Appendix 30

Meadowbank 2020 Landfarm Report

AGNICO EAGLE

MEADOWBANK COMPLEX

2020 Landfarm Report

In Accordance with NIRB Project Certificates No.004 & No. 008
&
NWB Type A License 2AM-MEA1530 & 2AM-WTP1830

Prepared by:
Agnico-Eagle Mines Limited – Meadowbank Division

March 2021

EXECUTIVE SUMMARY

As per the Landfarm Design and Management Plan (LDMP; March, 2017), this report has been prepared to provide the following information regarding landfarm activities in 2020:

- volume of material added to and removed from the facility
- disposal or reuse location
- results from laboratory analyses of soil and contact water
- volume and type of nutrient additions
- visual inspection results
- volume of contact water pumped

Meadowbank's first landfarm (Landfarm 1) was constructed in 2012 and located on the north-west side of the South Tailings Cell within the Tailings Storage Facility. Since this area was planned to eventually become flooded with reclaim water, Agnico constructed a new landfarm (Landfarm 2) in 2016, in order to continue the treatment of contaminated soil. In 2019, the Landfarm 1 area became flooded with reclaim water, and it is thus no longer in operation.

Based on surveys conducted by Meadowbank's Engineering Department the total volume of the landfarm 2 in January 2020 was 4,125 m^3. It is estimated that between January 2020 and the end of December 2020, 577.5 m^3 of soil were added to landfarm 2 from excavation of spills around the Meadowbank and Whale Tail sites. Total landfarm 2 volume at the end of December 2020 was 4,702.5 m^3 with a remaining estimated capacity of 6,742.5 m^3.

No landfarm soil sampling was conducted in 2020, and no material was removed from the landfarm.

Nutrient additions in the form of sewage sludge occurred in August 2020, as detailed in the LDMP. Total volume of sludge added to the landfarm is 6.8 cubic meters. Aeration of the material by the construction of windrow was also performed.

Visual inspections (37 times) indicated that the landfarm berm and pad appear to be structurally intact, and no maintenance was required.

No ponded water or seepage from the landfarm area was observed, so no water quality monitoring was required.

There was no landfarm at Whale Tail site in 2020. All petroleum-contaminated material was brought to the Meadowbank landfarm in 2020.

TABLE OF CONTENTS

LIST OF FIGURES

SECTION 1 • INTRODUCTION

1.1 BACKGROUND

Onsite storage and remediation has been established as the preferred method for treatment of petroleum hydrocarbon-contaminated soil that may be generated at Meadowbank facilities. Specifically, remediation through land farming has been identified as the primary treatment option. The Landfarm Design and Management Plan (LDMP) was updated in March 2017 to describe the operational procedures used onsite in relation to this management strategy.

1.2 OBJECTIVES

Per the Landfarm Design and Management Plan (March, 2017) this report summarizes the following aspects of the Meadowbank landfarm operation in 2020:

- volume of material added to the facility
- amount of material removed
- disposal or reuse location
- all analysis results
- volume and type of nutrient addition
- visual inspection results
- volume of contact water pumped.

SECTION 2 • LANDFARM ACTIVITIES

2.1 LANDFARM 1

The original landfarm design was submitted by Agnico to the Nunavut Water Board in October 2012 and was in use until 2016. As presented in Figure 1 below, the original landfarm (Landfarm 1) was located on the north-west side of the South Tailings Cell impoundment (within the Tailing Storage Facility – TSF).

Knowing that this landfarm area would eventually become flooded with reclaim water, Agnico decided to find an alternate location for a new landfarm in 2016 (Landfarm 2, see below).

Contaminated soil was deposited in Landfarm 1 from 2013 – 2016.

In 2017, activities at Landfarm 1 were limited to relocation of contaminated soil (~half the volume) to Landfarm 2.

In 2018, no activities occurred at Landfarm 1.

In 2019, Landfarm 1 was flooded by reclaim water, and is no longer in operation.

2.2 LANDFARM 2

The Landfarm 2 facility was constructed in October 2016 in order to provide sufficient area for the ongoing treatment of contaminated soil.

As presented on Figure 1, Landfarm 2 is located on the north east side of the South Tailing Cell, north of the Central Dike. Locating this site within the tailings impoundment provides containment in case of runoff water from the contaminated material.

Landfarm 2 is located 900 m west of the nearest water body, Dogleg Lake. Surface drainage in the area of the Landfarm 2 is westerly, towards the South Tailings Cell and away from surface watercourses.

Specifications of the Landfarm 2 design are presented in the LDMP. The facility is designed with one soil remediation/storage cell, which is constructed with a 2.5 m high berm and a 0.5 m thick layer of compacted till base with hydraulic conductivity estimated of $1x10^{-7}$ m/s. The slope of the base is 3% towards the East side, leading to a slope of 7% towards the South Tailings Cell. The pad underneath the till layer varies between 6 m and 22.5 m thick, based on elevation of the tundra underneath, which ranges from 151 masl to 134 masl. In the Meadowbank area, the shallow groundwater is estimated to be 1.5 m below surface (active layer of permafrost July to September), at the average depth of thaw. Therefore, no impacts to groundwater are anticipated.

From 2017 - 2019, soil was either relocated from Landfarm 1 to Landfarm 2, or deposited in Landfarm 2 from the clean up of spills around the mine site. In 2020, all the material was disposed in Landfarm 2, including contaminated material from Whale Tail. Details of soil additions and removals for Landfarm 1 and 2 are provided in Section 2.3.

As per the Water License 2AM-MEA1530 Part F, Item 19; “Water accumulating in the landfarm shall be contained within the landfarm and not be discharged to the environment”. The water will be managed and contained within the landfarm, and discharged to the TSF if required. The monitoring station ST-14B will be sampled as per requirement of the Water License.

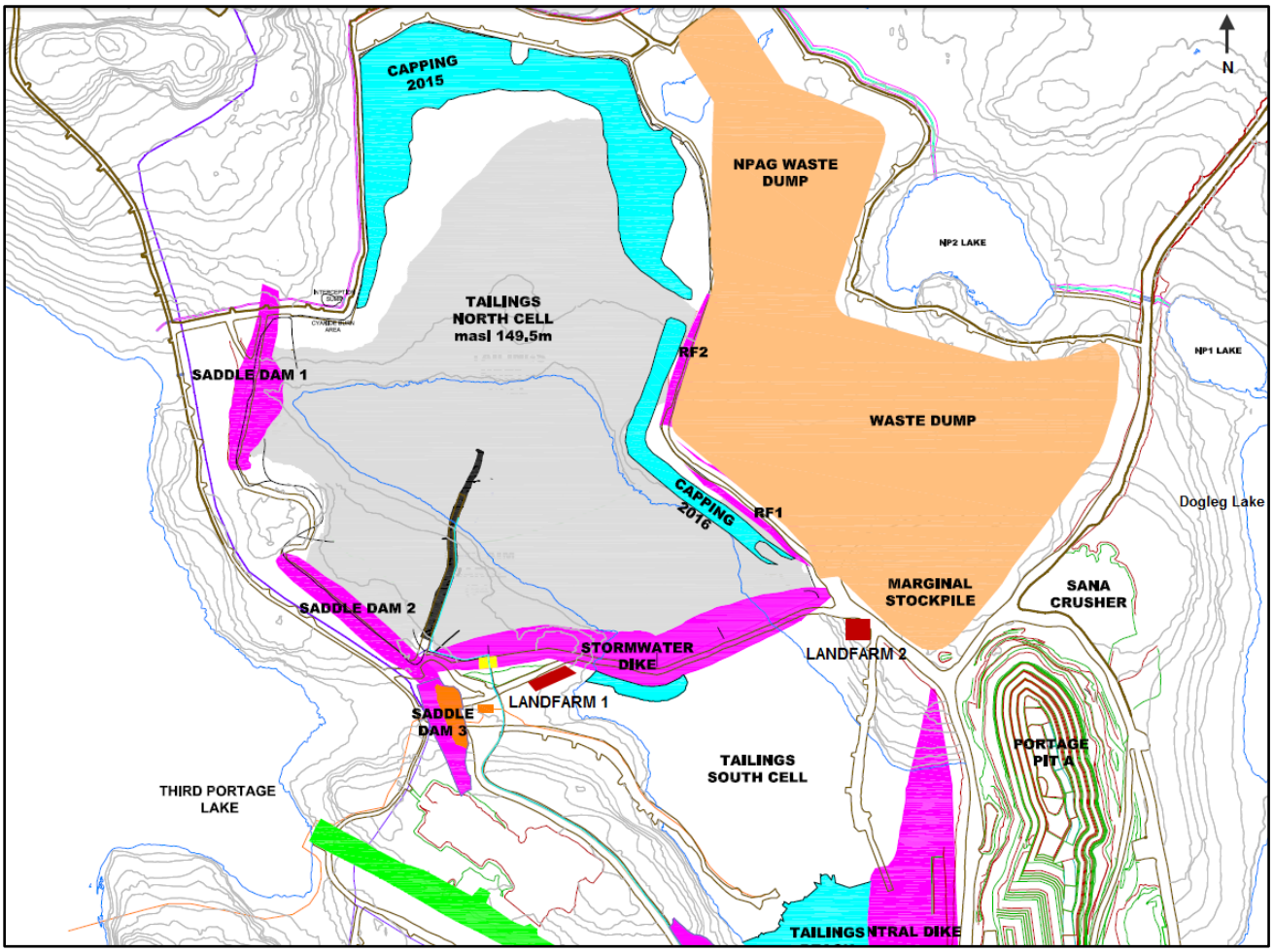

Figure 1. Landfarm 1 and Landfarm 2 locations.

2.3 SOIL ADDITION AND REMOVAL

From landfarm survey data, 577.5 m^3 of soil were added to Landfarm 2 between January 2020 and the end December 2020 from excavation of PHC spills around the Meadowbank and Whale Tail sites.

A summary of spills occurring in 2020 including those for which excavated material was sent to the landfarm are provided in the 2020 Annual Report.

2.3.1 Very Coarse Material (>1") Screening

As described in the Landfarm Design and Management Plan, the use of an Extec screener to separate coarse and fine material was tested in September, 2013, and use was continued annually through 2017. No screening occurred in 2018, 2019 and 2020 and no coarse material was removed from the landfarm during this time. In 2020, the screening of material was

postponed due to the reduction of site personal on site because of the COVID-19 pandemic situation; The landfarm has the capacity to contain contaminated material in 2021.

2.3.2 Remediated Fine Soil Removal

According to the LDMP, for landfarmed soil to be considered remediated and removed for use onsite (e.g. road works), samples must meet GN criteria for agricultural/wildlands. Soil meeting industrial criteria may be removed to the waste rock storage facility where it will eventually be capped with up to 2 m of fill, or used as base cover in the TSF where it will eventually be capped with up to 4 m of fill.

No confirmatory sampling of soil for removal from the landfarm was conducted in 2020, and no soil was removed, due to low staff associated to COVID-19.

A summary of historical sample results for years in which sampling was conducted (2014 – 2016) is provided in Table 1. Since landfarm additions and removals occurred each year, piles were mixed, and sampling locations are not consistent, year-over-year trends were not assessed.

Table 1. Government of Nunavut soil quality criteria for agricultural/wildlands and industrial areas, and results of landfarm soil analyses. *Sample locations do not necessarily correspond year-over-year. Samples exceeding GN Agricultural/Wildland criteria are shaded grey.

Year	Sample Name*	Parameter							
		Benzene	Toluene	Ethylbenzene	Xylene	F1	F2	F3	F4
Agricultural/ Wildland (mg/kg)>		**0.03**	**0.37**	**0.082**	**11**	**30**	**150**	**300**	**2800**
Industrial (mg/kg) >		**0.03**	**0.37**	**0.082**	**11**	**320**	**260**	**1700**	**3300**
2014	CSP-1A	-	-	-	-	<0.06	900	3500	650
	CSP-1B	-	-	-	-	<0.06	380	2200	460
	CSP-STP-2A	-	-	-	-	<0.06	590	2200	6400
	CSP-STP-2B	-	-	-	-	<0.06	450	2300	6600
	CSP-3	-	-	-	-	<0.06	25	110	<50
	CSP-4A	-	-	-	-	<0.06	480	3300	520
	CSP-4B	-	-	-	-	<0.06	51	1100	210
	CSP-5A	-	-	-	-	<0.06	51	2500	550
	CSP-5B	-	-	-	-	<0.06	460	5100	1000
	CSP-5C	-	-	-	-	<0.06	130	2100	540
	CSP-5D	-	-	-	-	<0.06	38	1400	360
	CSP-5E	-	-	-	-	<0.06	61	1900	450
	CSP-6	-	-	-	-	0.22	2300	610	57
	Average						**455**	**2178**	**1483**

Year	Sample Name*	Parameter							
		Benzene	Toluene	Ethylbenzene	Xylene	F1	F2	F3	F4
2015	CSP-1a	<0.03	<0.06	<0.06	<0.06	<0.3	600	3200	490
	CSP-1b	<0.03	<0.06	<0.06	<0.06	<0.3	350	2300	380
	CSP-2a	<0.03	<0.06	<0.06	<0.06	<0.3	810	6200	2400
	CSP-2b	<0.03	<0.06	<0.06	<0.06	<0.3	5600	20000	3100
	CSP-3a	<0.03	<0.06	<0.06	<0.06	<0.3	670	4200	490
	CSP-3b	<0.03	<0.06	<0.06	<0.06	<0.3	920	3500	530
	CSP-4	<0.03	<0.06	<0.06	<0.06	<0.3	840	320	<50
	CSP-5a	<0.03	<0.06	<0.06	<0.06	<0.3	260	5200	720
	CSP-5b	<0.03	<0.06	<0.06	<0.06	<0.3	2000	13000	1600
	CSP-5c	<0.03	<0.06	<0.06	<0.06	<0.3	38	1500	350
	CSP-5d	<0.03	<0.06	<0.06	<0.06	<0.3	640	7300	1600
	CSP-6a	<0.03	<0.06	<0.06	<0.06	<0.3	<10	620	79
	CSP-6b	<0.03	<0.06	<0.06	<0.06	<0.3	200	1200	200
	Average						**1052**	**5496**	**1057**
2016	CSP-1a	<0.03	<0.06	<0.06	<0.06	<0.3	350	3000	530
	CSP-1b	<0.03	<0.06	<0.06	<0.06	<0.3	240	2400	490
	CSP-1c	<0.03	<0.06	<0.06	<0.06	<0.3	840	5400	930
	CSP-2a	<0.03	<0.06	<0.06	<0.06	<0.3	470	3000	560
	CSP-2b	<0.03	<0.06	<0.06	<0.06	<0.3	560	5800	1200
	CSP-2c	<0.03	<0.06	<0.06	<0.06	<0.3	240	2200	400
	Average						**450**	**3633**	**685**

2.4 NUTRIENT ADDITIONS AND SOIL AERATION

As permitted under the LDMP, nutrient additions in the form of sewage sludge occurred in August, 2020. Total volume of this addition was 6.8 m^3.

In addition to mix the nutrient amendment into the biopiles, heavy equipment was used to perform aeration of the material by the construction of windrows.

2.5 REMAINING LANDFARM CAPACITY

For Landfarm 2, the useful area is 3,815 m^2. It is considered that contaminated material can be stockpiled up to 4 m high. Accounting for a 25% loss of area due to sloping at that windrow height, the landfarm area will allow for the storage of a maximum of 11,445 m^3.

With a current contaminated soil stockpile volume of 4,702.5 m^3, and conservatively assuming no soil remediation & removal prior to closure, Landfarm 2 will be able to accommodate an additional 6,742.5 m^3 of soil. The available landfarm volume will not be exceeded within the expected life of mine.

Thus, ample room will be available to accommodate expected future contaminated soil, and to maintain smaller windrow piles to maximize rates of biodegradation and volatilization.

2.6 WATER MANAGEMENT

No ponded water or seepage from the landfarm area was identified in 2020, so no water quality sampling was required.

2.7 REQUIRED MAINTENANCE

Visual inspections indicated that the landfarm berm and pad appear to be structurally intact, and no maintenance requirements were identified. Inspection sheet can be provided on request.

SECTION 3 • ACTIONS

The following actions are planned for 2021:

- Continue to implement communications plan to ensure records of sewage sludge additions to the landfarm are maintained.

- Sampling was not completed at the landfarm because the overall design of the new landfarm did not permit piles to be segregated while sampling results were received. Thus, upon reception, it would have been impossible to identify the section sampled and remediate accordingly to the tier results obtained. It is planned to sample isolated

back sections of material (windrows created in 2020) located in the landfarm in 2021 to assess the state of contaminations. Reduce staff related to COVID-19 also impacted the sampling and screening action in 2020.

- Look at the possibility to hire an external consultant to provide advice on the landfarm and/or assist with the screening and sampling of material in 2021.