Containment Capacity (liter)	20M							

CONSTRUCTION SUMMARY REPORT Baker Lake Fuel Storage Tank 7 and Containment Facilities Agnico Eagle Mines Ltd | Réf. client : [Client Reference] 653281-0004-40ER-0005\_0



#### 2.6 Secondary Containment Imperviousness

As per NFCC art. 4.3.7.2, the base and walls of the fuel farms secondary containment are designed, constructed and maintained to withstand full hydrostatic head and provide a permeability of not more than 10<sup>-6</sup> cm/s to the flammable liquids or combustible liquids contained in the storage tank. The berm is impervious to avoid any seepage into the environment. A 5.10 mm ES-2 Coletanche geomembrane provide adequate imperviousness.

#### 2.7 Secondary Containment Drainage

The finished grade of the secondary containment is sloped away from the Tank to drain the runoff water. The bottom of the berms surface is built with slopes that will allow accidental spills to be concentrated at a low point. A drainage basin located at the low point allows the recovery by pumping accumulations of rainwater and accidental spills.

#### 2.8 Drawings and photographs

Fuel farm tank and containment final design and construction drawings are available in the Appendix A, construction pictures are available in Appendix C.

#### 2.9 Timeline

The baker lake fuel storage tank number 7 and containment facility where built in 2019. Civil and earth work started on April 2019, followed by tank and piping fabrication in August 2019. Construction work were finalised on September 17<sup>th</sup>, 2019.

### 3. Field decisions

#### 3.1 Equipment and controls

Equipment where build in containers and installed without modification on site document 6120-C-260-001-REP-001 Fuel Tank Storage and Containment Facilities Design Report and Drawings, present the rational and decisions that led to its construction. No modifications were performed, and the Fuel storage tank and containment facilities are operational as they were designed.

#### 3.2 Piping

Piping between filling and distributing container and the fuel tank respect the point to point design. The piping isn't exactly as per drawing (can be seen on photos in Appendix C) but respect the P&ID. As built drawings can be consulted in Appendix B.

CONSTRUCTION SUMMARY REPORT Baker Lake Fuel Storage Tank 7 and Containment Facilities Agnico Eagle Mines Ltd | Réf. client : [Client Reference] 653281-0004-40ER-0005\_0



#### 4. Mitigation measure

Quarrying activities to build the berm was at Quarry #2 situated at KM 13 on AWAR. No blast were done on the construction site. During the fuel storage tank and containment facilities construction, no sediments were released in water from construction areas and no water was used to manage dust emissions from construction activity.

## 5. Construction monitoring and inspection test plan

#### 5.1 Membrane

The manufacture and supply of the liner system for the fuel farm comply with ASTM standard. The manufacturer provided a certification stating that the material proposed has physical properties that meet the required values. The rolls of liner were labelled, packaged, shipped, off-loaded, stored and handled by appropriate means to prevent damage to the material.

The subgrade surface was inspected by an engineer to verify suitability prior to installation of the liner system. A minimum thickness of fill covering the liner is maintained for operating equipment over the liner to prevent any damage. The installation of the liner system was performed by a qualified technician. All seaming, patching, welding operations, and testing were performed by a qualified technician. Joints/seams between liners panels were welded using the manufacturer's recommended procedures and equipment. The backfill material was placed in accordance with the drawings and specifications for the maximum lift thickness, compaction requirements and final grade levels.

During membrane installation, visual testing by a qualified worker was carried. Those tests were done on cooled bitumen. Joints were tested with a round-tipped trowel to ensure that the welds were not separating. All defects were clearly marked for repair.

#### 5.2 Tank weld

During the tank construction, a testing protocol was followed by the construction team. To meet API Standard 650, companies building tank are required to monitor their work trough an inspection program. In this program, the contractor registers welder's qualifications, confirm construction material quality and outlines its testing protocol. The results from weld tests are also registered there. All that information is required by API 650 standard. Testing on welds took place during the whole construction process. To attest welds quality, inspector relied on visual inspection, magnetic particulate tests and high penetration oil tests. To review those tests results, the materials quality and weld inspection results can be consulted in Appendix D.

# Appendix A

Final construction drawing



























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AS-BUILT BAKER LAKE FUEL FARM CONSTRUCTION **CONTRACT # 11-903** 



GROUP LTD

CON-FD-205-1

AS-BUILT BAKER LAKE FUEL FARM CONSTRUCTION CONTRACT # 11-903





PREPARED BY : MIKAËL LÉVESQUE DATE : 10-07-2019 CON-FD-205-2









General site view before tank and containment construction



Overburden excavation



Pad and Berm construction



Containment overview



Tank pad construction



Tank floor construction



Tank wall welding



Tank roof structure



Piping to and from fuel tank



Tank general view

## Appendix D Fuel tank handover package