APPENDIX 29-1. AIR QUALITY MONITORING PLAN

AGNICO EAGLE

MELIADINE GOLD MINE

Air Quality Monitoring Plan

MARCH 2025
VERSION 4

ᐃᓅᕐᓯᒪᔪᖅ

ᐊᒡᓂᖁ ᐋᒍ ᐅᔭᕋᒃᑕᕆᐊᓕᕆᔨᒃᑯᑦ (ᐊᒡᓂᖁᒃᑯᑦ) ᐊᐅᓛᖅᑎᑦᑎᔪᖅ ᑕᓯᕐᔪᐊᕐᒥᑦ ᒌᓗᒧᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ (ᐅᔭᕋᒃᑕᕆᐊᖅ), 25 ᑭᓛᒥᑕᓪᓗᐊᓂᒃ ᐅᖓᓯᒃᑎᒋᔪᖅ ᐅᐊᖕᓇᖓᓂᑦ ᑲᖏᖅᓵᓂᐅᑉ, ᐊᒻᒪᓗ 80 ᑭᓛᒥᑕᓪᓗᐊᓂᒃ ᐅᖓᓯᒃᑎᒋᔪᖅ ᓂᑎᖅᐸᓯᐊᓂᑦ/ᐱᖓᖕᓇᖅᐸᓯᐊᓂᑦ ᐃᒡᓗᓕᒑᕐᔪᖕᒥᑦ ᑭᕙᓪᓕᕐᒥᑦ ᓄᓇᕗᒻᒥᑦ.

ᑎᑎᖅᑲᖅ ᑐᓂᓯᔪᖅ ᐊᓂᖅᓵᖅᑐᖅᑕᑉᑕ ᖃᓄᐃᓐᓂᖓᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐸᕐᓇᐅᑎᒥᑦ (ᐸᕐᓇᐅᑎ) ᐅᔭᕋᒃᑕᕆᐊᕐᒧᑦ. ᑐᕌᒐᕆᔭᖓ ᑐᕋᖓᔫᑉ ᓇᓗᓇᐃᕐᓂᐊᕐᓗᒍ ᐊᔾᔨᒋᓐᓂᖓᑕ ᐊᖏᓗᐊᖏᒋᐊᖅᑎᑦᑎᓂᕐᒧᑦ ᐱᓕᕆᐊᖑᔪᑦ ᐃᓱᒪᒋᔭᐅᔪᓂᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒧᑦ ᑭᖑᓪᓕᖅᐹᒃᑯᑦ ᐊᕙᑎᒥᒃ ᐊᒃᑐᖅᓯᓂᕐᒧᑦ ᑎᑎᖅᑲᖓᓂᑦ (FEIS), ᐊᒻᒪᓗ ᑕᐃᒪᓐᓇᐃᓕᐅᕐᓗᓂ, ᖃᐅᔾᔨᓂᐊᕐᓗᓂ ᐊᓯᐊᑭᖕᒫᖅ ᐊᖏᓗᐊᖏᒋᐊᖅᑎᑦᑎᓂᕐᒧᑦ ᖃᓄᖅᑑᕈᑎᓂᑦ ᐱᔭᐅᔭᕆᐊᖃᕐᒪᖔᑕ ᒥᑭᓛᒃᑰᖅᑎᓐᓂᐊᕐᓗᒋᑦ ᓯᓚᒧᑦ ᐊᓂᐊᔪᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᐊᒻᒪᓗ ᐊᒃᑐᖅᓯᓂᕆᔭᖏᑦ.

ᐊᓂᖅᓵᖅᑐᖅᑕᑉᑕ ᖃᓄᐃᓐᓂᖓᓂᒃ ᐃᓕᑕᖅᓯᓯᒪᔪᖅ ᐅᑯᓂᙵᑦ:

- ᑐᕌᒐᖏᓐᓂᒃ ᐊᓂᖅᓵᖅᑐᖅᑕᑉᑕ ᖃᓄᐃᓐᓂᖓᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᑐᕋᖓᔪᖅ;
- ᒪᓕᒐᓕᕆᓂᕐᒥᒃ ᐃᓱᒪᒋᔭᐅᔪᑦ ᐊᒻᒪᓗ ᐊᕙᑎᒥᒃ ᐊᒃᑐᖅᓯᓂᕐᒧᑦ ᓇᓚᐅᑦᑖᖅᑕᐅᔪᑦ;
- ᐊᓂᖅᓵᖅᑐᖅᑕᑉᑕ ᖃᓄᐃᓐᓂᖓᓂᒃ ᐊᒻᒪᓗ ᐃᑯᐊᓪᓚᒃᑎᑦᑎᕝᕕᖕᒥᑦ ᐊᓂᐊᔪᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᑐᕋᖓᔪᑦ;
- ᐊᖏᓗᐊᖏᒋᐊᖅᑎᑦᑎᓂᖅ ᐊᒻᒪᓗ ᐊᑐᓕᖅᑎᑦᑎᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᖃᓄᖅᑑᕈᑏᑦ; ᐊᒻᒪᓗ
- ᐊᑐᖅᑕᐅᔪᑦ ᐅᓂᒃᑳᓕᐅᕆᓂᕐᒧᑦ ᐊᒻᒪᓗ ᐸᕐᓇᐅᑎᒥᒃ ᕿᒥᕐᕈᓂᕐᒧᑦ.

ᒪᓕᒃᓱᒍ ᐊᓂᖅᓵᖅᑐᖅᑕᑉᑕ ᖃᓄᐃᓐᓂᖓᓄᑦ ᐊᒃᑐᖅᓯᓂᕐᒥᒃ ᖃᐅᔨᓴᐃᓂᖅ ᐱᓕᕆᐊᕐᒧᑦ FEIS-ᒥᑦ ᐊᒻᒪᓗ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᖅ ᓈᓴᐅᑎ: 006, ᑐᓂᔭᐅᓚᐅᖅᑐᖅ ᐊᑐᐃᓐᓇᕆᔭᐅᓂᑦ ᐊᕗᓐᓂᕝᒃ 2015-ᒥᑦ (ᐋᒻᒪᓗ ᐋᖅᕿᒋᐊᖅᓯᒪᔪᑦ ᐊᕗᓐᓂᕝᒃ 2019-ᒥᑦ ᐊᒻᒪᓗ ᓇᑦᑎᐊᑦ 2022-ᒥᑦ), ᐊᓂᖅᓵᖅᑐᖅᑕᑉᑕ ᖃᓄᐃᓐᓂᖓᓄᑦ ᖃᐅᔨᓴᐃᖃᑦᑕᖅᑐᑦ ᐅᑭᐅᓗᒃᑖᕐᒥᑦ ᐅᑯᓄᖓ: ᑖᒪᓂᖅᓴᖅᑐᑦ ᒥᑭᔫᑎᑦ, ᐳᔪᖃᑖᓂᒃ, NO_2-ᓂᑦ ᐊᒻᒪᓗ SO_2-ᓂᑦ. ᓯᓚᒧᑦ ᐊᓂᐊᔪᓂᒃ ᖃᐅᔨᓴᐃᓂᖅ ᐊᒃᑕᑯᓂᒃ ᐃᑯᐊᓪᓚᒃᑎᑦᑎᕝᕕᖕᒧᑦ ᐱᓕᕆᐊᖑᖃᑦᑕᖅᑐᖅ ᒪᓕᒃᓱᒋᑦ ᒪᓕᒐᓄᑦ ᐊᑐᖅᑕᐅᔪᑦ ᑕᐃᓲᒃᓯᓐ-ᓄᑦ, ᕗᕌᓐ-ᓄᑦ ᐊᒻᒪᓗ ᓄᖑᓯᐃᑦᑐᒧᑦ. ᐃᓚᒋᔭᐅᔪᖅ, ᐱᕙᓪᓕᐊᔪᒥᑦ ᓯᓚᓕᕆᕝᕕᖕᒥᑦ ᐃᓕᓯᓚᐅᖅᑐᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᓈᓴᐅᑎᓂᒃ/ᑎᑎᖅᑲᓂᒃ ᑐᑭᓕᐅᕆᓂᐊᖅᑐᒥᒃ.

ᐃᓚᒋᔭᐅᕗᓂ ᑐᕋᖓᔪᒧᑦ, ᐊᒡᓂᖁᒃᑯᑦ ᖃᐅᔨᓴᐃᓂᖃᖃᑦᑕᖅᑐᑦ ᒪᓕᒡᓗᒋᑦ ᓈᒻᒪᒃᑐᒃᑯᑦ ᐆᒃᑐᕋᕈᑎᓂᑦ ᐱᔪᓂᒃ ᓯᓚᓕᕆᓂᕐᓂᑦ, ᐊᒻᒪᓗ ᐊᑐᖅᑕᐅᔪᑦ ᖃᓄᐃᖏᓐᓂᕐᒧᑦ ᓇᓗᓇᐃᖅᓯᓂᕐᒧᑦ/ᖃᓄᐃᓐᓂᕐᒧᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ (QA/QC) ᐊᑐᖅᑕᐅᔫᓴᐃᑦ ᒪᓕᒃᑕᐅᓗᑎᒃ. ᐃᓂᓕᐅᖅᑕᐅᑎᓪᓗᒋᑦ ᖃᓄᐃᖏᑦᑎᐊᕐᓂᕐᒧᑦ ᖃᐅᔨᓴᐃᕝᕖᑦ, ᐱᔾᔪᑕᐅᔪᑦ ᓲᕐᓗ ᓄᓇᐅᑉ ᐋᖅᕿᐅᒪᓂᖓ, ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᐊᑐᖅᑕᐅᔪᑦ ᐱᕐᑯᑏᑦ ᐊᒻᒪᓗ ᐆᒻᒪᖅᑯᑎᖃᖅᑎᑦᑎᔪᑦ, ᐊᒻᒪᓗ ᐅᔭᕋᒃᑕᕆᐊᕐᒧᐊᕈᖕᓇᕐᓂᖅ ᐃᓱᒪᒋᔭᐅᓚᐅᖅᑐᑦ.

ᐊᒡᓂᖁᒃᑯᑦ ᑐᓂᓯᔪᑦ ᐊᕐᕋᒍᑕᒫᖅᓯᐅᑎ ᐅᓂᒃᑳᒥᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᓐᓄᑦ ᓇᐃᓈᖅᓯᒪᔪᓂᒃ ᓈᓴᐅᑎᓂᒃ/ᑎᑎᖅᑲᓂᒃ ᑲᑎᑕᐅᓚᐅᖅᑐᓂᑦ ᒪᓕᒃᓱᒍ ᐊᓂᖅᓵᖅᑐᖅᑕᑉᑕ ᖃᓄᐃᓐᓂᖓᓂᒃ ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ. ᐃᓚᒋᔭᐅᔪᖅ, ᐊᒡᓂᖁᒃᑯᑦ ᐅᓂᒃᑳᓕᐅᖅᑐᑦ ᐱᑦᑕᐅᖏᑦᑐᑦ ᓯᓚᒧᑦ ᐊᓂᐊᔪᑦ ᐅᖅᓯᐃᑦ ᑲᓇᑕᒥᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐊᒻᒪᓗ ᓯᓚᐅᑉ ᐊᓯᔾᔨᖅᐸᓪᓕᐅᔪᓕᕆᔨᒃᑯᓐᓄᑦ (ECCC) ᒪᓕᒃᓱᒋᑦ ᐱᑦᑕᐅᖏᑦᑐᑦ ᓯᓚᒧᑦ ᐊᓂᐊᔪᑦ ᐅᖅᓯᓂᑦ ᐅᓂᒃᑳᓕᐅᕐᓂᐊᕐᓗᓂ ᑐᕋᖓᔪᖅ (GHGRP). ᓯᓚᒧᑦ ᐊᓂᐅᔪᑦ ᐅᓂᒃᑳᓕᐊᖑᖃᑦᑕᖅᑐᑦ ECCC-ᑯᓐᓄᑦ ᐊᑉᓯᒪᑉᓗᑎᒃ ᑲᓇᑕᒥᑦ ᐱᐅᖏᑦᑐᓂᒃ ᓴᑉᑯᐃᓂᕐᒧᑦ ᖃᑉᓯᐅᓂᖏᓐᓄᑦ ᑐᕋᖓᔪᖅ (NPRI).

ᑖᒻᓇ ᐸᕐᓇᐅᑎ ᐱᓕᕆᐊᖑᓚᐅᖅᑐᖅ ᒪᓕᒃᓱᒋᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᐱᓕᕆᐊᕐᒧᑦ ᓇᓗᓇᐃᒃᑯᑕᖅ: 006 ᐊᒻᒪᓗ ᕿᒥᕐᕈᔭᐅᓂᐊᖅᑐᖅ ᐊᒻᒪᓗ ᐅᐸᓗᒥᒨᓕᖅᑐᖅᑕᐅᓗᓂ ᐱᔭᕆᐊᖃᕐᓂᖓᑐᑦ, ᑕᑯᓴᐅᑎᓐᓂᐊᕐᓗᒋᑦ ᐊᓯᐊᙱᖅᑐᑦ ᐅᔭᕋᒃᑕᕆᐊᕐᒥᑦ ᖃᓄᐃᖓᓂᐅᔪᑦ, ᖃᐅᔨᓴᐃᓂᕐᒧᑦ ᐊᑐᖅᑕᐅᖃᑦᑕᖅᑐᑦ, ᐊᒻᒪᓗ ᒪᓕᒐᓕᕆᓂᕐᒧᑦ ᐱᔭᕆᐊᓖᑦ. ᐊᓯᐊᙱᖅᑐᑦ ᑎᑎᕋᐅᓯᐅᖃᑦᑕᕐᓂᐊᖅᑐᑦ ᐊᒻᒪᓗ ᐅᐸᓗᒥᒨᓕᖅᑐᖅᓯᒪᔪᑦ ᐸᕐᓇᐅᑏᑦ ᑐᓂᔭᐅᓂᐊᖅᑐᑦ ᐊᕙᑎᓕᕆᔨᒃᑯᓐᓄᑦ ᕿᒥᕐᕈᓂᐊᕐᓗᓂᒋᑦ.

EXECUTIVE SUMMARY

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

This document presents the Air Quality Monitoring Plan (Plan) for the Mine. The goal of this program is to confirm the effectiveness of mitigation measures assumed in the Mine's Final Environmental Impact Statement (FEIS), and in doing so, determine if alternative mitigation strategies are required to minimize emissions from the Mine and their impacts.

This Air Quality Monitoring Plan identifies the:

- goals of the air quality monitoring program;
- regulatory considerations and environmental impact predictions;
- air quality and incinerator emissions monitoring programs;
- mitigation and adaptive management strategies; and
- procedures for reporting and plan review.

Based on the air quality impact assessment from the Project FEIS and Project Certificate No.: 006, issued by the Nunavut Impact Review Board (NIRB) in February 2015 (and amended February 2019 and March 2022), air quality monitoring is performed year-round for: suspended particulates, dustfall, NO_2 and SO_2. Emission monitoring for waste incineration is conducted to ensure compliance with regulatory standards for dioxins, furans and mercury. In addition, a real-time meteorological station has been installed at the site for use in data interpretation.

As part of this program, Agnico Eagle ensures that monitoring is conducted in accordance with the appropriate sampling reference methodologies, and that standard quality assurance/quality control (QA/QC) procedures are followed. In siting the air quality monitoring stations, factors such as topography, infrastructure and power supply, and site accessibility have been considered.

Agnico Eagle provides an Annual Report to the NIRB summarizing the data collected under this Air Quality Monitoring Plan. In addition, Agnico Eagle reports greenhouse gas emissions to Environment and Climate Change Canada (ECCC) under the Greenhouse Gas Emissions Reporting Program (GHGRP). Air emissions are reported to ECCC separately under the National Pollutant Release Inventory program (NPRI).

This Plan has been prepared in accordance with NIRB Project Certificate No.:006 and will be reviewed and updated as necessary, to reflect changes in site conditions, monitoring methods, and regulatory requirements. Changes will be documented and updated plans will be provided to the NIRB for review.

Document Control

Version	Date	Section	Revision	Author
1	November 2015	All	The Air Quality Monitoring Plan as Term and Condition No.1 of Project Certificate No.: 006, submitted to Nunavut Impact Review Board for review and approval	Golder Associates Ltd. Agnico Eagle Environmental Coordinator
2	April 2020	All	General update of the document language to reflect current period of operations	Agnico Eagle Environment Department
		1.2	Added conformity table	
		2.1	Updated figure and expanded description of existing monitoring locations	
		2.2.1 2.3.1	Supplemental details of Partisol and dustfall sampling methods	
		2.2.4	Addition of trace metals analysis in suspended particulates	
		2.3.2	Addition of dustfall monitoring transects along the AWAR, Bypass road, and background dustfall analysis	
		2.3.3	Description of dustfall monitoring frequency, including rationale for reduction in AWAR sampling frequency from year-round to summer-only	
		2.3.4	Rationale for change from analysis of metals in AWAR dustfall jars to analysis in water samples under the Aquatic Effects Monitoring Program	
		2.2.5 2.3.5 2.4.4	Supplemental details for data analysis – specific comparisons to regulatory guidelines and FEIS predictions provided	
		2.5	Description of snowpack monitoring	
		5	Description of incinerator stack testing report, to be appended to Air Quality Monitoring Report	
		6	Added indication of GHG and NPRI reporting to ECCC	
		7	Updated list of management plans related to fugitive dust and emissions	
3	June 2020	2.3.2	Threshold added to increase dustfall monitoring stations	Agnico Eagle Environment Department
		2.3.5	Threshold added to start further investigation and increase monitoring efforts	
4	March 2025	2.1	Added monitoring location DF-10 (suspended particulate, gaseous compounds, dustfall) and removed location DF-4	Agnico Eagle Environment Department

			(dustfall only) to coincide with future mine development in this area	
		2.2	Description of possible switch to continuous suspended particulate monitoring instead of Partisol units (including discontinuation of ongoing analysis of metals in TSP)	
		2.2.5 & 2.4.4	Added comparisons to CAAQS ($PM_{2.5}$, NO_2, SO_2)	
		2.3.5	Added GNWT (2023) as a dustfall guideline value	

ABBREVIATION AND ACRONYM LIST

AENV	Alberta Environment
AEMP	Aquatic Effects Monitoring Program
Agnico Eagle	Agnico Eagle Mines Limited
FEIS	Final Environmental Impact Statement
EPA	Environmental Protection Agency
GHG	Greenhouse gas
Golder	Golder Associates Ltd.
LSA	Local study area
Mine	Meliadine Gold Mine
NAPS	National Air Pollution Surveillance Network
NIRB	Nunavut Impact Review Board
NO_2	Nitrogen dioxide
NPRI	National Pollutant Release Inventory
PM_{10}	Particles nominally smaller than 10 µm in diameter
$PM_{2.5}$	Particles nominally smaller than 2.5 µm in diameter
PM_{coarse}	$PM_{10-2.5}$
QA	Quality assurance
QC	Quality control
SSA	Site study area
SO_2	Sulphur dioxide
SP	Suspended particulates
TEMMP	Terrestrial Environment Monitoring and Management Plan
TSP	Total suspended particulate matter

DISTRIBUTION LIST

Agnico Eagle – Environment Department
Agnico Eagle – Energy and Infrastructure Department

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FIGURES

1 INTRODUCTION

1.1 Background

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Gold Mine (the Mine), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Mine site is located on a peninsula between the east, south, and west basins of Meliadine Lake (63°1’23.8" N, 92°13’6.42" W), on Inuit Owned Lands.

This document presents the Air Quality Monitoring Plan (Plan) for the Mine. This Plan is designed and updated according to the current scale of the Mine and the effects identified through the environmental impact assessment process. The predicted ambient air quality concentrations were considered in the design of an appropriate monitoring program and the development of mitigation and adaptive management strategies.

The overall goal of the monitoring program is to confirm the effectiveness of mitigation measures assumed in the Mine’s environmental assessment by measuring key air quality parameters, and in doing so, determine if alternative mitigation strategies are required to minimize emissions from the Project and their impacts.

This Plan further identifies the:

- regulatory considerations and environmental impact predictions;
- air quality and incinerator emissions monitoring programs;
- mitigative and adaptive management strategies; and
- procedures for reporting and plan review.

This Plan has been prepared in accordance with Terms & Conditions 1, 2, 3, 27b of the NIRB Project Certificate No.: 006 issued on February 26, 2015 and amended on February 26, 2019 and March 2, 2022. The Plan will be reviewed and updated on a regular basis as necessary, to reflect changes in site conditions and regulatory requirements. In particular the current revision considers guidance from the GNWT’s “*Ambient Air Quality Monitoring Guideline – In Support of the Environmental Agreements and memorandums of Understanding with Mine Operators*” (April, 2023).

1.2 Conformity with Terms & Conditions of the NIRB Project Certificate

Components of the Plan that are included to comply with Terms and Conditions of the Project Certificate No.:006 related to air quality monitoring and dust management are described in Table 1-1.

Table 1-1. Conformity Table.

Project Certificate No.:006 Term & Condition		Document Location
1 a	Description of real-time air monitoring stations including proposed timing of installation, location, and any factors considered with regards to planning for the installation;	Section 2.2

Project Certificate No.:006 Term & Condition		Document Location
1b	Plans for the collection of total suspended dust samples year round, including sampling for metals content relevant to the Project;	Section 2.2
1c	Description of snowpack surveys and dustfall collectors;	Snowpack - Section 2.5 Dustfall – Section 2.3
1d	Description of lichen surveys;	See Terrestrial Environment Management and Monitoring Plan
1e	Identification of near field, far field and reference sites that are located with consideration of ambient wind conditions;	Section 2.1
1f	Baseline data collected prior to significant construction activity;	See 2016 Air Quality Monitoring Report, Fig. 4 & 5 for baseline/pre-construction dustfall results (2012 – 2016). Monitoring for gaseous compounds and suspended particulates began during the construction phase.
1g	A description of the proposed annual reporting mechanism and response framework.	Section 8
2	The Proponent shall demonstrate through monitoring of air quality at the aboveground emissions points at the mine site and at the Tiriganiaq site that sulphur dioxide (SO_2) and nitrous dioxide (NO) emissions remain within predicted levels and, where applicable, within limits established by all applicable guidelines and regulations. In cases where exceedances occur, the Proponent shall provide an explanation for the exceedance, a description of planned mitigation, and shall conduct additional monitoring to evaluate the effectiveness of mitigative measures.	Section 2.4
3a	Align plan requirements with commitments made in the FEIS and during the Final Hearing to monitor dust along the all-weather access road and associated roads and trails.	Section 2.3 and see Roads Management Plan and Dust Management Plan
3b	Verify commitments to the utilization of dust suppressants along the all-weather access road including and associated roads and trails, including a description of the type of suppressant to be utilized, the frequency and timing of applications to be made throughout the various seasons of road use	See Roads Management Plan and Dust Management Plan
3c	Outline the specific adaptive management measures to be considered should monitoring indicate that dust deposition is higher than predicted, specifically where traffic along the all-weather access road is greater than initially predicted	Dust Management Plan

Project Certificate No.:006 Term & Condition		Document Location
27b	A description of measures to be undertaken as relate to dustfall monitoring, designed in accordance with the following: i. To establish Phase 1 all-weather access road baseline data and a description of plans for data collection during Project operations for comparison; ii. To facilitate comparison with existing guidelines; iii. To assess the seasonal deposition (rates, quantities) and chemical composition of dust entering aquatic systems along representative distance transects of the all-weather access road and Rankin Inlet by-pass road;	Section 2.3

2 AIR QUALITY MONITORING PROGRAM

2.1 Summary of Monitoring Methods and Locations

Table 2-1 summarizes the components of the air quality monitoring program. While construction for various elements is yet to occur (e.g. infrastructure to support development of new mining areas), the Mine is currently in the operations phase. Air quality monitoring during this phase focuses on measuring airborne particulates, dustfall, and the gaseous compounds NO_2 and SO_2. Monitoring locations are shown in Figure 2-1, and described in Table 2-2.

Table 2-1. Summary of air quality monitoring program components.

Project Phase	Program Objective	Monitoring Equipment
Pre-construction (2012 – 2016)	• To obtain baseline data in order to be able to compare with construction and operation phases	• Three dustfall jars (passive) onsite • Three dustfall jars along AWAR
Construction (2017 – 2018)	• To verify compliance with applicable standards • To apply mitigation measures if necessary	• One continuous TSP/PM_{10} sampling unit (Partisol model 2025) • One passive NO_2 – SO_2 monitor • Four dustfall jars (passive) onsite • Three dustfall jars along AWAR

Project Phase	Program Objective	Monitoring Equipment
Operations – during Tiriganiaq Pit Development Phase (2019 – est. 2025)	• To verify the predicted concentrations of TSP, PM_{10}, and $PM_{2.5}$ • To verify that the mitigation measures considered integral to the Project are being incorporated as planned, and are effective	• Two TSP sampling units (Partisol model 2025) (DF-5, DF-7) • Two PM_{coarse}/$PM_{2.5}$ sampling units (Partisol Model 2025-D) (DF-5, DF-7) • Two passive NO_2–SO_2 monitors (DF-5, DF-7) • Four dustfall jars (passive) onsite (DF-4, DF-5, DF-6, DF-7) • Three dustfall monitoring transects along AWAR (km 4, 10, 23 – DF-1, DF-2, DF-3) and one along the Rankin Inlet Bypass Road (DF-WT) – summer season
Operations – during Pump/Wesmeg Pit Development Phase (est. 2025+)	• (As above)	• Three TSP monitoring units (e.g. Thermo Fisher Scientific 5014i, or Partisol model 2025, located at DF-5, DF-7, DF-10) • Three $PM_{2.5}$/PM_{10} monitoring units (e.g. Thermo Fisher Scientific 5028i, or Partisol model 2025-D, located at DF-5, DF-7, DF-10) • Three passive NO_2 and SO_2 monitoring stations (DF-5, DF-7, DF-10) – year-round • Four dustfall jars onsite (DF-5, DF-6, DF-7, DF-10) – year-round • Three dustfall monitoring transects along AWAR (km 4, 10, 23 – DF-1, DF-2, DF-3) – summer season only • One dustfall monitoring transect along the Rankin Inlet Bypass Road (DF-WT) – summer season only

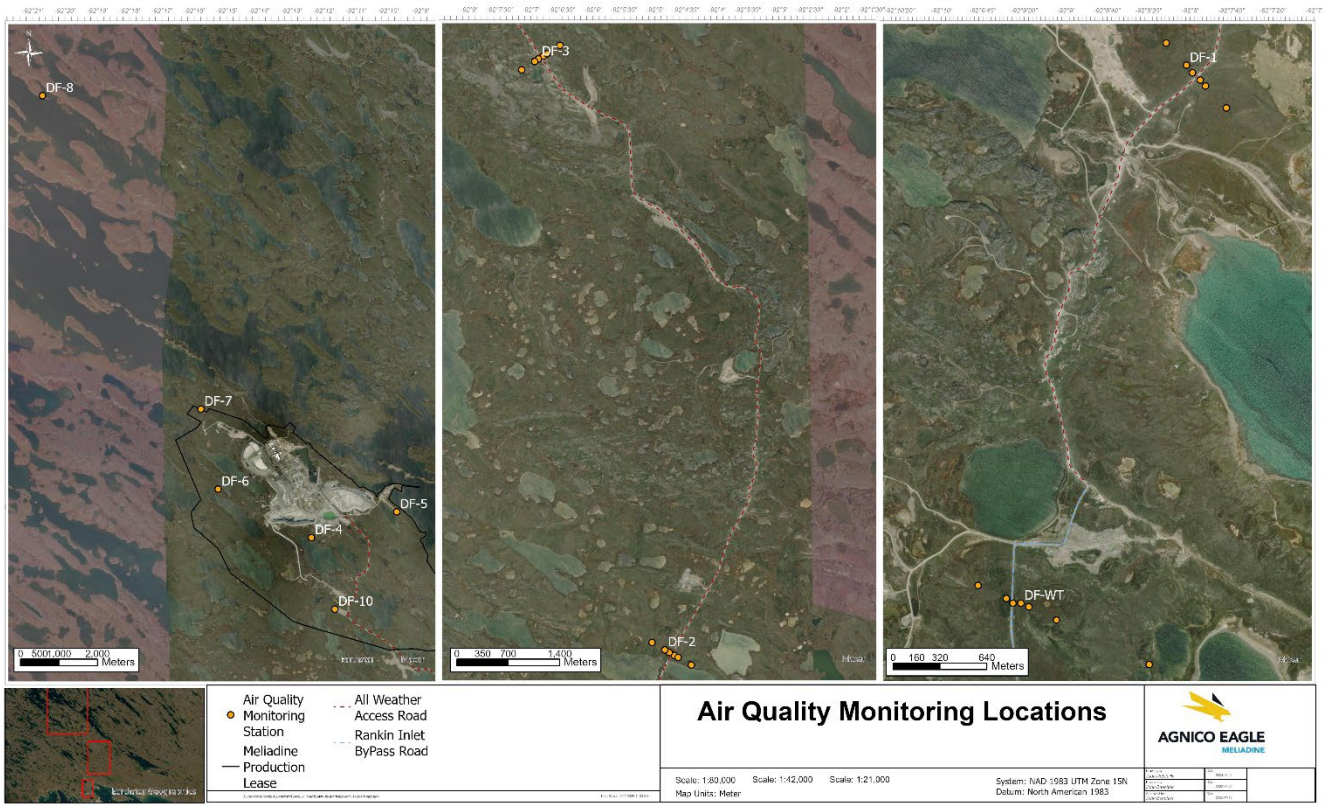

Figure 2-1. Air quality monitoring locations for the Meliadine site.

Table 2-2. Description of historical and current air quality monitoring stations for the Meliadine Mine.

Monitoring Station	UTM (15V)	Parameters	General Location	Years Active	Description
DF-WT	542890E 6967093N	Dustfall transect	Rankin Inlet Bypass Road	2019, 2021+	1.3 km northwest of Nipissar Lake and ~500m southeast (downwind) of community quarry sites. Samples at 60, 120, and 300 m on each side of the road.
DF-1	544073E 6970759N	Dustfall transect	AWAR	2012-2018 (single jar) 2019, 2021+ (full transect)	AWAR km 4 South of Iqalugaarjuup Nunanga Park Samples at 25, 100, and 300 m on each side of the road.
DF-2	546621E 6973334N	Dustfall transect	AWAR	2012-2018 (single jar) 2019+ (full transect)	AWAR km 10 East of Iqalugaarjuup Nunanga Park Samples at 25, 100, and 300 m on each side of the road.
DF-3	544899E 6981387N	Dustfall transect	AWAR	2012-2018 (single jar) 2019+ (full transect)	AWAR km 23 North of Iqalugaarjuup Nunanga Park Samples at 25, 100, and 300 m on each side of the road.
DF-4	540014E 6987836N	Dustfall	Onsite	2012 – 2025 (est.)	Approx. 380 m south of Tiriganiaq Open Pit 1. Downwind of main mine site. *To be replaced with DF-10 to accommodate construction of the new mining areas*.
DF-5	542226E 6988507N	Dustfall NO_2, SO_2 TSP, PM_{10}, $PM_{2.5}$	Onsite	Dustfall: 2012+ NO_2, SO_2: 2017+ TSP, PM_{10}, $PM_{2.5}$: 2019+	500 m south-east of the exploration camp. Downwind of main mine site
DF-6	537586E 6989096N	Dustfall	Onsite	2012+	Adjacent to Lake B5, approx. 600 m west of main mine site (direction perpendicular to dominant wind)
DF-7	537143E 6991176N	Dustfall NO_2, SO_2 TSP, PM_{10}, $PM_{2.5}$	Onsite	Dustfall: 2012+ NO_2, SO_2: 2017+ TSP, PM_{10}, $PM_{2.5}$:	Approx. 500 m northwest (upwind) of the emulsion plant and 1.5 km from the main mine site facilities (TSF).

Monitoring Station	UTM (15V)	Parameters	General Location	Years Active	Description
				2019+	
DF-8	525656E 7001656N Or alternative	Dustfall	Reference	2019+	North end of Meliadine Lake near Aquatic Effects Monitoring Program (AEMP) Reference Area. UTM approximate. Reference stations may be rotated to establish a range of background dustfall values, which are expected to vary significantly depending on local site conditions.
DF-10	540624E 6985981N (approx. – to be field fit)	Dustfall NO_2, SO_2 TSP, PM_{10}, $PM_{2.5}$	Onsite	2025 (est.)+	Adjacent to communication tower, approx. 500 m southeast (downwind) of Pump Pit area, and 250 m northwest (upwind) of the access road. Southeast (downwind) edge of the main minesite area. Within Air Quality Impact Assessment Site Study Area.

During the main construction phase, air quality monitoring was primarily by passive samplers, due to site accessibility and electrical power requirements. Two active monitors for suspended particulates (DF-5, DF-7) were installed in December 2018, prior to the operations phase, with sample collection largely beginning in early 2019. A third active monitoring station (DF-10) will be installed to correspond with the new furthest downwind (southeast) perimeter as operations begin in other mining areas (e.g., Pump, Wesmeg deposits).

Passive monitoring of dustfall started in 2012 with three monitoring stations along the AWAR and four stations on site. In 2019, dustfall monitoring along the AWAR and Rankin Inlet Bypass Road was intensified to include four transects, rather than single samples. AWAR and Bypass Road dustfall transects are sampled during the summer season only (when dustfall rates are highest), and onsite dustfall stations are monitored year-round.

Passive monitoring of NO_2 and SO_2 has occurred in two locations since 2017. A third monitoring station will be added at DF-10 to correspond with operations at the Pump Pit area.

2.2 Suspended Particulates

2.2.1 Monitoring Methods

Historically, ambient outdoor monitoring for suspended particulates at the Meliadine Mine has been conducted using two sets of Partisol Sequential Air Samplers. Partisol samplers draw in a stream of ambient air at a controlled flow rate, and

particulates are collected on a pre-weighed filter supplied by an accredited laboratory. The exposed filter is then shipped back to the laboratory and re-weighed to measure the total accumulated particulates. By this method, suspended particulates (TSP, PM_{10}, $PM_{2.5}$) are sampled over 24-h periods every six days.

To coincide with development of mining areas approved under the 2024 NWB Type A Water Licence amendment, Partisol instruments may be replaced with continuous monitors that will evaluate the same suite of size fractions (e.g. Thermo Fisher Scientific 5014i and 5028i). Continuous suspended particulate monitors provide data at much higher frequencies (e.g. 1-min, 5-min, or hourly), and without the time delays associated with laboratory analysis.

Similar to the Partisol instruments, continuous SP monitors will be housed in temperature-controlled shelters and will be calibrated and maintained following procedures from the operating manual and ECCC protocols from the National Air Pollution Surveillance Network's Ambient Air Monitoring and QA/QC Guidelines.

Since October 2020, concentrations of metals considered relevant to the project (historically, cadmium and iron) have been measured in TSP collected on Partisol filters, in recognition of T&C 1b of the Project Certificate (see Table 1-1). Available reference-grade continuous SP monitoring instruments do not allow for the speciation of particulate matter but provide the benefit of a larger dataset for suspended particulates themselves. As Partisol instruments are phased out, assessments of the impacts of metals of relevance to the project in dust will continue under other programs, as required (discussed below). If measured concentrations of suspended particulates trend upwards, with results consistently above regulatory guidelines and/or FEIS predictions, or concerns otherwise arise, an appropriate targeted program for the analysis of airborne metals using alternate instruments will be designed.

This approach is considered appropriate for the Mine at this time, since the FEIS Environmental and Human Health Risk Assessment (Golder, 2014; Section 10.2) predicted no offsite impacts from toxicity of metals in air (inhalation route, as evaluated through suspended particulate sampling and speciation). In addition, since the initiation of analysis for cadmium in 24-h TSP samples in late 2020, all measured concentrations have been less than the laboratory detection limit, which is an order of magnitude less than the FEIS-selected 24-h health-based screening value. Air quality monitoring onsite is also conducted under the mine site's Health and Safety Plan (including suspended particulates and metals) and will continue accordingly. Analysis of the impacts of metals in particulate matter on ecological receptors will continue to be evaluated through the Mine's Aquatic Effects Monitoring Program and Terrestrial Environment Monitoring and Management Plan, with plans for the supplemental analysis of metals in dustfall to be designed and conducted as part of those assessments, as needed.

2.2.2 Monitoring Locations

The specific locations of the monitors are shown in Figure 2-1. Locations DF-5 and DF-7 were determined previously, following standard siting criteria defined in the amended Air Monitoring Directive (Alberta Environment 1989). Location DF-10 was similarly sited according to guidance in GNWT (2023). Specifically, consideration has been given to the following:

- site accessibility;
- power supply;
- effects of topography;
- local interferences (e.g., buildings);
- security;
- local meteorological conditions (wind speed);

- dispersion patterns as predicted within the FEIS Volume 5, Section 5.2; and
- location of potentially sensitive receptors.

Based on the above noted criteria, the dynamic air samplers are sited in proximity to the production lease boundary, both upwind (DF-7) and downwind (DF-5, DF-10) of the main mine site facilities. The location of these stations may be altered in the future based on changes in operations or monitoring methods.

2.2.3 Monitoring Frequency

Suspended particulate sampling will be conducted year-round.

While non-continuous monitors (Partisol units) remain in operation, the monitoring of TSP, PM_{10}, and $PM_{2.5}$ concentrations will be carried out at a minimum of every 6 days. This frequency aligns with the National Air Pollution Surveillance (NAPS) schedule, whereby a single 24-hour sample is collected every 6^{th} day. In addition, by operating on a 6-day cycle, different days are sampled each week, which allows for the monitoring of differing production intensities or other variations. Annual averages are calculated from the 24-h measurements for comparison to regulatory guidelines. Analysis of trace metals of relevance to the project in these particulate samples will be conducted at least monthly from September through June to capture seasonal variation, and 2x/month in July and August (at least 12 days apart) when the maximum potential for fugitive dust is expected due to lack of snow cover and increased site activity.

When continuous monitors are installed, data loggers will be set to record on a 1-min basis, with 24-h and annual averages calculated from this data for comparison to regulatory guidelines.

Historically, blowing snow and extreme cold weather at or below the operating limits of the Partisol units (-40°C) has resulted in difficulty maintaining the equipment, and some data loss has occurred, particularly during the winter. Climate-controlled shelters are used to house the equipment, which can result in differences between ambient and filter temperatures that exceed the optimal range described by the manufacturer and service provider. Implications are discussed as required in the annual report. Agnico Eagle continues to work on optimizing maintenance schedules to minimize data loss and to look for alternative sampling solutions if necessary. While better success has been reported by other operators in the North using the proposed continuous monitors, occasional downtime due to the extreme operating conditions is still anticipated.

2.2.4 Monitoring Parameters

Suspended particulate monitoring will include the following size fractions: TSP, PM_{10}, and $PM_{2.5}$.

While filter-based (Partisol) suspended particulate monitors remain in use, total suspended particulate matter (TSP filters) will additionally be analyzed for trace metals of relevance to the Mine, in accordance with Term and Condition 1b of the Project Certificate No.:006. Based on the contaminants of potential concern (COPCs) for air quality identified in the Project's Human Health Risk Assessment (FEIS Volume 10, Section 10.2.6.3.1), these metals have historically (since 2020) included cadmium and iron. However, based on further review, analysis of iron in suspended particulate is planned to be discontinued moving forward. As described in the FEIS assessment for this metal (Golder, 2014), the 24-h health-based screening value for iron inhalation is based on toxicity of particulate matter, not toxicity of the chemical itself. Particulate matter continues to be evaluated under this monitoring program, with comparison to the appropriate screening values (Section 2.2.5.1).

2.2.5 **Data Analysis**

2.2.5.1 Suspended Particulates

Laboratory-reported results for mass of particulates will be used to calculate associated concentrations of TSP, PM_{10} and $PM_{2.5}$ ($\mu g/m^3$) according to the Partisol operating manual.

Suspended particulate data from the continuous monitors will be appropriately screened and processed, according to standard methods (e.g. NAPS guidance) and recommended QAQC procedures described in GNWT (2023).

In both cases, final datasets for suspended particulates will be compared to applicable ambient air quality standards (Table 2-3). Specifically, results will be compared primarily to available Government of Nunavut (GN) Environmental Guidelines for Ambient Air Quality (October, 2011). Where GN guidelines are not available (24-h PM_{10}) results will be compared to the GNWT (2023) guidelines. Comparison to the most recent Canadian Ambient Air Quality Standards (CAAQS; CCME, 2012) is also provided, for reference. CAAQS represent voluntary objectives for an individual site and are typically used at a regional scale for airshed planning purposes.

Results will additionally be compared to FEIS predictions for maximum concentrations of suspended particulates for the site study area (SSA; where DF-5 and DF-10 are located) and local study area (LSA; where DF-7 is located) (Table 2-3). The interpretation of this comparison must recognize that many factors can lead to differences between field measurements and model-predicted ground-level concentrations of air quality parameters, and these factors will be discussed in the reporting context.

If FEIS predictions for particulates are exceeded in multiple monitoring events, Agnico Eagle will explore other means of analysis to confirm results, such as follow-up dispersion modelling, and/or alternative sampling or analytical methods. If confirmed, an investigation into implications for air quality or human health impacts will be initiated and/or supplemental mitigation measures will be implemented as necessary. Adaptive management and mitigation measures are described in associated management plans (see Section 7).

Suspended particulate results will be further assessed for spatial and temporal trends (seasonality, differences between upwind and downwind locations, corresponding construction events, etc.). There is the possibility that unusual events in the region (e.g., a dust storm transporting airborne particulate) could result in higher measured particulate concentrations at specific locations. Any such unusual event will be analyzed in conjunction with the on-site meteorological data to investigate the cause of the event. Comparisons of Meliadine monitoring data to FEIS-predicted peak concentrations (which include influence of meteorological anomalies) may be conducted if such a situation occurs. The analysis of temporal trends will look for consistent trends in the measured particulate concentrations on an annual basis. In addition to the annual trend analysis, ongoing visual observation at the site is one mechanism for identifying high dust events and triggering remedial actions. The potential cause(s) of the condition and the mitigation action available will be evaluated and implemented as appropriate.

Table 2-3. Regulatory guidelines and 2014 FEIS predictions for outdoor ambient suspended particulate matter.

Parameter	Averaging Time	Regulatory Guideline		FEIS Prediction ($\mu g/m^3$)	
		Jurisdiction	Guideline ($\mu g/m^3$)	SSA (represented by DF-5 and DF-10)	LSA (represented by DF-7)
$PM_{2.5}$	24-h	GN	30	55.2	19.6
		CAAQS	27*	-	-
	Annual	CAAQS	8.8^	-	-
PM_{10}	24-h	BC/GNWT	50	104.0	58.2
Total Suspended Particulate (TSP)	24-h	GN	120	213.7	122.3
	Annual‡	GN	60	16.8	17.0

BC: British Columbia Ambient Air Quality Objectives (BC, 2021)
CAAQS: 2020 Canadian Ambient Air Quality Standards (CCME, 2012)
FEIS: 2014 Final Environmental Impact Statement (Golder, 2014a) predictions for maximum suspended particulate matter concentrations within the Meliadine Site Study Area (SSA) and Local Study Area (LSA)
GN: Government of Nunavut Environmental Guidelines for Ambient Air Quality (GN, 2011)
GNWT: Government of the Northwest Territories Ambient Air Quality Monitoring Guideline – In Support of the Environmental Agreements and Memorandums of Understanding with Mine Operators (GNWT, 2023)
*The 3-year average of the annual 98th percentile of the daily 24-hour average concentrations.
^The 3-year average of the annual arithmetic average of the daily 24-hour average concentrations.
‡GN guideline applies to the geometric mean and FEIS prediction applies to the arithmetic mean.

2.2.5.2 Trace Metals in TSP

In accordance with Term and Condition 1b of the Project Certificate, concentrations of metals of relevance to the Mine (iron and cadmium – see Section 2.2.4) have been measured in TSP samples since 2020, and this analysis will continue while the installed Partisol units remain in use. Results are compared to FEIS-selected human health-based screening values (Table 2-4), as well as FEIS-predicted maximum concentrations of these parameters for monitoring-site locations Receptor 1 and Camp, which correspond to the DF-7 and DF-5 locations, respectively (Golder, 2014; Volume 10). Note: The screening value for iron is provided in Table 2-4 for historical context, but analysis of this metal is planned to be discontinued moving forward, as discussed in Section 2.2.4. For terrestrial wildlife, inhalation was not considered as an exposure pathway for the identified contaminants of concern. Inhalation of metals for wildlife is generally considered to be insignificant in comparison to ingestion (USEPA, 2005).

Table 2-4. FEIS-selected health-based screening values for chronic inhalation (as compared to 24-h average concentrations) from the Project's Human Health Risk Assessment, and FEIS-predicted maximum concentrations of contaminants for monitoring-site locations Receptor 1 and Camp (Golder, 2014, Volume 10).

Contaminant	FEIS Values		
	Selected Health-Based Screening Value ($\mu g/m^3$)	Prediction – Camp (DF-5) ($\mu g/m^3$)	Prediction – Receptor 1 (DF-7) ($\mu g/m^3$)
Cadmium	0.025	0.0180	0.0030
Iron	4	8.7300	3.7000

2.3 Dustfall

2.3.1 Monitoring Methods

In addition to the dynamic monitoring for suspended particulates, a dustfall monitoring program has been implemented at the mine site to measure deposition rates of particulate matter. Unlike the active samplers, dustfall collection is a passive program that provides a measure of all particulates that would be directly deposited onto vegetation, soil, and water in the vicinity of the Mine.

Dustfall is collected in open vessels, generally referred to as canisters or jars, containing a purified liquid matrix (de-ionized water and isopropanol), supplied by a commercial analytical laboratory. According to ASTM 1739-98, canisters are placed on a 2 m stand with an open bucket-style holder fitted with wires around the rim to deter birds (see Figure 2-2). Dustfall canisters are each exposed in the field for a nominal period of 30 days. Particles are deposited and retained in the vessel, which is then sealed in the field and returned to the supplying laboratory where total and fixed (non-combustible) dustfall are quantified ($mg/m^2/30d$; according to ASTM 1739-98). This sampling method is widely used in air quality studies in the North for dustfall monitoring, with the benefit of being a passive system that is readily set up in remote locations. Limitations of the method such as lack of associated environmental quality guidelines are noted (see BC, 2020), and results interpreted in this context.

Figure 2-2. Dustfall monitoring station.

2.3.2 Monitoring Locations

To monitor rates of dust deposition on site, four static samplers are continuously installed at the following locations (see Figure 2-1):

- one at each of the dynamic sampler locations (DF-5, DF-7, DF-10; located predominantly upwind and downwind of major mine activities);
- one sampler in between lakes B5 and B6 (DF-6);
- one sampler was also previously installed near Lake A8 (DF-4), but this station will be replaced with DF-10, to accommodate construction of mine infrastructure beginning in 2025 (est.).

To monitor rates of dust deposition along the AWAR, dustfall monitoring stations and transects have been established at kilometers 4, 10, and 23 (DF-1, DF-2, and DF-3, respectively). Transect monitoring began in 2019, augmenting the single canisters that were previously used at each AWAR location (DF-1 – DF-3). Each transect includes samples at 25 m, 100 m, and 300 m on the east (predominantly downwind) and west (predominantly upwind) side of the road. Results of transect

monitoring to date indicate that rates of dustfall tend to decline below Alberta Environment's guideline for recreational areas within 25 m of the road. Supplemental stations at 500 m will be added to the program if the Alberta Environment Ambient Air Quality Guideline for dustfall in industrial areas (1.58 mg/cm^2/30d) is exceeded for two consecutive months. Exceedances of that threshold at 500 m for two consecutive months will trigger management action (see Dust Mitigation Plan).

One transect has been similarly established to assess deposition rates for the Rankin Inlet Bypass road (DF-WT). For this transect, samplers are located at 60, 120, 300, and 1000 m on the east (upwind) and/or west (downwind) sides of the road. These locations were chosen to correspond with historical (pre-construction) monitoring that was conducted at several of these stations.

Background dustfall rates prior to major construction were measured from 2012 – 2016, and historical comparisons are provided in the annual Air Quality Monitoring Report. However, to ensure measured values continue to be representative of current conditions, background rates of dustfall in the area will be determined annually at a far field reference site (DF-8). This site was initially located at the north end of Meliadine Lake, adjacent to AEMP Reference Area 2, but alternate sites may be sampled to establish a range of background dustfall values, which are expected to vary significantly depending on local site conditions.

2.3.3 Monitoring Frequency

Dustfall monitoring at onsite locations (DF-4/DF-10, DF-5, DF-6, DF-7) will occur year-round, with each sampler deployed for a nominal period of 30 days, after which it will be retrieved and replaced, according to laboratory instructions.

For transects at locations DF-1, DF-2, DF-3, and DF-WT along the AWAR and Bypass Road, dustfall samples will be collected twice during the summer season over nominal 30-day averaging periods (generally throughout July and August). The reference site (DF-8) will be sampled for one or two 30-d periods during this time. Maximum rates of dustfall are expected to occur during these months, when roads are not snow-covered and traffic reaches peak volume. A 2012 study (Golder, 2012) at two northern mines indicated that road dust is naturally mitigated by 94 – 96% as a result of winter conditions, compared to summer conditions). Therefore, conservative estimates of year-round dustfall can be determined based on summer sampling results. If results exceed reference values, the sampling window will be expanded to better understand trends. This approach is supported by results of year-round dustfall monitoring in 2017 and 2018, which indicated no exceedances of Alberta Environment's dustfall guideline for recreational areas (AENV, 2019) at 100 m from the AWAR during any month (Agnico Eagle, 2017 & 2018).

2.3.4 Monitoring Parameters

Dustfall samples will be analyzed for rates of total and fixed dustfall (mg/cm^2/30d), according to procedures of the commercial analytical laboratory and ASTM 1739-98.

It is noted that as a condition of the Project Certificate (T&C 27b-iii), NIRB has also indicated a requirement to monitor the rates of deposition and chemical composition of dust entering aquatic systems along the AWAR under the AEMP (see Table 1.1). While rates of deposition are determined through this dustfall monitoring program for AWAR locations, metals analysis for AWAR dustfall samples has not historically been conducted. Instead, impacts of contaminants in dustfall on aquatic systems are evaluated directly through water and/or sediment quality monitoring programs, since no environmental quality or human health guidelines exist for metals in dustfall. If only chemical composition of dust is measured, subsequent impacts

to aquatic systems need to be extrapolated from those results through modelling exercises which incorporate many assumptions, whereas water or sediment quality analyses under the AEMP measure impacts directly. Targeted analyses of metals in deposited dust may be added under the AEMP and/or TEMMP as warranted, based on evolving needs of those assessments.

2.3.5 Data Analysis

Total and fixed dustfall rates measured at the monitoring stations will primarily be analyzed for indications of spatial or temporal trends. Analysis of spatial trends will include comparisons between the various monitoring stations and transect locations, upwind and downwind locations, and distance from the road. A temporal analysis will also check for consistently increasing trends in the measured dustfall rates year over year. In all cases, limitations of this sampling method are noted and will be considered, including inherently high spatial variability.

In addition to trend analysis, total dustfall results will be compared to available dustfall guidelines (e.g. GNWT (2023) guideline of 0.87 mg/cm^2/30d, Alberta Environment and Parks (2019) guidelines of 0.57 mg/cm^2/30d and 1.53 mg/cm^2/30d) to provide context and identify management action. These guidelines are based on aesthetic or nuisance concerns, not ecological or human health impacts, and is to be used for general planning and management, as a performance indicator, and to assess local concerns. A threshold of 1.58 mg/cm^2/30d at 500 m from the road will be used to identify areas where supplemental dust mitigation measures are implemented. Dust thresholds and related management actions are fully described in the Dust Management Plan.

No quantitative predictions for total dustfall (deposition) were presented in the FEIS for comparison to monitoring results.

2.4 Gaseous Compounds

2.4.1 Monitoring Methods

In accordance with Condition 2 of the Project Certificate, Agnico Eagle will monitor NO_2 and SO_2 at a minimum of two onsite locations throughout the construction and operations phase of the Mine.

Passive NO_2-SO_2 samplers, provided by a commercial analytical laboratory, are used for this monitoring program. The monitors are suitable for this type of program as they require no electricity, and can be left unattended for extended periods. The samplers are deployed by Agnico Eagle technicians according to laboratory-identified procedures, and mounted to a support pole co-located with dustfall samplers (Figure 2-3). The passive samplers are exposed for a nominal period of 30 days before they are retrieved, replaced, and sent to the laboratory for analysis.

Figure 2-3. NO_2-SO_2 sampler at the Meliadine site.

2.4.2 Monitoring Locations

Two passive ambient air monitors for NO_2 and SO_2 were installed for the initial construction and operation phases of the Mine. An additional monitoring will be installed to coincide with operation of the Pump Pit area (est. 2025+). The NO_2-SO_2 monitoring stations are co-located with dustfall and suspended particulate monitoring stations at DF-5, DF-7, and DF-10. These stations are within the Air Quality Impact Assessment Site Study Area (DF-5, DF-10) and Local Study Area (DF-7), in downwind and upwind locations from the mine site, respectively.

2.4.3 Monitoring Frequency

Monitoring for NO_2-SO_2 is conducted year-round on an approximate 30-d cycle. Passive samplers are exposed in the field for a nominal period of 30 days, collected for analysis, and replaced. As passive sampling is done over a longer period to allow for a sufficient sample size for analysis, it provides an indication of longer-term air quality trends.

2.4.4 Data Analysis

The analysis of the NO_2 and SO_2 monitoring data will include a comparison of results with the GN Environmental Guidelines for Ambient Air Quality (October, 2011) for these compounds. For reference, results are also compared to the Canadian Ambient Air Quality Standards (CAAQS) for the annual averaging time (CCME, 2020a & b). Concentrations measured on a monthly basis will be averaged and compared to the annual average guidelines for NO_2 (60 µg/m^3 or 32 ppb) and SO_2 (30 µg/m^3 or 11 ppb) (Table 2-5).

In order to evaluate assumptions made during the Project environmental assessment phase, a comparison to NO_2 and SO_2 concentrations described in the FEIS (Golder, 2014) will also be included (Table 2-5). For the Site Study Area (SSA), where the sampling stations DF-5 and DF-10 are located, the FEIS predicted a maximum annual average of 43.9 µg/m^3 (23.3 ppb @ 25°C) for NO_2, and 0.3 µg/m^3 (0.1 ppb @ 25°C) for SO_2. For the Local Study Area (LSA), where the sampling station DF-7 is located, the FEIS predicted a maximum annual average of 22.8 µg/m^3 (12.1 ppb @ 25°C) for NO_2, and 0.0 µg/m^3 (0.0 ppb @ 25°C) for SO_2. It should be noted that model predictions were for emissions produced by mine site activity, which do not include background values, which are included in monitoring results. The background values assumed in the FEIS (Table 5.2-6) of 0.1 µg/m^3 (0.05 ppb) for NO_2 and 0.5 µg/m^3 (0.2 ppb) for SO_2, are from the Fortune Minerals NICO project. Therefore, results of the monitoring program at Meliadine are compared to the sum of these assumed background values and the predicted concentrations from site activity, as summarized in Table 2-5.

Table 2-5. Regulatory guidelines and 2024 FEIS predictions for annual average concentrations of NO_2 and SO_2.

Compound	Regulatory Guideline		FEIS Prediction + Background (Annual Average)	
	Jurisdiction	GN Guideline (Annual Average)	SSA (DF-5, DF-10)	LSA (DF-7)
NO_2	GN	32 ppb	23.4 ppb	12.2 ppb
	CAAQS (2025)	12.0 ppb*		
SO_2	GN	11 ppb	0.3 ppb	0.2 ppb
	CAAQS (2025)	4.0 ppb*		

GN: Government of Nunavut Environmental Guidelines for Ambient Air Quality (GN, 2011)
CAAQS: 2025 Canadian Ambient Air Quality Standards (CCME, 2020a,b)
FEIS: 2014 Final Environmental Impact Statement (Golder, 2014a) predictions for maximum annual average NO_2 and SO_2 within the Meliadine Site Study Area (SSA) and Local Study Area (LSA).
*The average over a single calendar year of all 1-hour average concentrations.

The measured ambient NO_2 and SO_2 concentrations will also be analyzed for indications of spatial and temporal trends.

2.5 Snowpack Contaminants

In accordance with Term & Condition 1c of the Project Certificate No.:006, snowpack monitoring for contaminants will be conducted annually. The intent of the condition is to assist in predicting the impact of contaminants released in snowmelt on the water quality in Meliadine Lake, as described in the GN's Final Written Submission to the NIRB regarding the FEIS for the Meliadine Project (GN, 2014; Section 4.1.1). Therefore, this program is reported as a component of the AEMP. Contaminants in melted snowpack samples for Meliadine Lake locations are analyzed for AEMP constituents of potential concern, and results are interpreted in the context of potential impacts to Meliadine Lake water quality, within the annual AEMP report.

3 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Quality Assurance (QA) refers to plans or programs that encompass a wide range of internal and external management and technical practices designed to ensure the collection of data of known quality that matches the intended use of the data. Quality Control (QC) is a specific aspect of QA that refers to the internal techniques used to measure and assess data quality). As QC procedures are variable and program-specific, the procedures have been summarized in this section on a program component basis.

3.1 Suspended Particulate Monitoring

QA/QC procedures for the dynamic particulate monitoring program include the following:

- Travel blanks (laboratory prepared samples that travel with the samples but are not exposed to the atmosphere) will be used with each shipment (filter-based monitors);
- Samplers will be calibrated and maintained according to operating manuals and at least annually by appropriately trained personnel;
- Weekly attendance of samplers will be performed to verify operating condition, in accordance where possible with the sampler operating manual;
- An accredited laboratory will be used for pre-sample preparation and determining sample weights (filter-based monitors);
- Samples and data will be collected by appropriately trained personnel; and
- Qualified personnel will interpret the flow data and confirm ambient particulate concentrations based on laboratory results.

3.2 Dustfall Monitoring

QA/QC procedures for the dustfall monitoring program include the following:

- Travel blanks (laboratory prepared samples that travel with the samples but are not exposed to the atmosphere) will be used with each shipment;
- An accredited laboratory will be used for pre-sample preparation and analysis; and
- Samples will be collected by appropriately trained personnel.

3.3 Passive NO_2 & SO_2 Monitoring

- Travel blanks (laboratory prepared samples that travel with the samples but are not exposed to the atmosphere) will be used with each shipment;
- An accredited laboratory will be used for pre-sample preparation and analysis;
- Samples will be collected by appropriately trained personnel consistent with detailed written operating instructions from qualified personnel; and
- Qualified personnel will interpret ambient NO_2-SO_2 concentrations based on laboratory results.

4 METEOROLOGICAL MONITORING

Meteorological data are a critical input to air dispersion models and emissions estimation that will be required throughout the life of the Mine. These data allow for site-specific meteorological conditions to be included in emissions and modelling assessments, which can assist in developing trends.

A single meteorological monitoring station is installed at the site to meet international meteorological installation standards. The station continuously measures the following parameters:

- wind speed;
- wind direction;
- temperature;
- solar radiation; and
- total precipitation.

A summary of meteorological data will be included in the annual report (see Section 8.0), with a discussion of extreme events as necessary.

5 WASTE INCINERATION

In addition to the monitoring programs, Agnico Eagle has committed that the Mine will meet CCME emission requirements for waste incinerators. These requirements are summarized as follows:

Canada-Wide Standards for Dioxins and Furans (CCME, 2001): This document sets out the emission limits from incinerators. Emission limits are expressed as a concentration in the exhaust gas exiting the stack of the facility and will be met using generally available incineration and emission control technology and waste diversion. An emission concentration limit of 80 picograms of International Toxic Equivalency Quotients per cubic metre (pg I-TEQ/m^3) is applicable to the Mine for waste incinerator emissions .

Environmental Guideline for the Burning and Incineration of Solid Waste (Nunavut, 2012): This document sets out practices, methods and limits with respect to the combustion of solid waste in Nunavut. The guideline includes a specific limit of 80 picograms of International Toxic Equivalency Quotients per cubic metre (pg I-TEQ/m^3) for dioxins and furans, which is consistent with the CCME limit above. The guideline also sets a limit of 20 micrograms per cubic metre (µg/m^3) for mercury.

An Incineration Management Plan has been developed for the Mine, which includes a stack testing program for mercury as well as dioxins and furans. The stack testing report is provided as an appendix of the Annual Report.

6 POLLUTANT RELEASE QUANTIFICATION AND REPORTING

Agnico Eagle reports greenhouse gas emissions annually to ECCC's Greenhouse Gas Emissions Reporting Program (GHGRP), and further reports air emissions to the National Pollutant Release Inventory (NPRI) program.

For the purposes of quantifying emissions, an inventory of all emissions sources is conducted each year that reporting thresholds are triggered. Emissions are attributed to each of the identified sources based on a combination of field and desk-based emissions statistics and annual usage calculations.

7 MITIGATION AND ADAPTIVE MANAGEMENT

Design aspects, operational measures, and other mitigation measures have been incorporated into the current Mine plans, which will minimize associated air emissions. Mitigation measures that will be applied to the Mine can be classified into 3 stages:

- Design-based mitigation;
- General mitigation; and
- Activity-specific mitigation.

Through its Mine design, Agnico Eagle has identified a series of best management practices that will be employed to minimize potential air quality changes. For example, design specifications, such as the purchase of vehicles that meet Tier III emission standards, have been incorporated. Other mitigation will include the development of general mitigation practices, such as routine maintenance and housekeeping programs, as well as activity specific mitigation, such as incineration management programs. The following management plans which have been submitted to the NIRB further describe mitigation measures related to air quality:

- Dust Management Plan
- Incineration Management Plan
- Ore Storage Management Plan
- Mine Waste Management Plan
- Roads Management Plan
- Borrow Pits and Quarries Management Plan
- Greenhouse Gas Reduction Plan

8 REPORTING

Agnico Eagle will provide an annual air quality report that summarizes the air quality monitoring data collected during each year. In addition and as mentioned above, Agnico Eagle will report annual emission estimates to the National Pollutant Release Inventory (NPRI) and Greenhouse Gas (GHG) emissions to the appropriate federal program.

The following items will be included in the annual air quality monitoring report:

- Description of the monitoring programs;
- Description of mitigation efforts undertaken in the previous year;
- Monitoring locations;

- Instrumentation;
- Weather conditions during sample collection;
- Time and duration of monitoring, including dates;
- Suspended particulate monitor inspection reports and data verification methods;
- Relevant standards/guidelines;
- Results of monitoring (raw and averaged as appropriate for comparison to standards);
- Comparison of results to relevant standards, FEIS predictions, and analysis of spatial and temporal trends;
- Discussion of results, including possible reasons for non-compliance with reference values or exceedance of FEIS predictions; and
- Mitigation measures for reducing non-compliance incidents in the future.

9 PLAN REVIEW

The Air Quality Monitoring Plan will be reviewed periodically and updated as changes to the equipment or the program occur.

10 REFERENCES

Agnico Eagle Mines Ltd (Agnico Eagle), 2017. Meliadine Gold Project – 2017 Air Quality Monitoring Report. March, 2017.

Agnico Eagle Mines Ltd (Agnico Eagle), 2018. Meliadine Gold Project – 2018 Air Quality Monitoring Report. March, 2018.

Alberta Environment and Parks (AB), 2019. Alberta Ambient Air Quality Objectives and Guidelines Summary. Air Policy Branch, Alberta Environment and Parks. Available online at: https://open.alberta.ca/publications/9781460134856

Canadian Council of Ministers of the Environment (CCME), 2020a. Guidance Document on Achievement Determination for Canadian Ambient Air Quality Standards (CAAQS) for Nitrogen Dioxide. PN 1608. ISBN 978-1-77202-061-8 PDF.

Canadian Council of Ministers of the Environment (CCME), 2020b. Guidance Document on Achievement Determination for Canadian Ambient Air Quality Standards (CAAQS) for Sulphur Dioxide. PN 1610. ISBN 978-1-77202-063-2 PDF.

Canadian Council of Ministers of the Environment (CCME), 2012. Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards (CAAQS) for Fine Particulate Matter and Ozone. PN 1483. ISBN: 978-1-896997-91-9 PDF

Canadian Council of Ministers of the Environment (CCME), 2001. Canada-wide standards for dioxins and furans. Winnipeg, MB.

Golder Associates (Golder), 2014. Final Environmental Impact Statement – Meliadine Gold Project, Nunavut. Volume 5.0 Atmospheric Environment and Impact Assessment. April, 2014.

Golder Associates (Golder), 2012. Determination of Natural Winter Mitigation of Road Dust Emissions from Mining Operations in Northern Canada. Submitted to De Beers Canada Inc. September, 2012.

Government of Nunavut (GN), 2014. NIRB File No. 11MN053: Government of Nunavut Final Written Submission for Agnico Eagle Mines Ltd.'s Meliadine Gold proposed project. Sent via email to Kelli Gillard, Technical Advisor, NIRB. Cambridge Bay, NU. July 18, 2014.

Government of Nunavut (GN), 2012. Environmental Guideline for the Burning and Incineration of Solid Waste. October, 2010. Revised January, 2012.

Government of Nunavut (GN), Department of Environment. 2011. Environmental Guideline for Ambient Air Quality.

Government of the Northwest Territories (GNWT), 2023. Ambient Air Quality Monitoring Guideline – In Support of the Environmental Agreements and Memorandums of Understanding with Mine Operators. April, 2023.