



AGNICO EAGLE

Meliadine Division

Meliadine – Greenhouse Gas Reduction Plan

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VERSION 2_NIRB**

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited (Agnico Eagle) operates the Meliadine Gold Mine (the Mine), located approximately 25 km north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. The Approved mine plan currently operates open pits and one underground mine at the Tiriganiaq deposit. Several other pits and underground mining operations are planned to extend the life of mine until 2043, as well as construction and operation of a windfarm as part of Meliadine Extension.

The impacts of climate change have the potential to affect a wide range of environmental, social and economic systems of value to Inuit, as indicated by the observations and changes experienced by Rankin Inlet traditional land users. Climate change is a global issue caused by emissions of greenhouse gases.

This document presents the Greenhouse Gas Reduction Plan as per Nunavut Impact Review Board Project Certificate No.006, Condition 9. It discusses predicted emissions for the Mine, sources of GHG, as well as monitoring measures and energy reduction initiatives.

Emissions of greenhouse gas for the Meliadine Mine will be calculated on a monthly basis and reported annually through Environment Canada's Greenhouse Gas Emissions Reporting Program and NIRB Annual Report. This report will also include a discussion on the monthly variations of greenhouse gas emissions, as well as a comparison with Final Environmental Impact Statement emission predictions.

A number of initiatives are planned to reduce project-related greenhouse gas emissions over the Meliadine life of mine. Some strategies have already been implemented while others are currently being assessed.

DOCUMENT CONTROL

Version	Date (YM)	Section	Page	Revision
1	January 2019	ALL	-	Comprehensive plan for the Meliadine Project.
2_NIRB	November 2021	All		Updated to address Meliadine Extension application submission to NIRB for review and approval

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ACRONYMS

Agnico Eagle	Agnico Eagle Mines Limited – Meadowbank Division
FEIS	Final Environmental Impact Statement
GHGRP	Canada’s Greenhouse Gas Emissions Reporting Program
NIRB	Nunavut Impact Review Board
Project	Meliadine
TSM	Towards Sustainable Mining
CO ₂	carbon dioxide
CH ₄	methane
N ₂ O	nitrogen dioxide

UNITS

<=	less than
%	percent
CO ₂ e/yr	carbon dioxide equivalents per year
kt CO ₂ e	kilotonnes of carbon dioxide equivalents
kt CO ₂ e/yr	kilotonnes of carbon dioxide equivalents per year
t CO ₂ e/yr	tonnes of carbon dioxide equivalents per year
L	liters
km	kilometre(s)
km ²	square kilometre(s)
kW	kilowatt

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Limited – Meliadine Division (Agnico Eagle) is the owner and operator of the Meliadine Gold Mine (Mine), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut.

Nunavut Impact Review Board (NIRB) Project Certificate No.006 was issued in 2015 which included approval of a multi-phase approach to development, including mining of Tiriganiaq deposit using open pit and underground mining methods) and mining of the Pump, F Zone, Discovery, and Wesmeg deposits using open pit methods.

The Meliadine Extension proposes to include underground mining and associated saline water management infrastructures at the Pump, F Zone, and Discovery deposits, development of a new portal and associated infrastructures in the Tiriganiaq-Wolf area, construction and operation of a windfarm, and use of additional borrow pits and quarries. The life of the mine would be extended by an additional 11 years until 2043, closure will occur from 2044 to 2050, and post-closure from 2051 to 2060.

The impacts of climate change have the potential to affect a wide range of environmental, social and economic systems of value to Inuit, as indicated by the observations and changes experienced by Rankin Inlet traditional land users. Climate change is a global issue caused by emissions of greenhouse gases (GHG). Changes to weather and climate have the potential to affect environmental, social and economic systems of value to the Inuit and other regional stakeholders.

The purpose of this Plan is to provide consolidated information on the management and monitoring of GHG for the Meliadine Mine, by presenting predicted emissions for the Mine, sources of GHG, followed by monitoring measures and initiatives taken to reduce emissions.

As per NIRB Meliadine Project Certificate No.006 Condition 9, the Greenhouse Gas Reduction Plan should be submitted to the NIRB at least 90 days prior to the commencement of operations

- An estimate of the Project's GHG baseline emissions;
- A description of monitoring measures to be undertaken, including the methods, frequency, parameters, and a description the analysis; and
- A description of reduction initiatives planned and taken, to reduce project-related GHG emissions over the Project lifecycle.

SECTION 2 • EMISSIONS

2.1 Emission Predictions

An initial assessment was completed to estimate the GHG emissions related to the Meliadine Mine in the 2014 Final Environmental Impact Statement (FEIS; Volume 5 – Atmospheric Environment, Section 5.4.5, Agnico Eagle 2014). As part of that assessment, GHG emissions were calculated using methods consistent with Canada’s Greenhouse Gas Emissions Reporting Program (GHGRP).

Table 1 compares the estimated annual direct GHG emissions in kilotons (kt) of CO₂ equivalents (CO₂e) from the Meliadine Mine site and marine operations at Rankin Inlet for the Approved Project and Meliadine Extension. In the 2014 FEIS, total GHG emissions from the Meliadine Mine site were conservatively estimated to be not more than 304 kt/yr. of CO₂e. The Meliadine Extension proposes the installation and operation of five wind turbines in a first phase with the alternative for an additional six, which would reduce GHG emissions by about 47kt CO₂e (Hatch 2021), bringing the total GHG emission from the Meliadine Mine site to about 270 kt/yr. Calculated emissions for the Meliadine site (including Rankin Inlet operations) were reported in June 2021 for the 2020 year. Total emissions were 122.8kt CO₂e, which is less than the 2014 FEIS-predicted maximum of 317kt CO₂e/yr.

The 2019 annual GHG emissions for Nunavut and Canada are also provided in Table 1. It is important to note that the predictions are extremely conservative as the estimated emissions from the Meliadine Extension are based on maximum values that consider all sources operating at maximum capacity; the emissions will be much less in reality, these quantities can be revised as further details of the project are brought to a higher level of engineering. The reported values taken from the “National Inventory Report on GHG sources and sinks in Nunavut and Canada” are based on actual reported values.

With the installation of wind turbines, a positive change is anticipated to the overall Meliadine Mine. By replacing electricity generated using diesel at the power plant, wind energy will lead to an overall reduction in GHG emissions of the Meliadine Mine.

Table 1: Comparison of Meliadine Extension GHG Emissions to Nunavut and Canadian Emissions

Source	Annual GHG Emissions (kt CO ₂ e/yr.) 2014 FEIS	Annual GHG Emissions (kt CO ₂ e/yr.) Meliadine Extension	Meliadine Extension Relative to Nunavut and Canada GHG as a Percentage
Meliadine Site (Operations)	304	304 ¹	
Rankin Inlet shipping (Operations)	13	13	
Indirect Emissions	negligible	negligible	
Removed GHG emissions from 5 wind turbines	n/a	(47) ²	
Estimated total GHG emissions	317	270	
Nunavut	422 (2010)	733 (2019) ³	40%
Canada	692 000 (2010)	730 000 (2019) ³	0.04%

1 = Meliadine 2014 FEIS emission estimate carried into Meliadine Extension. Actual GHG emission for Meliadine Mine in 2020 122.8 kt CO₂e/yr (OPBS Report, BBA 2021)

2 = Hatch (2021)

3 = Canada.ca/ghg-inventory National Inventory Report – 2021 Edition Part 3 - Table A11–27 2019 GHG Emission Summary for Nunavut and Table A10–2 Canada's GHG Emissions by Canadian Economic Sector, 1990–2019

2.2 Main Sources of Greenhouse Gas for the Meliadine Mine

There are four main sources of GHG identified for the Meliadine Mine predicted emissions:

- Off-road vehicle exhaust emissions;
- On-road vehicle exhaust emissions;
- Power plant related GHG emissions; and
- Camp heater related GHG emissions.

SECTION 3 • DESCRIPTION OF MONITORING MEASURES

3.1 Greenhouse Gas Emission Monitoring

Emissions of GHG for the Meliadine Mine are calculated on a monthly basis. Emissions related to the four main sources described in Section 2 are calculated. Although considered minimal compared to the other sources, emissions produced by the following activities are also calculated and compiled:

- helicopter transportation;
- light truck transportation using gasoline; and
- blasting (use of emulsion - ammonium nitrate/fuel oil).

Quantity of diesel (in liter) used for the generation of electricity, heating and for light and heavy equipment are recorded on a monthly basis for the Mine. The quantities of aviation fuel (liter) and ANFO explosive (tonne) are also recorded on a monthly basis. From those quantities, the direct emissions based on ``Standard Emissions Factors`` are calculated. For each sources, carbon dioxide (CO₂) emissions are calculated (in tonnes), as well as methane (CH₄) and nitrogen dioxide (N₂O) in tonnes of carbon dioxide equivalent (CO₂e tonnes). Emissions calculated for each sources are added to obtain a monthly total Project related emissions in tonnes of carbon dioxide equivalents (t CO₂e/yr).

3.2 Data Analysis and Reporting

Estimated GHG emissions for the Meliadine Mine are compiled and analysed on a monthly basis. Data will be reviewed and variations will be correlated to factor of causes such as seasonal climate, production activities or other factors of influence identified.

GHG emissions will be reported on an annual basis, as per the requirements of Project Certificate No.006, in the Meliadine Annual Report and to Environment and Climate Change Canada via the GHGRP. The Annual Report will also include a discussion on GHG emissions monthly variations, as well as a comparison with FEIS and Meliadine Extension emission predictions. Emissions related to aviation, blasting, and light truck transportation using gasoline will also be presented and analysed.

SECTION 4 • REDUCTION INITIATIVES

A number of reduction initiatives are planned to reduce Meliadine Mine-related GHG emissions over the life of mine. While some have already been implemented others are currently being assessed.

4.1 Strategies to Reduce Fuel Consumption

4.1.1 Diesel Generator – Efficiency

One of the most efficient diesel generators available for procurement on the market were obtained for Meliadine Mine. The purchase of the Model 12V34DF-LQO generators (Wärtsilä, Finland), which each produce 5,564 kW are 5% more efficient than the generators operating at Agnico Eagle's Meadowbank Mine. This efficiency translates to a diesel reduction of approximately 2.5 million litres (ML) per year when compared to the gensets operating at Meadowbank.

The Wärtsilä generators are also configured for 'dual-fuel use', meaning that they can easily be converted to be fueled by liquified natural gas if/when it becomes available for use at the Mine. Use of LNG instead of diesel fuel is would reduce GHG emissions but also result in large reductions of criteria air contaminants, especially diesel particulate matter containing a high proportion (79%), by weight, of black carbon. The loading rate of generators is optimized to minimize quantities of gas by-products and aerosols.

4.1.2 Heat Recovery

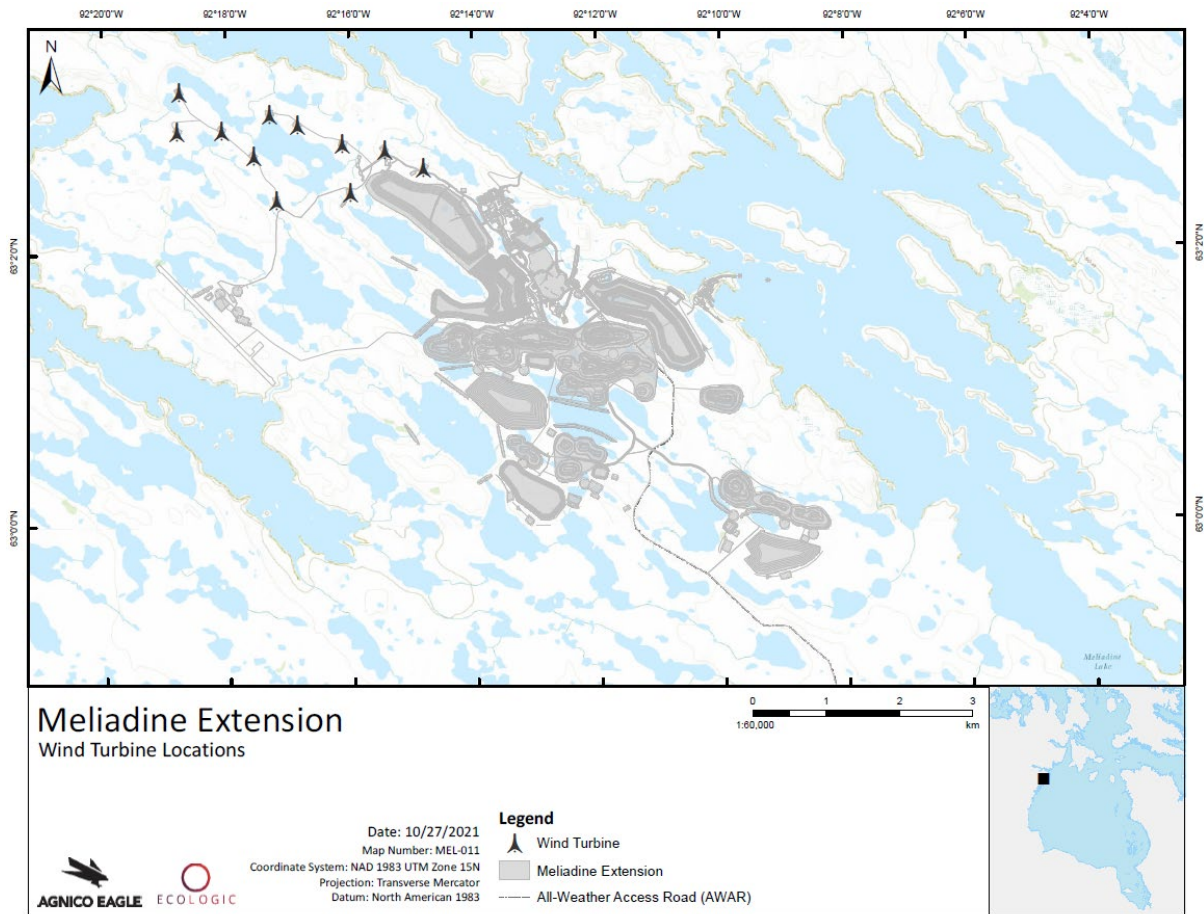
Operational experience from Agnico Eagles' Meadowbank Mine were incorporated during the construction/operation of the heat recovery system for Meliadine. The improved design/operation of the heat recovery systems results in a heat recovery rate of 0.85 kWth / kWe as compared to the Meadowbank's heat recovery rate of 0.50 kWth / kWe. The improved heat recovery and use of water rather than glycol as the working fluid in the system, is predicted to result in an annual reduction of 2.0 ML of diesel fuel. This represents a 22% reduction in heating-related diesel fuel consumption compared to a predicted total 9.0 ML of diesel fuel required in the absence of heat recovery system.

4.1.3 Strategy to Replace Fuel Consumption by Renewable Energy

Renewable energy alternatives are being assessed and validated on a continuous basis. As we aspire to reduce GHG, we evaluate alternative energies, which are sources of energy that have a lower intensity and GHG footprint than that of diesel. Alternative energy sources were assessed for the Meliadine Extension. Out of all the non-fossil fuel energy sources, only one alternative was technically and economically feasible which is wind power generation. Eleven wind turbines are planned on the northwest of the Mines footprint to produce a significant portion of the operation's energy needs through a renewable source.

Figure 1 shows the proposed location of the wind turbines as an alternative to power generation for the Meliadine Extension.

Figure 1: Wind Turbine Locations



4.1.4 Strategy Development and Awareness

4.1.4.1 Energy saving staff committee

This committee is formed by a group of employees from various departments, who work together to identify areas of improvement for energy consumption savings and to find innovative ideas to improve energy consumption and reduce GHG emissions.

4.1.4.2 Towards Sustainable Mining flow chart

The Towards Sustainable Mining flowchart has been implemented with the Strategic Optimization Group and intends to create a visual approach for employees to understand the energy system and consumption on site, to create a venue for discussing energy-savings opportunities.

4.1.4.3 Risk Management and Monitoring System

Agnico Eagle has designed a Risk Management and Monitoring System (RMMS) to manage health, safety, environmental and social acceptability of its projects and follow up on commitments made in our Sustainable Development Policy.

The RMMS is consistent with the ISO 14001 Environmental Management System and the OHSAS 18001 Health and Safety Management System. The RMMS ensures compliance to different industry standards. National and International guidance related to greenhouse gas emission are: CDP (Carbon Disclosure Project); the Global Reporting Initiative; the Sustainability Accounting Standards Board for Metals and Mining; the United Nations Sustainable Development Goals; the World Gold's Council's Responsible Gold Mining Framework.

Results and published annually through the Corporate Sustainability Report.

4.1.4.4 Raising Awareness

On a regular basis, the Environment and Camp Departments send emails and memos, or install posters to remind employees about the importance of saving energy. For example, the Camp Department staff place individual reminders in rooms during cleaning when the lights are left on by guests. The Environment Department sends regular communications about the ``no idling policy`` for vehicles on site, to avoid having vehicles left on idle mode while not in use. Inspections on site are also completed to raise awareness and enforce this policy.

SECTION 5 • REFERENCES

Agnico Eagle (Agnico Eagle Mines Limited). 2014. Final Environment Impact Statement (FEIS) Volumes 1 to 11, Meliadine Project, Volume 5 – Atmospheric Environment.

BBA (BBA Inc.). 2021. Meliadine 2020 Output-Based Pricing System Annual Report on Emissions and Production; R01, June 18, 2021.

Hatch. 2021. Wind Power Project Layout Review, H365501, Rev. 1. July 16, 2021.