AGNICO EAGLE

Meadowbank Division

Operational ARD-ML Sampling and Testing Plan – Whale Tail Pit Addendum

NOVEMBER 2018
VERSION 3
WT023

EXECUTIVE SUMMARY

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) will develop the Whale Tail Pit and Haul Road Project (Project), a satellite deposit located on the Amaruq property, to continue mine operations and milling at Meadowbank Mine.

Amaruq property is a 408 square kilometre (km^2) site located on Inuit Owned Land approximately 150 kilometres (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposit will be mined as an open pit (i.e., Whale Tail Pit), and ore will be hauled to the approved infrastructure at Meadowbank Mine for milling.

Mining facilities include accommodation buildings, two ore stockpiles, one overburden stockpile, one rock storage facility area planned to receive waste rock and waste overburden, a water management system that includes collection ponds, water diversion channels, and retention dikes/berms, and a waste water treatment plant.

Waste rock, overburden and lake sediment were sampled and tested as part of a geochemical program presented in Golder (2016). Among the 8 lithologies tested, 2 have low acid generating and metal leaching potential, while the remaining lithologies are either potentially acid generating and/or metal leaching rock. The overburden is non-potentially acid generating and non-metal leaching while the lake sediment is potentially acid generating and metal leaching. Testing will be completed on waste rock to identify material that is non-potentially acid generating and low leaching that can be used as construction and closure rock.

An approach is proposed to define if the waste rock lithologies can be used as construction/closure material or must be piled in the Whale Tail Waste Rock Storage Facility.

DOCUMENT CONTROL

Version	Date	Section	Page	Revision	Author
1	June 2016			The Operational ARD-ML Sampling and Testing Plan as Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval	Golder Associates Ltd.
2	June 2018	All	All	Updated to address Term and Condition 8 (NIRB project certificate 008; March 15, 2018). Includes update to project nomenclature to reflect current usage.	Golder Associates Ltd.
3	November 2018	All	All	Update to address recommendations of CIRNAC and ECCC	Agnico Eagle

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ACRONYMS

ABA	Acid-Base Accounting
Agnico Eagle	Agnico Eagle Mines Limited – Meadowbank Division
ARD	Acid Rock Drainage
HCT	Humidity Cell Test
LOM	Life of Mine
MEND	Mine Environment Neutral Drainage
MPA	Maximum Potential Acidity
ML	Metal (and arsenic) Leaching
NML	Not Metal Leaching
NIRB	Nunavut Impact Review Board
NWB	Nunavut Water Board
NP	Neutralization Potential
NPR	Net Potential Ratio
NPAG	Non-Potentially Acid Generating
PAG	Potentially Acid Generating
Project	Whale Tail Pit
QA/QC	Quality Assurance / Quality Control
SFE	Shake Flask Extraction
TDS	Total Dissolved Solids
TIC	Total Inorganic Carbon
WRSF	Waste Rock Storage Facility

UNITS

%	percent
kg	kilogram(s)
km	kilometer(s)
km^2	square kilometer(s)
mg/kg	milligram per kilogram
Mt	million tonne(s)
ppm	parts per million
t	tonne(s)
µg/g	micrograms per gram
wt%	weight percent

SECTION 1 • INTRODUCTION

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) is proposing to develop Whale Tail Pit and Haul Road (Project), a satellite deposit located on the Amaruq property, to continue mine operations and milling at Meadowbank Mine. Agnico Eagle is seeking approval to extend Meadowbank Mine to include development of resources from Whale Tail Pit. Concurrent with the reconsideration of the Project Certificate by the Nunavut Impact Review Board (NIRB), Agnico Eagle is seeking an amendment to Meadowbank Mine Type A Water Licence (No. 2AM-MEA1525; NWB 2015) to include mining of Whale Tail Pit and construction and operations of associated infrastructure from the Nunavut Water Board (NWB).

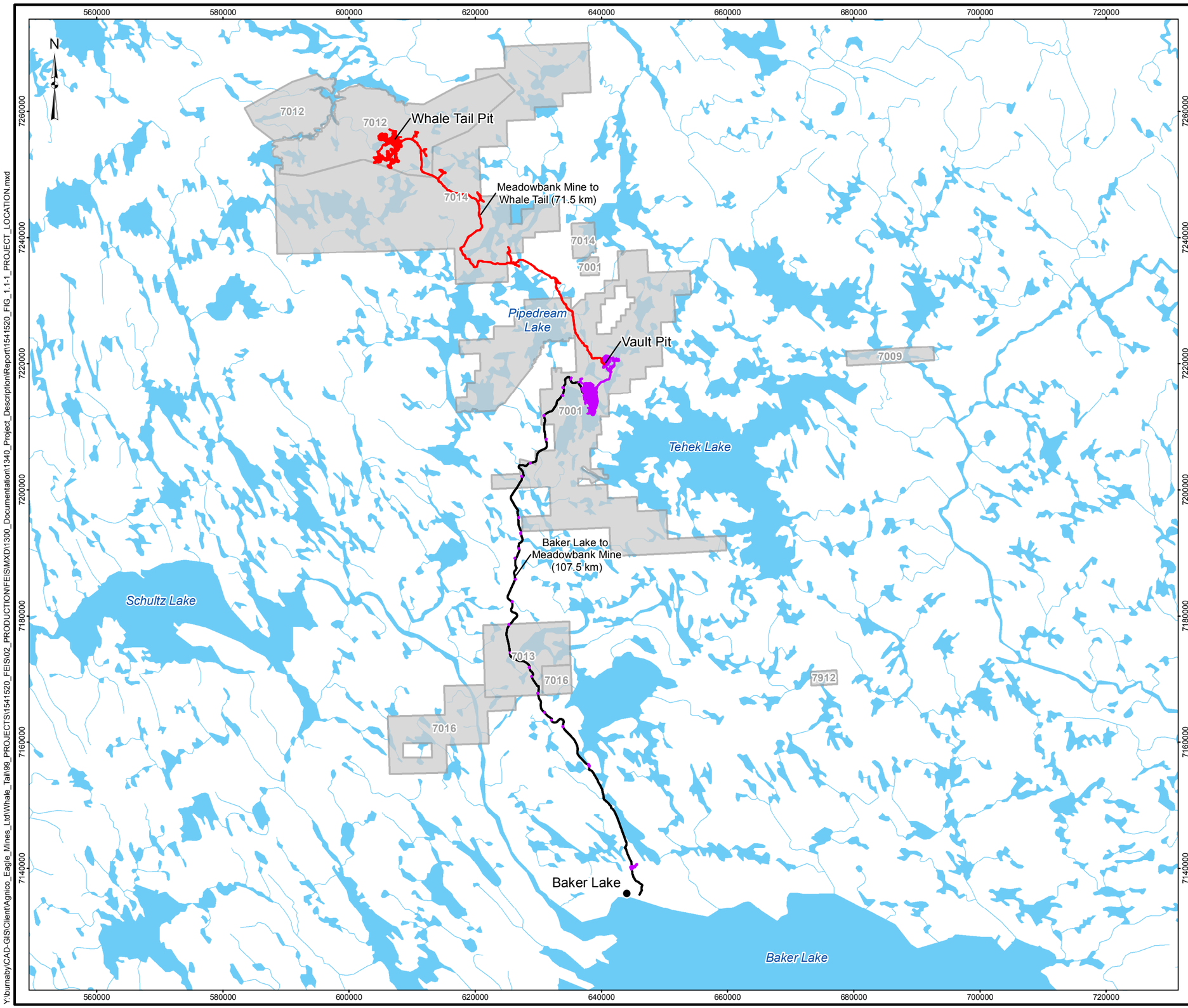
The Amaruq property is a 408 square kilometre (km^2) site located on Inuit Owned Land approximately 150 kilometres (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposit will be mined as an open pit (i.e., Whale Tail Pit), and ore will be hauled to the approved infrastructure at Meadowbank Mine for milling.

The general mine site location for the Project is presented in Figure 1.1.

This document presents an update to the Operational Acid Rock Drainage (ARD) and Metal Leaching (ML) Sampling and Testing Plan (Plan) to address NIRB Project Certificate 008 Term and Condition No. 8 (NIRB 2018), with the exception of thermal monitoring of waste rock, which will be covered in the Thermal Monitoring Plan (Agnico Eagle 2018). The Plan is closely associated with the Whale Tail Pit – Waste Rock Management Plan (Agnico Eagle 2018, Version 2) and the Water Management Plan (Agnico Eagle 2016).

The objectives of the Plan are to define the sampling, analysis, and testing procedures that are to be implemented to define the acid generating and metal leaching potential of waste rock for the Project. This characterization is to be used by mine staff to ensure that waste rock, overburden (till), and lake sediments are identified, managed, segregated and disposed of in an environmentally appropriate manner, as designated in the Plan. The Plan will also define if the waste rock, the overburden, and the lake sediment can be used as construction/closure material.

This Plan will be updated as required to reflect any changes in operation or economic feasibility occurs, and to incorporate new information and latest technology, where appropriate.



LEGEND

- COMMUNITY
- PROPOSED HAUL ROAD
- ALL WEATHER ROAD
- WHALE TAIL PIT
- MEADOWBANK OPERATION AND INFRASTRUCTURE
- CLAIM BOUNDARY
- WATERCOURSE
- WATERBODY

REFERENCE

1. HAUL ROAD OBTAINED FROM AGNICO EAGLE MINES LIMITED. 2015-10-14 FROM 6103-117-230-200_R0.dwg
2. CLAIM BOUNDARIES OBTAINED FROM AGNICO EAGLE MINES LIMITED.
3. WATERCOURSE AND WATERBODY DATA OBTAINED FROM CANVEC © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
4. INSET MAP DATA OBTAINED FROM ESRI.

DATUM: NAD 83 CSRS PROJECTION: UTM ZONE 14

12 0 12
KILOMETRES

PROJECT
AGNICO EAGLE

AGNICO EAGLE MINES LIMITED:
MEADOWBANK DIVISION
WHALE TAIL PIT PROJECT

TITLE

LOCATION OF THE PROJECT

Golder Associates

PROJECT		1541520	FILE No.	
DESIGN	JR	24 Mar. 2016	SCALE AS SHOWN	REV. 0
GIS	CDB	24 Mar. 2016		
CHECK	JR	09 May 2016		
REVIEW	LY	09 May 2016		

FIGURE 1.1

Y:\burnaby\CAD-GIS\Client\Agnico_Eagle_Mines_Ltd\Whale_Tail\99_PROJECTS\1541520_FEIS\02_PRODUCTION\FEIS\MXD\1300_Documentation\1340_Project_Description\Report\1541520_FIG_1.1-1_PROJECT_LOCATION.mxd

SECTION 2 • WASTE ROCK MANAGEMENT

2.1 Lithologies

There are six major bedrock types (or lithologies) found at Whale Tail deposit: komatiite, greywacke, chert, iron formation, basalt, and diorite. Variable thicknesses of overburden and lake sediments are present which will be removed upon mining.

The ARD and ML potential of each waste rock lithology was evaluated through a static and kinetic testing program (Golder 2016) that is on-going. Details on the test methods used and results obtained are provided in Golder (2016; summarized in Appendix A). The anticipated ARD/ML potentials for each rock type based on exploration drill core tests are shown in Table 2.1; it is noted that while the bulk of material from each lithology is PAG and/or ML, these lithologies do contain some material that is less reactive and non-potentially acid generating (NPAG) and/or non-metal leaching (NML).

Table 2.1 Anticipated ARD/ML Potential of Waste Rock Types at Whale Tail (Golder 2016)

Rock Type	Rock Unit Code	ARD Potential	ML Potential[1]	Tonnage (t)
Komatiite North	V4a – 0a	No	High	7,907,211
Komatiite South	V4a – 0b	No	Moderate	12,153,743
Greywacke Central	S3C – 3b	Yes	Variable	3,640,167
Greywacke South	S3S – 3b	No	Low	9,790,461
Greywacke North	S3N-3b	Variable	Variable	16,009,050
Chert	S10 – 3b	Yes	Variable	278,068
Iron Formation	S9E – 3b	No	High	8,958,267
Basalt	V3 – 1b	No	Moderate	2,344,027
Diorite	I2 – 8b	No	Low	628,264
Overburden	n.a.	No	Low[2]	5,666,408[4]
Lake sediment	n.a.	Yes	High[2]	

n.a. not applicable

[1] based on large column kinetic test results

[2] based on Shake Flask Extraction results

[4]Overburden and Lake sediment are considered as the same unit in the geological model

The NPAG waste rock tonnage required for the construction of the Whale Tail WRSF for the 4.7 m thermal cover is 8,883,000 tonnes.

2.2 Waste Rock Segregation

Overburden generated from the Whale Tail Pit will be placed in the Whale Tail Waste Rock Storage Facility (WRSF). Characterization of ARD/ML potential in the excavated waste rock is required in order to properly segregate it for use or disposal, as follows:

- **General Construction and/or Closure** – Only rock that is NPAG and low leaching can be used for site construction, including dewatering dikes, and WRSF closure. It is the responsibility of the Geology Superintendent to ensure that all waste rock being used for construction or

reserved for future use during closure has been characterized and verified as being NPAG and low leaching.

- **Disposal** – All other waste rock (PAG and/or ML), as well as overburden, will be placed within the Whale Tail WRSF for permanent storage.

2.2.1 Whale Tail Waste Rock Storage Facility Design

The majority of waste rock generated at the Whale Tail site will be placed in the Whale Tail WRSF. Under the current plan, the Whale Tail WRSF has an area of approximately 110 hectares. Waste rock and overburden from the Whale Tail Pit not used for site development purposes will be trucked to the Whale Tail WRSF until the end of mine operations.

The Whale Tail WRSF is designed to minimize the potential for ARD and ML. The Whale Tail WRSF will be constructed to encapsulate potentially acid generating (PAG) and ML waste rock inside a layer of NPAG material as a control measure for ARD and ML. The NPAG rock that is placed on the top and sides of the storage pile is needed in the long term to host the thawed layer and prevent liquids from contacting the centre of the pile that contains PAG and ML waste rock. Presently it is anticipated that the cover design will be similar to the Meadowbank Portage WRSF. The cover will consist of a 4.7 m thick NPAG/NML waste rock layer on the top and edges of the facility. The cover is expected to maintain freezing conditions in the pile in the long-term. This rationale is based on results to date on thermal modelling that considers thermistor readings at the Portage waste rock pile (Golder 2018, in preparation). Rock oxidation can still occur in frozen material but will proceed at a slower rate than predicted by laboratory testing because of the cold temperature prevalent for much of the year. Permafrost will retain water as ice, so it was predicted that contaminants will not be transported away from the core of the WRSF in the long-term.

Monitoring will be conducted to measure temperatures throughout the waste rock pile, and to measure the depth of the annual surface thaw (see Section 4.2.2 and the Whale Tail Thermal Monitoring Plan). This information will be used to detail the rock cover design required to close the Whale Tail WRSF. Further information of the Whale Tail WRSF are provided in the Whale Tail Pit – Waste Rock Management Plan (Agnico Eagle 2018, Version 2).

SECTION 3 • ASSESSMENT OF ARD/ML POTENTIAL AT WHALE TAIL PIT

Sampling and testing of waste materials for ARD and ML will be conducted during mine operation in order to segregate suitable waste for use in construction and for closure (Section 2.2) from that which will report directly to the Whale Tail WRSF. This section discusses field sampling methods, analytical testing, ARD/ML evaluation criteria, and the delineation of waste rock.

Appendix B includes a flow diagram of the process to be followed for waste rock sampling, testing, and segregation.

3.1 Field Sampling

Drill holes will be sampled for testing as part of the ARD/ML evaluation (Section 3.2). Sampling will proceed according to the following guidelines that are currently utilized at Meadowbank Mine:

- To be sampled in accordance with the frequency set out in writing by the Geology Superintendent. The default sampling frequency is the sampling of every fourth drill hole in each drill hole pattern, however the Geology Superintendent may vary this frequency as described below. The shallow benches in Whale Tail Pit will be sampled at a frequency of one sample every two drill holes.
- Drill holes will be spaced to ensure an even distribution of samples throughout the planned blast area.
- Drill cuttings is collected and fully mixed in a sampling stainless steel tray placed beside the drill.
- The sampling stainless steel tray content is transfered into a polyethylene plastic bag.
- Each sample will be collected from drill cuttings and should weigh no less than 1 kilogram (kg).
- The samples will be labeled using a convention that is readily traceable back to the production drill hole numbers.

The Geology Superintendent may vary the default frequency based on his knowledge from previous drilling and from visual inspections depending on where the drill pattern is situated and which rock type is encountered. The sampling frequency will be reviewed periodically, and a reduced frequency of one sample every sixteenth drill hole in each drill hole pattern may be considered for specific rock types in certain zones.

Table 3.2 Recommended Sampling Frequency by Rock Type

Rock Type	Rock Unit Code	Sampling Frequency
Komatiite North	V4a – 0a	Every 4th hole
Komatiite South	V4a – 0b	Every 4th hole
Greywacke Central	S3C – 3b	Every 4th hole
Greywacke South	S3S – 3b	Every 4th hole
Chert	S10 – 3b	Every 4th hole

Iron Formation	S9E – 3b	Every 4th hole
Basalt	V3 – 1b	Every 4th hole
Diorite	I2 – 8b	Every 4th hole

3.2 Evaluation of ARD/ML Potential at Whale Tail Pit

The ARD and ML potential of all samples collected (Section 3.1) will be evaluated through laboratory testing, as described below.

3.2.1 ARD Testing and Classification of ARD Potential (PAG / NPAG)

The most conventional method of characterizing the ARD potential of waste rock is to classify it as PAG, NPAG, or of uncertain acid generating potential (uncertain ARD potential) based on the net potential ratio (NPR) value. The NPR is the ratio of the acid-buffering potential (neutralization potential or NP) and the acid generation (maximum potential acidity or MPA; assumed to be due to sulphide sulphur content, or total sulphur minus sulphate sulphur).

The Whale Tail Pit geochemical characterization study (Golder 2016) examined the use of carbonate NP as a surrogate for bulk NP using data obtained from exploration drilling (Golder 2016). The carbonate NP and bulk NP correlate well (R^2= 0.97), implying that NPR calculated using carbonate NP is a safe assessment of available buffering capacity. . Further, MPA is calculated based on the total sulphur content of the samples (rather than sulphide content) on the basis that there are no sulphate minerals present in any lithologies. This approach to ARD classification is based on observed trends in rock chemistry, mineralogy, and reactivity of neutralizing minerals (Golder 2016).

The ARD potential of waste rock is traditionally characterized through acid-base accounting (ABA) analyses, which involves a suite of analytical tests that include paste pH, total sulphur, sulphate sulphur, neutralization potential, and carbonate neutralization potential based on total inorganic carbon. Since ABA analyses are relatively slow to complete at a commercial laboratory and require several different types of equipment, the Meadowbank onsite assay laboratory is equipped to analyze total sulphur and total inorganic carbon overnight for the samples of drill cuttings. Mine staff will use these results to calculate the NPR value for each sample as follows:

- Total sulphur is converted into **MPA** by multiplying the total sulphur wt% by 31.25, which yields an MPA value in kg $CaCO_3$ equivalent.
- Total inorganic carbon is similarly converted into a carbonate NP (**CaNP)** by multiplying the total wt% inorganic carbon (reported as %C) by 83.34 which yields an NP value in kg $CaCO_3$ equivalent.
- The carbonate NPR for the blast hole drill cutting sample is then calculated as **NPR = CaNP/MPA**.

This approach is consistent with the use of total sulphur and total inorganic carbon to calculate the MPA and CaNP of waste rock material for the Whale Tail Pit geochemical characterization study (Golder 2016).

The ARD potential of waste materials from Whale Tail Pit will be classified first based on total sulphur content and then using the NPR-based guidelines published by MEND (2009). Total sulphur will be used as an initial screening criteria to identify NPAG material, whereby a sample will be considered NPAG when it contains less than 0.1 wt% sulphur, regardless of the NP (Golder 2016). Where total sulphur is above 0.1%, the calculated carbonate NPR value will be used for sample classification, as summarized in Table 3.2.

Table 3.3 ARD Classification of Whale Tail Pit Waste Rock and Overburden

Total Sulphur Screening Criteria	NPR Screening Criteria (based on Carbonate NP)	ARD Potential
Total S < 0.1%	-	Non-potentially acid generating (PAG)
Total S > 0.1%	NPR > 2	
	1 ≤ NPR < 2	Uncertain or low acid generating potential
	NPR < 1	Potentially acid generating (PAG)

3.2.2 Metal Leaching Potential Testing and Evaluation

Waste rock materials can also potentially leach metals (and other elements) when they come into contact with water and air, which is referred to as ML potential and can occur even if the materials are non-acid generating. Arsenic is identified as a parameter of environmental interest based on laboratory leaching tests (Golder 2016).

Standard laboratory techniques for analysis of ML potential include Shake Flask Extraction (SFE) and humidity cell tests (HCT). Both of these tests involve exposing the samples to water, and measuring the metal content of the water after a prescribed period of contact time. The turn-around time for analytical results is too long for either of these tests to be used as a decision-making tool on a day-to-day basis as required during mine operations. Consequently, it is not feasible to segregate waste materials based on measured ML potentials derived from leaching tests.

However, the amount of arsenic released by leaching has been shown to be proportional to the total arsenic content of the sample (Golder 2016), whereby samples with total arsenic content below approximately 75 ppm (as µg/g or mg/kg) indicate a low potential to leach arsenic. This has been selected as a suitable identifier of arsenic leaching. Total arsenic will be analyzed at the Meadowbank on-site laboratory, and arsenic leaching potential be inferred based on the total arsenic content.

A surface runoff water monitoring program will be implemented for the Project like it is at the other deposits of Meadowbank to detect ML in site contact waters. Further details on the water quality monitoring program are provided in Section 4.2.1.

3.2.3 Quality Assurance / Quality Control (QA/QC)

Samples from Whale Tail Pit will be subjected to the same quality assurance / quality control (QA/QC) program currently in use at Meadowbank, which includes the use of certified reference materials and duplicate analyses by an accredited external lab. Duplicate analyses include more complex testing described above for ARD classification (Acid Base Accounting or ABA), and metal leaching evaluation (bulk metal content and Shake Flask Extraction or SFE).

For the duplicate samples, the testing frequency of 75 samples per quarter that is currently in place at Meadowbank will be followed, however this frequency will be evaluated and altered as necessary as the database increases. A geostatistical approach will be considered to establish the number of QA/QC samples required by rock type to achieve statistical confidence.

Further, the duplicate test results will be used to confirm the total sulphur (0.1 %) and total arsenic (75 ppm) threshold values in place for waste classification. SFE results from the duplicate analyses will be evaluated against the proposed Effluent Quality Criteria for arsenic (0.1 mg/L) and the 75 ppm value will be modified as necessary based on the results.

3.3 Waste Rock Delineation and Tracking

Following laboratory analysis, geology staff will classify waste rock into the following types of material as defined in Table 3.3.

Table 3.3 ARD Guidelines used to Classify Whale Tail Pit Waste Rock and Overburden

Waste Type	Criteria for Classification	Frequency of Outlying Data
NPAG/NML	Total S < 0.1% and/or NPR > 2 ***and*** Average Total Arsenic < 75 ppm	• No more than one PAG (S>0.1% and NPR<1) for every 8 NPAG samples. • No more than one uncertain sample (S>0.1% and 1≤NPR<2) for every 4 NPAG samples. • Average total arsenic value is below 75 ppm
PAG/ML	Total S > 0.1% and NPR < 2 ***and/or*** Average Total Arsenic > 75 ppm	• Two or more PAG (S>0.1% and NPR<1) for every 8 NPAG samples. • Two or more uncertain samples (S>0.1% and 1≤NPR<2) for every 4 NPAG samples. • Average total arsenic value is above 75 ppm

NPAG/NML waste can be used for construction (i.e. pads, roads, and dykes) and closure (i.e., Whale Tail WRSF cover material) while waste rock classified as PAG/ML must be stored in the Whale Tail WRSF. The criteria outlined in Table 3.3 can be re-evaluated when judged relevant by the Geology Superintendent in consultation with the mine engineer, as additional test data become available. The ARD/ML classification of all samples will be logged in a database for the Project, and will be available as required for annual reports or upon request.

NPR and total arsenic values will be transferred to the mine plans for each specific blast. Once blasting is complete the mine surveyor will identify the two waste categories: 1) suitable for capping and infrastructure (NPAG/NML) and 2) non-suitable material (PAG/NML-ML and NPAG/ML). Outlines from the drill pattern will be used to outline the respective dig limits in the open pit for each type of material. The different material types or packets will be identified in the field using stakes, wire flags and flagging tape so that each type of material can be excavated and sent to the appropriate destination (see Section 2.2).

Both waste types (1) NPAG/NML and 2) PAG/NML-ML and NPAG/ML) will be assigned a unique identification number and tracked in WENCO to their final location in the Whale Tail WRSF.

SECTION 4 • PLAN REVIEW, PERFORMANCE MONITORING & REPORTING

4.1 Plan Review

The Mine Geology Superintendent will be responsible for implementing the Operational ARD-ML Sampling and Testing Plan. The overall Plan is to be reviewed as required by the Geology Superintendent and updated if necessary to reflect any adaptive changes made in the Operational ARD-ML Sampling and Testing Plan. The changes should be made in consultation with the mine engineer and chief assayer. Revised versions should be sent according to the Distribution List.

4.2 Performance Monitoring

The Operational ARD-ML Sampling and Testing Plan is the primary tool to ensure that all overburden and waste rock generated during the Project is appropriately characterized and managed to prevent the future release of contaminants from the Whale Tail WRSF into the receiving environment.

In addition to the analytical QA/QC procedures outlined in Section 3.0, performance monitoring activities will include those activities outlined below.

4.2.1 Water Quality Monitoring

Water quality will be sampled and monitored by the Agnico Eagle in accordance with the Type A Water Licence. The details of this monitoring program are described in the Water Quality and Flow Management Plan (Agnico Eagle 2018b, Version 3). On-site monitoring locations for site contact water will include the Whale Tail WRSF drainage, the Attenuation Pond, Whale Tail Pit sumps, Industrial Sector and dewatering dikes. The data from this monitoring is to be provided to the NWB through annual reporting, as per the Type A Water Licence.

4.2.2 Permafrost Development

Thermistors will be installed within the Whale Tail WRSF to determine if permafrost formation is observed. More information is provided in the Thermal Monitoring Plan (Agnico Eagle 2018a). Thermal monitoring results are provided in Agnico Eagle's annual report submitted to the NWB.

SECTION 5 • ADAPTIVE MANAGEMENT

5.1 Management Actions

Adaptive management will be achieved through performance monitoring (Section 4) and management actions that will be implemented, should they be triggered. Action level responses taken during the year will be documented in Agnico Eagle's annual report submitted to the NWB.

Table 5.1 outlines the various adaptive management actions associated with the ARD/ML plan.

Table 5.1 Adaptive Management Actions Associated with the ARD/ML Plan

Thresholds	Mitigation Strategies	Potential Issues	Steps	Management Responses
Significant variations from model predictions are observed suggesting potential for ARD/ML Drainage	Use only NPAG/NML waste rock for site construction and closure	Observations of visible sulphide minerals or staining, inferring PAG rock was used in construction material across the site	• Notify management • Note location and estimate dimensions of potential PAG/ML material • Collect samples of material from the observed area for analysis (Section 3.2) • Review results; if samples are PAG/ML, establish a monitoring station down gradient of the location • Review water quality sampling; if elevated metal concentrations are detected, proceed to management response.	• Consider relocation of material to WRSF or cover with additional NPAG/NML rock if possible, otherwise investigate other mitigation strategies. • Review the application of the ARD/ML sampling plan (i.e. sampling frequency, total sulphur and total arsenic threshold value, and material classification)
	Confirm that waste rock being encountered exhibits the anticipated range of behaviour from baseline study	Higher proportion of waste rock is PAG/ML than anticipated	• Geology to document the location and classification of samples to identify trends outside the anticipated geochemical behaviour of the rock types • Notify management if unanticipated trends are observed	• Confirm the availability of sufficient NPAG/NML waste rock for closure • Confirm the availability of sufficient space in the WRSF for PAG/ML waste rock • Initiate a follow-up investigation to evaluate the implications
Significant variations from model predictions are observed in the water quality of the WRSF pond	Manage contact water quality to avoid exceedance to predicted levels	One contact water quality monitoring sample is different than predicted	• Collect and analyze follow up confirmation samples to confirm results • If confirmed, notify management	• Initiate an investigation to reduce the effects of contact water quality, if possible
		Water quality monitoring program identifies trends outside of those predicted, for a significant period of time (i.e. great than two months)	• Increase monitoring frequency • Notify management	• Investigate alternative strategies to control effects to water quality • Investigate strategies to reduce seepage and runoff from identified sources
	Use of thermal cover to minimize water in contact with PAG/ML rock in post-closure	Cover placement is incomplete or not of sufficient thickness	• Monitor the placement of cover material on the WRSF to ensure appropriate thickness of cover • Modify cover thickness with placement of additional material when thickness is not sufficient	• Waste Rock Facility Monitoring program to confirm completeness of cover on WRSF (Agnico Eagle 2018, Version 2)
		Thermal monitoring confirms that the waste rock cover freeze back is not occurring as anticipated	• Notify management	• Investigate effects of the different thermal regimes on water quality • Consider alternative strategies to mitigate impacts to water quality from the PAG/ML material in the WRSF

SECTION 6 • REFERENCES

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APPENDIX A • SUMMARY OF THE ARD/ML POTENTIAL OF WHALE TAIL MINE WASTES

The acid rock drainage (ARD) and metal leaching (ML) potential of waste material to be produced at Whale Tail Pit has been evaluated through both static and kinetic testing (Golder 2016). The static tests conducted for this purpose included the following:

- Mineralogy;
- Whole rock analysis;
- Elemental solid phase analysis (multi-acid digestion);
- Acid base accounting (ABA);
- Net acid generation tests; and
- Shake Flask Extraction.

Test methods and results are provided in (Golder 2016).

Kinetic testing was conducted on representative samples of waste rock from each lithology using standard 1 kg humidity cell tests, 12 to 60 kg composite column tests, a 40 kg composite submerged column, and two 8 kg field cells. Test methods are provided in (Golder 2016).

Table A.1 summarizes the ARD/ML potential for the overburden (till), lake sediments, and pit rock, based on the results of static and kinetic testing (Golder 2016). ARD potential was evaluated by comparing ABA results to the Canadian guidelines presented in MEND (2009). ML potential was evaluated based on exceedances in kinetic test leachate of the mean monthly Effluent Quality Criteria (EQC) developed for the Project as proposed in the Whale Tail water license application to the Nunavut Water Board (Agnico Eagle 2018b).

Table A.1 Summary of ARD/ML Potentials of Whale Tail Pit Waste Types

Waste Type	Unit	ARD Potential[1]			Effluent Quality Criteria Exceedances in Test Leachate[2]	ML Potential[2]
		% PAG	% Uncertain	% NPAG		
Komatiite North	V4a – 0a	5	-	95	As	High
Komatiite South	V4a – 0b	29	-	71	As	Moderate
Greywacke Central	S3C – 3b	58	29	13	As	Variable
Greywacke South	S3S – 3b	-	-	100	-	Low
Greywacke North	S3N – 3b	16.6	16.6	66.6	Ni	Variable
Chert	S10 – 3b	87	4	9	As	Variable
Iron Formation	S9E – 3b	27	4	69	As	High
Basalt	V3 – 1b	-	3	97	As	Moderate
Diorite	I2 – 8b	15	15	70	-	Low
Overburden	n.a.	-	-	100	Al, Cu, Fe	Low
Lake sediment	n.a.	100	-	-	Al, As, Fe, Ni	High

[1]Percentage of total samples analyzed (Golder 2016), where PAG = potentially acid-generating; NPAG = not potentially acid-generating
[2]Based on the results corresponding to the bulk column composite samples (Golder 2016) with the exception of diorite which is based on humidity cell test results and overburden and lake sediment which are based on SFE results
n.a. = not applicable; N/A= not analyzed

APPENDIX B • FLOW CHART FOR WASTE ROCK DELINEATION AND SEGREGATION

ARD/ML Plan Attachment B: Flow Chart

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STEP 1: SAMPLE COLLECTION[1,2]

Responsibility: Geology Superintendent

1. Identify rock types to be excavated using block model
2. Define sample frequency per Table
3. Plan and map sample locations to ensure an even distribution throughout the planned blast area, sufficient for packet definition
4. Collect each sample from drill cuttings (>1 kg) and label using production drill hole numbers
5. Document for each sample:
   - Date
   - Blast pattern / GPS location
   - Sample ID
   - Rock Type
6. Submit samples to Assay Lab Manager for analysis.
   - Include documentation (Step 2)
   - CC the Environmental Coordinator on submission

Rock Type	Rock Unit Code	Sampling Frequency
Komatiite North	V4a – 0a	Every 4th hole
Komatiite South	V4a – 0b	Every 4th hole
Greywacke Central	S3C – 3b	Every 4th hole
Greywacke South	S3S – 3b	Every 4th hole
Chert	S10 – 3b	Every 4th hole
Iron Formation	S9E – 3b	Every 4th hole
Basalt	V3 – 1b	Every 4th hole
Diorite	I2 – 8b	Every 4th hole

STEP 2: LABORATORY ANALYSIS[1,2]

Responsibility: Assay Laboratory

1. Prep samples (crush and homogenize)
2a. Initiate on-site analysis:
   - Total Sulphur (S)
   - Total Inorganic Carbon (TIC)
   - Total Arsenic
3. Quarterly analysis (minimum of 75 duplicate samples). Send subset of samples to off-site laboratory for QA/QC:
   - Tests: ABA, Bulk Metals, SFE
   - Include Chain of Custody

Copy Environmental Coordinator on COC

STEP 3: DATA EVALUATION AND ROCK CLASSIFICATION[1]

Responsibility: Geology Superintendent

1. Compile on-site data with sample information:
   - Total Sulphur
   - Total Inorganic Carbon
   - Total Arsenic
   - Sample documentation
2. Compare Total Sulphur with Cut-off (0.1%)
3. Calculate NPR from Total Sulphur (S) and Total Inorganic Carbon (TIC) to determine ARD potential:

   NPR = [TIC%*83.34] / [S%*31.25]
4. Evaluate arsenic leaching potential with Total Arsenic (As)

Send compilation to Environmental Coordinator

Total S < 0.1% **= NPAG**

Total S > 0.1% *and* NPR>2 **= NPAG**

Total S > 0.1% and 1≤ NPR<2 **= Uncertain**

Total S > 0.1% and NPR<1 **=PAG**

Total As < 75 ppm **=NML**

Total As > 75 ppm **= ML**

NPAG/NML Samples

Uncertain Samples

PAG/ML Samples

Data QA/QC See Page 2 (reverse)

STEP 4: ROCK SEGREGATION AND MANAGEMENT[1]

Responsibility: Geology Superintendent, Engineering, Environmental Coordinator, Construction Supervisor

1. Log results in database. Map the distribution of samples and define the groups of material for each blast

NPAG and NML Material

- ≤1 PAG sample per 8 NPAG samples
- ≤1 Uncertain sample per 8 NPAG samples
- Average total arsenic <75 ppm

PAG and/or ML Material

- ≥2 PAG samples per 8 NPAG samples
- ≥2 Uncertain samples per 4 NPAG samples
- Average total arsenic >75 ppm

2. Field Segregation of Waste Types:
   - Outline dig limits using stakes, wire flags, and flagging tape
   - Track in WENCO
3. Record the following with each Packet:
   - Packet number
   - Sample Results (Total S, TIC, As, NPR)
   - Block model rock type
   - Final location in WRSF

No Restrictions for Re-Use as Construction and/ or Cover Material

Not Approved for Re-Use; must be managed to control ARD/ML

Suitable for the following:

- Pads
- Roads
- Dykes
- WRSF sides and cover material

Disposal and Management Requirements:

- Encapsulated within NPAG/NML rock that hosts the thawed layer, and encouraged to freeze
  - Placed on a pad of NPAG/NML rock
  - Placed in centre of the pad (≥4m from edge)
  - Covered with ≥4 m of NPAG/NML rock
- Placed away from permanent water contact
- Monitor temperature and seepage quality

License B WRSF
Whale Tail WRSF

ARD/ML Plan Attachment B: Flow Chart

STEP 3a. DATA QA/QC – EXTERNAL LABORATORY
Responsibility: Geology Superintendent / Environmental Coordinator

1. Confirm ARD Potential using external lab results (ABA). Calculate NPR using the Total Sulphur and Total Inorganic Carbon reported by external lab to compare directly with Meadowbank assay lab data.

↓

2. Confirm arsenic leaching potential using external lab results.

Arsenic leaching potential is considered high if:

- Total arsenic > 75 mg/kg

and

- Leachable arsenic (SFE) > 0.1 mg/L

↓

3. Complete QA/QC of data against onsite results by calculating an RPD value. RPD values below 35% are considered acceptable[3].

↓

4. If the ARD and/or ML designation determined by the external lab data are different than that determined by the onsite lab, a more rigorous QA/QC program is required and refinements must be considered in the block model designation.

↓

5. If required, revisit the cut-off criteria for total arsenic based on updated leach test data.

LIST OF ACRONYMS

ARD: acid rock drainage
PAG: potentially acid generating
NPAG: not potentially acid generating
NPR: net potential ratio
ML: metal leaching
NML: not metal leaching
ABA: acid base accounting
Bulk metals: total metals by ICP
WRA: whole rock analysis
SFE: metal leaching by shake flask extraction
XRF: x-ray fluorescence
ppm = parts per million
S = sulphur
C = carbon
As = arsenic

LIST OF ANALYTES AT EXTERNAL LAB

ABA: acid base accounting by Modified Sobek method. Includes paste pH, Bulk NP, analysis of total S and Total C by C/S analyzer (LECO Furnace), Acid Leachable Sulphate and Sulphide by difference.

Bulk metals: trace metals scan by aqua regia digest and analysis by ICP-MS and ICP-OES. Includes Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, U, V, Zn

WRA: whole rock analysisor major oxides by Borate Fusion XRF. Includes SiO_2, Al_2O_3, Fe_2O_3, MgO, CaO, Na_2O, K_2O, TiO_2, P_2O_5, MnO, Cr_2O_3, V_2O_5, LOI

SFE: metal leaching by shake flask extraction, 24 hr leach extraction using DI water at 4:1 L/S ratio, and filtered leachate through 0.2 micron filter. Analysis of leachate includes pH, alkalinity, conductivity, anions (Cl, SO4, NO2, NO3, Br), ortho-phosphate, fluoride, mercury (by CVAAS), and trace metals by ICP-MS and ICP-OES (Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, U, V, Zn).

References:
1-*Operational ARD-ML Sampling and Testing Plan – Whale Tail Pit Addendum (Golder 2016)*
2- Procedure AMQ-ENV-PRO- Quarry and borrow pit ARD-ML Sampling for Construction
3-EPA Guidelines for Inorganic Data Review, 1994