

**AGNICO EAGLE MINES LIMITED**

# **MELIADINE PROJECT**

DESIGN REPORT FOR HORIZONTAL FUEL  
STORAGE TANKS SYSTEM AND PUMPING  
STATIONS



**AGNICO EAGLE**

DESIGN REPORT

MARCH 2017





# MELIADINE PROJECT

## DESIGN REPORT FOR HORIZONTAL FUEL STORAGE TANKS SYSTEM AND PUMPING STATIONS

**Agnico Eagle Mines Limited**

### **Design Report (A)**

Project N°: 151-06440-40

Date: March 2017

### **WSP Canada Inc.**

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March 16, 2017

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**Subject:** Horizontal Fuel Storage Tanks System and Pumping Stations  
**Project:** Meliadine

**WSP reference no.:** 151-06440-40

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Dear Ms Arseneault,

In response to your request, WSP is pleased to submit a Design Report regarding *Horizontal Fuel Storage Tanks System and Pumping Stations* for the Meliadine Project. You will find enclosed the Design Report including all the appendices.

Do not hesitate to contact us for any further information.

Hoping everything is to your satisfaction.

Yours sincerely,

---

Jean-Philippe Grenier, P. Eng.  
Project Manager, Mining Infrastructures

C.c.: Mr. Daniel Séguin, P. Eng., Agnico Eagle Mines Limited  
Mr. Denis Thibodeau, P. Eng., WSP Canada Inc.

**Attachment:**

- Design Report (A)

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# REVISION HISTORY

VERSION	ISSUE DATE	DESCRIPTION
A	2017-03-20	Initial release





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# SIGNATURES

## PREPARED BY



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Joël Morlière, Technician

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2017-03-16

Date

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Jean-Philippe Grenier, P. Eng.  
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142 796  
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2017-03-16  
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# PRODUCTION TEAM

## CLIENT – AGNICO EAGLE MINES LIMITED

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Project Manager	Jean-Philippe Grenier, P. Eng.

## Reference to mention:

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N/A



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# EXECUTIVE SUMMARY

## GENERAL

Agnico Eagle Mines Limited (AEM) is developing the Meliadine Gold Project which lies inside the Kivalliq District of Nunavut, near the western shore of Hudson Bay in Northern Canada. The nearest community is Rankin Inlet, an Inuit hamlet that is the regional centre and largest community of the Kivalliq Region. The Meliadine property is accessible through an all-weather road linking Rankin Inlet to the Meliadine site.

AEM retained WSP Canada Inc. (WSP) to design the surface infrastructures of the project which include surface infrastructures for fuel storage and handling systems. Within this report we will refer more specifically to the installation of *Horizontal Fuel Storage Tanks System* and the associated *Pumping Stations*.

Two (2) *Horizontal Fuel Storage Tanks System and Pumping Stations* are required to be installed and be used in 2017 to support facilities such as the underground mine ventilation and heating system as well as the construction genset system.

Facilities requiring the system:

- Mine Ventilation and Heating system (September 2017);
- Construction Genset system (April 2017).

This report presents the site conditions, design basis and considerations, engineering design and drawings for the *Horizontal Fuel Storage System and Pumping Stations*.



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# 1 INTRODUCTION

## 1.1 PURPOSE OF THE REPORT

The purpose of this report is to present the design elements and the characteristics of the Horizontal Fuel Storage Tanks System and the associated Pumping Stations that will be installed for Agnico Eagle Mines Limited's Meliadine Project to the regulatory authority having jurisdiction.

## 1.2 LOCATION AND ACCESS

Agnico Eagle Mines Limited (AEM) is developing the Meliadine Project (the Project), a gold mine located approximately 25 km north from Rankin Inlet, and 80 km southwest from Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Project site is located on a peninsula between the east, south, and west basins of Meliadine Lake on Inuit Owned Land.

The area is accessible from the all-weather gravel road linking the existing exploration camp to Rankin Inlet.

## 1.3 EXISTING AND FUTURE FACILITIES

Current facilities at the Meliadine Project site include the exploration camp located on the shore of the Meliadine Lake, approximately 3.5 km southeast of the future accommodations. The self-contained exploration camp consists of four wings of new trailers that can accommodate up to 200 people and includes kitchen facilities, complete with diesel generators. Power for the exploration camp is currently provided by diesel generators. Potable water for the exploration camp is pumped from the Meliadine Lake.

Facilities that are scheduled to be constructed for the operation of the future Meliadine Mine include a mill, power plant, maintenance facilities, tank farm for fuel storage, water treatment plant, sewage treatment plant and accommodations and kitchen facilities for 520 people.

The Nunavut Water Board (NWB) has issued Type A Water License 2AM-MEL1631 to AEM for the Meliadine Gold Project site authorizing the use of water and the disposal of waste required by mining and milling and associated uses.

This report includes the final design and construction drawings for Fuel Storage Facilities, as specified under Water License 2AM-MEL1631 Part D, Item 1.

## 1.4 SCOPE OF WORK

AEM retained the services of WSP Canada Inc. (WSP) to carry out the design associated with the surface infrastructures of the Meliadine Gold Project which include surface infrastructures for fuel storage and handling systems. As part of the scope of work, AEM asked WSP to:

- Conduct a detailed design for the installation of *Horizontal Fuel Storage Tanks System* and the associated *Pumping Stations* as well as the piping between the *Horizontal Fuel Storage Tanks and Pumping Stations*;
- Produce construction drawings and specification for the *Horizontal Fuel Storage Tanks System* and the associated *Pumping Stations* and piping;
- Prepare a design report of the *Horizontal Fuel Storage Tanks System* and the associated *Pumping Stations* and piping.

This report summarizes the site conditions, design basis and considerations of the installation of *Horizontal Fuel Storage Tanks System* and the associated *Pumping Stations* and Piping.

## 1.5 ENGINEERING DOCUMENTS

Table 1 lists the Engineering document related to the *Horizontal Fuel Storage Tanks and Pumping Stations*.

**Table 1: Engineering document list**

ENGINEERING DOCUMENTS	
MECHANICAL	<ul style="list-style-type: none"><li>• General Arrangement (GA) / Process Flow Diagram (PFD)</li></ul>

# 2 DESIGN

## 2.1 GENERAL

This section describes the criteria used to design the *Horizontal Fuel Storage Tanks System and Pumping Stations*, to prepare general arrangement and to select equipment and/or materials.

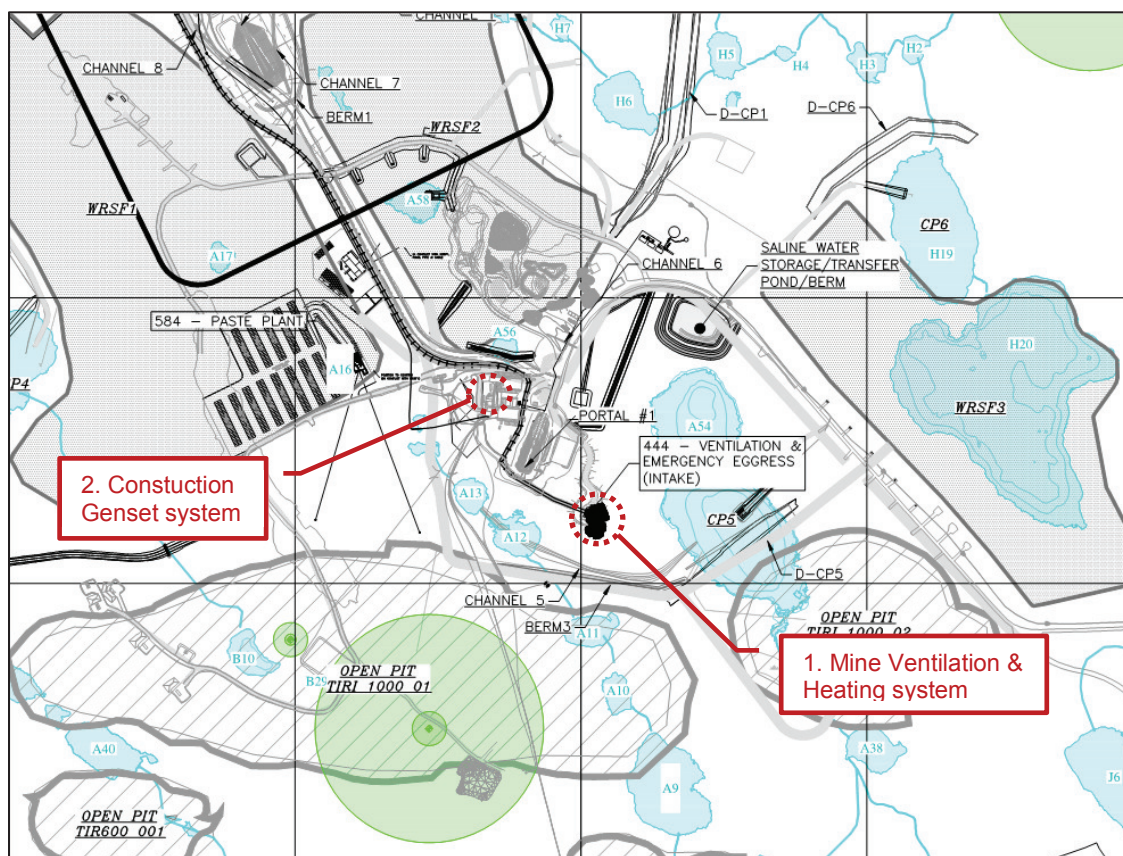
The *Horizontal Fuel Storage Tanks System and Pumping Stations* is scheduled to be installed to supply two (2) different facilities:

1. Mine Ventilation and Heating system (September 2017);
2. Construction Genset system (April 2017).

The location of both setups is indicated on Figure 1 below.

The Mine Ventilation & Heating system consists of axial-flow fans connected to a raise collar via a ducting system. The fan air inflow will go through heating modules that will produce the heat load required to supply fresh air for the underground mine. These heating modules will be equipped with indirect diesel heater that will be supplied with the *Horizontal Fuel Storage Tanks System and Pumping Stations*.

The Construction Genset System consists of a series of generators that will be used during the construction phase of the Project. The genset combination will be supplied with the *Horizontal Fuel Storage Tanks System and Pumping Stations* in order to provide the required power.



**Figure 1: Meliadine Project - Site overview (extract from drawing 65-000-210-200 - Revision R - Sheet 2 of 6)**

## 2.2 CODES AND STANDARDS

The system complies with the latest editions of the Codes and Standards relating to this project (Federal, Provincial, Municipal, NBCC, NFCC, CEC, CSA, NFPA, and API) as well as the directives of the authorities having jurisdiction over this project. Specific codes and standards such as R-125-95 NWT – Nunavut Mine Health and Safety Regulations (Mine Health and Safety Act) and RRNWT 1990 – c F-12 – Fire Prevention Regulations shall apply.

NBCC	National Building Code of Canada
NFCC	National Fire Code of Canada
CEC	Canadian Electrical Code
CSA	Canadian Standards Association
NFPA	National Fire Protection Association
API	American Petroleum Institute
SNWT	Consolidated Mine Health and Safety Act
CCME	Canadian Council of Ministers of the Environment

## 2.3 CODE ANALYSIS

The Horizontal Fuel Storage Tanks System and Pumping Stations design is first based on the compliance with the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197). The article 14 (1) of this regulation mentions that for the installation of a fuel storage system, the system has to comply with the applicable requirements set out in the CCME Code of Practice (CCME PN1326).

Looking into the CCME, the main design criteria are defined in the Part 3 that applies to the design and installation of a new aboveground storage tank system and Part 5 that applies to the design and installation of new piping systems.

The applicable general requirements set out in sections 3.2 and 5.2 refer to the NFCC and the CSA B139 for conformity of the installation.

Concerning the aboveground storage tank, according to CCME point 3.9.1 (3) (c), a tank with a capacity of 50,000 Liters or less and equipped with a double wall acting as the secondary containment is an acceptable system. Plus, these tanks will be operated individually and isolated by a control system (described at section 0). Consequently, the system doesn't require external secondary containment such as dikes or berms.

Looking into the NFCC latest edition, part 4 for flammable and combustible liquids exclude systems that are covered by the CSA B139 "Installation for oil-burning equipment" as per item 4.1.1.1. 3) b). In this case, the Horizontal Fuel Storage Tanks System and Pumping Stations will be used for power generation and heating system, meaning that the CSA B139 will apply.

According to CSA B139 latest edition, point 8.7.2.2 outdoor storage double wall tanks having a capacity of 50,000L or less do not require external dikes. Plus, there is no restriction regarding the number of 50,000 Liters double wall tanks that can be installed and connected.

## **2.4 ARRANGEMENT DESCRIPTION**

The proposed arrangement is based on six (6) double-walled ULC S601 storage tanks having a capacity of 50,000 Liters each. The tanks are connected to a pumping station which will transfer the fuel to a facility. Appendix A illustrates the general arrangement (GA) of the system.

The objective of the proposed arrangement is to avoid the possibility of syphoning more than one (1) tank at a time. The tanks are connected to a common suction line going to the pumping station. The suction line of each tank is coming from the top of the tank and is equipped with an anti-siphon valve and a fail-safe motorized valve.

- In case of power shut down both valves close automatically.
- The motorized valves are in closed position and only one (1) valve can open at a time meaning that only one (1) tank will supply the facility at a time.
- The anti-siphon valves are in closed position and will be activated only while the fuel pump is running. In case of a system failure, the anti-siphon valves close automatically eliminating the risk of spillage from the tanks.

The tanks will be refueled individually as they are not interconnected, meaning that fuel level cannot balance between tanks. Furthermore, storage tanks will have an automatic mechanical overfill protection to prevent spillage during refuelling operation.

## **2.5 OPERATION SEQUENCE**

From the pumping station, fail-safe motorized valves described previously will be controlled by an operator via a human-machine interface. The system will be programmed in order to ensure that only one (1) valve at a time can be opened. If the system is not running or is out of power, all valves will be automatically in closed position.

No manual valves bypass will be installed on the suction line which means that the motorized valves system cannot be bypassed by the operator.

During tank refueling, an automatic mechanical overfill protection will prevent spillage by automatically stopping the refueling operation.

## **2.6 MAINTENANCE**

Maintenance team will inspect the system on a regular basis as per regulations and codes. All piping will be installed above the ground which means any leaks can be detected during the periodic visual inspection.

# **3 CONCLUSION**

## **3.1 CLOSURE**

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

Respectfully submitted,

# Appendix A

**GENERAL ARRANGEMENT – HORIZONTAL FUEL STORAGE SYSTEM  
& PUMPING STATIONS (65-403-210-202 RÉV. 0)**



LEGEND

PIPING

FLANGED	THREADED	
		BALL VALVE
		GATE VALVE
		PRESSURE RELIEF VALVE
		CONTROL VALVE
		MOTORIZED BALL VALVE
		CHECK VALVE
		STRAINER
		FLEXIBLE
		REDUCER
		UNION
		FLANGES
		BLANK FLANGE
		CAP
		CONNECTION
		PIG CATCHER
		VALVE ANTI-SIPHON
		VALVE OVERFILL PREVENTION
		VALVE-NORMALLY OPEN
		VALVE-NORMALLY CLOSED
		PUMP
		PRESSURE RELIEF VALVE KIT: PIPING Ø12.5 SCH. 80, PRESSURE RELIEF VALVE (AJUSTED TO 5 PSI UNLESS OTHERWISE SPECIFIED), UNION, T WITH PLUG & BALL VALVE
		PRESSURE GAGE TO VACUUM OF POMPE (VACUUM)
		PRESSURE GAGE TO DISCHARGE OF PUMP (POSITIVE PRESSURE)
		METER c/w STRAINER & BLEEDER



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Ref: 151-06440-40

NOTES GÉNÉRALES / GENERAL NOTES

1. MOTORIZED VALVES ARE NORMALLY CLOSED, ONLY ONE VALVE CAN BE OPENED AT A TIME ON EQUIPMENT DEMAND

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DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG




REV.	DATE	DESCRIPTION	PAR/APP.	CLIENT
0	2017-03-01	ISSUED FOR CONSTRUCTION	C.B.	D.T.

REVISIONS

TITRE / TITLE
AGNICO EAGLE – MELIADINE DIVISION 403 – COMBUSTIBLES 210 – GENERAL ARRANGEMENT HORIZONTAL FUEL STORAGE SYSTEM & PUMPING STATION

DESSINÉ PAR DRAWN BY	CARINE BEAULIEU	DATE 2017-02-01
VÉRIFIÉ PAR CHECKED BY	J. MORLIERE	2017-03-01
APPROUVÉ PAR APPROVED BY	D. THIBODEAU, P. Eng.	2017-03-01

ÉCHELLE SCALE	1:50	DATE 2017-02-01
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NO. DESSIN DRAWING NO.	65-403-210-202
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NO. PROJET PROJECT NO.	6515	REVISION 0	FEUILLE / SHT 1 / 1
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PUMPING STATION & HORIZONTAL FUEL STORAGE – LOADING AREA  
SCL: 1:50