AGNICO EAGLE

HOPE BAY MINE

Hydrocarbon Contaminated Material Management Plan

NOVEMBER 2025
VERSION 5

Revisions

Version #	Date	Section	Summary of Changes	Author
1	2010	Throughout	Approved Plan under 2AM-DOH1323.	HBML
2	2014	Throughout	Changes to document structure for operational suitability and efficiency. TMAC as current licensee for the Hope Bay region.	TMAC
3	January 2017	Throughout	Changes to document structure for operational suitability and efficiency.	TMAC
4	November 2017	Throughout	Updated title to Hydrocarbon Contaminated Material Management Plam, previously Hope Bay Project Landfarm Management Plan. Updated to a belt-wide plan.	TMAC
5	November 2025	Throughout	Changes throughout this version of the plan represent a clean-up of existing roles, responsibilities, and processes as well as Agnico Eagle formatting. Additions are marked in the right-hand margin as follows: 	Agnico Eagle
		Table 1.3	Updated to reflect current role titles and responsibilities.	
		Section 2.2 Throughout	Updated description to reflect decommissioned Boston LTA and removed Appendix specific to Boston LTA.	
		Section 1.1 Section 3 Section 4.1.5 Section 4.3 Section 7	Included details of hydrocarbon-contaminated material storage as an alternative to underground storage.	
		Table 6.1	Updated roles and responsibilities.	

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Glossary

Term	Definition
Agnico Eagle	Agnico Eagle Mines Limited
BTEX	benzene, toluene, ethylbenzene and xylene
CCME	Canadian Council of Ministers of the Environment
dS/m	deciSiemens per metre
EC	Electrical conductivity
EPD	Environmental Protection Division of the Nunavut Department of Environment
ESR	Environmental and Social Responsibility
HDPE	High-density polyethylene
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
KitIA	Kitikmeot Inuit Association
LTA	Land Treatment Area
NIRB	Nunavut Impact Review Board
NWB	Nunavut Water Board
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PID	Photoionization detector
PHC	Petroleum hydrocarbon
ppm	Parts per million
QAQC	Quality Assurance and Quality Control
SAIC	Science Application International Corporation
SAR	Sodium adsorption ratio
THE	Total extractable hydrocarbon
TIA	Tailings Impoundment Area
TPH	Total petroleum hydrocarbon
TSS	Total suspended solids
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compounds
WSCC	Workers Safety and Compensation Committee

1. Introduction

This *Hydrocarbon Contaminated Material Management Plan* (the Plan) has been prepared by Agnico Eagle Mines Limited (Agnico Eagle) in accordance with various water licenses held by Agnico Eagle associated with developments throughout the Hope Bay region.

The Plan is intended primarily for use by Agnico Eagle and its contractors to ensure that best practices for minimizing potential environmental impacts and potential environmental liabilities with respect to hydrocarbon contaminated water, snow, overburden, crush rock (e.g. from infrastructure pads) and waste rock are followed, and that the conditions of the water licenses are met.

This Plan is structured such that one document pertaining to storage and management of hydrocarbon contaminated materials is approved and implemented across all Agnico Eagle Hope Bay sites, while still addressing site- and licence-specific needs. This plan is subject to annual review and will be updated as required.

1.1. Objectives

The objective of this Plan is to outline how hydrocarbon contaminated materials will be managed within the Hope Bay Mine site.

Hydrocarbon contaminated water, snow and some overburden can be treated on site, or can be permanently stored underground in closed areas of the mine voids. Management of hydrocarbon contaminated soils include relocation to a dedicated landfarm where it will be treated or temporarily stored, or relocation to an underground mine for permanent storage.

In cases where there is no suitable underground location, and/or the material is not conducive to treatment in the existing landfarm, hydrocarbon- contaminated material may be stored on a suitable liner or containment system while the final clean-up approach plan is determined. In some cases, material may be stored in the Tailings Impoundment Area (TIA). V5

1.2. Relevant Legislation and Guidance

Worker health and safety and operational components of the Plan are part of Agnico Eagle's mine plan and come under the jurisdiction of the Nunavut Mines Inspector. Environmental elements of the Plan come under the jurisdiction of the Nunavut Water Board (NWB), the Nunavut Impact Review Board (NIRB) and other regulatory agencies.

Implementation of the Plan must be considered alongside the following relevant legislation in Table 1.1.

Table 1.1. Federal and Territorial Regulations and Guidelines Governing the Hydrocarbon Contaminated Material Management Plan

Regulation	Year	Governing Body	Relevance
Workers Safety and Compensation Commission (WSCC) Chief Mines Inspector as per Mine Health and Safety Act	1995	Government of Nunavut	Provides regulations for Workers Safety
Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils (SAIC).	2006	Government of Canada	Provides guidance for siting, design, operation and monitoring of a landfarm for remediation of petroleum hydrocarbon contaminated soil

1.3. Related Documents

Table 1.2. Documents Related to the Hydrocarbon Contaminated Material Management Plan

Document Title	Relevance
Waste Rock, Ore, and Mine Backfill Management Plan	This Plan describes the approved procedures for disposing of hydrocarbon contaminated materials within an underground mine
Spill Contingency Plan	This Plan describes the spill response procedures to be used at the Hope Bay Mine

1.4. Plan Management

Revisions to this Plan may be triggered by activities such as changes in the mine plan, operational status, personnel or organizational structure, mine ownership, regulatory or social considerations, and life cycle or design philosophy. The Plan is reviewed annually and is revised or updated as necessary in accordance with changing circumstances and requirements of the licence.

1.5. Roles and Responsibilities

Table 1.3 shows the roles and responsibilities for implementation of the *Hydrocarbon Contaminated Material Management Plan*.

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Table 1.3. Roles and Responsibilities

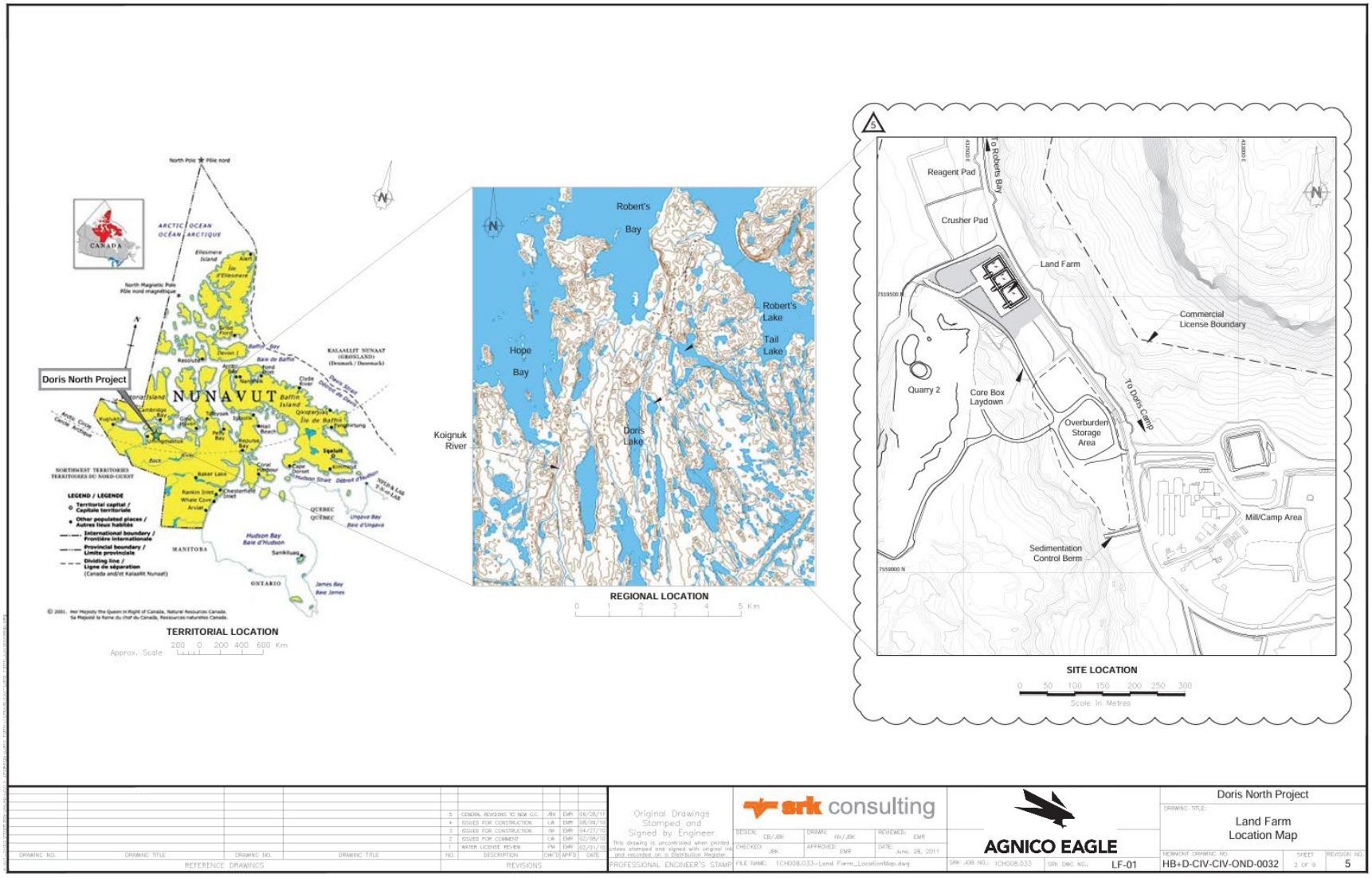
Role	Responsibility
Mine General Manager	• Overall responsibility for implementation of the Plan; and • Responsible for the management and operations of the facilities and for providing the necessary resources to manage the facilities.
E&I Superintendent (or designate)	• Implementing the Plan; • "Owns" the facilities; • Providing on-site resources to operate the facilities; • Conducting and documenting regular inspections; • Notifying Environmental when water accumulation is noted in the facilities; • Ensuring that water treatment and discharge activities take place as requested by Environment and logs of discharge quantities and locations are provided to ESR; and • Providing input on the modifications in the design and the operation of the facilities.
Environmental Superintendent	• Responsible for ensuring this plan is reviewed annually and updated as required.
Environmental Supervisors	• Liaise with Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) inspector prior to removal of and placement of contaminated soils; • Ensuring water and soil sampling programs are completed as needed, and providing the necessary resources for completing these sampling programs; • Ensuring internal records are kept of the quantities of contaminated soils (source, material, contamination type and time) placed within the facilities; • Conducting and documenting Landfarm and Land Treatment Area (LTA) inspections; and • Keeping records of on site analysis, observations, photographs, water and soil discharge activities and laboratory analysis.

2. Landfarm Facilities

2.1. Doris Landfarm

The Doris Landfarm is located approximately 0.6 km north of the existing Doris Camp Area and is situated between the existing all-weather road and Quarry 2. Access to the facility is gained via an 8.0 m wide access road originating immediately southwest of the Crusher Pad. The Doris Landfarm layout is shown in Figure 1.

Figure 1 – Doris Landfarm Layout



2.2. Boston LTA

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The Boston LTA facility approved under the existing Type B Water Licence 2BB-BOS1727 was located at the Boston Camp Site and is now decommissioned.

2.3. Boston Landfarm

The Boston Landfarm is planned to be located on a crushed rock pad between the Boston process plant and Boston contact water pond #2.

The Boston Landfarm is currently planned to be similar to the existing landfarm at Doris. It will consist of three cells, one for contaminated snow and water, one for clean water (pending discharge) and one for contaminated soil.

The planned design criteria for the landfarm are:

- Minimum clean water and soil pond containment volumes of 360 m^3;
- Minimum contaminated snow and water containment volume of 550 m^3;
- The floor of each cell will be sloped at 1% towards a sump;
- Each cell will be accessed via access ramps sloped at 5H:1V (11°);
- Each cell shall be lined with a geomembrane liner; and
- Landfarm berms will have:
    - A minimum of 3.4 m crest width,
    - Inner slopes of 2H:1V (26.5°), and
    - Outer slopes of 1.5H:1V (34°).

The landfarm berms will be constructed with geochemically suitable transition material, and bedding material. The landfarm cells will be lined with a textured high-density polyethylene (HDPE) liner sandwiched between two layers of non-woven geotextile. A 0.15 m thick layer of bedding material will be placed below the liner system and a 0.6 m thick layer of bedding material will be placed above the liner system.

3. Contaminated Material Management Strategies

Hydrocarbon contaminated materials will typically either be temporarily stored and treated in a dedicated landfarm facility or placed in an underground mine for permanent storage.

Where feasible, landfarming will be used for remediating petroleum hydrocarbon (PHC) contaminated materials. Material containing the following hydrocarbons may be treated at a landfarm facility:

- Diesel fuel;
- Aviation gasoline (Avgas);
- Jet fuels (Jet A, Jet A-1, and Jet B); and
- Gasoline.

Material deemed inappropriate for landfarming due to contamination type or substrate characteristics may be placed in an underground mine for permanent storage in accordance with the *Waste Rock and Ore Management Plan*. Alternatively, it may be transported to the TIA or temporarily stored on a suitable liner or in appropriate containment until the final remediation option is taken. In some cases, the material may be removed from site via sealift backhaul. V5

3.1. Contaminated Material Characterization

If the type of contamination is unclear, the soil will be characterized to determine the appropriate management strategy and to determine the concentrations of contaminants present. Characterization will be conducted by collecting samples of the material for laboratory analysis, reviewing spill records or a combination of the two. Information recorded regarding the type and volume of the spill may reduce the required characterization sampling. Characterization will help identify which chemical parameters should be monitored during the remediation process.

Table 3.1 shows the type of analyses recommended for contaminated material characterization with the Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils (SAIC 2006).

Table 3.1. Recommended Analyses Based on Suspected Soil Contamination[1]

Contaminant Source	Parameters Analyzed								
	Canadian Wide Standards - Petroleum Hydrocarbon (PHC) Fractions	Benzene, Toluene, Ethylbenzene & Xylene (BTEX)	Total Petroleum Hydrocarbon (TPH) (Calculate)	Lead	Total Heavy Metals[2]	Chromium/Cadmium	Polychlorinated Biphenyl (PCB)	Phenols	Polycyclic Aromatic Hydrocarbons (PAH)
Unleaded gasoline	X	X	X		X				
Leaded gasoline, aviation gasoline	X	X	X	X	X				
Fuel oil, diesel, kerosene, jet fuel, mineral oil/spirits, motor oil	X	X	X		X				X
Petroleum solvents	X		X				X		
Crude oils, hydraulic fluids	X		X	X	X				X
Waste petroleum products	X	X	X	X	X	X	X	X	X

Notes: Source - Table adopted from SAIC (2006)
(1) Modified from Environment Canada, 1993
(2) Heavy metals analyses required to determine if constituents are not present at levels toxic to micro-organisms (>2500 ppm) (USEPA. 1994)

4. Soil Management

Contaminated soils that have been characterized and deemed appropriate for remediation in a landfarm facility will be managed as outlined below.

4.1. Management for Optimal Remediation

4.1.1. Placement of Contaminated Soil in Landfarm Facility

For optimal remediation of the contaminated soil, soil plots or windrows will be placed at a depth of 0.35 to 0.40 m with a maximum depth of 0.50 m. Soil depth will also be dependent on the equipment available for tilling and availability of space in the soil pond.

Trucks or equipment will refrain from driving in the landfarm ponds, except for when placing the material, because their weight will pack the soil making it more difficult to till and potentially damage the liners. Compacting the soil may prolong the time to complete soil remediation. The contaminated soil will be tilled using equipment that can disperse soil clumps, mix, and aerate the deposited soil but not compact it (e.g. a backhoe, skid steer, disk, rototiller, etc.).

Where possible, soil will not be placed on a layer of snow or ice. When the soil base is saturated it will encourage glaciation which will slow melting in the spring and ultimately slow the remediation process during the short, warm period. Contaminated soils excavated from site in winter will be placed in the section of the soil pond with the highest elevation (away from the sump) for spreading during the following spring and summer. Contaminated materials may also be placed in this area during periods when the landfarm is saturated in the spring and during rainy weather. Alternatively, contaminated material may be stored in containment (such as drums, using liners, etc.) until it can be processed in the landfarm.

The Environmental supervisors will maintain a record of the amount of contaminated soil placed in the landfarm, the location of each contaminated soil batch by contaminant type, and the date of deposition. Copies of these records will be readily available for internal and external audits and for inspectors.

4.1.2. Tilling

A substantial amount of soil hydrocarbon remediation is achieved simply through the exposure to air and subsequent volatilization of the hydrocarbons. Additionally, most soil microorganisms degrade PHC better in an aerobic environment. Tilling provides aeration of the soil and re-distribution of nutrients and moisture which aids in the bio-remediation and volatilization processes. Tilling is encouraged to aerate the soil and enhance remediation activities. Typically, tilling is planned at least once per month in the summer months. Tilling will not occur during the winter months.

Ideally tilling will occur when the soil moisture content is moderate (within the optimal range of 40% to 85%). Very dry soils will not be tilled until after irrigation to avoid dust generation. Wet soils do not benefit

from tilling due to compaction of the soil by passing equipment. If soils appear muddy, or sticks to the tires of the equipment, it is too wet to till.

The tilling equipment operator will be careful not to till below the contaminated material and inadvertently damage or disturb the underlying HDPE liner. As per design, the landfarms are constructed with a slight gradient and therefore, extra care must be taken when tilling the soils. The depth to the liner must be carefully determined prior to beginning to till. Damage to the underlying liner, surrounding berms, or sump area must be reported to the E&I Superintendent and the Environmental Supervisor immediately.

4.1.3. Moisture Content, Nutrients and pH of the Soils

To ensure the effectiveness of the facility at the start of the landfarming season, soil samples may be analyzed for nutrients, moisture, and pH content to achieve the most efficient remediation of PHC. Optimum conditions are as follows:

- Moisture content between 40 and 85%,
- A carbon:nitrogen:phosphorus ratio between 100:10:1 to 100:10:5, and
- Soil pH between 6 and 8 pH units.

Additional nutrient, moisture, or pH testing may occur during the summer season if soil conditions are suspected to differ from the start of the landfarming season, or at the discretion of the Environmental Supervisor.

The landfarm facilities will be monitored daily during freshet and after significant precipitation events and weekly during summer months by the E&I Superintendent and/or Environmental Supervisor to ensure that water build-up does not occur.

4.1.4. Product Addition for Optimal Landfarming

Landfarming remediation time can be reduced by maintaining optimal soil conditions for microbial PHC biodegradation. If testing indicates that the landfarming conditions are not optimal for remediation, the following options for amending soil conditions may be applied:

- Moisture: To increase moisture retention, organic matter may be tilled into the landfarm soil. Irrigating with sump water, freshwater, suitable water from other site containment areas, treated sewage effluent, or the application of fresh snow are also acceptable means of increasing soil moisture content. Recycled water from the sump will not generally be used for irrigation if there is a visible PHC sheen unless first treated using absorbents, or avoided by drawing water from beneath the water surface.
- pH: The addition of lime will increase soil pH and addition of elemental sulphur will decrease pH.
- Nutrients: Fertilizer may be applied in solid form during tilling or in liquid form during irrigation to increase nitrogen and phosphorous concentrations. The use of slow-release fertilizers can

reduce application frequency. Application of fertilizer can lower pH and increase salt concentrations, which can be harmful to micro-organisms.

- Soil texture: Bulking agents such as gypsum or sawdust can be added to clay-rich soils to increase soil surface area for microorganism growth.

It is noted that soil amendments may reduce the potential post-treatment uses of the soil. Any soil product addition will be considered in approving post-treatment use.

4.1.5. Additional Analyses of the Soils During Remediation

Soil sampling to verify interim treatment results will also include BTEX and F1 to F4 hydrocarbon fraction analysis. Periodic measurement of the volatile organic compounds (VOC) concentrations with a photoionization detector (PID) can be a useful indicator of remediation progress but should not be substituted for remediation verification sampling.

Biodegradation or landfarm remediation rates can slow down or cease all together due to excessive salt content, PHC concentrations, and other parameters present in the soils. If the rates of remediation decline or cease all together, the following parameters can be tested to help identify the source of the problem:

- Microbial population density test;
- Total petroleum hydrocarbon (TPH) or total extractable hydrocarbons (TEH);
- Total metal concentration;
- Electrical conductivity (EC); and
- Sodium adsorption ratio (SAR).

Soils with parameter concentration of contaminants that exceed the following recommended levels shown in Table 4.1 are generally not considered suitable for landfarming. Soils that are no longer suitable for landfarming will be placed in an underground mine for permanent storage in accordance with the *Waste Rock and Ore Management Plan,* temporarily stored on appropriately lined containment, placed in the TIA, or removed during backhaul. V5

Table 4.1. Recommended Maximum Concentrations to Avoid Unsuitable Landfarming Conditions

Parameter	Concentration
TPH or THE	< 3%
Total heavy metals	< 2500 ppm
EC	< 4 dS/m
SAR	< 6

4.2. Recovery of Soil from Landfarm Facility

Recovery of soil must be undertaken with adequate care and supervision such that the liner is not damaged.

Immediately following recovery of soil from the landfarm, the liner will be inspected for damage. Damage will be repaired prior to additional placement of contaminated materials and if possible, prior to the spring freshet.

4.3. Soil Remediation Sampling and Monitoring

The Environmental Protection Division (EPD) of the Nunavut Department of Environment has published the "Environmental Guideline for Contaminated Site Remediation - March 2009" (EPD 2009). This document provides an outline of the remediation criteria for PHC and other contaminants present in soils for Nunavut (Table 4.2). These guidelines are from "Interim Canadian Environmental Quality Criteria for Contaminated Sites" (CCME 1991) and "Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health" (CCME 1999 updated September 2007). Agnico Eagle will use the "industrial" land use remediation guidelines, as set out in Table 4.2 to determine when soil has been remediated to a level acceptable for removal from the landfarm facility. Remediated soils will be used in an industrial land use setting or placed in an underground mine for permanent storage in accordance with the *Waste Rock and Ore Management Plan*.

Contaminated soil in the facility will be sampled annually and prior to removal, at minimum, to determine the concentrations of contaminants within the soils being remediated. Soil will only be removed from the facility when the remediation levels defined by the EPD (2009) are met, or if it is determined that the material cannot be successfully remediated and will subsequently be placed in an underground mine for permanent storage, temporarily stored on appropriately lined containment, placed in the TIA, or hauled out via backhaul. V5

Sampling will be conducted by Agnico Eagle prior to any soil being removed from the landfarm to demonstrate that the soil has been successfully remediated. There are no Canadian Council of Ministers of the Environment (CCME) guidelines for density of soil sampling in a landfarm, and Agnico Eagle plans to divide each separate area within the landfarm soil into cells and sample with a target density of approximately 1 sample per 5 m^3 to adequately characterize the hydrocarbon and other parameter concentrations in the soil.

Soil samples will be collected from a depth ranging between 0 and 20 cm, with an additional sample being collected if the soil depth is greater than 20 cm. The location and depth of all soil samples collected will be recorded. The soil samples will be analyzed for the parameters shown in Table 4.2, including PHC fractions (Fractions F1, F2, F3, and F4), BTEX, TPH, polychlorinated biphenyl (PCB), phenols, lead, and total metals using a 36 element ICP-MS scan. The soil sampling records and corresponding analytical results will be kept by the Environmental Supervisor and reported to the Kitikmeot Inuit Association (KitIA) and the NWB if requested.

Soil will only be removed from the landfarm facility and used on site following the consultation and approval by the KitIA, Government of Nunavut Department of Environment and the Inspector. Remediated fine textured soils will be used for general reclamation purposes and initially on areas where the existing vegetative cover has been disturbed; coarse textured materials will be used in construction activities as needed, or possibly in reclamation activities if appropriate.

Table 4.2. Remediation criteria

Substance	Industrial (mg/kg soil)	
	Course	Fine
Conductivity [dS/m]	4	
pH	6 to 8	
Sodium Adsorption Ration (SAR)	12	
Antimony	40	
Arsenic (inorganic)	12[b]	
Barium	2000[c]	
Benzene		
Surface[w]	0.03[t,u]	0.0068[t,u]
Subsoil[w]	0.03[t,u]	0.0068[t,u]
Surface[x]	0.03[t,u]	0.0068[t,u]
Subsoil[x]	0.03[t,u]	0.0068[t,u]
Benzo(a)pyrene	0.7[f]	
Beryllium	8	
Cadmium	22[b]	
Chromium		
Total chromium	87[b]	
Hexavalent chromium (IV)	1.4[h]	
Cobalt	300	
Copper	91[b]	
Cynaide (free)	8.0[b]	
DDT (total)	12[ij]	
Diisopropanolamine[z]	180[b]	
Ethylbenzene		
Surface	0.082[t]	0.018[t,u]
Subsoil	0.082[t]	0.018[t,u]
Ethylene glycol	960[k]	
Fluoride (total)	2000	
Lead	600[b]	

Substance	Industrial (mg/kg soil)	
	Course	Fine
Mercury (inorganic)	50[b]	
Molybdenum	40	
Naphthalene	22[h]	
Nickel	50[l]	
Nonylphenol (and its ethyloxylates)	14[p]	
Pentachlorophenol	7.6[b]	
Phenol	3.8[b]	
Polychlorinated biphenyls (PCB)	33[j,l]	
Polychlorinated di-benzo-p-dioxins/dibenzofurans (PCDD/Fs)	4 ng TEQ/kg[s]	
Propylene glycol	Insufficient Information[v]	
Selenium	2.9[b]	
Silver	40	
Sulfolane[z]	1[b]	
Tetrachloroethylene	0.6[f]	
Thallium	1[o]	
Tin	300	
Toluene		
Surface	0.37[t]	0.08[t]
Subsoil	0.37[t]	0.08[t]
Trichloroethylene	0.01[b,u]	
Uranium[z]	300[t]	
Vanadium	130[i]	
Xylenes		
Surface	11[t]	2.4[t]
Subsoil	11[t]	2.4[t]
Zinc	360	
Monocyclic Aromatic Hydrocarbons		
Chlorobenzene	10	
1,2-Dichorobenzene	10	
1,3-Dichorobenzene	10	
1,4-Dichorobenzene	10	
Styrene	50	
Phenolic Compounds		
Chlorophenols[1] (each)	5	
Nonchlorinated[2] (each)	10	

Substance	Industrial (mg/kg soil)	
	Course	Fine
Polycyclic Aromatic Hydrocarbons (PAHs)		
Benzo(a)anthracene	10	
Benzo(b)fluoranthene	10	
Benzo(k)fluoranthene	10	
Dibenz(a,h)anthracene	10	
Indeno(1,2,3-c,d)pyrene	10	
Phenanthrene	50	
Pyrene	100	
Chlorinated Hydrocarbon		
Chlorinated aliphatics[3] (each)	50	
Chlorobenzenes[4] (each)	10	
Hexachlorobenzene	10	
Fractions		
Fraction 1 (C6 - C10)	320 (240[5])	320 (170[5])
Fraction 2 (>C10 - C16)	260	260 (230[5])
Fraction 3 (>C16 - C34)	1700	2500
Fraction 4 (>C34)	3300	6600

Source: EPD 2009, Table 1, A4.2 and A4.2

Notes:
(1) Subscript notes in Attachment 2

5. Water Management

Water management is focussed on surface water accumulation within the facilities. The facilities have no external catchment and there is low potential for seepage due to the liner and underlying permafrost at the site.

5.1. Water Management Strategies

5.1.1. Soil Pond

The water management strategy for the soil pond will focus on maintaining optimal moisture content conditions which will promote remediation within the soil. Excess water accumulating in the soil pond from spring melt and significant precipitation events will be passed through an oil separation (absorbent) treatment system and deposited into the snow pond. This will be accomplished by installing a pump in the soil pond sump to transfer water through the oil separation treatment system. The oil separation treatment system will be located on the berm between the soil and snow pond in such a manner to ensure that any leakage that may occur will report to the soil pond.

5.1.2. Snow Pond

The water management strategy for the snow pond is to keep the pond empty to the extent possible during the open water season (summer months) to provide a contingency for the storage of potentially contaminated water resulting from precipitation coming in contact with hydrocarbon contaminated material in the soil pond.

Water quality samples of water accumulating in the snow pond will be collected and submitted for laboratory analysis to determine if treatment with an oil separation treatment system is required. If discharge criteria are met without treatment (e.g., clean snow/precipitation accumulation), this water may be discharged directly to the environment following the necessary approvals and requirements for discharge to the environment outlined below.

If water accumulating in the snow pond is known/suspected to be hydrocarbon contaminated, or samples submitted for laboratory analysis do not meet the discharge criteria, water in the snow pond will be recirculated from the snow pond through an oil separation treatment system and back to the snow pond. If this method of treatment is used, no additional snow or water will be added to the snow pond to avoid adding additional contaminants to the pond.

Additional water quality samples will be collected post-treatment and submitted for laboratory analysis. Once the water quality in the snow pond meets discharge criteria, verified through laboratory analysis, it be discharged to the environment in accordance with the necessary approvals and requirements outlined below. Otherwise the water will be transported to the TIA.

5.1.3. Clean Water Pond

Once water from the snow pond has been verified through laboratory analysis to meet discharge criteria it may be discharged to the environment as outlined below or transferred to the clean water pond for storage prior to discharge to the environment. This will be accomplished by placing a portable pump into the sump of the snow pond with the attached hose/piping laid across the berm so that any leakage that may occur will report back to the snow pond. Only water that is suitable for discharge to the tundra will be placed into the clean water pond.

5.2. Water Quality Verification and Discharge of Treated Water

Samples of water from the pond(s) will be collected, appropriately preserved and submitted to an accredited laboratory for analysis. No water will be discharged from the facility until the results of the analysis are received and confirm that the water is suitable for discharge in accordance with discharge criteria outlined in existing Type A Water Licence 2AM-DOH1335 Part F, item 18(f), issued to Agnico Eagle by the NWB (Table 5.1) and a 10-day notification of discharge has been provided to the CIRNAC Inspector.

Table 5.1. Landfarm Effluent Discharge Quality Limits

Parameter	Maximum Allowable Concentration (mg/L)
pH	6.0 - 9.0
Total Suspended Solids (TSS)	15.0
Total Oil & Grease	5 and no visible sheen
Total Ammonia-N	2.0
Total Lead	0.01
Benzene	0.37
Toluene	0.002
Ethyl Benzene	0.090

Once the CIRNAC inspector has been provided with a 10-day notification and confirmation of the water quality is received, the water will be discharged to the tundra or at a location approved by the inspector in accordance with existing Type A Water Licence 2AM-DOH1335 Part F, item 18. This will be accomplished by installing a portable pump in the clean water or snow pond sump.

Alternatively, once confirmation is received that the water within the facility is suitable for release, a vacuum truck may be used to remove the water from the pond for use in dust suppression on site access roads. This action would reduce the amount of clean water removed from lakes for dust suppression activities.

During pumping, care will be taken not to disturb any settled solids at the bottom of the source pond sump (if present) and pumping of the sump will only take place when conditions are suitable. In addition,

the pump discharge will be managed in a manner that minimizes erosion and siltation of the area downstream of the discharge location. Documentation of flow rates for water release, discharge volume, as well as erosion and vegetation changes at the release sites will be monitored.

If the water from a landfarm facility does not meet discharge criteria following treatment, the water from the pond will be re-treated until it meets discharge criteria or transferred to the TIA for disposal in accordance with Type A Water Licence 2AM-DOH1335 Part F, item 18(c).

5.2.1. Pump Power Supply

The power supply to operate temporary pumps used within the facility will typically be provided by portable gas-powered units or electrical if possible. Each of the units are self-contained and will have “drip trays”.

6. Monitoring and Evaluation

Agnico Eagle will implement an inspection and monitoring program for each of the facilities. The objective is to ensure that each facility is functioning properly.

6.1. Spring Freshet and Post-Precipitation Event Inspection

During spring freshet, a visual inspection of the landfarm facility will be conducted once per day to verify water levels in each of the three ponds. The objective of the inspection will be to ensure that sufficient freeboard exists within the facility to ensure that no hydrocarbon contaminated water exits the facility and to decide on the most efficient time to commission the oil separation (absorbent) treatment system.

Similarly, during the open water season (summer), a visual inspection of the facility will be completed weekly and after each significant precipitation event to ensure that sufficient freeboard exists within the facility ensuring that no hydrocarbon contaminated water exits the facility.

Monitoring will note the use of ponds by any water dependent birds as per the *Wildlife Mitigation and Monitoring Plan*.

6.2. Clean Water Discharge

6.2.1. Pre-Discharge Water Sampling and Quality Verification

Water will not be discharged to the environment from the landfarm facility until the results of the sample analysis confirm that the water is suitable for release and the CIRNAC Inspector has been notified. The results of this analysis will be retained on site and will be available for review upon request.

6.2.2. Visual Inspections during Discharge

Prior to commencing any discharge, the volume of water to be discharged will be calculated. The results will be recorded and the record maintained on site by the Site Services Personnel.

During pumping to tundra, a visual inspection of the landfarm facility and pumping activities will be conducted daily by staff from either the surface or the environmental departments. These inspections are to ensure that all pumps and hosing/piping are operating properly and that the discharged water is not causing unacceptable erosion downstream. Additionally, flow, volume and duration of the discharge will be measured or calculated and recorded. All records will be maintained on site by the Environmental Supervisor.

6.3. Annual Geotechnical Inspection

An annual geotechnical inspection of each landfarm facility will be conducted by a qualified Geotechnical Engineer during the period between July and September in accordance with existing Type A Water Licence

2AM-DOH1335 Part I, item 9. The inspection will be conducted in accordance with the Canadian Dam Safety Guidelines where applicable and account for all earthworks making up the facility, as well as the facility itself.

6.4. Summary of Inspections and Monitoring

Table 6.1 and Table 6.2 provides summaries of the monitoring, inspection and sampling that will be undertaken during the operation of the landfarm facilities.

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Table 6.1 Landfarm Facility Inspection and Monitoring Summary

Item	Responsibility	Purpose	Frequency	Required Records
Landfarm Treatment Operations Inspection	E&I Superintendent and/or Environmental Supervisor	Record keeping of treatment operations and berm performance for due diligence.	Once per day during spring freshet and after precipitation events. Weekly during open water season. Monthly at other times.	Inspection date and field notes, e.g., weather, and facility condition including any repairs required, odor noted, quantity of water accumulated in the ponds, water level of the ponds, and amount of freeboard. Record of any unauthorized discharges or deposits and follow-up action taken.
Soils Acceptance at Facility	Environmental Supervisor or delegate	To determine if soils are acceptable for treatment at the landfarm facility.	Once per spill, unless spilled material is known.	Soils origin and associated spill report number, if applicable. Field notes, e.g., sampling details, soil texture, moisture content, colour, odour. Location of soil placement in landfarm following placement approval.
Soil Sampling for Remediation Progress and Verification of Remediation	Environmental Supervisor or delegate	To provide interim indications of remediation progress and to determine if remedial objectives have been met.	Once per year. Additional sampling prior to discharge.	Field notes and sketch of location and depth of samples taken. Laboratory issued reports including QA/QC and chain of custody. Documentation proving compliance with discharge criteria, notification of discharge of soils to inspector, and fate of treated soils. Update of landfarm soil placement map as required.
Operation of Oil Adsorption (Separation) Treatment System	E&I Superintendent or delegate (operator)	To identify any maintenance requirements and minimize chances of unexpected discharges to the environment.	Once at the beginning of operation and once per day during operation.	Daily volume pumped and any field observations (e.g. location of discharge, flow, piping) to be provided to Environmental Coordinators.
Water Sampling prior to Discharge	Environmental Supervisor or delegate	To conform to Water License requirements.	As required prior to discharge.	Document notification of INAC Inspector (written notification at least 10 days prior to discharge) including estimate of volume to be pumped. Field notes including sampling details e.g. colour, and odour. Laboratory-issued reports including QA/QC and chain of custody.
Visual Monitoring During Discharge	Environmental Supervisor or delegate	To conform to Water License requirements.	Daily during discharge.	Field notes for discharge to tundra including flow, volume, and duration.
Geotechnical Inspection	Geotechnical Engineer	To identify any maintenance requirements.	Annually	Inspection of geotechnical performance of facility. Document recommendations of any repair/maintenance work. Record of any repair work made to the facility.

Table 6.1. Landfarm Facility Sampling Summary

Item	Responsibility	Purpose	Frequency	Parameter/Sampling Required	Remediation Values
Soil Acceptance at Facility	Environmental Supervisor or delegate	To determine if soils are acceptable for treatment at the landfarm facility.	Once per spill, unless spilled material is known.	Soil: • Quantity • PHC Fractions • BTEX • TPH • Lead • Total heavy metals • PBC • Phenols • PAHs	N/A
Soil Sampling for Remediation Progress	Environmental Supervisor or delegate	To provide interim indications of remediation progress of PHC and to determine source of slow down or cease of landfarm remediation rates.	As deemed helpful during remediation.	Soil (remediation of PHC): • Moisture content • carbon:nitrogen:phosphorus ratio • pH • BTEX • Fractions (F1 to F4) • VOC Soil (source of slow down or cease in remediation rates): • Microbial population density test • TPH or THE • total heavy metal concentration • EC • SAR	• Moisture between 40 and 85% • carbon:nitrogen:phosphorus ratio 100:10:1 to 100:10:5 • Soil pH between 6 and 8 pH units • Microbial population density test minimum heterotrophic plate count 10^3 CFU/g • TPH or THE < 3% • total heavy metals < 2500 ppm • EC < 4 dS/m • SAR < 6
Soil Sampling for Verification of Remediation	Environmental Supervisor or delegate	To determine if remedial objectives have been met.	Once per year.	Soils for discharge: • Parameters listed in Table 4.2 • 1 sample per 5 m^3 of material collected from depth of 0-20 cm. Additional sample if soil depth >20 cm	• Remediation criteria listed in Table 4.2
Water Sampling prior to Discharge	Environmental Supervisor or delegate	To conform to Water License requirements.	As required prior to discharge.	Water: • pH • TSS • Total oil and grease • Total ammonia • Total lead • Benzene • Toluene • Ethyl Benzene	• Discharge limits listed in Table 3.1

6.5. Documentation and Reporting

6.5.1. Annual Geotechnical Inspection Report

Agnico Eagle will submit to the NWB a geotechnical engineer's inspection report within sixty (60) days of completion of the annual geotechnical inspection in accordance with existing Type A Water Licence 2AM-DOH1335 Part I, item 10. That report will include the results of the assessment of the landfarm facility and include a cover letter from Agnico Eagle outlining an implementation plan to address recommendations made by the geotechnical engineer in his/her report.

6.5.2. Clean Water Discharge – Volume and Quality

Where water is discharged to the environment, Agnico Eagle will report the volume of water discharged from the landfarm facility and the results of the analysis of the water released. This information will be provided in the monthly monitoring report submitted in accordance with existing Type A Water Licence 2AM-DOH1335 Part I, item 12.

An annual report will be submitted in accordance with existing Type A Water Licence 2AM-DOH1335 Part B, item 2 by March 31 of the following year. The annual report will satisfy the requirements in Schedule B that pertain to the landfarm.

6.5.3. Soil Treatment Reporting

A report will be submitted presenting the results of the soil treatment testing utilised in verification of remediation prior to removing remediated soils from the facility for use on site.

6.6. QAQC Procedures for Soil and Water Sampling

Quality assurance and quality control (QAQC) is a set of operating principles that, if strictly followed during sample collection and analysis, will produce data of known and legally defensible quality. A high level of quality assurance can be achieved by applying the following principles:

- Personnel involved in sampling and analysis are trained and competent;
- Sampling and testing equipment are calibrated regularly and are kept in good working condition;
- Standard procedures are implemented for the collection and transportation of samples, based on acceptable and approved operating practices;
- Use of Canadian Association for Laboratory Accreditation Inc. certified external laboratories to conduct chemical analyses;
- QC programs are developed and implemented, based on recognized best operating practice, to assess the quality of the analytical data and provide warning of unacceptable analytical or samplers errors;

- Prompt remedial action is taken when deficiencies are identified; and
- Analytical results and QC program results are reported internally and externally using standard procedures. Including field blanks, travel blanks, duplicates, etc.

Sampling procedures include:

- Using clean sampling gloves for each sample;
- Cleaning sampling equipment between each sample;
- Collecting samples using bottles and jars provided by the laboratory following the instructions provided by the laboratory for each parameter type;
- Labelling sample containers clearly with the sample station, date, time, and analysis requested;
- Keeping samples cool and dark during storage and shipment to the laboratory; and
- Checking field notes for accuracy and completeness at the end of each sampling session.

Detailed QA/QC procedures are available in the *Quality Assurance and Quality Control Plan*.

7. Contingencies

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Should additional contaminated material not be able to be placed underground for any reason, and therefore require storage that exceeds the capacity of the site facility, a temporary lined facility may be required to store the excess material. Alternatively, it may be transported to the TIA or temporarily stored on a suitable liner or in appropriate containment until the final remediation option is determined. In some cases, the material will be packaged for off-site disposal via sealift to a licenced remediation/disposal facility.

8. Facilities Closure

The landfarm/land treatment facilities will be decommissioned at mine closure, upon closure of the existing site Camp or upon construction of a new facility as a replacement. The liner system will be removed and the berms graded to promote positive drainage across the site. Remaining contaminated soils will be stored underground within an underground mine in accordance with the *Waste Rock and Ore Management Plan*.

Details of the closure of each landfarm facility are available in the relevant *Closure and Reclamation Plans*.

9. References

[CCME] Canadian Council of Ministers of the Environment, 1991. Interim Canadian Environmental Quality Criteria for Contaminated Sites.

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[EPD] Environmental Protection Division, 2009. Environmental Guideline for Contaiminated Site Remediation. Published March 2009.

Government of Nunavut. 1995. Consolidation of Mine Health and Safety Act (Nunavut). S.N.W.T. 1994, c.25; In force December 15, 1995; SI-014-95. As Amended by Northwest Territories Statues: S.N.W.T. 1996, c.9; In force April 16, 1996. As Amended by Statues Enacted Under Section 76.05 of Nunavut Act: S.N.W.T. 1998, c.34; In Force April 1, 1999.

[SAIC] Science Applications International Corporation, 2006. Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils. Science Applications International Corporation. March. Project No. 11953.B.S08.

USEPA. 1994. “Chapter V” in How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites: A Guide for Corrective Action Plan Reviewers. (EPA 510-B-94-003; EPA 510-B-95-007; and EPA 510-R-04-002). October 1994.