



AGNICO EAGLE

February 6, 2024

NWB File No. 2BB-MEL1424

Robert Hunter
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Re: Agnico Eagle's Response to Comments for 2BB-MEL Water Licence Renewal

Dear Mr. Hunter:

Agnico Eagle thanks the Kivalliq Inuit Association, Crown-Indigenous Relations and Northern Affairs Canada, and Environment and Climate Change Canada for their Comments for the Meliadine 2BB-MEL1424 Water Licence Renewal. Agnico Eagle has provided responses to the Comments received in the attached.

Should you have any questions or require further information, please contact the undersigned at your convenience.

Regards,

Manon Turmel
Manon.turmel@agnicoeagle.com
Permitting & Regulatory Affairs Superintendent

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KIVALLIQ INUIT ASSOCIATION (KivIA)

Interested Party:	KivIA	Rec No.:	KivIA-C-01
Re:	RECLAIM		

Request Made by Interested Party:

Please provide the cost spreadsheets for RECLAIM 7.0.

Agnico Eagle’s Response to Request:

The cost estimate spreadsheets are provided in Appendix A.

Interested Party:	KivIA	Rec No.:	KivIA-C-02
Re:	Exploration Camp		

Request Made by Interested Party:

Please provide a schedule of when the progressive reclamation will be completed at the Meliadine Exploration Camp.

Agnico Eagle’s Response to Request:

During late June and July 2023, Agnico Eagle continued to assess and inventory various equipment and items at the exploration camp and laydown. Agnico Eagle has identified items that are in use, being assessed for reuse, or determined to be disposed of or removed from the site during the annual sealift. Agnico Eagle plans to retain the Exploration Camp for potential future purposes; however, the plywood shacks, heli-pad, water seacans, fly drill shack, wood beams, non-functional incinerators will be dismantled/disposed of and various items (e.g., water tanks, mobile pump shack, fuel sleighs, etc.) will be backhauled as soon as practicable.

CROWN-INDIGENOUS RELATIONS AND NORTHERN AFFAIRS CANADA (CIRNAC)

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-01
Re:	Camp Incinerator		

Request Made by Interested Party:

In the Scope Description documents, Agnico Eagle requested that the components related to the camp incinerator be removed from the 2BB-MEL licence. The document stated, “The exploration camp incinerator is no longer in operation, and all putrescible waste is now being incinerated at the main camp incinerator under 2AM-MEL Licence”.

There is no information regarding whether the exploration camp incinerator is being reused for the main camp or being salvaged. There is no information that the incineration site has been cleaned up and reclaimed. Did Agnico Eagle clean up the site and provide any report to NWB?

CIRNAC recommends that Agnico Eagle updates NWB regarding what procedure was followed to decommission the discovery camp incineration site and confirm if any cleanup was done after decommissioning.

Agnico Eagle’s Response to Request:

As per Agnico Eagle’s March 23, 2023 Meliadine Water Licence Inspection Follow-up memo issued to CIRNAC on August 8, 2023, the two functioning incinerators are being stored for use; therefore, the incineration site is still being retained. There are also two non-functional incinerators currently in the planning stages of being backhauled.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-02
Re:	Water Monitoring Locations		

Request Made by Interested Party:

Agnico Eagle requested that the MEL-5 water monitoring site be removed from the 2BBMEL licence. The current licence requires MEL-5 water sampling as the point of discharge for the Bermed Fuel Containment Facilities for the exploration camp. The Scope Description documents for the renewal application stated, “Since it was decommissioned, sampling is no longer required.”

Agnico Eagle provided no information on when the Bermed Fuel Containment Facilities were decommissioned. There is no information on whether the reclamation was completed, the site had been inspected, or any post-monitoring program was in place after the decommissioning of the Bermed Fuel Containment Facilities for the exploration camp.

CIRNAC recommends that Agnico Eagle confirm the completion of reclamation and restoration of the Bermed Fuel Containment Facilities for the exploration camp, including photos and any work orders and engineering reports and provide post-closure monitoring results before NWB considers removing MEL-5 from the licence.

Agnico Eagle’s Response to Request:

The Bermed Fuel Containment Facilities was decommissioned after transferring all fuel to the Meliadine Mine Site fuel farm, which was fully operational in January 2019. This area is now under the waste rock storage facility (WRSF3) footprint (see Figure 1). The latest monitoring results for the Bermed Fuel Containment Facilities was completed in 2021; the sampling locations are shown in Figure 2. All borehole soil sampling results were below Canada Wide Standards for Petroleum Hydrocarbons in Soil (CCME 2008) and provided as Appendix B.

Figure 1: WRSF3 (former Bermed Fuel Containment Facility)



Figure 2: 2021 Sampling Locations



References:

CCME. 2008. Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil. January 2008.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-03
Re:	Waste Rock and Ore		

Request Made by Interested Party:

In the Scope Description documents, Agnico Eagle requested that the conditions related to waste rock and ore be removed from the 2BB-MEL licence as the 2AM-MEL licence covers waste rock and ore activities.

CIRNAC understands that the 2BB-MEL and 2AM-MEL licences include waste rock and ore processing activities and wants to highlight that these two licences' purpose and allowed activities are not the same. Moreover, the current 2BB-MEL1424 licence allows advanced exploration (bulk sample) activities beyond the 2AM-MEL licence boundaries, and the licensee has requested further to extend the exploration area under the current 2BB-MEL licence renewal. Reporting on waste and ore activities is a critical component of the annual report. Therefore, CIRNAC believes that waste rock and ore conditions should not be removed from the 2BB-MEL licence, and the licensee should submit an updated Waste Rock and Ore Storage Plan as part of the current renewal amendment application.

CIRNAC recommends that NWB does not remove the conditions related to waste rock from the 2BB-MEL licence and requires the Waste Rock and Ore Storage Plan as part of the renewal amendment application.

Agnico Eagle's Response to Request:

Agnico Eagle had a discussion with CIRNAC (Andrew Keim) on January 24, 2024 (Vancouver, BC) where both parties mutually agreed that conditions relating to waste rock and ore can be excluded from the licence and that the licence type will revert to a "BE type" licence. The scope required under this licence renewal would be exploratory activities (e.g., geological mapping, prospecting, etc.).

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-04
Re:	Licence Extent		

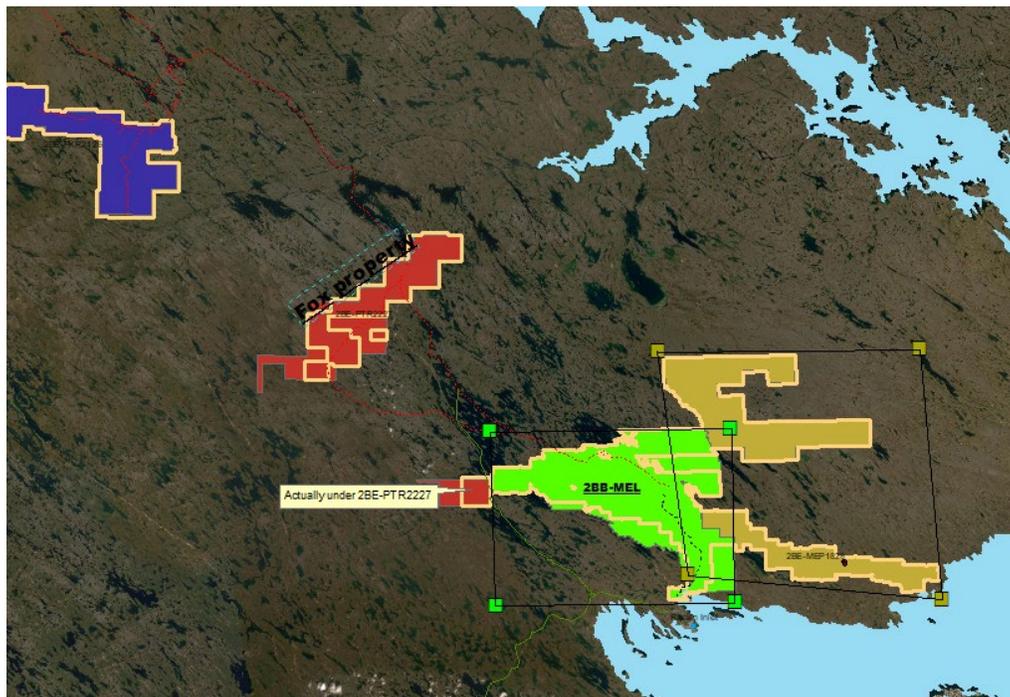
Request Made by Interested Party:

Agnico Eagle has requested to extend the current licence boundaries to the west of the existing licence extent. The renewal amendment application did not specify the type of activities that will be conducted in the extended areas.

CIRNAC recommends that Agnico Eagle clarify and provide details of the activities it intends to conduct in the proposed extended areas, as well as provide proof of their right of access to any lands not currently covered under the authority of the existing licence.

Agnico Eagle’s Response to Request:

The licence extent includes a portion of land that is currently under Agnico Eagle’s Licence 2BE-PTR2227 (shown in red on the map below). The 2BE-PTR2227 licence will be abandoned by Agnico Eagle; however, as this licence boundary is split (e.g., not one large polygon), Agnico Eagle is requesting to extend the 2BB-MEL licence slightly to capture a portion of the property that would be lost in cancelling the 2BE-PTR licence. Agnico Eagle is requesting lease boundaries beyond the necessary limit to streamline the boundary definitions (e.g., simple polygon). The cancellation of the 2BE-PTR licence will be submitted following the conclusion of this review by the Exploration division.



Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-05
Re:	Security Estimate		

Request Made by Interested Party:

Agnico Eagle has submitted a revised security estimate (i.e., December 2023) of \$359,491 (\$186,414 water liability) under the current application as opposed to \$1,489,082 (\$965,051 water liability) in the previous estimate (i.e., August 2023). The security estimate difference between the Reclamation and Closure plan versions is manifold. Agnico Eagle did not provide enough information and explanation to reconcile the difference. Therefore, CIRNAC can not comment on the security estimate at this moment. CIRNAC will require a detailed explanation of the units’ rates, lump sum costs, allowances, and other rates and underlined assumptions to better understand the revised security estimate and provide comments.

CIRNAC recommends that Agnico Eagle work cooperatively with all interested parties to address reclamation security for this undertaking.

Agnico Eagle’s Response to Request:

Detailed RECLAIM cost estimate spreadsheets are provided in Appendix A. Agnico Eagle looks forward in collaborating with interested parties and will address questions as they arise.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-06
Re:	Management Plans		

Request Made by Interested Party:

The renewal amendment application did not submit any Used Water Management Plan and Wildlife Protection and Response Plan that are part of the current licence. Moreover, Agnico Eagle requested that the requirement of the Waste Rock and Ore Storage Plan and Waste Management Plan be removed from the 2BB-MEL licence as the activities are covered under the 2AM-MEL licence.

CIRNAC believes the Used Water Management Plan and Wildlife Protection and Response Plan should remain part of the 2BB-MEL licence and be updated as required. As mentioned in R-04, the extent of the 2BB-MEL licence is beyond the boundaries of the 2AM-MEL licence. Activities under the 2BB-MEL will likely happen in areas not covered under the 2AM-MEL licence. Therefore, the 2BB-MEL licence should include a Waste Rock and Ore Storage Plan, its own Waste Management Plan, and the Used Water Management Plan and Wildlife Protection and Response Plan.

CIRNAC recommends that NWB require submission of Waste Rock and Ore Storage Plan, Waste Management Plan, Used Water Management Plan and Wildlife Protection and Response Plan as part of the current renewal amendment application.

Agnico Eagle’s Response to Request:

Agnico Eagle has been in extensive collaboration with parties in developing Meliadine Mine Wildlife Protection and Response Plan, which includes the extent of the 2BB-MEL licence. The latest approved plan is included in Appendix C.

As detailed in Section 2.1 of the “Amendment Request of Water Licence 2BB-MEL1424”, the exploration camp landfill is not in operation; the landfill under the 2AM-MEL Licence is being used for solid waste. Similarly, the exploration camp incinerator is also not in operation and all putrescible waste is being incinerated at the main camp incinerator under 2AM-MEL Licence. Therefore, there is no requirement for a Waste Management Plan under 2BB-MEL licence.

Similarly, a Used Water Management Plan is no longer required for the 2BB-MEL licence, as treated water from the exploration STP is trucked to the Main Meliadine Mine site, which is covered under 2AM-MEL management plans. Agnico Eagle clarifies that all other activities would be covered under the Water Management Plan that was submitted as part of the 2BB-MEL licence renewal.

See also response to CIRNAC-R-03 in regard to the Waste Rock and Ore Storage Plan.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-07
Re:	Terms of the Licence		

Request Made by Interested Party:

Agnico Eagle is requesting the following condition be added to Part F: Conditions Applying to Drilling Operations and Trenching:

“The Licensee is authorized to conduct land-based drilling within thirty-one (31) metres of the ordinary High Water Mark of any water body during winter conditions within the project area, as identified in the Amendment Application.”

Inclusion of this term should not mean that the licensee is allowed to drill on ice, and any waste, including drill cuttings or wastewater from the drilling operations, should be stored/deposited more than 31 meters from the ordinary High Water Mark of any water body.

CIRNAC recommends that NWB clarify in the licence that the proponent is not allowed to drill on ice, and any waste, including drill cuttings, should be stored/transported/ deposited more than 31 meters above the ordinary High Water Mark of any water body.

Agnico Eagle’s Response to Request:

Agnico Eagle thanks CIRNAC for their comment and would like to highlight that the exact wording of the proposed condition is also included in our Meadowbank 2BB-MEA1828 licence. Agnico Eagle will make every effort to drill on land; however, it is not always possible to achieve the targeted area strictly on land, especially during the installation of the diamond drill. Agnico Eagle has developed a Drilling on Ice Action Plan (Action Plan) in collaboration with CIRNAC officers in October 2022.

Interested Party:	CIRNAC	Rec No.:	CIRNAC-R-08
Re:	Security for 2BE-MEP1828		

Request Made by Interested Party:

As per current licence 2BB-MEL1424, the “Interim Reclamation and Closure Plan Water Licenses 2BE-MEP1318 and 2BB-MEL0914” dated August 2013 included estimates of reclamation liability for different components of the Project under both of the listed licenses. The reclamation and closure costs for the Meliadine Project and Meliadine East Camp (under 2BE-MEP1828) were calculated at \$1,489,082 and \$34,126, respectively. An updated Reclamation and Closure Plan was submitted to the NWB on November 26, 2018, specifically for the 2BE-MEP1828 licence, as \$33,681. The plan addresses the requirements of Part I, Item 1 of the 2BE-MEP1828 licence.

In the past, security estimates for 2BB-MEL and 2BE-MEP licences were discussed together. CIRNAC does not hold separate security for the 2BE-MEP licences, and its activity is not covered under the 2AM-MEL licence security. Agnico Eagle is required to fulfill the conditions of Part I for the 2BE-MEP1828 licence, which requires the licensee to complete restoration and progressive reclamation work. Therefore, in CIRNAC’s view, reclamation and closure costs for the 2BE-MEP licence should be factored in when discussing the security estimate for this renewal application.

CIRNAC recommends that reclamation and closure costs associated with the 2BEMEP1828 license not be dropped but continued factored in during the security discussion for 2BB-MEL licence renewal.

Agnico Eagle’s Response to Request:

Agnico Eagle agrees with CIRNAC’s recommendation and added a line item to the reclamation and closure costs of the 2BB-MEL1424 Water Licence renewal, in the amount of \$34,126 for the Meliadine East Camp (as per 2BE-MEP1828 Approved Reclamation and Closure Plan). This has been adjusted in the RECLAIM file provided in Appendix A.

ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

Interested Party:	ECCC	Rec No.:	ECCC-C-01
Re:	Drill Holes		

Request Made by Interested Party:

Section 5 of the Interim Reclamation and Closure Plan (IRCP) states that all “drill sites are reclaimed on a progressive basis. Following completion of a drill hole, the casing is pulled if possible, or cut off at or below ground level. Water and drill cuttings flow down the hole or casing and freeze in place thereby plugging the drill hole.”

It is not clear whether the Proponent intends to plug the drill hole with material strong enough to ensure that the drill hole sealed or capped, and as such does not become a hazard when the frozen water in the hole thaws. The water that flows back into the drill hole, as indicated by the Proponent, will freeze in the cold months but then will thaw during warmer months, leaving the drill hole open and unsealed or unplugged.

ECCC recommends that drill holes be plugged or sealed properly so that they do not become a hazard. The IRCP should be updated to reflect these procedures.

Agnico Eagle’s Response to Request:

It is an approved practice to plug drill holes with frozen water and drill cuttings, this will also avoid introducing foreign material into the environment. Agnico Eagle confirms that all environmental regulations are being followed and the site undergoes regular inspections by relevant authorities (CIRNAC) to provide additional reassurance. Mitigation actions will be followed should hazards be identified.

Interested Party:	ECCC	Rec No.:	ECCC-C-02
Re:	Remediation Criteria for Soil Treated in Landfarm		

Request Made by Interested Party:

Several criteria for determining when hydrocarbon impacted soil is sufficiently treated and can be removed from the landfarm are discussed in Section 3.5 of the Landfarm Management Plan (LMP): “Agnico Eagle currently follows the Government of Nunavut Remediation Guidelines (as outlined in the following sections); however, as with the 2AMMEL Licence will apply the soil remediation criteria used to the Abandoned Military Site Reclamation Protocol guidelines for the protection of human health and the management limit, which are more appropriate for the Meliadine site.”

It is not clear when the Proponent will apply the Abandoned Military Site Reclamation Protocol (AMSRP) guidelines, because they are not discussed further in the LMP. It is also unclear why the human health and management limits (for hydrocarbon products approximately equal to the sum of the F1 through F3 fractions below 0.5 m depth) from this protocol would be appropriate. This uncertainty stems in part because proposed disposal for treated soils includes two options, one where the soil would be exposed and another where it would not be at the ground surface. Section 2.1 of the LMP states: “the soils will be removed from the facility and can be used for construction purposes such as part of the cover of the Tailings Storage Facility (TSF) or stacked in the Waste Rock Storage Facility (WRSF).”

The agriculture/wildlife and industrial criteria from the Government of Nunavut Remediation Guidelines are listed as relevant. Section 3.5.1 of the LMP details “remediation to agricultural/wildlife criteria is targeted; however, if these criteria cannot be met, industrial criteria will be followed”, but does not specify if the soil meeting different criteria will be disposed of differently during operations. At closure, Section 3.7 of the LMP describes the different management of soils that meet the agriculture/wildlife criteria and those that meet the industrial criteria: “No excavation will be necessary if the agricultural/wildlife criteria are met. If industrial criteria are used, the Landfarm will be covered with a 2 m thick layer of waste rock, or other suitable material used for reclamation.”

The final disposal location of treated soils and the treatment criteria need to be linked. If soils will be used for cover, they need to meet agricultural/wildlife criteria, since the closure objective in the IRCP is to “return negatively impacted areas to productive and lasting use by wildlife and humans”. Soils only meeting industrial criteria disposed of at the surface have the potential to leach hydrocarbons in surface water over time, so they would have to be disposed of differently, as is acknowledged in the closure section of the plan. The proposed stacking in a WRSF should provide adequate protection, but as mentioned in Section 4.2.3 of the LMP, could require a suitable monitoring program for petroleum hydrocarbons.

ECCC recommends that remediation criteria for treated soils be clarified in the Landfarm Management Plan, specifically:

1. *If the AMSRP guidelines are to be used, the LMP should state the following:*
 - i. *In which circumstances the AMSRP criteria will be used;*
 - ii. *When treated materials have reached the AMSRP thresholds, where will they be disposed of; and*
 - iii. *An explanation of why the specific remedial objectives chosen are appropriate.*
2. *If the AMSRP guidelines are not used, the reference to them should be removed from the Plan.*
3. *The disposal locations of soils meeting different treatment criteria should be specified in the LMP, in order to achieve final closure objectives.*

Agnico Eagle's Response to Request:

Response bullet 1)

- i. Agnico Eagle currently follows the Government of Nunavut Remediation Guidelines; however, is proposing to change the soil remediation criteria used to the Abandoned Military Site Reclamation Protocol guidelines for the protection of human health and the management limit, which are more appropriate for the Meliadine site. Full details are provided in the Meliadine Mine Remedial Action Plan (Appendix D).
- ii. Treated material that meet AMSRP threshold can be place in the WRSF or used as cover at the TSF.
- iii. The current land use is for industrial purposes. As Agnico Eagle is currently following the Government of Nunavut Remediation Guidelines, Agnico Eagle will strive to achieve agricultural/wildlife criteria however, the industrial criteria is still appropriate.

Response bullet 2)

See response to bullet 1) i.

Response bullet 3)

As the current land use is for industrial purposes, all treated material that meet the Government of Nunavut Remediation Guidelines' industrial threshold can be place in the WRSF or used as cover at the TSF. However, Agnico Eagle is proposing to change the soil remediation criteria used to the AMSRP guidelines for the protection of human health and the management limit. The final depth of treated soil will be greater than 0.5 m and the final placement will be greater than 30 m from surface waterbodies.

Interested Party:	ECCC	Rec No.:	ECCC-C-04
Re:	Freshwater Use at Landfarm		

Request Made by Interested Party:

Section 3.4.3 of the LMP discusses the importance of sufficient soil moisture to prevent dust generation, and states if the “soil is too dry, non-contaminated water from within the Landfarm containment area will be used as a moisture source. If no accumulated water is available, freshwater will be used.” The Water Management Plan (WMP) does not mention this possible water use when discussing general water management.

ECCC recommends the Water Management Plan be updated to include possible use of water at the landfarm.

Agnico Eagle’s Response to Request:

Agnico Eagle has updated the Water Management Plan (Appendix E) to include a statement that water may be used to ensure sufficient soil moisture to prevent dust generation at the landfarm.

Interested Party:	ECCC	Rec No.:	ECCC-C-05
Re:	Segregation of Contaminants Treated at Landfarm		

Request Made by Interested Party:

The LMP’s discussion of segregation of contaminants lacks some details and contains inconsistencies. Section 2.1 states that “when possible, materials contaminated with heavy hydrocarbons (e.g., hydraulic fluid, grease), are to be segregated, packaged, and shipped south for treatment and/or disposal.” It is not clear what actions are taken when it is not possible to segregate material.

Furthermore, Section 3.1.1 lists hydraulic oil as a product acceptable for treatment, even though it is a type of hydraulic fluid. Section 2.1 identifies hydraulic fluid as a product to be “segregated, packaged, and shipped south for treatment and/or disposal.”

Only soil with contaminants that can be treated on operational timescales should be kept in the landfarm.

ECCC recommends the Landfarm Management Plan be updated to:

- 1. Describe procedures for when it is not possible to segregate materials contaminated with heavy hydrocarbons;*
- 2. Consistently classify hydraulic oil as a contaminant requiring treatment off site or as appropriate for treatment in the landfarm.*

Agnico Eagle’s Response to Request:

Response bullet 1)

When it is not possible to segregate materials contaminated with heavy hydrocarbons, it will be disposed of in the Landfarm, given that they meet the requirements as outlined in Section 3.1.1 of the Landfarm Management Plan. Otherwise, they will be placed in totes/drums for shipment off-site.

Response bullet 2)

Agnico Eagle would like to clarify that the intent of the sentence:

“When possible, materials contaminated with heavy hydrocarbons (e.g., hydraulic fluid, grease), are to be segregated, packaged, and shipped south for treatment and/or disposal”

is that efforts will be made to segregate heavy hydrocarbon contaminated material for shipment off-site as practicable. This does not mean that the contaminated material is unsuitable for the Landfarm.

Interested Party:	ECCC	Rec No.:	ECCC-C-06
Re:	Closure of Landfarm and Drill Hole Sumps in IRCP		

Request Made by Interested Party:

The IRCP is missing details on reclamation of elements that are described in other plans. Compiling all proposed reclamation activities in the Plan will help ensure closure objectives will be met consistently for all elements and infrastructure covered by the water licence.

Section 4: Reclamation of Meliadine Exploration Camp Area of the IRCP lists termination activities for five different surface conditions, but does not include a landfarm or a bermed area. Section 3.7: Landfarm Closure and Reclamation of the LMP includes reclamation activities that would be appropriate in the IRCP.

Section 5: Reclamation of Drill Sites of the IRCP discusses removing casings and plugging drill holes with water and drill cuttings, but does not explain how sumps will be remediated or how drill cuttings will be disposed of. Section 3.4 of the WMP describes some of these elements as well, and could be integrated in the IRCP.

ECCC recommends the Interim Reclamation and Closure Plan be updated to include how the landfarm and drill sumps will be reclaimed and how drill cuttings are disposed of.

Agnico Eagle’s Response to Request:

Agnico Eagle does not intend on digging sumps, drill cuttings will be disposed of within a natural depression, more than 31 meters above the ordinary High Water Mark of any water body. Procedures will be followed as agreed upon with the site inspector.

Appendix A: RECLAIM Cost Estimate

SUMMARY OF COSTS

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT		\$0	\$0	\$0
UNDERGROUND MINE		\$0	\$0	\$0
TAILINGS FACILITY		\$0	\$0	\$0
ROCK PILE		\$0	\$0	\$0
BUILDINGS AND EQUIPMENT		\$272,603	\$132,677	\$139,927
CHEMICALS AND CONTAMINATED SOIL MANAGEMENT		\$9,800	\$3,920	\$5,880
SURFACE AND GROUNDWATER MANAGEMENT		\$0	-	\$0
INTERIM CARE AND MAINTENANCE		\$0	-	\$0
	SUBTOTAL: Capital Costs	\$282,403	\$136,597	\$145,807
	PERCENT OF SUBTOTAL		48%	52%

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMobilIZATION		\$34,248	\$16,566	\$17,682
CLOSURE MONITORING AND MAINTENANCE		\$0	\$0	\$0
POST CLOSURE MONITORING AND MAINTENANCE		\$0	\$0	\$0
ENGINEERING	5%	\$14,120	\$6,830	\$7,290
PROJECT MANAGEMENT	5%	\$14,120	\$6,830	\$7,290
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	0%	\$0	\$0	\$0
BONDING/INSURANCE	1%	\$2,824	1,365.97 \$	\$1,458
CONTINGENCY	20%	\$56,481	\$27,319	\$29,161
MARKET PRICE FACTOR ADJUSTMENT	0%	\$0	\$0	\$0
	SUBTOTAL: Indirect Costs	\$121,793	\$58,911	\$62,883

TOTAL COSTS		\$404,197	\$195,507	\$208,689
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SUMMARY OF COSTS 2BB-MEL1424 Renewal

CAPITAL COSTS	COMPONENT NAME	COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT		\$0	\$0	\$0
UNDERGROUND MINE		\$0	\$0	\$0
TAILINGS FACILITY		\$0	\$0	\$0
ROCK PILE		\$0	\$0	\$0
BUILDINGS AND EQUIPMENT		\$272,603	\$132,677	\$139,927
CHEMICALS AND CONTAMINATED SOIL MANAGEMENT		\$9,800	\$3,920	\$5,880
SURFACE AND GROUNDWATER MANAGEMENT		\$0	-	\$0
INTERIM CARE AND MAINTENANCE		\$0	-	\$0
SUBTOTAL: Capital Costs		\$282,403	\$136,597	\$145,807
PERCENT OF SUBTOTAL			48%	52%

INDIRECT COSTS		COST	LAND LIABILITY	WATER LIABILITY
MOBILIZATION/DEMOBILIZATION		\$34,248	\$16,566	\$17,682
CLOSURE MONITORING AND MAINTENANCE		\$0	\$0	\$0
POST CLOSURE MONITORING AND MAINTENANCE		\$0	\$0	\$0
ENGINEERING	5%	\$14,120	\$6,830	\$7,290
PROJECT MANAGEMENT	5%	\$14,120	\$6,830	\$7,290
HEALTH AND SAFETY PLANS/MONITORING & QA/QC	0%	\$0	\$0	\$0
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SUBTOTAL: Indirect Costs		\$121,793	\$58,911	\$62,883

TOTAL COSTS	COST	LAND LIABILITY	WATER LIABILITY
	\$404,197	\$195,507	\$208,689

2BB-MEL1424 Application Security

CAPITAL COSTS				
COMPONENT TYPE	COMPONENT NAME	TOTAL COST	LAND LIABILITY	WATER LIABILITY
OPEN PIT	0	\$1,500	\$1,500	\$0
UNDERGROUND MINE	0	\$189,255	\$111,297	\$79,558
TAILINGS	0	\$0	\$0	\$0
ROCK PILE	0	\$0	\$0	\$0
BUILDINGS AND EQUIPMENT	0	\$759,758	\$239,940	\$519,818
CHEMICALS AND SOIL MANAGEMENT		\$31,238	\$12,495	\$18,743
WATER MANAGEMENT		\$0	\$0	\$0
POST-CLOSURE MONITORING AND MAINTENANCE		\$51,542	\$0	\$51,542
SUBTOTAL		\$1,033,293	\$365,232	\$669,661
		PERCENTAGES	35%	65%
MOBILIZATION/DEMOBILIZATION		\$125,135	44,231	81,098
PROJECT MANAGEMENT	5%	\$51,665	\$18,262	\$33,483
Bonding	1%	\$10,333	\$3,652	\$6,697
Taxes (GST on supplies) - est.	allowance	\$0	\$0	\$0
Insurance	1%	\$10,333	\$3,652	\$6,697
ENGINEERING	5%	\$51,665	\$18,262	\$33,483
CONTINGENCY	20%	\$206,659	\$73,046	\$133,932
Market Price Factor Adjustment	0%	\$0	\$0	\$0
GRAND TOTAL - CAPITAL COSTS		\$1,489,082	\$526,337	\$965,051

#	Open Pit Name:	Pit # 1							
ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost % Land	Land Cost	Water Cost	
CONTROL ACCESS									
Fence				#N/A	\$0.00	\$0	\$0	\$0	
Signs				#N/A	\$0.00	\$0	\$0	\$0	
Berm at crest				#N/A	\$0.00	\$0	\$0	\$0	
Rock Barricade at ramp				#N/A	\$0.00	\$0	\$0	\$0	
Other				#N/A	\$0.00	\$0	\$0	\$0	
STABILITY STUDY									
Conduct stability and setback study				#N/A	\$0.00	\$0	\$0	\$0	
STABILIZE SLOPES									
Off-load crest, soil A				#N/A	\$0.00	\$0	\$0	\$0	
Off-load crest, soil B				#N/A	\$0.00	\$0	\$0	\$0	
Doze/trim overburden at crest				#N/A	\$0.00	\$0	\$0	\$0	
Drill & blast pit crest				#N/A	\$0.00	\$0	\$0	\$0	
Buttress slope				#N/A	\$0.00	\$0	\$0	\$0	
Other				#N/A	\$0.00	\$0	\$0	\$0	
COVER/CONTOUR SLOPES									
Place fill, soil A				#N/A	\$0.00	\$0	\$0	\$0	
Place fill, soil B				#N/A	\$0.00	\$0	\$0	\$0	
Rip rap				#N/A	\$0.00	\$0	\$0	\$0	
Vegetate slopes				#N/A	\$0.00	\$0	\$0	\$0	
Vegetate pit floor				#N/A	\$0.00	\$0	\$0	\$0	
Other				#N/A	\$0.00	\$0	\$0	\$0	
CONSTRUCT DIVERSION DITCHES									
Excavate ditches -soil				#N/A	\$0.00	\$0	\$0	\$0	
Excavate ditches -rock				#N/A	\$0.00	\$0	\$0	\$0	
Rip rap in channel base				#N/A	\$0.00	\$0	\$0	\$0	
CONSTRUCT SPILLWAY									
Excavate channel				#N/A	\$0.00	\$0	\$0	\$0	
Concrete				#N/A	\$0.00	\$0	\$0	\$0	
Rip rap				#N/A	\$0.00	\$0	\$0	\$0	
Other				#N/A	\$0.00	\$0	\$0	\$0	
RECLAIM QUARRIES									
Contour slopes	Reduced to 0 as Tiriganiaq is associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0	\$0	\$0	
Place overburden				#N/A	\$0.00	\$0	\$0	\$0	
Vegetate				#N/A	\$0.00	\$0	\$0	\$0	
FLOOD PIT-Captital									
Remove stationary equipment (sump pumps)				#N/A	\$0.00	\$0	\$0	\$0	
Remove dewatering pipeline				#N/A	\$0.00	\$0	\$0	\$0	
Remove power lines				#N/A	\$0.00	\$0	\$0	\$0	
Construct diversion ditches				#N/A	\$0.00	\$0	\$0	\$0	
-Ditch, mat'l A				#N/A	\$0.00	\$0	\$0	\$0	
-Ditch, mat'l B				#N/A	\$0.00	\$0	\$0	\$0	
Construct embankment/dam				#N/A	\$0.00	\$0	\$0	\$0	
Supply/install pump station				#N/A	\$0.00	\$0	\$0	\$0	
Piping installation				#N/A	\$0.00	\$0	\$0	\$0	
Supply/install pump				#N/A	\$0.00	\$0	\$0	\$0	
Remove pump post-closure				#N/A	\$0.00	\$0	\$0	\$0	
Remove piping post-closure				#N/A	\$0.00	\$0	\$0	\$0	
FLOOD PIT-Annual Cost									
Operate pumps (power)				#N/A	\$0.00	\$0	\$0	\$0	
Maintain pump/piping				#N/A	\$0.00	\$0	\$0	\$0	
Annual Pump Servicing				#N/A	\$0.00	\$0	\$0	\$0	
Pump Servicing Travel Allowance				#N/A	\$0.00	\$0	\$0	\$0	
Accommodations				#N/A	\$0.00	\$0	\$0	\$0	
Passive/biological additives				#N/A	\$0.00	\$0	\$0	\$0	
Passive additives purchase and shipping				#N/A	\$0.00	\$0	\$0	\$0	
Water from Meliadine Lake				#N/A	\$0.00	\$0	\$0	\$0	
					Annual pumping costs		\$0		
Number of years of pump flooding		years		Total pumping costs		\$0	\$0	\$0	
					Total		\$0	\$0	\$0
					% of Total		0%	0%	0%

5

Underground Mine Name

UG Mine # 1

ACTIVITY/MATERIAL	Notes	Unit	Qty	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
CONTROL ACCESS									
backfill portal - ore	Reduced to 0 as underground bulk sampling is longer applicaple and underground acitivities are associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0		\$0	\$0
backfill portal -cover	Reduced to 0 as underground bulk sampling is longer applicaple and underground acitivities are associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0		\$0	\$0
doz ore into place	Reduced to 0 as underground bulk sampling is longer applicaple and underground acitivities are associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0		\$0	\$0
Doz cover material into place & contour				#N/A	\$0.00	\$0		\$0	\$0
Remove sample tower to Itiiva	Reduced to 0 as underground bulk sampling is longer applicaple and underground acitivities are associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0		\$0	\$0
Remove steel portal cover to Itiiva	Reduced to 0 as underground bulk sampling is longer applicaple and underground acitivities are associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0		\$0	\$0
REMOVE HAZARDOUS MATERIALS									
Remove hazardous materials, U/G labor				#N/A	\$0.00	\$0		\$0	\$0
Remove/decontam. stationary & elect. equip				#N/A	\$0.00	\$0		\$0	\$0
Remove/decontam. mobile equipment				#N/A	\$0.00	\$0		\$0	\$0
Remove misc. haz. mat & explosives				#N/A	\$0.00	\$0		\$0	\$0
Other				#N/A	\$0.00	\$0		\$0	\$0
INSTALL BULKHEADS									
Bulkheads to control water flow				#N/A	\$0.00	\$0		\$0	\$0
Grout bulkhead				#N/A	\$0.00	\$0		\$0	\$0
FLOOD MINE									
Supply/install pump				#N/A	\$0.00	\$0		\$0	\$0
Supply/install piping system				#N/A	\$0.00	\$0		\$0	\$0
Operate pumps to flood workings				#N/A	\$0.00	\$0		\$0	\$0
Other				#N/A	\$0.00	\$0		\$0	\$0
INSTALL GROUNDWATER COLLECTION SYSTEM									
Excavate/install sumps				#N/A	\$0.00	\$0		\$0	\$0
Install pumping wells				#N/A	\$0.00	\$0		\$0	\$0
Install pumps/pipelines/power supply				#N/A	\$0.00	\$0		\$0	\$0
SPECIALIZED ITEMS									
Install water quality monitoring pipes				#N/A	\$0.00	\$0		\$0	\$0
Install permanent pumping system				#N/A	\$0.00	\$0		\$0	\$0
Install permanent instrumentation				#N/A	\$0.00	\$0		\$0	\$0
						Total		\$0	\$0
						% of Total		0%	0%

Building / Equip Name:	Meliadine			Bldg / Equip #: 1					
ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost % Land	Land Cost	Water Cost	
DISPOSE MOBILE EQUIPMENT (surfa)									
Dispose and ship off-site				#N/A	0.00	\$0	\$0	\$0	
Dispose on-site				#N/A	0.00	\$0	\$0	\$0	
REMOVE BUILDINGS									
Exploration Camp	Adjusted to represent all Exploration Camp buildings.	m2	4257	BRS1L	45.00	\$191,565	50%	\$95,783	\$95,783
2BE-MEP1828 East Camp	Added per response to CIRNAC-R-08			#N/A	0.00	\$34,126	50%	\$17,063	\$17,063
Building 2 -Accom. - weatherhaven tents, wood floor				#N/A	0.00	\$0		\$0	\$0
Building 3 -Offices, Repair, Lab, Warehouse				#N/A	0.00	\$0		\$0	\$0
Building 4 -Warehouse - gravel floor with liner -Sprung				#N/A	0.00	\$0		\$0	\$0
Building 5 -Stick built, core shack, incinerator, hall ways				#N/A	0.00	\$0		\$0	\$0
Building 6 -Weatherhaven tents to the landfill				#N/A	0.00	\$0		\$0	\$0
Building 7 - Biodisk Sewage Treatment Plants				#N/A	0.00	\$0		\$0	\$0
Building 8 -Generators				#N/A	0.00	\$0		\$0	\$0
Building 9 -Incinerators				#N/A	0.00	\$0		\$0	\$0
Building 10 -AEM equipment at the camp				#N/A	0.00	\$0		\$0	\$0
Building 15 -Fuel tanks				#N/A	0.00	\$0		\$0	\$0
Building 16 - 8 Bladders				#N/A	0.00	\$0		\$0	\$0
Building 23 Sprung buildings - fabric over frame				#N/A	0.00	\$0		\$0	\$0
Building 26 Freshwater Intake				#N/A	0.00	\$0		\$0	\$0
Decontaminate bladder fuel storage area				#N/A	0.00	\$0		\$0	\$0
LANDFILL and landfarm									
Place soil cover landfill				#N/A	0.00	\$0		\$0	\$0
Vegetate				#N/A	0.00	\$0		\$0	\$0
GRADE AND CONTOUR PADS									
Exploration Camp	Adjusted to represent all Exploration Camp buildings.	m3	4682.7	AEM	\$8.47	\$39,662	50%	\$19,831	\$19,831
Building 2 -Process Facilities				#N/A	\$0.00	\$0		\$0	\$0
Building 3 -Offices, Repair, Lab, Warehouse				#N/A	\$0.00	\$0		\$0	\$0
Building 4 -Storage Facilites				#N/A	\$0.00	\$0		\$0	\$0
Building 5 -Water and Wastewater Treatment Facilities				#N/A	\$0.00	\$0		\$0	\$0
Building 6 -U/G Portal Area	Reduced to 0 as underground bulk sampling is longer applicaple and underground acitivities are associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0		\$0	\$0
Building 7 - Emulsion Plant				#N/A	\$0.00	\$0		\$0	\$0
Building 8 -Warehouse, Shops and Other				#N/A	\$0.00	\$0		\$0	\$0
place rock cover				#N/A	\$0.00	\$0		\$0	\$0
Vegetate				#N/A	\$0.00	\$0		\$0	\$0
puncture liner and place soil cover	Reduced to 0 as Tiriganiaq is associated with the 2AM-MEL Licence			#N/A	\$0.00	\$0		\$0	\$0
RECLAIM QUARRIES									
Grading and contouring borrow areas				#N/A	\$0.00	\$0		\$0	\$0
Drill and blast slopes				#N/A	\$0.00	\$0		\$0	\$0
RECLAIM ROADS									
Remove culverts	Reduced to 1 as portal area included within the 2AM-MEL Licence	each	1	PLRL	\$4,000.00	\$4,000		\$0	\$4,000
Scarify and install water breaks	Reduced to 1 as portal area included within the 2AM-MEL Licence	km	1	#N/A	\$3,250.00	\$3,250		\$0	\$3,250
Vegetate				#N/A	\$0.00	\$0		\$0	\$0
other				#N/A	\$0.00	\$0		\$0	\$0
SPECIALIZED ITEMS									
Dispose of misc. debris and laydown area refuse				#N/A	\$0.00	\$0	50%	\$0	\$0
Total						\$272,603		\$132,677	\$139,927
% of Total								49%	51%

Chemicals/Soil Area Name: Meliadine

Note: The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	% Cost	Land Cost	Water Cost
HAZARDOUS MATERIALS AUDIT								
				#N/A	\$0.00	\$0	\$0	\$0
				#N/A	\$0.00	\$0	\$0	\$0
				#N/A	\$0.00	\$0	\$0	\$0
BUILDING DECONTAMINATION & CONSOLIDATION OF HAZARDOUS MATERIALS								
Environmental technician/coordinator				#N/A	\$0.00	\$0	\$0	\$0
Decontaminate: oil, fuel and glycol systems				#N/A	\$0.00	\$0	\$0	\$0
Decontaminate maintenance shop				#N/A	\$0.00	\$0	\$0	\$0
Decontaminate power plant				#N/A	\$0.00	\$0	\$0	\$0
Decontaminate bulk fuel storage				#N/A	\$0.00	\$0	\$0	\$0
Decontaminate emulsion plant				#N/A	\$0.00	\$0	\$0	\$0
Decontaminate garage area				#N/A	\$0.00	\$0	\$0	\$0
Decontaminate offices/warehouse/accom				#N/A	\$0.00	\$0	\$0	\$0
Removal of asbestos siding on buildings				#N/A	\$0.00	\$0	\$0	\$0
Removal of friable asbestos on equipment				#N/A	\$0.00	\$0	\$0	\$0
HAZARDOUS MATERIALS REMOVAL								
Waste oils	Updated rates based on 2AM rates litre		5000	ORL	\$0.43	\$2,150	40%	\$860
waste batteries	Updated rates based on 2AM rates each		1	MBK	\$3,000.00	\$3,000	40%	\$1,200
Waste batteries				#N/A	\$0.00	\$0	\$0	\$0
Mill and water treatment reagents				#N/A	\$0.00	\$0	\$0	\$0
Assay & environmental lab reagents				#N/A	\$0.00	\$0	\$0	\$0
Machine shop paints, solvents etc				#N/A	\$0.00	\$0	\$0	\$0
Glycol				#N/A	\$0.00	\$0	\$0	\$0
Process reagents				#N/A	\$0.00	\$0	\$0	\$0
Nuclear sources				#N/A	\$0.00	\$0	\$0	\$0
Other hazardous materials				#N/A	\$0.00	\$0	\$0	\$0
HAZARDOUS MATERIALS								
Transportation to disposal facility				#N/A	\$0.00	\$0	\$0	\$0
Disposal fees				#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
CONTAMINATED SOILS								
Contam. soil investigation				#N/A	\$0.00	\$0	\$0	\$0
				#N/A	\$0.00	\$0	\$0	\$0
CONTAMINATED SOIL REMOVAL								
Excavate, load, haul to biopile or: Excavate and transport to onsite facility	adjusted unit rate and unit cost based on 2AM	m3	500	SC4L	\$9.30	\$4,650	40%	\$1,860
Remediate on-site at biopile or: Manage hydrocarbon remediation at facility				#N/A	\$0.00	\$0	\$0	\$0
Remediate on-site at biopile or: Manage hydrocarbon remediation at facility				#N/A	\$0.00	\$0	\$0	\$0
Remediate on-site at biopile or: Manage hydrocarbon remediation at facility				#N/A	\$0.00	\$0	\$0	\$0
Excavate and transport to offsite facility				#N/A	\$0.00	\$0	\$0	\$0
Excavate and transport to offsite facility				#N/A	\$0.00	\$0	\$0	\$0
Excavate and transport to offsite facility				#N/A	\$0.00	\$0	\$0	\$0
CONTAMINATED SOIL VERY LOW PERMEABILITY COVER								
Supply geomembrane, HDPE, ES3, GCL				#N/A	\$0.00	\$0	\$0	\$0
Upper and lower bedding layers				#N/A	\$0.00	\$0	\$0	\$0
Install geomembrane, HDPE, ES3, GCL				#N/A	\$0.00	\$0	\$0	\$0
Erosion protection layer				#N/A	\$0.00	\$0	\$0	\$0
Vegetate				#N/A	\$0.00	\$0	\$0	\$0
Install infiltration/seepage instrumentation				#N/A	\$0.00	\$0	\$0	\$0
Other				#N/A	\$0.00	\$0	\$0	\$0
OTHER								
				#N/A	\$0.00	\$0	\$0	\$0
Total						\$9,800	\$3,920	\$5,880
% of Total							40%	60%

1 Post-Closure Monitoring & Maintenance:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost		
				Code	Unit Cost	Cost
MONITORING & INSPECTIONS Active Closure						
Annual geotechnical inspection -Meliadine		each	1	#N/A	\$0.00	\$0
Annual Surface water sampling - Exploration	\$43k for the whole Meliadine site	each	1	#N/A	\$0.00	\$0
Monitoring program (Meliadine and AWAR)		each	1	#N/A	\$0.00	\$0
Receiving/downstream water sampling		each		#N/A	\$0.00	\$0
Underground water		each		#N/A	\$0.00	\$0
Regulatory costs*		each		#N/A	\$0.00	\$0
Site water monitoring (AEMP and SNP)		each		#N/A	\$0.00	\$0
- Active closure and flooding		each		#N/A	\$0.00	\$0
- Post pit flooding		each		#N/A	\$0.00	\$0
Air Quality Monitoring Program (AQMP)		each		#N/A	\$0.00	\$0
Wildlife Effects Monitoring Program (WEMP)		each		#N/A	\$0.00	\$0
Vegetation Monitoring		each		#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
COVER MAINTENANCE						
Repair erosion - infill gullies				#N/A	\$0.00	\$0
Repair erosion - upgrade diversion ditches				#N/A	\$0.00	\$0
Remove problem vegetation				#N/A	\$0.00	\$0
Repair animal damage				#N/A	\$0.00	\$0
Repair/upgrade access controls				#N/A	\$0.00	\$0
Other				#N/A	\$0.00	\$0
SPILLWAY MAINTENANCE						
Repair erosion		m3		#N/A	\$0.00	\$0
Clear spillway		each		#N/A	\$0.00	\$0
CWTS MAINTENANCE						
Maintain flow, restore vegetation		allow		#N/A	\$0.00	\$0
MAINTENANCE AND SURVEILLANCE						
Site care-taker - Meliadine + Disco		manhours		#N/A	\$0.00	\$0
Site vehicle and equipment - Meliadine + Disco		allow		#N/A	\$0.00	\$0
Accommodation and site maintenance - Meliadine + Disco		mandays/ALLOWS		#N/A	\$0.00	\$0
<hr/>						
Subtotal, Annual post-closure costs						\$0
Discount rate for calculation of net present value of post-closure cost, %				8.00%		
Number of years of post-closure activity				3 years		
Present Value of payment stream						\$0

1 Interim Care and Maintenance

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
INTERIM CARE & MAINTENANCE						
on-site caretaker		manmonths		#N/A	0	\$0
extra personnel		manmonths		#N/A	0	\$0
-electrician		manmonths		#N/A	0	\$0
-mechanic		manmonths		#N/A	0	\$0
annual fuel		litre		#N/A	0	\$0
misc. supplies		allow		#N/A	0	\$0
pick-up truck		each		#N/A	0	\$0
small dozer		allow		#N/A	0	\$0
small excavator		allow		#N/A	0	\$0
snow machine		allow		#N/A	0	\$0
communications		allow		#N/A	0	\$0
SNP/AEMP water sampling & reporting		each		#N/A	0	\$0
geotechnical assessment		each		#N/A	0	\$0
interim water treatment				#N/A		\$0
Maintenance, surveillance, monitoring and inspection-Active closure		each	1	AEM		\$0
				Annual Interim C&M Cost		\$0
Number of years of ICM		years	3		Total	0 \$

1 Mobilization/Demobilization:

ACTIVITY/MATERIAL	Notes	Units	Quantity	Cost Code	Unit Cost	Cost
MOBILIZE HEAVY EQUIPMENT						
Excavators	Reduced as part of overall MEL Mine equipment			#N/A	0	\$0
Dump trucks	Reduced as part of overall MEL Mine equipment			#N/A	0	\$0
Dozers	Reduced as part of overall MEL Mine equipment			#N/A	0	\$0
Light duty vehicles	Reduced as part of overall MEL Mine equipment			#N/A	0	\$0
MOBILIZE MISC. EQUIPMENT						
Minor tools and equipment	Reduced as part of overall MEL Mine equipment			#N/A	0	\$0
Truck tires				#N/A	0	\$0
Other				#N/A	0	\$0
MOBILIZE CAMP						
Reclamation activities				#N/A	0	\$0
Long term reclamation activities (eg pump flooding)				#N/A	0	\$0
MOBILIZE WORKERS						
crew travel time	Reduced number of days as will only need to mobilize for demo of the camp. Adjusted unit rates to match 2AM	each	24 AEM		1386	\$33,264
crew transportation	Reduced number of days as will only need to mobilize for demo of the camp. Adjusted unit rate to match 2AM. 6 workers, 4 trips/yr, 1 year	hour	24 operl		41	\$984
WORKER ACCOMODATIONS						
Reclamation activities				#N/A	0	\$0
Long term reclamation activities (eg pump flooding)				#N/A	0	\$0
MOBILIZE FUEL						
Fuel freight - reclamation activities				#N/A	0	\$0
Fuel freight - long term reclamation activities				#N/A	0	\$0
Fuel freight accomodations				#N/A	0	\$0
WINTER ROAD						
Snow removal				#N/A	0	\$0
DEMOBILIZE HEAVY EQUIPMENT						
Excavators				#N/A	0	\$0
Mobile equipment - Meliadine				#N/A	0	\$0
Mobile equipment - Discovery				#N/A	0	\$0
Dump trucks				#N/A	0	\$0
Seacans - Meliadine				#N/A	0	\$0
Seacans - Discovery				#N/A	0	\$0
Dozers				#N/A	0	\$0
Demolition shears				#N/A	0	\$0
Crane				#N/A	0	\$0
Loader				#N/A	0	\$0
Compactor				#N/A	0	\$0
Light duty vehicles				#N/A	0	\$0
Other				#N/A	0	\$0
DEMOBILIZE CAMP						
				#N/A	0	\$0
DEMOBILIZE WORKERS						
crew travel time				#N/A	0	\$0
crew transportation				#N/A	0	\$0
WINTER ROAD						
Construction and operation				#N/A	0	\$0
Limited winter use				#N/A	0	\$0
Winter road tarriff				#N/A	0	\$0
					Total	\$34,248

Appendix B: Bermed Fuel Containment Facilities Soil Sampling Results (2021)



Your P.O. #: OL-1006009
 Site Location: MELIADINE
 Your C.O.C. #: na

Attention: Reporting

Agnico-Eagle
 Meliadine
 Meliadine Mine
 Rankin Inlet, NU
 CANADA X0C 0G0

Report Date: 2021/09/09
 Report #: R6803655
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1P1753

Received: 2021/09/01, 09:15

Sample Matrix: Soil
 # Samples Received: 17

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Petroleum Hydrocarbons F2-F4 in Soil (1, 2)	17	2021/09/03	2021/09/08	CAM SOP-00316	CCME CWS m
Moisture (1)	17	N/A	2021/09/02	CAM SOP-00445	Carter 2nd ed 51.2 m
Volatile Organic Compounds and F1 PHCs (1)	14	N/A	2021/09/08	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds and F1 PHCs (1)	3	N/A	2021/09/09	CAM SOP-00230	EPA 8260C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Mississauga

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.



Your P.O. #: OL-1006009
Site Location: MELIADINE
Your C.O.C. #: na

Attention: Reporting

Agnico-Eagle
Meliadine
Meliadine Mine
Rankin Inlet, NU
CANADA X0C 0G0

Report Date: 2021/09/09
Report #: R6803655
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1P1753
Received: 2021/09/01, 09:15

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
Your P.O. #: OL-1006009
Sampler Initials: RS

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

BV Labs ID		QNW507	QNW508	QNW509	QNW510	QNW511	QNW512		
Sampling Date		2021/08/29	2021/08/29	2021/08/29	2021/08/29	2021/08/29	2021/08/29		
COC Number		na	na	na	na	na	na		
	UNITS	WRSF3-1	WRSF3-2	WRSF3-3	WRSF3-4	WRSF3-5	WRSF3-6	RDL	QC Batch
Inorganics									
Moisture	%	14	17	21	8.6	18	20	1.0	7557735
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	7561078
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7561078
Toluene	ug/g	0.10	0.050	0.050	0.18	<0.020	0.029	0.020	7561078
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7561078
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7561078
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7561078
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	<10	10	7561078
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	<10	10	7561078
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	56	<10	15	52	14	24	10	7562714
F3 (C16-C34 Hydrocarbons)	ug/g	470	<50	84	220	94	170	50	7562714
F4 (C34-C50 Hydrocarbons)	ug/g	84	<50	<50	<50	<50	<50	50	7562714
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	Yes		7562714
Surrogate Recovery (%)									
o-Terphenyl	%	99	90	92	89	87	81		7562714
4-Bromofluorobenzene	%	87	87	88	88	89	87		7561078
D10-o-Xylene	%	83	77	76	96	78	77		7561078
D4-1,2-Dichloroethane	%	104	100	102	100	100	98		7561078
D8-Toluene	%	92	92	93	94	93	96		7561078
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



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BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
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Sampler Initials: RS

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

BV Labs ID		QNW513	QNW514	QNW515	QNW516		QNW517		
Sampling Date		2021/08/29	2021/08/29	2021/08/29	2021/08/29		2021/08/29		
COC Number		na	na	na	na		na		
	UNITS	WRSF3-7	WRSF3-8	WRSF3-9	WRSF3-10	RDL	WRSF3-11	RDL	QC Batch
Inorganics									
Moisture	%	7.4	8.2	11	9.6	1.0	42	1.0	7567735
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	<0.012	0.012	7561078
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	0.010	<0.020	0.020	7561078
Toluene	ug/g	0.10	0.054	0.10	1.1	0.020	<0.040	0.040	7561078
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	<0.040	0.040	7561078
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	<0.040	0.040	7561078
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	<0.040	0.040	7561078
F1 (C6-C10)	ug/g	<10	<10	<10	<10	10	<20	20	7561078
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	10	<20	20	7561078
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	<10	45	<10	44	10	24	10	7562714
F3 (C16-C34 Hydrocarbons)	ug/g	<50	200	<50	390	50	110	50	7562714
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	100	50	<50	50	7562714
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes		Yes		7562714
Surrogate Recovery (%)									
o-Terphenyl	%	94	88	89	93		83		7562714
4-Bromofluorobenzene	%	87	87	88	86		89		7561078
D10-o-Xylene	%	85	83	80	84		87		7561078
D4-1,2-Dichloroethane	%	101	101	101	98		100		7561078
D8-Toluene	%	94	93	95	95		95		7561078
RDL = Reportable Detection Limit QC Batch = Quality Control Batch									



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BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
Your P.O. #: OL-1006009
Sampler Initials: RS

CCME PETROLEUM HYDROCARBONS SOIL (SOIL)

BV Labs ID		QNW518	QNW519	QNW520	QNW521	QNW522	QNW523		
Sampling Date		2021/08/29	2021/08/29	2021/08/29	2021/08/29	2021/08/29	2021/08/29		
COC Number		na	na	na	na	na	na		
	UNITS	WRSF3-12	WRSF3-13	WRSF3-14	WRSF3-15	WRSF3-16	WRSF3-17	RDL	QC Batch
Inorganics									
Moisture	%	17	22	17	27	23	15	1.0	7557735
Volatile Organics									
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	7561078
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	7561078
Toluene	ug/g	0.026	<0.020	0.075	<0.020	0.25	0.032	0.020	7561078
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7561078
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7561078
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	7561078
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	<10	10	7561078
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	<10	10	7561078
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	25	19	<10	<10	<10	<10	10	7562714
F3 (C16-C34 Hydrocarbons)	ug/g	92	60	<50	65	<50	<50	50	7562714
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	<50	<50	50	7562714
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	Yes		7562714
Surrogate Recovery (%)									
o-Terphenyl	%	92	82	86	89	84	92		7562714
4-Bromofluorobenzene	%	86	85	88	86	85	85		7561078
D10-o-Xylene	%	75	88	73	75	78	72		7561078
D4-1,2-Dichloroethane	%	99	101	103	102	102	103		7561078
D8-Toluene	%	96	95	94	94	94	93		7561078
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									



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BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
Your P.O. #: OL-1006009
Sampler Initials: RS

TEST SUMMARY

BV Labs ID: QNW507
Sample ID: WRSF3-1
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW508
Sample ID: WRSF3-2
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW509
Sample ID: WRSF3-3
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW510
Sample ID: WRSF3-4
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW511
Sample ID: WRSF3-5
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW512
Sample ID: WRSF3-6
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland



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Report Date: 2021/09/09

Agnico-Eagle
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Your P.O. #: OL-1006009
Sampler Initials: RS

TEST SUMMARY

BV Labs ID: QNW512
Sample ID: WRSF3-6
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW513
Sample ID: WRSF3-7
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW514
Sample ID: WRSF3-8
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW515
Sample ID: WRSF3-9
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW516
Sample ID: WRSF3-10
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW517
Sample ID: WRSF3-11
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal



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BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
Your P.O. #: OL-1006009
Sampler Initials: RS

TEST SUMMARY

BV Labs ID: QNW517
Sample ID: WRSF3-11
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW518
Sample ID: WRSF3-12
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW519
Sample ID: WRSF3-13
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW520
Sample ID: WRSF3-14
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/08	Yang (Philip) Yu

BV Labs ID: QNW521
Sample ID: WRSF3-15
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/09	Yang (Philip) Yu

BV Labs ID: QNW522
Sample ID: WRSF3-16
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/09	Yang (Philip) Yu



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BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
Your P.O. #: OL-1006009
Sampler Initials: RS

TEST SUMMARY

BV Labs ID: QNW523
Sample ID: WRSF3-17
Matrix: Soil

Collected: 2021/08/29
Shipped:
Received: 2021/09/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	7562714	2021/09/03	2021/09/08	Anna Stuglik-Rolland
Moisture	BAL	7557735	N/A	2021/09/02	Prgya Panchal
Volatile Organic Compounds and F1 PHCs	GC/MSFD	7561078	N/A	2021/09/09	Yang (Philip) Yu



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VERITAS

BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
Your P.O. #: OL-1006009
Sampler Initials: RS

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.7°C
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Sample QNW517 [WRSF3-11] : VOCF1 Analysis: Detection limits were raised due to high moisture content and/or low weight of soil provided.

Results relate only to the items tested.



BUREAU
VERITAS

BV Labs Job #: C1P1753

Report Date: 2021/09/09

QUALITY ASSURANCE REPORT

Agnico-Eagle

Site Location: MELIADINE

Your P.O. #: OL-1006009

Sampler Initials: RS

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7561078	4-Bromofluorobenzene	2021/09/08	99	60 - 140	102	60 - 140	87	%		
7561078	D10-o-Xylene	2021/09/08	95	60 - 130	86	60 - 130	86	%		
7561078	D4-1,2-Dichloroethane	2021/09/08	94	60 - 140	102	60 - 140	103	%		
7561078	D8-Toluene	2021/09/08	107	60 - 140	105	60 - 140	93	%		
7562714	o-Terphenyl	2021/09/08	89	60 - 130	84	60 - 130	96	%		
7557735	Moisture	2021/09/02							4.5	20
7561078	Benzene	2021/09/08	93	60 - 140	105	60 - 130	<0.0060	ug/g	NC	50
7561078	Ethylbenzene	2021/09/08	90	60 - 140	97	60 - 130	<0.010	ug/g	NC	50
7561078	F1 (C6-C10) - BTEX	2021/09/08					<10	ug/g	NC	30
7561078	F1 (C6-C10)	2021/09/08	112	60 - 140	98	80 - 120	<10	ug/g	NC	30
7561078	o-Xylene	2021/09/08	91	60 - 140	100	60 - 130	<0.020	ug/g	NC	50
7561078	p+m-Xylene	2021/09/08	94	60 - 140	101	60 - 130	<0.020	ug/g	NC	50
7561078	Toluene	2021/09/08	96	60 - 140	106	60 - 130	<0.020	ug/g	NC	50
7561078	Total Xylenes	2021/09/08					<0.020	ug/g	NC	50
7562714	F2 (C10-C16 Hydrocarbons)	2021/09/09	95	50 - 130	92	80 - 120	<10	ug/g	NC	30
7562714	F3 (C16-C34 Hydrocarbons)	2021/09/09	94	50 - 130	92	80 - 120	<50	ug/g	0.87	30
7562714	F4 (C34-C50 Hydrocarbons)	2021/09/09	92	50 - 130	89	80 - 120	<50	ug/g	NC	30

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU
VERITAS

BV Labs Job #: C1P1753
Report Date: 2021/09/09

Agnico-Eagle
Site Location: MELIADINE
Your P.O. #: OL-1006009
Sampler Initials: RS

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Eva Pranjic


Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

BV Labs Job #: C1P1753

Report Date: 2021/09/09

Agnico-Eagle

Site Location: MELIADINE

Your P.O. #: OL-1006009

Sampler Initials: RS

**Exceedance Summary Table – Metal Mining Effluent Reg
Result Exceedances**

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						
The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.						

Appendix C: Meliadine Mine Wildlife Protection and Response Plan



AGNICO EAGLE

MELIADINE GOLD PROJECT

WILDLIFE PROTECTION AND
RESPONSE PLAN

VER: 8

JANUARY 2019

January 2019

Document Control

Version	Date (YMD)	Revised by	Section	Page	Revision
August 2012	2012/08/30	David Frenette	2.2.5, 2.2.9.4	7,12	Typo errors (page 7 and 12),
August 2012	2012/08/30	David Frenette	2.2.9.1	11	Precision on the report to send to the authorities during the caribou migration.
November 2012	2012/11/12	David Frenette	2.2.9.1	10	Removal of the 3 monitoring stations as requested by the GN.
June 2013	2013/06/12	David Frenette	App. A	31	Update of the Air Traffic Management Plan
November 2015	2015-11-15	Philip Roy / Jeffrey Pratt	2.2.1	8	Update speed limits
			2.2.7.2	11	Inclusion of wildlife mortality procedure MEL-ENV-0015
			2.2.8.1	12	Update steps for dispatching wildlife on the Meliadine project
			2.2.9	13-16	Comprehensive revision of section 2.2.9 - Protocol for dealing with caribou and muskoxen during their migration
			3.2.2.3	20	Environment department protocol for managing problem predatory mammals
December 2016	2016-12-23	Alexandre Gauthier / Jeffrey Pratt	2.2.9.2		Updated when to activate the work suspension protocol
			5.3.3		Included Bearwise training outcome
January 2018	2018-01-20	Alexandre Gauthier			Annual review
January 2019	2019-01-10	Martin Theriault	App. A and App. D	32	Annual review, Update of the Air Traffic Management Plan and the problem wildlife procedure



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SECTION 1 – INTRODUCTION

This plan proposes mitigation measures and monitoring initiatives to lessen the likelihood that wildlife will become habituated to the Meliadine site and its infrastructures. The plan identifies measures to deter wildlife from obtaining camp food waste, finding shelter around the site, gaining access to harmful substances present on the project site, being injured as a result of vehicle collisions, and damaging mine property.

Despite these mitigation measures, personnel may occasionally come into contact with wildlife that inhabits the Meliadine area. Incidents must be managed to keep both humans and wildlife safe while using only humane control methods.

Furthermore, all staff must be familiar with the standard operating procedures and best practices aimed at ensuring human-wildlife conflicts are minimized during the construction activities. All personnel, including contractors, on site have a role to play in ensuring human safety, conservation of wildlife and documenting wildlife activities in the mine area.

The plan also provides information on general human-wildlife conflict policies and regulations, species-specific response plans for ungulates and predatory mammals, and general wildlife awareness.



SECTION 2 – HUMAN-WILDLIFE CONFLICTS

2.1 Overview

Wildlife encounters can take many forms. A conflict occurs when either human or wildlife health, and/or safety are put at risk. Human health and safety can be affected by contact or conflict with wildlife in several ways, including direct or indirect physical injury, and exposure to animal diseases that can infect humans (i.e., rabies).

The most common conflict faced by wildlife is the increased risk of mortality from human encounters, which most often occur when wildlife become habituated to human activity and lose their natural fear of people. The most serious form of habituation is directly correlated to animals obtaining food, which is known as food conditioning. Food-conditioned animals become dependent on humans for sources of food. Because these human-induced habits become engrained in the animal, attempts to deter the habituated behavior generally fail with the end result usually being the death of the animal. Loss of habitat effectiveness (how the animal uses its available habitat), and effects to wildlife movement (how the animal travels through its available habitat) can also result from wildlife in conflict with human development. Ultimately, this will affect both the health and safety of the wildlife species involved. While it is impossible to remove all risk to both human and wildlife health and safety, approaches to minimize the risk do exist. Reactive measures do have their place in stopping the conflicts when they occur, but proactive strategies are the most effective means of preventing potential conflicts.

2.2 Agnico Eagle Policies and Regulations

The following summarizes the general rules regarding wildlife on the site and will form the basis of the Wildlife Awareness Orientation and Courses (see below).

Employees and contractors are advised to report all wildlife related activities in the vicinity of the Meliadine site to the Environmental Department.

2.2.1 General Restrictions for Wildlife Protection

The following are general restrictions for site workers and contractors, intended to minimize the potential for negative project-related effects (e.g., increased mortality risk) on wildlife in and around the site.

- Wildlife shall have the right-of-way except where it is judged to be unsafe to do so. All species of wildlife (i.e., from small mammals to large carnivores, songbirds to raptors) when encountered by personnel on foot or in vehicles will be given the right-of-way,
- Non-mine-registered firearms are not permitted on site,
- Feeding wildlife is prohibited at all times,
- Harassment¹ of wildlife is prohibited at all times at the Meliadine site,

¹ defined as to kill, injure, seize, capture or trap, pursue and includes to stalk, track, search for, or lie in wait for all purposes not authorized by the Environmental Department



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- The deliberate destruction or disruption of wildlife nests, eggs, dens, burrows, and the like, is prohibited at all times at the Meliadine site,
- Hunting and fishing is prohibited at all times at the site,
- Pets are prohibited at all times at the site,
- Maximum speed limit:
 - On all site roads is 40 km/h.
 - AWA 50 km/hr
 - 20 km/hr around buildings and infrastructure
 - Between camp and mine road is 10km/hr
- Traffic (including ATVs and snowmobiles) is restricted to designated roads and trails.

The site refers to any facility present during the construction and operation phase, including but not limited to, outbuildings (e.g., machine shop, offices), the portal, waste rock pads, parking areas, drill sites, access roads and borrow pits.

2.2.2 Wildlife Attractants

A list of potential wildlife attractants is provided below. The list is intended as a general summary of attractants but may not be comprehensive of all potential attractants.

- Food wastes and garbage;
- Chemicals (e.g., salt for drilling) and refuse (e.g., empty fuel containers);
- Wildlife carcasses (e.g., road kills, hunter kills);
- Human activity moving around the site; and
- Roads, which may create preferential travel corridors for wildlife, can lead to vehicle collisions and increased exposure to wildlife encounters at the site.

2.2.3 Garbage Management

General recommendations directed to minimize wildlife interactions related to food wastes and garbage is provided below.

- Littering is prohibited on and in the vicinity of the site and along access roads. All garbage (e.g. lunch bags) must be returned to temporary storage containers. Note: organic wastes (e.g., orange peels, apple cores, left over coffee, tea or fruit drinks) are included.
- Food related waste (including packaging) will be incinerated on a daily basis and general waste will be stored for disposal in the landfill and then buried.



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- Wastes associated with mechanical maintenance and repairs (e.g., motor oil and antifreeze) will be disposed of as per the Hazardous Materials Management Plan.
- All temporary (small) storage containers for food waste garbage (yellow bin) will be wildlife protective (i.e. have bear proof lids).
- No open top buckets or anything similar will be tolerated outside buildings.
- Feeding wildlife is prohibited at all times on or in the vicinity of the site, including during travel to and from the site on workdays.
- Wildlife incidents related to garbage or human food attractants will be reported as soon as possible. See Section 2.2.7 (Reporting Wildlife Observations and Incidents) for more information.
- Improperly disposed garbage, particularly food wastes will be reported as soon as possible.
- See Section 2.2.7 (Reporting Wildlife Observations and Incidents) for more information.

While arctic fox tends to be the greatest concern with respect to access to garbage, other animals (e.g., wolverines, wolves, grizzly and polar bears) may be attracted to uncontained garbage sources. Problem wildlife data at the Meliadine project to date, indicate that Arctic fox are the most likely species to be attracted to the site.

2.2.4 Wildlife Health

The following recommendations are intended to reduce potential mine-related effects on wildlife health (including non-vehicle related accidents and consumption of toxic substances).

- Feeding wildlife is prohibited at all times on or in the vicinity of the site, including during travel to and from the site. If caught feeding wildlife, employees will be subject to disciplinary action which could include dismissal.
- Company procedures on the safe and prompt clean-up of any chemical spills will be followed.
- See Meliadine Gold Project's Fuel Transportation and Spill Contingency Plan. Any observations of wildlife in and around potential sources of contaminants (e.g., fueling sites) will be reported. See Section 2.2.7 (Reporting Wildlife Observations and Incidents) for details.

2.2.5 Wildlife and Vehicles

The following recommendations are intended to reduce the incidence of wildlife-vehicle collisions and near misses.

- Wildlife has the right-of-way except where it is judged to be unsafe to do so.
- Obey all traffic signs.
- Maximum speed limit:



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- On all site roads is 40 km/h.
- AWAAR 50 km/hr.
- 20 km/hr around buildings and infrastructure.
- Between camp and mine road is 10kmph.
- Verbally report wildlife carcasses observed on and in the vicinity of the site, and along roads, as soon as possible. See Section 2.2.7 (Reporting Wildlife Observations and Incidents) for more information.
- Restrict traffic (including ATVs and snowmobiles) to designated access roads and trails.
- When clearing snow from roads, push the snow with a dozer or blow the snow away with the snow blower to avoid the build-up of snow banks on the side of the road.
- Report all wildlife-vehicle collisions that results in the death or injury of wildlife as soon as possible. See Section 2.2.7 (Reporting Wildlife Observations and Incidents) for details.
- A near miss between a vehicle and an animal should be reported as a wildlife 'incident'. See Section 2.2.7 (Reporting Wildlife Observations and Incidents) for details.

2.2.6 Wildlife and Buildings

The following recommendations are intended to reduce the risk of close encounters between wildlife and people

- Keep sea-can doors closed at all time to avoid wildlife using them as shelter.
- Open top bins and containers for food waste will not be permitted outside buildings.

2.2.7 Reporting Wildlife Observations and Incidents

2.2.7.1 Reporting Requirements of Project Workers and Contractors

- Workers and contractors are required to verbally notify the Environmental Department of the following wildlife observations or incidents as soon as possible.
 - Signs of animal presence (e.g., scat, nests, burrows) in close proximity (visible to the eye from within the site footprint frequented by workers).
 - Sightings of animals in close proximity (visible to the eye from within the site footprint frequented by workers).
 - Aggressive or unusual wildlife behaviour around site facilities.
 - Instances of workers feeding wildlife.
 - Instances of improper disposal of garbage or other waste materials.
 - Observed maintenance issues (e.g., improper placement or maintenance of garbage containers).
 - Instances of workers not following vehicle use guidelines (e.g. speed limits).
 - Vehicle collisions with wildlife or near misses.



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- Observations and locations of dead (e.g., road kill) or injured animals.

Following the verbal report of a wildlife incident or observation, the Environment Department will complete a Wildlife Incident Report and forward to the authorities as necessary. Wildlife fatality reporting will follow the Wildlife Reporting Protocol (MEL-ENV-0015). This can be found in Appendix B.

2.2.7.2 Reporting Requirements of Wildlife Occurrences

Wildlife Incident Reports provide essential information that may identify:

- potentially dangerous situations requiring intervention (e.g., problem wildlife);
- situations that require notification of the Nunavut Department of Environment (GN), KIA and/or the HTO;
- weaknesses in garbage-handling and problem wildlife prevention measures; and
- areas that may require warning signs (e.g., poor visibility road corners).

The Senior Environmental Coordinator or designate(s) should ensure that records of wildlife observations and incidents are thoroughly documented. Reports should attempt to include the following information wherever possible:

- Identification and number of wildlife observed;
- Specific timing and location of the observation(s);
- Details regarding the animal behaviour, including direction of approach and departure, what it was doing, any aggressive behaviour, etc.
- Assessment of local attractants, such as garbage, odours, movement of people, other wildlife, etc.;
- If local attractants are identified as a factor, determination of what steps were or will be taken to address/remove potential attractants; and
- Identification of any potential mitigation measures available to deter wildlife or limit access and how they will be implemented (refer to Section 2.2.8 for additional information on dealing with problem wildlife).

2.2.8 Protocol for Dealing with Problem Wildlife

A problem wildlife situation may arise when an animal acts in an aggressive manner and/or is a repetitive nuisance or threat to worker safety. See the problem wildlife procedure in Appendix D

2.2.8.1 Dispatching Problem Wildlife

1. Prior to dispatching any wildlife on site, the Environment Department will consult with the GN Wildlife Officer for advice/direction. If an animal is destroyed, a description of the lethal measures deployed



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(e.g., rifle), statement of the rationale for use of lethal measures (e.g., proximity to workers, repeated incidents, observed condition of the animal, etc.), and indication of what previous non-lethal measures were employed (e.g., deterrents, hazing, trapping and relocating (with permission from GN) etc.).

2. Written direction (email) from the GN Wildlife Officer must be obtained prior to dispatching any wildlife. The only exception is if there is an immediate threat to human safety (example carnivorous animal is attacking people) Only authorized personnel are permitted to use lethal and non-lethal projectiles (e.g., rubber bullets) see environment department for list of authorized persons on site.
3. Do not attempt to deal with a problem wildlife issue on your own. Problem wildlife can be dangerous.
4. Conform to recommendations regarding predator safety. All staff will receive wildlife awareness training during their orientation.
5. *An animal may be dispatched without consultation with the GN Wildlife Officer only if actions listed in 3.2.2.3 have been followed.*

2.2.9 Protocol for Dealing with Caribou and Muskoxen during their migration

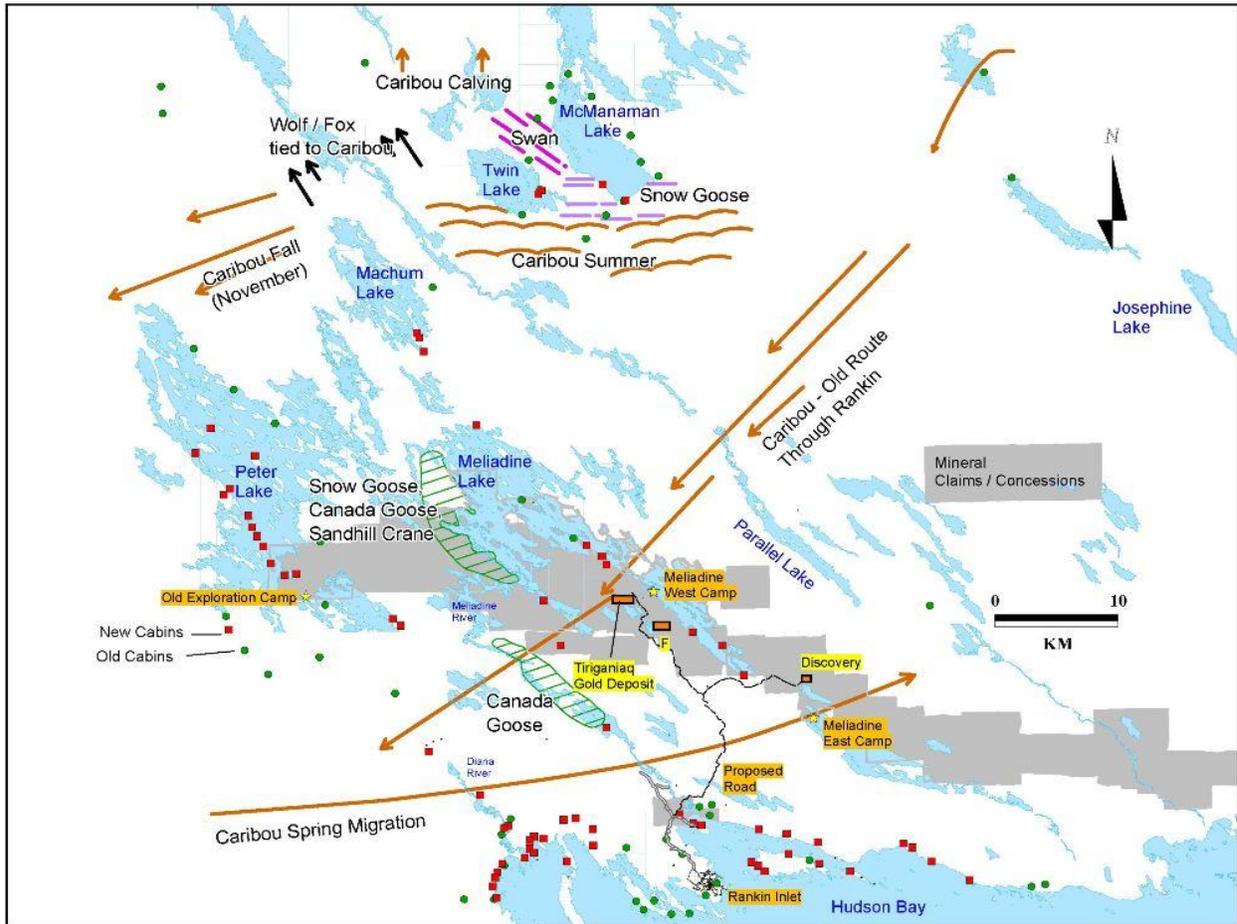
Results from baseline surveys indicate that caribou and, only recently, muskox are present in the Meliadine Area for parts of the four seasons, but caribou are observed in greatest abundance between May and September.

The baseline study established a map of historical wildlife presence in the region of the Meliadine project, including historical migration routes for the caribou. This map is shown in Figure 1.



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Figure: 1 Map of Historical Wildlife Presence in the region of the Meliadine Project



The protocol has 3 components:

- A caribou and muskox herd sighting and protection protocol.
- An activity shutdown protocol including crew change and helicopter flight control.
- An activity restart protocol.

2.2.9.2 Caribou and muskox sighting reporting and protection protocol

When the migration starts around the beginning of July, herds of 1000 to 5000 animals (or greater) can cross the area of Meliadine camp. For a period of 3 to 10 days, the caribou may be present around the site for the annual migration. Historically, migrations have been noted between October-December as well.

Studies of woodland caribou have demonstrated avoidance of up to 1 km for well sites and 250 m for roads and seismic lines (Dyer et al. 2001). Data from the Ekati Diamond Mine suggests that the instantaneous



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negative response (alert, stop feeding) of barren-ground caribou to stressors (e.g., truck traffic) increases within 1 km of the source (BHPB 2004).

During this period, Agnico Eagle will report any sighting and prevent human activities that could disturb the herd. Caribou will have the “right-of-way”, and will not be blocked or deterred from moving through the Project area.

AEM must take all possible measures to avoid disturbance to the caribou or muskox herd.

At all times, it's *strictly forbidden to harass wildlife*. This includes persistently worrying or chasing animals, or disturbing large groups of animals.

When observing herds of caribou or muskox:

Staff at Meliadine must report immediately the presence of caribou (50 or more) or muskox (10 or more) to the Environmental Department. The Environment Department will notify the KIA, HTO and the Government of Nunavut Environment Department electronically via a “Caribou Migration Alert” (Section 2.2.9.5)

When reporting the presence of the herd, the location and the approximate size of the herd will be specified.

When to activate the work suspension protocol:

During migration of Muskox (10 or more animals) or Caribou (50 or more animals) herds AEM must start implementing the work suspension protocol when the caribou herd is moving in the direction of the activities. In accordance with the IIBA, all off-site and on site-related activities must be stopped once the Herd is within 5 km radius of such activities. Those related activities include; off-site drilling and/or helicopter flight, approved development, construction site development, road traffic and construction; all site, camp, and mine outdoor surface activities. A decision tree was put in place in 2017 to have proper step to follow to activate the work suspension protocol.

2.2.9.3 Work suspension protocol (in this section we are only listing the activities – the actual stoppage protocol is in A) and B) below

The activities below could interfere with the caribou migration and will be suspended if necessary:

- Helicopter flights.
- Drill operations off site.
- Surface mining activities such as transportation to mining areas, non-essential refueling of equipment, service vehicle traffic, etc.
- Surface activities related to underground mining such as surface stockpiling of ore or waste with loaders, scoop trams, etc.



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- Surface construction activities such as approved pre-development and development construction, road construction, non-essential waste deposition, transportation of equipment, etc.
- Outside Camp activities.

Upon activation of the work suspension protocol, the following steps will be taken:

A. Drilling and Helicopter Activities Off-Site

- Inform all employees at the drill sites that are in the direction of the caribou migration and within 5km radius of the migration that they will need to shut down the operations such that the drills and associated helicopter flights can cease as quickly as possible.
- Shutdown will include removal of drill rods from the holes and securing of the drill station.
- Organize transport of the affected personnel to the camp. Personnel that do not require air or road transportation will be requested to walk back.
- During helicopter transport of personnel, the Air Traffic Management Plan (in appendix A) will be applied to protect the caribou herd (avoidance distance of 1,000 m vertical and 1,500 m horizontal).

B. Surface Mining and Construction Activities On Site

- Surface mining, construction activities, outside camp activities and surface activities related to underground mining as described in Sec 2.2.9.3 above will be stopped when caribou migration herds or muskox herds are within the 5km radius stop work buffer zone.
- All personnel in such cases will return to camp if necessary.
- Use of helicopter for emergency evacuation of personnel for medical reasons will still be allowed.

2.2.9.4 Road utilization

- For a group of caribou (≥ 50) or muskoxen (≥ 10) within 100 m from the AWAR road and Meliadine Camp Access road:
 - Regular vehicle traffic for transport to and from the site will be suspended and /or stopped to allow Caribou herds to cross the road.
 - Wildlife has the right of the way and vehicles must wait without disturbing their movements.
 - The use of the road for mining or construction related activities will cease until Caribou or musk ox herds have moved outside the 5km radius stop work buffer zone.

2.2.9.5 Activity Restart Protocol – Caribou Migration Alert



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- AEM Meliadine Environmental personnel will perform a ground based caribou or muskox survey 3 times per day during the migration. The survey will determine the distance to Meliadine on and off site. The location will be marked on a map depicting the 5km radius buffer zone and the location of the caribou or musk ox herd. As stated previously, all mining related work will cease within the 5km radius stop work buffer zone. Mining, drilling and construction activities as well as the camp will be referenced on the map. Surveys will be conducted,
 - Morning
 - Lunch
 - Evening
- Once the survey is completed, a map noting the herd and proximity of any mining, drilling and construction activities as well as a report containing the following information will be forwarded to all Meliadine Departments, Contractors, KIA, GN, and the local HTO:
 - Where the herd(s) have been observed.
 - Estimated number of animals in the area.
 - Where activities can resume.
 - Where activities are suspended.

This will be referred to as a “***Caribou Migration Alert***”

- No work will resume in a suspended/stop work zone until the next survey can verify that the herds are outside the 5km radius zone. An example of a Caribou Migration Alert can be found in Appendix C



SECTION 3 – SPECIES-SPECIFIC RESPONSE PLANS

3.1 Purpose

Response plans specific to species groups (i.e., ungulates and predatory mammals) are required to ensure that all personnel at the Meliadine site are provided guidance on how to respond in a manner that is safe to both humans and wildlife should they encounter wildlife on or around the project site.

3.2 Species Groups Addressed

Ungulates (caribou and muskoxen) and predatory mammals (polar and grizzly bears, wolverine, wolf and Arctic fox) have the highest potential for interactions with humans during the life of the mine, and thus require specific response plans. If other wildlife is encountered, adaptive management strategies will be implemented if mitigation techniques and the mine policies and regulations mentioned in this document are not effective for these species. The proposed wildlife monitoring program will be the best measure of identifying potential areas in need of new mitigation strategies, or changes in policies or regulations.

For each of the species groups described below, the seasonal activity in the project area is discussed, as well as the protocol in the event of an encounter.

3.2.1 Ungulates

3.2.1.1 Seasonal Activity in the Project Area

Results from baseline surveys indicate that caribou and, only recently, muskoxen are present in the Meliadine area for part of the four seasons, but caribou are observed in greatest abundance in the spring (e.g., July) when thousands of animals may be present in the vicinity of the Meliadine site. This only occurs annually.

3.2.1.2 Response to Encounters

3.2.1.2.1 Caribou

It is extremely rare for humans to have physical altercations with caribou. Caribou rut in the fall when relatively low numbers can be found from time-to-time on the site and the levels of aggression displayed, particularly by males, increases substantially. There is literature suggesting that a bull caribou may attack a person or vehicle during the rut. Therefore, a close encounter with caribou (during the fall) or muskoxen could be dangerous.

If you encounter a single or herds of caribou, the following actions should be taken:



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- Back away slowly;
- Ensure animal(s) have an escape route;
- Do not make sudden movements;
- Do not make loud noises or attempt to scare the animal(s);
- Use radio/satellite phone to report presence of the animal(s) to the Environmental Department;
- Stay in radio/phone contact until the animal(s) moves away or you have returned to a safe area;
- (e.g. inside vehicle or building); and
- Wait for the animal(s) to pass before continuing work in the area.

3.2.1.2.2 Muskox

Although considered rare, muskoxen will charge humans if they are threatened (especially lone bulls). Being a sedentary species, the muskoxen will have the tendency to stand their ground when threatened, defending their territory or their young.

If you encounter a single or herds of muskoxen the following actions should be taken:

- Back away slowly;
- Ensure animal(s) have an escape route;
- Do not make sudden movements;
- Do not make loud noises or attempt to scare the animal(s);
- Use radio/satellite phone to report presence of the animal(s) to the Environmental Department;
- Stay in radio/phone contact until the animal(s) moves away or you have returned to a safe area
- (e.g. inside vehicle or building); and
- Leave the area and wait for the animal(s) to go away before continuing work in the area.

3.2.2 Predatory Mammals

3.2.2.1 Seasonal Activity in the Project Area

Polar and Grizzly Bear

Baseline surveys indicated limited use of the Meliadine study area by grizzly bears, which is consistent with what would be expected for grizzly bears in the north, given their wide-ranging habits and low densities. Polar bears are more commonly seen of late. **These are extremely dangerous under all circumstances as they are known to prey on humans. Get help immediately if you see a polar bear.**



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Wolverine

Wolverines are thought to occur in the project area on an infrequent basis. Records of wolverine sightings or their sign were not found since baseline studies began in 1998. Similar to grizzly bears, the limited evidence for wolverine in the area is not surprising given their wide-ranging movements and characteristically low population densities.

Wolf

A single wolf was seen one time during the years of baseline studies. They are not common in the study area.

Arctic Fox

Camp personnel have regularly observed Arctic foxes in and around the Meliadine site during most months of operation, including winter. Arctic foxes are the most common predatory mammal species to be encountered at the Meliadine mine.

3.2.2.2 Response to Encounters

Predatory mammals such as wolves, wolverine, arctic fox and bears rarely attack people; however, they are extremely strong and vicious, and should be given respect. **Polar bears are known to attack humans.** Members of the dog family (such as wolves and foxes) are more at risk of carrying rabies, and other zoonotic diseases, and therefore should be avoided. Arctic fox in particular is easily tamed, quickly losing their fear of humans and often approaching very close. Sick or injured animals may no longer be able to feed themselves, and could be in a state of starvation. Often they show few physical signs that something may be wrong, but typically act more aggressively or even 'friendly' towards humans. Therefore, a close encounter with a predatory mammal could be dangerous. All bites and scratches from wildlife should be reported immediately to Health & Safety since animals can be vectors for rabies.

If you encounter a predatory mammal, the following actions should be taken:

- Back away slowly and do not turn your back on the animal;
- Do not make sudden movements;
- Do not make loud noises or attempt to scare the animal if it is simply traveling through the area;
- Use radio/satellite phone to report the presence of the animal to the Environmental department;
- Stay in radio/phone contact until the animal moves away or you have returned to a safe area. (e.g. inside vehicle or building); and
- Wait for the animal to pass before continuing work in the area.



If the predatory mammal does not back away, or shows interest in you:

- Continue to back away slowly and ensure a 10 m distance between yourself and the animal;
- Make sure the animal has a safe route of escape;
- Make noise to alert the animal of your presence or to scare it off;
- Avoid provoking it;
- Return to a safe area as soon as possible (e.g. inside a building or vehicle); and
- Keep the Environmental department informed of situation using the radio/phone.

If the predatory mammal still does not back away, call for deterrent action by the Environment

Department

The Environment Department is to treat all predatory mammals that are threatening or aggressive as they would treat a grizzly bear or polar bear, which are perceived to be most dangerous. All predatory mammals that are showing interest in a person or site facilities must be aggressively deterred to prevent habituation to the site. Detailed response recommendations are provided in Section 3.2.2.3 below. If an animal is not of an immediate safety concern, the Environment Department should discuss options to deter or remove the animal with Government of Nunavut conservation personnel.

3.2.2.3 Environment Department Protocols for Managing Problem Predatory Mammals

As part of the detailed response plan, the Environment Department will follow the procedures included here when responding to predatory mammal sightings and encounters. It is assumed that the reporting person(s) has followed procedures for predatory mammal incidents, and has requested the Environment Department to be dispatched due to the failure of human presence to deter the predatory mammal. If an animal is not of an immediate safety concern, the Environment Department should discuss options to deter or remove the animal with Government of Nunavut conservation personnel. All wildlife problems are to be recorded in the wildlife database.

The Environment Department will:

- Collect all deterrent equipment and receive briefing from the Senior Environmental Coordinator or designate on location and circumstances of the call.
- When firearms are to be used there will always be two individuals, one person with a firearm (12 gauge) for deterrent use, the other as back up having a rifle with lethal force or a 12 gauge with lethal rounds. No lethal force will be taken without consent from the Senior Environmental Coordinator or designate in conjunction with the consultation of the Government of Nunavut Wildlife Officer unless the situation is deemed to be life threatening.



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- The appropriate action, usually less than lethal deterrent, will be chosen and used in an effort to scare the predatory mammal away.
- If the deterrent is successful, the incident will be recorded in the Wildlife database and should detail the type and level of deterrent used, information on the predatory mammal involved, and all information on the circumstances leading up to the incident.

If the deterrent is not effective and the predatory mammal continues to approach or doesn't move away from the area of human activity or project footprint.

- Increase deterrent efforts to less than lethal projectile (rubber bullet) if not already being employed.
- Ensure the animal has an open escape route.
- Continue aggressive use of less than lethal projectile deterrents to try and chase the animal away.

Dispatching

All but the most aggressive animals should have been deterred at this point. If the situation escalates further the Senior Environmental Coordinator, Superintendent or designate must be contacted and made aware of the situation. No Further action will be taken until consultation with the GN Wildlife Officer has been completed.

NO LETHAL ACTION WILL BE TAKEN UNTIL CONSENT IS GIVEN BY GN WILDLIFE OFFICER.

The following will be determined by the Environmental Superintendent or designate in conjunctions with the H&S Superintendent and the Mine Manager or designate; any and all possible actions will be taken to communicate with the GN wildlife officer prior to making an internal decision.

The risk to human life or property is imminent since the predatory mammal has not responded to non-lethal deterrent options and the safety of the team or site property is now compromised.

- Shoot with the intention of stopping the threat, using buckshot or 1-ounce lead slugs or with the .300 calibre rifle as appropriate, to kill the animal.
- Shots should be aimed at the chest area, not the head or hind quarters.
- If lethal force has been used, the Environment Department must complete a full report detailing the event immediately.
- The GN conservation officers will be notified by phone. Direction will then be given to properly dispose of the carcass.
- Any wildlife showing signs of rabies will be dispatched (never shot in the head) and reported.

NOTE: Lethal action against any wildlife without consent from the GN Wildlife Officer can result legal ramifications. As well, unnecessary deterring of wildlife can be considered harassment and can also result in legal ramifications. The only exception is if there is an immediate threat to human safety (example carnivorous animal is attacking people), however even at this point approval from Environmental Superintendent or designate in conjunctions with the H&S Superintendent and the Mine Manager or designate must be obtained.



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Any AEM employee who does not follow the above mentioned steps **will be** subject to disciplinary measures.



SECTION 4 – WILDLIFE AWARENESS INFORMATION AND ENCOUNTER STRATEGIES

This section deals with general predatory mammal (ie. Wolves, wolverines, grizzly bears and polar bears) awareness information and encounter strategies. It does not replace the need for all personnel to take a recognized wildlife awareness course.

4.1 Factors that Influence a Predatory Mammal's Reaction

Wolverines, wolves, grizzly bears and polar bears will react differently to chance encounters with humans, depending upon many factors, including each animal's past experience with humans. Their reaction is difficult to predict because of the variability of factors with each encounter.

- Female mammals may aggressively defend her young (for example, female bears with cubs are more likely to attack than to flee).
- Wolverines or bears may defend a food cache (for example, a bear's main objective is to eat from the time it leaves its den to the time it returns to a winter den. Hunting bears will cache food after eating part of it by covering the food with dirt, branches or leaves. They will often establish a daybed nearby and return later for another meal). Animals will aggressively defend their food cache.
- Individual Space: All predatory mammals have a minimum distance surrounding them within which any intrusion is considered a threat. A cornered or surprised predatory mammal may be dangerous. If there is no cover to retreat to, their usual response to danger is to attack or to stand its ground.
- Old, wounded or predatory mammals with teeth malformations can be dangerous because they are very hungry or starving (e.g. wolves observed at the Meadowbank site in 2009)
- Wolverines, wolves, artic fox and bears are easily attracted to human food sources and may become aggressive to obtain it. Predatory mammals that have obtained food from humans become "human food habituated." These mammals are accustomed to humans and link people as sources for obtaining food.
- Young animals which are inexperienced hunters and/or recently weaned are also at a greater risk to take advantage of human food source opportunities.



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4.2 Animal Encounters

Most of animal safety is prevention – avoiding an encounter is the best way to stay safe while working in the home ranges of arctic fox, wolverines, wolves, and grizzly bears. Polar Bears are incidental to Meliadine as they wander inland from the shoreline in search of food. **Polar bears are extremely dangerous and help should immediately be sought.**

4.3. How to React to Animal Encounters

Your reaction should depend on circumstances and the behavior of the mammal.

1. Stop and assess the situation before you act.
2. Does the wolverine, arctic fox, wolf or bear know you are there?
3. How is the animal reacting to the nearby activity?
4. Remain calm.
5. Do not turn your back on the animal.

DO NOT RUN – You will trigger the animal’s natural response to chase you. Wolverines, wolves and bears are extremely fast and you cannot outrun them.

Some Simple Rules:

- Respect them – they can kill you.
- Be alert at all times.
- Watch for signs.
- Make noise – don’t surprise animals.
- Travel in groups when possible.
- Be cautious in noisy areas (streams).
- Know the types of areas animals use during the year.
- Do not approach them.
- Never feed them.
- Get trained and carry deterrents.
- Remember carcass equals danger – look for ravens, strong odours.
- Mentally rehearse encounters.



4.3.1 Specific situations: Animal Encounters

Wolverine, wolf, or bear is not aware of you:

- Leave the area quietly in the same direction that you came from.
- Move while the predatory mammal is not aware of you and stop moving when the mammal lifts its head to check its surroundings.
- Stay downwind so the wolverine, wolf or bear will not pick up your scent.
- When you have moved a safe distance away and preferably to your truck or shop where you can watch and wait until the predatory mammal leaves.
- Report event to Environmental department immediately

If the wolverine, wolf or bear is unaware of you and approaching:

- Allow the mammal the right of way. Make sure there is a safe escape route and that you are not in the way.
- Return to vehicle or building when available or allow animal a wide berth.
- Report event to Environmental department immediately.

If you cannot leave undetected:

- Move upwind so animal can pick up your scent; this will help them identify you as human.
- If possible, try to keep the predatory mammal in your sight.
- Watch to see if the predatory mammal leaves when it smells that a person is nearby.
- Report event to Environmental department immediately.

If the wolverine, wolf or bear is aware of you but in the distance:

- Continue walking at the same general pace and towards a safe area (vehicle or building).
- **DO NOT RUN.**



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The wolverine, wolf or bear is aware of you and close:

- A predatory mammal will feel threatened in a close confrontation. Generally, their natural tendency will be to reduce or to remove the threat. Assist the wolverine, wolf or bear by acting as non-threatening as possible.
- Do not make direct eye contact.
- Do not make any sudden moves.
- Do not run.
- In the case of a bear, they need to identify you as a person, so talk in low tones and slowly wave your arms over your head.
- Attempt to give the wolverine, wolf or bear an opportunity to leave. Be sure they have an open escape route.
- Try to back away slowly.
- If the mammal begins to follow you, drop your jacket, or pack or some other article (not food) to distract the wolverine, wolf or bear. This may distract the bear long enough for you to escape.
- Report to Environmental department immediately

The wolverine, wolf or bear is close and threatening:

- If you have a deterrent such as a bear banger or bear spray be prepared to use it depending on how close the predatory mammal is.
- If you do not have a deterrent, or if using the deterrent is not successful, act as non-threatening as possible.
- Talk to the predatory mammal in a calm authoritative tone of voice.
- Do not startle or provoke the predatory mammal by making sudden moves.
- Back slowly away from the wolverine, wolf or bear and drop a pack, jacket, or some other article in order to distract the mammal momentarily.
- Remember that the wolverine, wolf or bear may be defending their cubs that you have not yet seen or they may have a food cache nearby. Attempt to look as non-threatening as possible.
- Report to Environmental department immediately

The wolverine, wolf or bear is very close and approaching:

A distance of less than 50 meters in an open area is considered very close.

- If the predatory mammal continues to approach use your deterrent when in range.
- If the predatory mammal does not respond to the deterrent you must now **STAND YOUR GROUND!**
- Report to Environmental department immediately



The wolverine, wolf or bear charges:

In the case that you have done something that has provoked the wolverine, wolf or bear into showing signs of aggression towards you. It is often not clear to the person what they have done to provoke the mammal until after the attack. It is important that you act passively, humble your posture and do not look directly at the wolverine, wolf or bear. Always keep the mammal in sight. Never yell or throw things as these are obvious signs of aggression

When faced with a charging wolverine, wolf or bear:

- First use your deterrent, either a banger or pepper spray. If authorized (only Environment Department representatives or local security personnel) to carry a firearm, shoot the predatory.
- **DO NOT PLAY DEAD IF THE PREDATORY MAMMAL CONSIDERS YOU FOOD.**
- You must defend yourself with whatever means are available, act aggressively towards the bear.
- Stand up on something high and try to make yourself look bigger. Try to appear dominant. Try to frighten it. Yell, scream, shout and wave your arms. Jump up and down and fight back.
- Hold your jacket or backpack over your head to make yourself look bigger
- If being aggressively attacked in a predatory attack, fight back. Concentrate your efforts on the face, eyes and nose of the bear. Use whatever means you have, rocks, sticks, tools, hardhat, or simply kick and punch with all the strength you can muster.
- Report to Environmental department immediately

There are two types of bear attacks

Provoked Attacks:

- You have done something that has provoked the bear into showing signs of aggression towards you. It is often not clear to the person what they have done to provoke the bear until after the attack.
- It is important that you act passively, humble your posture and do not look directly at the bear. Always keep the bear in sight.
- Lie down on the ground in the prone position (i.e. play dead as this is a sign of submission to the bear and shows the bear that you are no longer a threat to them).
- Never yell at the bear or throw things at the bear, these are obvious signs of aggression towards the bear.
- Report to Environmental department immediately

Predatory Attacks:



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- The bear is hunting or stalking you! You are being treated as potential food. **DO NOT PLAY DEAD IF THE BEAR CONSIDERS YOU FOOD**
- You must defend yourself with whatever means are available, act aggressively towards the bear. Stand up on something high and try to make yourself look bigger.
- Try to appear dominant. Try to frighten the bear. Yell, scream, shout and wave your arms. Jump up and down and fight back. Hold your jacket or backpack over your head to make yourself look bigger.
- Use your deterrent; either a banger or pepper spray.
- If deterrent is unsuccessful. only as an absolute last resort, and If authorized to carry a firearm, shoot the bear.
- Report to Environmental department immediately

4.4 Wildlife Deterrents

4.4.1 Noise

- Pyrotechnics, including bangers, screamers, whistlers and flares. Requires a magazine launcher.

4.4.2 Wildlife chemical Deterrents

Bear Sprays are highly effective but they must be used correctly to be effective. As with all deterrents they have their good points and their bad points.

- The main ingredient in bear spray is “Capsicum” an extract from hot peppers.
- Capsicum needs to strike the eyes, nose or mouth of the mammal, (open membranes) to be effective.
- These sprays can only be used at very close range, 3 to 8 m or 10 to 25 ft.
- You cannot discharge the bear spray too early – or it will be completely ineffective.
- If the predatory mammal comes within the range of the bear spray – aim directly into their face and spray.
- You must be aware of the wind direction. If you the wind is blowing towards you, the spray will be carried by the wind into your face.
- Bear spray may not be effective in sub-zero weather. (Spray cans do not fire well in very cold temperatures.) In colder weather you need to keep the can of bear spray warm in order for it to fire effectively.
- Bear spray will not be effective in the rain. When you fire a can of bear spray, the spray will create a billowing cloud of capsicum and propellant. Rain can/will wash the spray right out of the air before it strikes the bear in the face.
- If you have used your can of bear spray to deter a mammal, wash the nozzle off with soap and water to remove the scent. Replace your can of spray as soon as possible. You do not want to have another bear encounter with a half a can of spray left.
- Bear sprays have a shelf life. Always replace your bear spray when you are nearing the end of the shelf life. The Capsicum does not deteriorate over time; it is the canister seals that deteriorate over time.



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- Do not test your can of spray before going out into the field. You need to take a full can of spray into the field, not a partially used one.

Wildlife chemical deterrents are only to be used for the purpose they are intended for. Misuse of wildlife deterrents such as chemical sprays, bangers, and pyrotechnics is considered a criminal offence.



SECTION 5 – TRAINING PROTOCOL

5.1 Scope

The Wildlife Training Protocol outlines recommended levels of training that specific groups of people at the Meliadine division site should receive. It is important that human activity at the site does not result in wildlife encounters that put people or wildlife at risk. All personnel on site have a role to play in ensuring human safety, conservation of wildlife, and documenting wildlife activities in the project area.

5.2 Assumptions and Key Considerations

Meliadine will assign overall accountability, recording and reporting responsibility to the Senior Environmental Coordinator or designate(s).

The Senior Environmental Coordinator or designates (s) will be responsible for ensuring that all employees, contractors and visitors at the Meliadine Division receive wildlife training appropriate to their roles and responsibilities.

The Environment Department will be responsible for all deterrent action whenever it is necessary to deter wildlife from mine infrastructure or personnel. All members of the Environment Department will receive specialized training in various levels of deterrent use. Security personnel and the Environment Department will be the only onsite personnel to have access to a firearm.

5.3 Training

Mandatory wildlife awareness for all staff will be included in the site induction, toolbox meetings, and through print media.

5.3.1 Wildlife-Human Conflict

- General restrictions for wildlife protection.
- Wildlife Attractants.
- Garbage Management.
- Wildlife Health.
- Wildlife and Vehicles.
- Preventing Problem Wildlife.
- Dealing with Problem Wildlife.
- Reporting Wildlife Observations and Incidents.



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5.3.2 Wildlife Awareness Training

This training will be aimed at providing awareness of potential wildlife encounters that may occur at the Meliadine Project. The course should review:

- Wildlife that commonly occur near the site.
- Behavior of wildlife that may be encountered near the site.
- Wildlife encounters.
- Wildlife Deterrents.

5.3.3 Environment Department

In addition to the required site orientation, the Environment Department may require additional training. The following training is recommended, especially for those without experience in situations where wildlife occurrences are common.

Bear Safety Training

Provided by qualified contractor or Territorial, Provincial or Federal Wildlife Officer, this course will provide:

- Instruction on the use of lethal and non-lethal deterrents for emergency response to bear incidents;
- Techniques for euthanizing bears during an emergency response;
- Other types of deterrent options available in non-emergency situations;
- In depth aversive conditioning techniques; and
- Practicum.

The Meliadine environmental Department and workers depicted on the MEL-ENV-0007 Use of Firearm procedure have all been trained by the Bearwise trainer; Andy McMullen in 2016 and 2017.

A Bearwise audit of Meliadine site was completed in 2016 and significant improvements were realized compare to 2012. The report mentioned that Meliadine site had developed effective and practical solutions to challenges as they arose over time. The efforts of all departments and employees to make the Meliadine operation safe for both people and wildlife are to be commended.

Carnivore Safety Training

Provided by qualified contractor or Territorial, Provincial or Federal Wildlife Officer to include:

- Biology, ecology and behavior of wolverine, wolf, Arctic fox;
- Rabies and other zoonotic diseases;
- Detailed deterrent and aversive conditioning techniques;



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- Instruction on the use of lethal and non-lethal deterrents for emergency response to incidents involving large carnivores; and
- Practicum.



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Appendix A – AIR TRAFFIC MANAGEMENT PLAN



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DATE: April 10, 2018

TO: All helicopter and fixed wing aircraft pilots operating near the Meliadine site

RE: Air Traffic Management Procedure

FROM: Environment Department

Please be advised that AEM is required to implement an air traffic management procedure in the immediate vicinity of the Meliadine Project. The primary objective of this procedure is to minimize to the greatest extent possible all potential impacts to wildlife from low flying aircraft and helicopters.

AEM asks that all pilots of helicopter and fixed wing aircraft abide this procedure when flying to/from the Meliadine Project or in the vicinity of the project area wherever possible (from a safety perspective).

- For long-range transportation flights (i.e. to and from Rankin Inlet), we ask all pilots to follow a practice that sees the aircraft fly at a minimum of 650 m above ground level. Exceptions may exist during takeoff and landing, low-level ceiling conditions, high winds, or other risks to flight safety.



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- For relatively shorter transportation flights, we ask that all pilots follow a practice that sees all aircraft (including helicopters) flying at a minimum of 300 m above ground level. Exceptions may exist during takeoff and landing, low-level ceiling conditions, high winds, or other risks to flight safety.
- The Environment Department must be notified if caribou, muskox or other animals are within 1 km of the landing area. The pilot should establish a radio contact on the Meliadine designated camp aircraft frequency and request that the camp radio operator call out the wildlife team to herd animals away from the strip/pad before landing.
- At remote landing areas, we ask that helicopters not land within 1 km of individual or large aggregations of wildlife.
- We ask that when flying over observed large concentrations of caribou (50 or more individuals in close proximity to one another), large concentration of muskoxen (10 or more individuals) or large concentration of migratory birds, to respect a 1,100 m vertical and 1,500 m horizontal distance from the herd whenever possible. We ask that all pilots avoid helicopter flights over known areas of raptor nests, snow geese during their moulting period (from July to August), waterfowl and shorebird staging areas during critical seasons (when birds are present –spring and summer months). The Environment Department can and should inform pilots of these areas. If maintaining this altitude is not possible, maintain a lateral distance of at least 1,500m from key sites.
- Harassment of wildlife (flying below 300 m), especially grizzly bear, muskoxen, caribou, wolves, and wolverine, is expressly forbidden. Exceptions exist only in the rare instance the animal(s) poses an immediate danger to a person in the field.
- Please report any wildlife sighting to the environment department.
- The Iqalugaarjuup Nunanga park is located between the Meliadine camp and Rankin Inlet. To minimize impact on the wildlife and the park's visitors, the pilots shall avoid to flight over or to land in the vicinity of the park. Emergency flights, specifically medical evacuation flights and/or search and rescue overflights are excepted from adherence to this requirement.

Please be also advised that AEM is required that a daily log or record of flight paths and cruising altitudes of aircraft within all Project areas is maintained and made available for regulatory authorities such as Transport Canada to monitor adherence and to follow up on complaints.



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Thank you for helping AEM protect the natural resources of Nunavut and for helping demonstrate that mineral exploration and mining can co-exist with the wildlife and population without causing a significant adverse impact.

Pilot name :

Date:

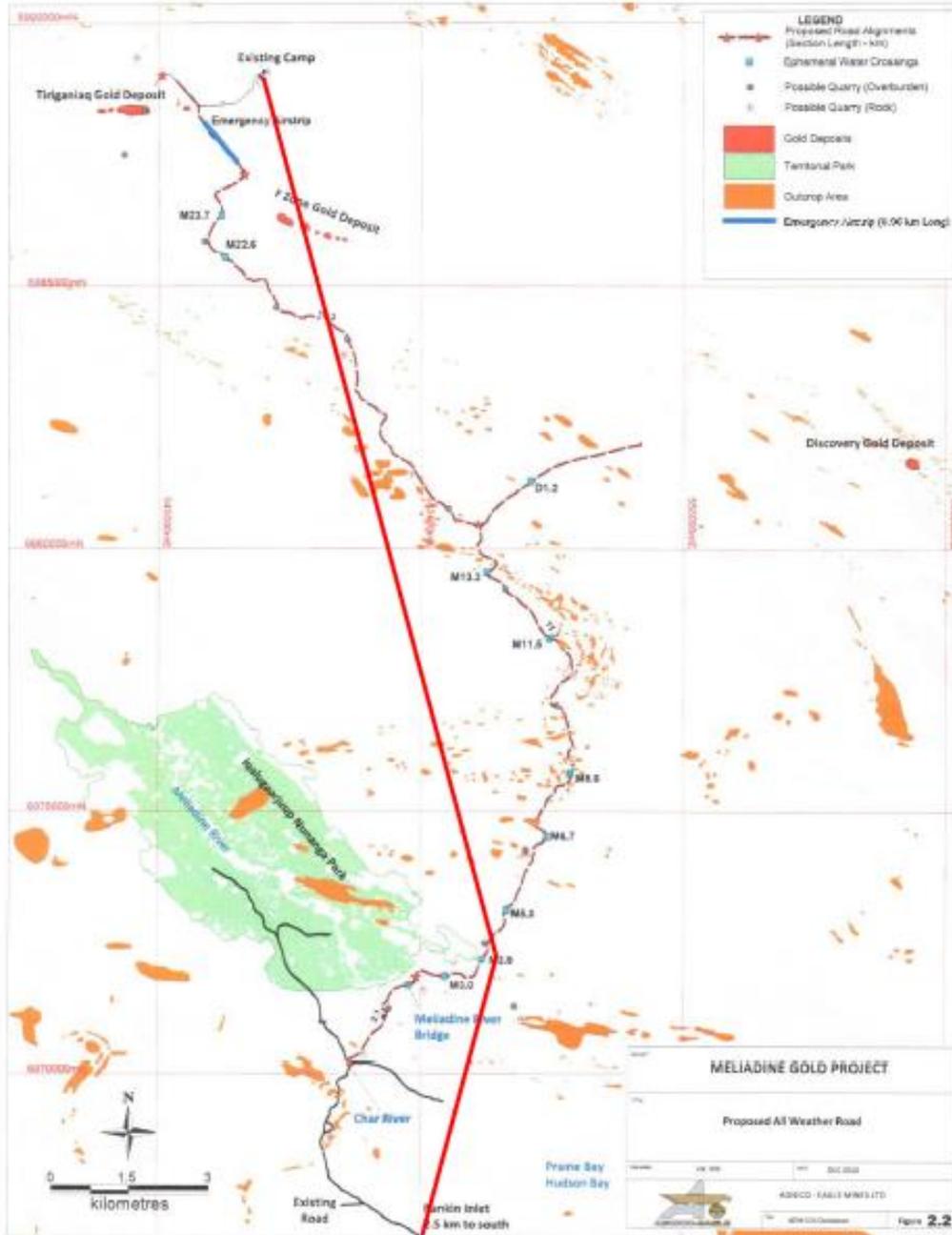
Signature:

Agnico Eagle Mines Ltd. Exploration division



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Air traffic path between Rankin Inlet and Meliadine camp



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Appendix B – MEL-ENV-0015





DOCUMENT ID: MEL-ENV-Wildlife reporting

People concerned: Meliadine Environment Dept.

Effective Date: 2018-03-08

This procedure corresponds to the required minimum standard. Each and everyone also have to comply with the rules and regulations of the Nunavut Government in terms of health and safety at work.

Rev #	Date	Description	Initiator
1	2018-03-08	Change to intelx template	Alexandre Gauthier
2	2018-03-27	Review	Matt Gillman

Objective:

- To ensure that the Meliadine site follows the proper procedure for reporting Wildlife fatalities, to uphold the IIBA agreement and Management plan obligations.

Definitions (If applicable):

- None



Tool/Equipment Required	PPE Required
<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None

Specific Training Requirements
<ul style="list-style-type: none"> None

<ol style="list-style-type: none"> 1. Upon receiving information of a wildlife fatality or upon observing a wildlife fatality during an inspection; a Problem Wildlife Report shall be generated. A blank report form can be located at \\Camefs02\groups\Environment\WILDLIFE\Wildlife Reports\Form\2016 AEM Meliadine Problem Willidfe Report template V 1xls.xls 2. The carcass of the animal should then be moved to a location that will not attract carnivorous' animals, for the interim. 3. At this point, the GN wildlife officer in Rankin Inlet will need to be contact via telephone for a verbal report and to receive direction on how the carcass will be disposed of. Please follow procedure MEL-ENV-0021 located at:\\Camefs02\groups\Environment\MANAGEMENT PLANS & PROCEDURES\Procedures\MEL-ENV-0021 - Problem Wildlife Procedure\MEL-ENV-0021 - Problem Wildlife Ver1.pdf 4. Upon receiving direction from the GN wildlife officer on disposal or transfer method, follow through with directions given. Add the disposal or transfer method to the report generated in step #1. 5. The report can now be sent for review by SR. Coordinator Compliance Counselor.



6. Upon review a final version can be made and saved in PDF. The PDF should now be sent to the Compliance Counselor for distribution to GN, KIA, and HTO. As well a copy should be saved for the annual report.

Related Documentation (If applicable):

- Wildlife management plan

References (If applicable):

- None



Appendix (If applicable):
<ul style="list-style-type: none">• None

Authorization (Print Name)	
Approved: _____ Name JOHSC Worker Rep.	Date: _____
Approved: _____ Name Department Superintendent / Delegate	Date: _____
Approved: _____ Name Health & Safety Superintendent / Delegate	Date: _____

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Appendix C – MIGRATION ALERT



2016-07-09 (12h00) Meliadine Caribou Situation

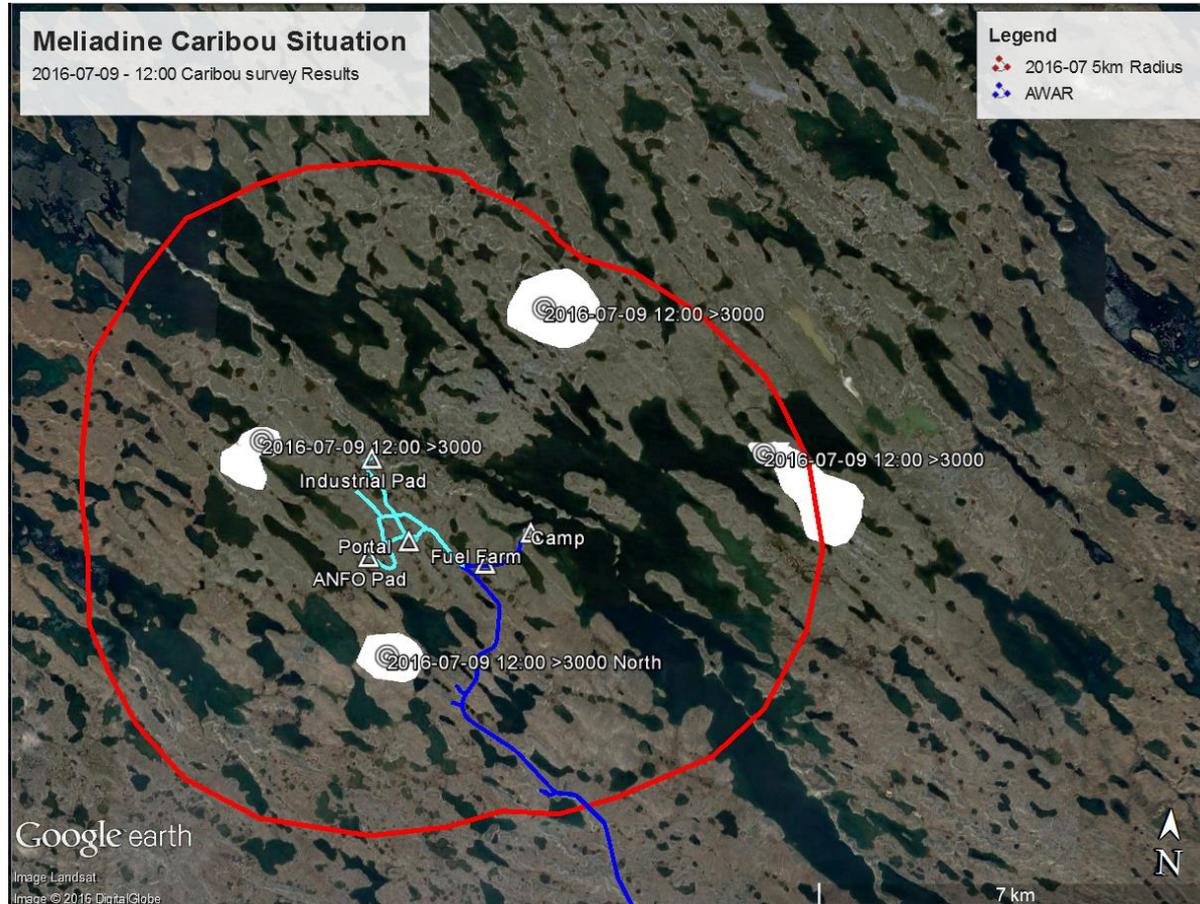


Figure 1: Caribou survey, results for July 9th 12h00. 4 groups over 3000 caribou have been observed going within the 5 km protection zone

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Appendix D – MEL-ENV-0021



DOCUMENT ID: MEL-ENV-Problem Wildlife

People concerned: Agnico Eagle employees, contractors, visitors on the Meliadine site

Effective Date: 2018-11-13

This procedure corresponds to the required minimum standard. Each and everyone also have to comply with the rules and regulations of the Nunavut Government in terms of health and safety at work.

Rev #	Date	Description	Initiator
1	2018-03-09	Change to intellex template	Alexandre Gauthier
2	2018-03-27	Review	Matt Gillman
3	2018-11-13	Communication for Polar Bear observation and required equipment	Martin Theriault

Objective:

- To define the procedure which must take place when dealing with problem wildlife on the Meliadine mine site and associated facilities.
- Problem Wildlife: any wildlife that; have entered buildings or structures, have shown signs of aggression towards employees or equipment, are showing signs of human habituation.
 ***Any large predators observed on the Meliadine site should be treated as potential “problem wildlife”

Definitions (If applicable):

The following procedure is to mitigate the risk of conflict between employees and wildlife at the Meliadine site and to ensure that all actions regarding problem wildlife are done in accordance to our Wildlife Management Plan and that the GN Wildlife Department are kept informed.

Tool/Equipment Required	PPE Required
<ul style="list-style-type: none"> • Bear spray • Rifles equipped with live ammunition <ul style="list-style-type: none"> ○ Tikka T3 0.300 cal. bolt action rifle • Firearm equipped with noise making ammunition or rubber bullets <ul style="list-style-type: none"> ○ Stoeger Double Defence 12GA coach gun ○ Remington 870 12GA pump action shotgun ○ Benelli Nova 12GA pump action shot gun 	<ul style="list-style-type: none"> • Regular PPE

Specific Training Requirements
<ul style="list-style-type: none"> • Firearm License • Bearwise training

<p>1.Procedure</p> <p>1.1 On-site personnel who encounter problem wildlife including large carnivore are required to notify the Environment Department immediately. *any wildlife not deemed problematic, under the definition outlined above, are not required to be reported directly to the Environment Department, but are required to be noted on the wildlife logs located in various locations around camp.</p> <p>1.2 The Environment Department staff will document all reported sightings of wildlife on the Meliadine project and provide the information to the Government of Nunavut Conservation officer(s) in Rankin Inlet as part of the monthly Wildlife Report.</p> <p>1.3 In the case that there is a recurring sighting of a particular animal including large carnivores in the vicinity of the camp or work areas, the environmental staff shall inform the Environmental Coordinator and/or General Supervisor</p>

1.4 The Environmental Coordinator and/or General Supervisor will then contact the Government of Nunavut Conservation officer(s) in Rankin Inlet to inform them of the recurring problem.

Contact will be made via telephone to the Rankin Inlet GN Wildlife Office. If the officers cannot be reached at the office then a call will be placed to the cellular phone numbers provided below. For each number called, if there is no answer, leave a message for the officer(s). In addition, a follow-up email must be sent to the officers' email address to ensure there is a documented form of communication. All documented communication must be provided to the Compliance Counselor for reporting purposes.

1.5 Any further action will be at the discretion of the Wildlife officer.

**Under no circumstances will any action be taken outside of what the Wildlife Officer has advised, unless approved in writing or via email by the Environmental Superintendent and the General Manager (or designate).

1.6 If the problematic animal continues to be present; return to step 2.4 and repeat until issue is resolved with the problematic animal of concern.

**The harassment or intentional dispatching of any wildlife on the Meliadine site without written permission can result in disciplinary actions.

Exception: If an animal is, without a doubt, threatening the safety of a person or is of immediate concern, the dispatching of an animal would be approved without consent provided by GN Wildlife Officers and Environmental Superintendent. In such a case, approval must still be gained by the designated Environmental Manager and acting Meliadine Manager. The dispatching of any animal must be performed by an individual whom is approved to use a firearm under procedure MEL-ENV-0007.

1.7 A full report of activities and actions will be required for any issues regarding problem wildlife. A template for the Problem Wildlife Report can be found at

\\Camefs02\groups\Environment\WILDLIFE\Wildlife Reports\Form\2016 AEM Meliadine_Problem Willidfe Report_template V 1xls.xls

2. Communication for Polar Bear Observation

2.1 Notify the Environment Department immediately.

2.2 Notification will be sent by the Environmental Coordinator and/or General Supervisor by e-mail to all employees including contractors and a radio notification will also be done on the camp channel.

2.3 Environmental Coordinator and/or General Supervisor and Environment Technician will keep a radio until the issue is deemed safe. Environment staff will patrol the area to assess whether it is safe.

2.4 Security officer may guard the main door from the main camp and ensure no one goes out of the main camp until the Environmental Coordinator and/or General Supervisor give the authorisation

2.5 All supervisors are responsible to advise their employees to ensure proper precautions are taken. No outside work will be allowed until the situation is deemed safe

2.6 Environment Team will monitor the situation and only the Environmental Coordinator and/or General Supervisor will be allowed to give the clearance.

November 2018 - GN Wildlife Officer Contact Information

Rob Harmer, Regional Manager
Kivalliq Region
Wildlife Management Division – Department of Environment
Government of Nunavut
P.O. Box 120 Arviat, NU X0C 0E0
Ph# 867-857-3172
Cell# 867-222-0067
Fax# 867-857-2986
RHarmer@GOV.NU.CA

Johanne Coutu-Autut, Conservation Officer III
Kivalliq Region
Wildlife Management Division – Department of Environment
Government of Nunavut
P.O. Box 947 Rankin Inlet, NU X0C 0G0
Ph# 867-645-8084
Cell# 867-645-7633
[Home# 867-645-3247](tel:867-645-3247)
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Daniel Kaludjak, Conservation Officer II
Kivalliq Region
Wildlife Management Division – Department of Environment
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Appendix D: Meliadine Mine Landfarm Remedial Action Plan



REPORT

Agnico Eagle - Meliadine Gold Project

Landfarm Remedial Action Plan

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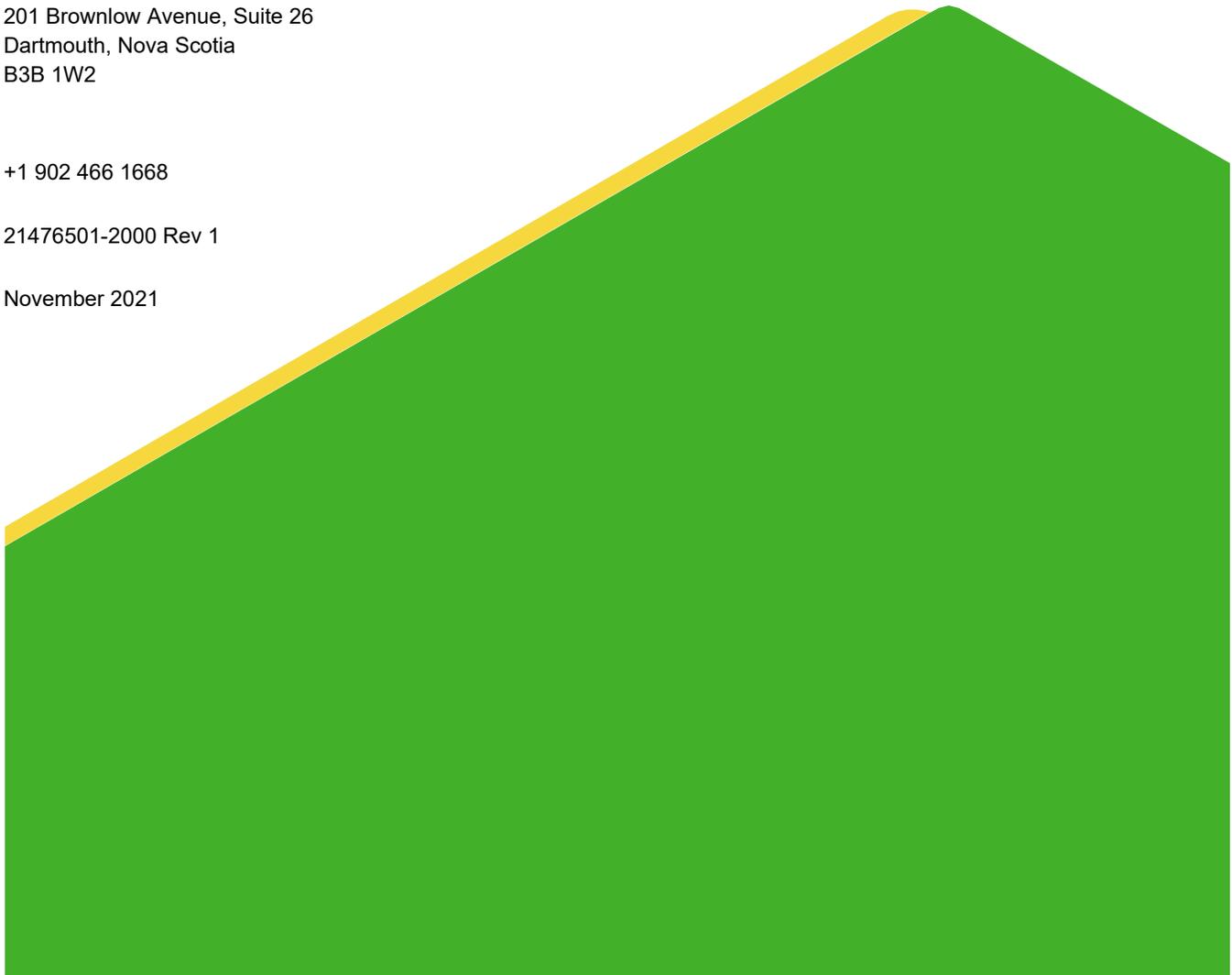
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List of Abbreviations

>	greater than
<	less than
°C	degrees Celsius
%	Percent
AANDC	Aboriginal and Northern Affairs Development Canada
AMSRP	Abandoned Military Site Remediation Protocol
BTEX	benzene, toluene, ethylbenzene, xylenes
CCME	Canadian Council of Ministers of the Environment
cm	centimetres
CP1	collection pond 1
CRP	Closure and Reclamation Plan
CWS	Canada Wide Standards
DEW	Distant Early Warning
DIAND	Department of Indian Affairs and Northern Development
EBA	EBA Engineering Consultants Ltd.
Earth Tech	Earth Tech Canada Inc.
F1, F2, F3, F4	petroleum hydrocarbon fractions 1, 2, 3, 4
Golder	Golder Associates Ltd.
GN	Government of Nunavut
HHERA	human health and ecological risk assessment
Imperial	Imperial Oil Limited
INAC	Indian and Northern Affairs Canada
IWB	Inuvialuit Water Board
Jacques Whitford	Jacques Whitford Ltd
km	kilometres
LMP	landfarm management plan

m	metre
m ²	squared metres
m ³	cubic metres
mm	millimetre
mbgs	metres below ground surface
mg/kg	milligrams per kilogram
NAPL	non-aqueous phase liquid
NIRB	Nunavut Impact Review Board
NRC	National Research Council
NWB	Nunavut Water Board
NWT	Northwest Territories
PHC	petroleum hydrocarbon
PID	photoionization detector
RAP	Remedial Action Plan
SCP	Spill Contingency Plan
SENES	SENES Consultants
SSTL	Site Specific Target Level
Stantec	Stantec Consulting Ltd.
SNC	SNC-Lavalin Inc.
TPH	total petroleum hydrocarbon
TSF	tailings storage facility
WorleyParsons	WorleyParsons Canada
WRSF	waste rock storage facility

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Agnico Eagle to develop a Remedial Action Plan (RAP) outlining a proposed approach for managing petroleum hydrocarbon (PHC)-impacted soil at the Meliadine Mine (the Project). The RAP includes an overview of the Project landfarming activities, site conditions and a review of the regulatory framework for PHC remediation in the arctic. The objective of the RAP is to provide Agnico Eagle with site-specific PHC remediation guidelines that, based on the pathways and receptors present at the Project, are more suitable/applicable to the future end land use than those currently being applied. The RAP will be included as an attachment in the updated Landfarm Management Plan (LMP) which will form a part of the documentation submitted to the Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB) for the Meliadine Extension permitting application.

The remainder of this document is structured as follows:

- Section 1.1 provides a brief overview of the current management of PHC contaminated soil at the Project.
- Section 2 provides a site description of the Project area.
- Section 3 describes the landfarm design.
- Section 4 details the contaminant types that are permitted for treatment in the landfarms.
- Section 5 provides a review of the regulatory framework for PHC remediation guidelines in the arctic, including a description of how the proposed Abandoned Military Site Remediation Protocol (AMSRP) guidelines were developed.
- Section 6 presents the applicable AMSRP guidelines based on the site-specific conditions of the Project.
- Section 7 details the RAP for soil treated in the landfarm, including minimum sampling requirements and the end use of treated soil.
- Section 8 describes recommended post-remedial monitoring activities following closure of the landfarm.
- Section 9 provides a summary.

1.1 Background

The Project operates a Type A Landfarm, associated with the NWB Type A Water Licence 2AM-MEL1631, for on-site storage and remediation of light-end PHC-contaminated soil that is generated at the mine site. This involves screening, mixing and placement of contaminated soil into windrows to enhance the conditions for volatilization and aerobic microbial degradation of PHCs.

The landfarm accepts soil, rock, snow and ice from the mine site that is contaminated with diesel fuel, gasoline, aviation fuel, hydraulic oil and other light oil (e.g., engine oil, lubricating oil) associated with on-site activities. Coarse-grained material (>2.5 centimetres [cm] diameter) is being separated from fine-grained material in the landfarm as biodegradation is not as effective in coarse-grained material due to low moisture content. However, PHC concentrations can still be reduced in coarse-grained material through volatilization. Coarse-grained soils are assessed by Meliadine Environment Department technicians near the end of each summer season for PHC odour and visible liquid PHC. When PHC odours are no longer detected using a photoionization detector (PID), the material may be removed to the waste rock storage facility (WRSF) or used as cover material in the tailings storage facility (TSF).

Fine-grained material is retained in the landfarm and placed into windrows. To promote aerobic conditions in the windrows, the soil is mixed multiple times a year during the summer months and water is added from the landfarm area or collection pond 1 (CP1) if the windrows are too dry (Agnico Eagle 2019a). Nutrient amendments were added to the windrows in 2018, 2019 and 2020 during mixing (Agnico Eagle 2019b, 2020, 2021). Contaminated snow and ice are placed in a designated area of the landfarm and treated as contact water after snowmelt. Contaminated water collected in the landfarm is pumped through the oil-water separator to remove PHC residue and is discharged to CP1.

To assess the success of the remediation of the fine-grained soil, composite samples are collected for each 10 metres (m) of windrow length (composite of three surface and three sub-surface [>1 m deep] samples) for PHC analyses at the end of the summer season and compared to the Government of Nunavut (GN) Tier 1 soil remediation criteria for surface soil in an agricultural/wildlife or industrial setting (GN 2009). Successfully remediated fine-grained soil with PHC concentrations less than the applicable GN Tier 1 criteria is then removed from the landfarm and stockpiled for use in site works or reclamation (if agricultural/wildlife criteria met) or placed in the WRSF (if industrial criteria met). It was estimated in the LMP that soils contaminated with light-end PHCs would take three years to meet the remediation criteria (Agnico Eagle 2019a). Based on the analytical results of the landfarm sampling, the rate of biodegradation in the Type A Landfarm is not performing as anticipated, taking more than three years to biodegrade PHC to less than the GN Tier 1 criteria.

In addition to the Type A Landfarm, there is a Type B Landfarm associated with NWB Water Licence 2BB-MEL1424, containing PHC-contaminated soil from the exploration phase. Material is not actively being treated while in the Type B Landfarm. As space becomes available in the Type A Landfarm, material will be transferred from the Type B Landfarm to undergo active remediation.

As part of Meliadine Extension, Agnico Eagle is also proposing to add two landfarms (i.e., Wesmeg and Discovery) to optimize contaminated soil management. This plan will also apply to these landfarms.

A human health and ecological risk assessment (HHERA) was conducted by Golder (2014) to evaluate the potential for adverse health effects on humans and terrestrial and aquatic life associated with changes in environmental quality due to chemical releases from the Meliadine Gold Project. The HHERA considered the impact from airborne emissions, dust generation and subsequent atmospheric deposition to soil and surface water, as well as discharges to aquatic environments occurring through the operations of the mine. Spills and leaks of PHCs from equipment during operation were not included in the pathway analysis of the HHERA because of the mitigation measures in place to address these occurrences within the LMP (Agnico Eagle 2019a) and Spill Contingency Plan (SCP) (Agnico Eagle 2015b). Therefore, the LMP and, by extension, this RAP, do not fall within the purview of the HHERA and any proposed changes to the guidelines for assessing PHC concentrations in landfarm soils will not impact the HHERA.

2.0 SITE DESCRIPTION

2.1 Location

The Project is in the Kivalliq Region, Nunavut, on Inuit Owned Lands. The Project is on the eastern shore of Hudson Bay on a peninsula between the east, south and west basins of Meliadine Lake ($63^{\circ}1'23.8''$ N, $92^{\circ}13'6.42''$ W). The Type A Landfarm is central to the mine workings and the Type B Landfarm is to the southeast.

The nearest communities to the Project are Rankin Inlet, approximately 25 kilometres (km) to the south, and Chesterfield Inlet, approximately 80 km to the northeast. The Project is accessed via the airport in Rankin Inlet and the All-weather Access Road, which will be completely removed during the post-closure phase of the Project (Agnico Eagle 2015c).

2.2 Physiography and Topography

The Project is near the northern border of the southern Arctic terrestrial ecozone. The area is dominated by drumlins (glacial till), eskers (gravel and sand) and waterbodies. Low relief ridges of glacial deposits oriented to the northwest-southeast control the regional surface drainage and the Project is in low-lying topography with many waterbodies and is at about 60 metres above sea level (Agnico Eagle 2015a).

2.3 Climate

The Project is within the Arctic tundra climate region, characterized by long cold winters and short cool summers. The mean annual air temperature based on climate normals for Rankin Inlet is approximately -10.4 degrees Celsius (°C) with monthly averages ranging from +10.5°C in July to -30.8°C in January and above freezing average temperatures for June to September (Environment Canada 2021, internet site). Mean annual precipitation is estimated to be 411.7 millimetres (mm) per year with 49 percent (%) falling as snow and 51% as rain (Agnico Eagle 2015a).

2.4 Permafrost

The Project is in a zone of continuous permafrost with intervening thaw bulbs and taliks. The permafrost in the region has an average annual surface temperature and zero amplitude temperature of less than -4 °C. The depth of permafrost at the Project is generally between 360 to 495 m and the depth of the active layer ranges from approximately 1 m in areas with shallow soil and up to approximately 3 m adjacent to lakes. The depth of the permafrost and active layer varies based on distance to the lakes, vegetation, climate conditions, overburden thickness and slope direction (Agnico Eagle 2015a). Ground ice content is expected to be less than 10% (dry permafrost) based on the regional scale (National Research Council [NRC] 1995), with areas of local ground ice associated with low-lying areas of poor drainage (Agnico Eagle 2015a).

2.5 Surface Water

The Project is on a peninsula between the east, south and west basins of Meliadine Lake with numerous small shallow lakes and ponds on the peninsula. The Type A Landfarm is approximately 80 m southwest of the CP1 and approximately 550 m southwest of Meliadine Lake. The Type B Landfarm is approximately 250 m southeast and north of some small ponds.

2.6 Groundwater

Areas of continuous permafrost typically have two groundwater flow regimes: shallow flow in the active layer near surface and deep flow below the permafrost. Shallow groundwater flow in the active layer occurs between spring and fall when the temperatures are greater than 0°C, where water flow follows surface topography. Shallow groundwater in the area of the Project flows towards local depressions and ponds that drain to lakes at estimated velocities of approximately 0.0025 to 0.02 m/day (Agnico Eagle 2015a). Permafrost in the bedrock would be nearly impermeable, with virtually no hydraulic connection between the active layer and the deep groundwater flow regime, except for taliks below lakes that extend to the base of the permafrost layer.

Open taliks of this nature may exist below Meliadine Lake and Lake B7. Groundwater flow velocity in the deep flow regime and in taliks is estimated to be approximately 0.2 to 0.3 m/year (Agnico Eagle 2015a).

Groundwater is not a source of drinking water in the area of the Project due to the continuous permafrost and the thin active layer.

2.7 Vegetation

Vegetation community types identified in the Project area include upland terrestrial vegetation classes (heath vegetation – low-growing evergreen shrubs [e.g., Labrador tea, bearberry and black crowberry]), wetland classes (wet sedge meadows or tussock hummock areas and low shrubby riparian vegetation along waterbodies) and unvegetated classes (bare ground and water and areas disturbed by pre-mining activities) (Agnico Eagle 2015a).

2.8 Land Use

The current land use is for industrial purposes. The Project preliminary Closure and Reclamation Plan (CRP) described the plan to carry out closure activities and establish self-sustaining ecosystems with similar land uses to pre-development conditions (Agnico Eagle 2015c). The CRP is updated throughout the Project life and the interim CRP (SNC-Lavalin Inc. [SNC] 2019) set out the following specific objectives:

- physically and chemically stable lands and waters at the reclaimed Meliadine site that are safe for human, wildlife and aquatic life;
- lands and waters at the reclaimed Meliadine site that allow for traditional uses;
- final landscape guided by pre-development conditions and traditional knowledge; and
- post-closure conditions that, where appropriate, do not require a continuous presence of Project staff until a walk-away condition is achieved (SNC 2019).

Some areas may be left in a semi-industrial condition with different end land use if agreed upon with regulators and community (SNC 2019).

The surrounding land use is undeveloped and may be used for traditional land uses.

2.9 Geology

Surficial geology in the Project area consists of a silty sand and gravel, with cobbles and boulders (till, marine sediments and beach ridges), underlying a thin layer of topsoil. Bedrock is encountered between approximately 2 and 18 metres below ground surface (mbgs) and is composed of a sequence of greywacke and siltstone, iron formation and mafic volcanics and volcanoclastics of the Archean Rankin Inlet Greenstone Belt (Agnico Eagle 2015a).

3.0 LANDFARM DESIGN

Tetra Tech was retained by Agnico Eagle to undertake the detailed design of the Type A Landfarm. The landfarm was designed based on the following (Tetra Tech 2017):

- The landfarm will have a raised base with perimeter containment berms, constructed over the original ground with no or minimum excavation to avoid disturbing the permafrost foundation.

- A geomembrane liner system will be enclosed in the landfarm base and perimeter berms to contain drainage/leachate and runoff water from the PHC-impacted soils and thawing snow/ice in the landfarm.
- The landfarm base will have a gentle slope, generally parallel to the original ground surface, which has a slope of approximately 3%.
- A sump area will be built in the lower portion of the landfarm to temporarily collect the drainage/leachate and runoff water.
- A pumping station with an oil separator will be installed on a pad close to the landfarm. The water in the landfarm sump will be pumped to the oil separator, on an as needed basis, to remove the oil products in the water. The treated water will then be pumped to CP1.
- A dedicated zone for temporary storage of the PHC-impacted snow/ice during each winter period will be in the lower portion of the landfarm close to the sump area, without blocking the natural drainage within the landfarm.
- A pad around the entrance to the landfarm will serve as an unloading zone for the PHC-impacted soils and snow/ice to avoid heavy equipment traffic over the area with the geomembrane liner system. A shovel or dozer with relatively low ground pressure will move the materials from the unloading area into the landfarm.
- Upon landfarm start-up, PHC-impacted soils that are temporarily stored at the site will be transferred and uniformly spread over the majority of the inside base of the landfarm, except for the sump and nearby areas. This initial layer of PHC-impacted soils will serve as a base for future lifts of incoming PHC-impacted soils.
- The PHC-impacted soils/rock will be typically treated for three years in the landfarm. After three years, the treated soils/rock that meet the treatment criteria can be removed from the landfarm to provide space for the PHC-impacted soils/rock for a future year.

4.0 LANDFARM CONTAMINANTS

As detailed in the LMP (Agnico Eagle 2019a), the landfarms only accept soil, snow and ice from the mine site that are contaminated with diesel fuel, gasoline, aviation fuel, hydraulic oil and other light oil (e.g., engine oil, lubricating oil) generated through mine-related activities at the Project. If the source of contamination is unknown, the material is placed in totes or drums until soil samples collected and analyzed for PHCs, total metals, oil and grease, and volatile organic compounds can confirm that the soil is only contaminated with PHCs approved for treatment in the landfarm. Soils contaminated with non-PHCs, such as solvents, are placed in drums for off-site disposal at approved facilities. Snow and ice are placed in a designated snow-cell area where it is considered contact water after snowmelt. Once melted, the water is pumped through the oil-water separator and discharged to CP1 (Agnico Eagle 2019a).

Contaminated soil is placed into windrows in the Type A Landfarm, where it is aerated multiple times during the summer and sampled as per the LMP (Agnico Eagle 2019a). Contaminated soil in the Type B Landfarm is from the exploration stage of the Project. The soil is undergoing natural remediation until there is space in the Type A Landfarm for active bioremediation treatment.

5.0 REGULATORY FRAMEWORK

Contaminated sites in Nunavut are managed through the *Environmental Protection Act* which gives the GN authority to take measures to ensure the protection, preservation and enhancement of the environment. The act

gives the Minister of Environment the authority to administer the Environmental Guideline for Contaminated Site Remediation (GN 2009).

The guidelines provide GN Tier 1 contaminant-specific remediation criteria for four land uses: agricultural/wildland, residential/parkland, commercial and industrial. The LMP currently applies the GN Tier 1 PHC soil remediation criteria for surface soil in an agricultural/wildlife or industrial setting as the target for successfully treated soil that can be removed from the landfarms (Agnico Eagle 2019a).

The GN Tier 1 PHC criteria, however, are considered generally protective of human and environmental health for the 'normal' activities associated with each land use (GN 2009). This may not, based on site-specific conditions, be applicable to remote sites in the arctic, resulting in remediation targets that are unnecessarily conservative given the pathways and receptors present in remote arctic environments.

To address this gap, the AMSRP Volume I Main Report and Volume II Chapter 4 (Protocol for the Evaluation of Hydrocarbon Impacted Sites) were developed to provide modified hydrocarbon remediation guidelines for Distant Early Warning (DEW) Line sites and other abandoned military sites in the arctic where the protection of all receptors may not be applicable (Indian and Northern Affairs Canada [INAC] 2008a,b). The development of the guidelines incorporated the Canadian Council of Ministers of the Environment (CCME) Canada Wide Standards (CWS) for PHC Tier 1 criteria and Site-Specific Target Level (SSTL) obtained by Jacques Whitford Ltd. (Jacques Whitford 2005, 2006) through quantitative risk assessments at INAC sites. A review of the modified hydrocarbon remediation guidelines and how they were developed is presented in Section 5.1 and a review of select arctic sites where the AMSRP guidelines have been used for PHC remediation is presented in Section 5.2.

5.1 Abandoned Military Site Remediation Protocol

The AMSRP was developed to provide a consistent protocol for abandoned military site cleanup in the arctic and is based on an approach that addresses legal requirements, INAC's Contaminated Sites Policy and standard environment practices (INAC 2008a). Hydrocarbon contamination is pervasive at most northern military sites and is associated with fuel storage, distribution, dispensing, vehicle repair, power generation, spills, long term leakage and/or inappropriate disposal of hydrocarbon wastes. The AMSRP Volume II Chapter 4 provides a framework for assessing hydrocarbon contamination at abandoned military sites whose remedial objectives address the potential risks to human health and the environment while considering the economic cost and potential negative impacts of remediation on the arctic environment (INAC 2008b). The typical hydrocarbon contaminant sources and their distribution in the environment, potential exposure pathways and receptors, remedial objectives and minimum sampling requirements described in the AMSRP are summarized below.

5.1.1 Contaminant Source and Distribution

The main type of hydrocarbon contamination at abandoned military sites in the arctic is diesel fuel with lesser quantities of soil contaminated with lubricating oils. Diesel is typically composed of mid-range petroleum products (petroleum hydrocarbon fractions F2 and F3) with insignificant amounts of F1. Benzene, toluene, ethylbenzene, xylenes (BTEX) concentrations may be low but are not considered the driving force for remedial activities. Lubricating oils are typically composed of the F3 and F4 fractions. The AMSRP has designated soils containing predominantly F3 and F4 hydrocarbons as Type A total petroleum hydrocarbon (TPH) (non-mobile; sum of F3 and F4 must be greater than 70% of the sum of F1 to F4 plus the F2 concentration must be less than the F4 concentration) and predominantly F2 and F3 as Type B (mobile). Hydrocarbon contamination in the subsurface can occur in: 1) the liquid phase (non-aqueous phase liquid [NAPL]) which is mobile in response to gradients; 2)

the residual phase on soil surfaces in pore spaces which is not mobile; 3) the dissolved phase that is transported with groundwater flow; and 4) the vapour phase which is mobile (INAC 2008b).

The DEW line sites across the arctic are within the zone of continuous permafrost, with a depth range of 1 to 2 m. NAPL released to soil in this environment migrates downward to the water table or until it reaches the permafrost table where it may spread laterally following topography or the permafrost surface (if permafrost is ice-saturated and well bonded). The mobility of the NAPL in the subsurface is associated with total porosity pore space interconnectivity and water content. The residual concentration in soil below which NAPL will not be mobilized by gravity or advection was estimated based on typical grain size distributions at arctic sites and NAPL characteristics. The residual concentration of Type A and Type B contamination, below which the NAPL will not be mobile, was conservatively estimated as 20,000 and 5,000 milligrams per kilogram (mg/kg), respectively (INAC 2008b).

Groundwater occurs in the active layer and given its shallow depth, may respond rapidly to precipitation. The rising water table may dissolve hydrocarbons present in the active layer. Groundwater flow in the active layer is defined by lithology, hydrogeological characteristics and the presence of permafrost. The study of abandoned military sites in the arctic suggests that groundwater flow in these environments is intermittent and discontinuous resulting in contamination that is localized. Contaminated groundwater may, however, flow to nearby surface water environments. Therefore, groundwater contamination is generally not of concern at arctic sites, unless a hydraulic connection between the contaminated area and a surface water body with aquatic life can be established. Surface water transport of contaminated sediment is a potential concern in areas that experience erosion (INAC 2008b).

Volatilization of hydrocarbon products is not considered a significant source of contaminant migration due to the cold temperatures and the short frost-free period (INAC 2008b).

5.1.2 Potential Exposure Pathways and Receptors

Numerous quantitative and qualitative risk assessments were carried out for DEW Line sites by Jacques Whitford (2005, 2006) in which potential exposure pathways and receptors were identified. The following section describes the guidelines that are protective of each receptor and the applicability of the guidelines to arctic sites is described in Section 5.1.3.

Human Health

Humans were identified as receptors that may be exposed to contaminated soil via soil contact/ingestion. The CCME CWS provide PHC Tier 1 guidelines that are protective of human health (dermal contact and soil ingestion) that were derived for the most sensitive receptor (i.e., toddler that ingests 100% of their daily intake of soil and is drinking water and breathing indoor air from the property). The CCME CWS PHC Tier 1 guidelines are presented in Table A below (INAC 2008b).

Soil Invertebrates/Vegetation

Soil invertebrates and vegetation were identified as receptors that may be exposed to contaminated soil through soil contact/ingestion (soil invertebrates) and porewater uptake (vegetation). The CCME CWS PHC has guidelines for ecological soil contact that are based on the exposure of soil invertebrates, microbes and vascular plants to hydrocarbons. The guidelines include values for surface soils (0 to 1.5 m) and subsoils (greater than 1.5 m) and are based on plant root growth and soil invertebrate contact. In arctic environments, invertebrates and root depth are generally limited to the top 0.10 m of the soil horizon and the permafrost table is generally between

1 and 2 m; therefore, a depth of 1.5 m is not considered applicable in the arctic. Surface soils defined as between 0 and 0.5 m are considered more appropriate for arctic environments.

Below a depth of 3 m, the CWS allows the exclusion of ecological soil contact with the application of management limits, which consider that soils at these depths are not available to certain receptors. The CCME CWS ecological direct contact guidelines are presented in Table A below (INAC 2008b).

Terrestrial Wildlife/Avi-fauna (Birds)

Terrestrial wildlife and avi-fauna were identified as receptors that may be exposed to contaminated soil through soil contact/ingestion and the ingestion of terrestrial plants and birds/mammals as prey. The exposure of terrestrial wildlife and avi-fauna to hydrocarbon-impacted soil is based on their home range and duration of residence. Species with smaller home ranges are potentially near or on impacted areas for longer time periods, leading to higher estimated total daily intake values. Risk assessments carried out by Jacques Whitford (2005, 2006) identified the most sensitive receptor to be the Rock Ptarmigan. When soils are contaminated with PHCs, Rock Ptarmigan which have an estimated home range of 24 hectares, are exposed through direct soil ingestion, consumption of terrestrial invertebrates and terrestrial plants. A SSTL for hydrocarbons of 2,350 mg/kg was derived from toxicology studies of mallard ducklings. Alberta Environment (2007) provides guidelines for wildlife soil and food ingestion with the meadow vole selected as the most sensitive receptor. The Alberta guidelines and the SSTL are presented in Table A below (INAC 2008b).

Aquatic Life

Aquatic life was identified as a receptor that may be exposed to contaminated soil through ingestion of surface water. The CCME CWS PHC guidelines for the protection of surface water quality is based on simplified hydrogeological flow and transport models and are only considered applicable for impacted areas that are less than 10 m from a surface water body. The models used to develop the guidelines use several assumptions that are not considered applicable in the arctic environment. AMSRP developed modified guidelines that incorporate arctic conditions and are applicable to impacted areas within 30 m of surface water bodies. Guidelines were not derived for F3 and F4 fractions because they are essentially insoluble. The AMSRP soil quality guidelines for the protection of aquatic life are presented in Table A below (INAC 2008b).

Table A: Summary of Human Health and Environmental Guidelines.

Hydrocarbon Fraction	Human Health - Direct Soil Contact (mg/kg) ^(a)	Ecological - Direct Soil Contact (mg/kg)		Wildlife - Soil and Food Ingestion (mg/kg)		Soil Quality for the Protection of Aquatic Life (mg/kg) ^(e)
		Surface Soil ^(a)	Management Limit ^(b)	Alberta ^(c)	SSTL ^(d)	
F1	12,000	210	700	11,000	2,350 to 10,880	1,290
F2	6,800	150	1,000	9,800		330
F3	15,000	300	2,500	16,000		-
F4	21,000	2,800	10,000	8,400		-

^(a)Residential/Parkland coarse-grained surface soils (CCME CWS 2008)

^(b)Below 3.0 m (CCME CWS 2008)

^(c)Alberta Environment (2007)

^(d)Jacques Whitford (2006)

^(e)Impacted area within 30 m of surface water body (INAC 2008b)
- not available

5.1.3 AMSRP Remedial Objectives for Hydrocarbon Contaminated Soil

The guidelines that are protective of each receptor were summarized in Section 5.1.2 and Table A. The following section describes which guidelines were considered applicable to remote arctic sites and were included in the remedial objectives for PHC-contaminated soil at abandoned military sites in the arctic.

Freshwater Aquatic Life

As described in Section 5.1.2, the AMSRP developed F1 and F2 guidelines for the protection of freshwater aquatic life that incorporate arctic conditions and are applicable to impacted areas within 30 m of surface water bodies. Guidelines were not derived for F3 and F4 fractions because they are essentially insoluble (INAC 2008b). These guidelines were included in the remedial objectives for PHC-contaminated soil at abandoned military sites in the arctic to be applied if the PHC-impacted area is within 30 m of a surface water body (Table B).

Direct Soil Eco-contact

While the AMSRP recognizes that soil conditions support eco-system function, the applicability of the guidelines in Table A to abandoned military sites in the arctic also took into account: 1) the areal extent of hydrocarbon impacts relative to the surrounding local habitat where the total area of the site is considered minor and impacts are localized and associated with disturbed areas that do not support significant vegetation growth; 2) disturbances associated with remediation (e.g. excavation, backfill sources, treatment area) results in a larger physical footprint than original impacted area; and 3) economic considerations. Considering the above and striking a balance between scientific and economic factors, the AMSRP did not include specific numerical guidelines for the protection of the direct ecological soil contact pathway in the remedial objectives for PHC-contaminated soil at abandoned military sites in the arctic (INAC 2008b) and they were not incorporated into Table B below.

Terrestrial Wildlife

The AMSRP selected a guideline of 2,500 mg/kg for Type B hydrocarbons based on the results of the site-specific risk assessments done by Jacques Whitford (2005, 2006), and based on arctic conditions, is considered only applicable to the top 0.5 m of the soil horizon. This value is also conservative when compared to the Alberta Environment (2007) guidelines in Table A. A guideline for Type A hydrocarbons was not selected because Type A impacts are typically localized and limited (INAC 2008b). The guideline of 2,500 mg/kg was included in the remedial objectives for PHC-contaminated soil and is included in Table B.

Human Health

The CWS guidelines listed in Table A that are protective of human health are considerably less conservative than the selected guideline of 2,500 mg/kg for Type B hydrocarbons for the protective of terrestrial wildlife; therefore, no guidelines are provided for the protection of human health for Type B hydrocarbons. The CWS guidelines listed in Table A for F3 and F4 (Type A) are 15,000 and 21,000 mg/kg, respectively. In a risk assessment based on traditional land use, Jacques Whitford (2005, 2006) developed a SSTL for F3 of 20,000 mg/kg. As this is generally consistent with the CWS guideline, it was adopted by the AMSRP as the guideline that is protective of human health for Type A hydrocarbons (INAC 2008b) and is included in Table B below.

Management Limits

The AMSRP recognized that hydrocarbon contamination impacts are not restricted to ecological and human receptors. The CWS developed managements limits that addresses the formation of free phase product (NAPL), vapour exposure in trenches, fire and explosive hazard, off-site migration, aesthetics and impacts of buried infrastructure.

The AMSRP considered the formation of NAPL, aesthetics and off-site migration to be applicable to abandoned military sites. The management limit was set at 5,000 mg/kg for Type B hydrocarbons for depths greater than 0.5 m and is based primarily on the potential for NAPL to form in coarse-grained material (INAC 2008b).

Table B: Summary of AMSRP Remedial Objectives for Hydrocarbon-Contaminated Soil

Hydrocarbon Fraction	Freshwater Life (mg/kg) ^(a)	Direct Eco-soil Contact (mg/kg)	Terrestrial Wildlife (mg/kg)	Human Health (mg/kg)	Management Limit (mg/kg)
F1	1,290	Not utilized	-	-	-
F2	330		-	11,000	-
F3	-		-	20,000	-
F4	-		-	-	-
Type B Hydrocarbon	330		2,500 ^(b)	-	5,000 ^(c)
Type A Hydrocarbon	-		-	20,000	-

^(a)Within 30 m of a water body

^(b)For surface soils to 0.5 m depth

^(c)Below 0.5 m depth, may be applied based on professional judgement

- not available

5.1.4 Minimum Sampling Requirements

The AMSRP specifies a minimum sampling frequency for confirmatory sampling of excavated areas. This sampling frequency is further discussed in Section 8.1 on post-remediation confirmation soil sampling of the base and berms of the landfarms.

The AMSRP describes a sampling protocol for soils excavated from landfills and dumps where the material is stockpiled in piles with maximum volumes of 20 cubic metres (m³) and five discrete and one composite sample are collected from every pile for the first 20 piles and then from every 20th pile thereafter.

The AMSRP does not, however, specify a sampling frequency for PHC-impacted soil undergoing treatment in a landfarm. Therefore, a sampling frequency for the treated landfarm soil has been selected based on other jurisdictions and is presented in Section 7.3.

5.2 Petroleum Hydrocarbon Remediation Examples in the Arctic

The development of the AMSRP guidelines for PHC remediation was based on human and ecological risk assessments conducted at two DEW Line sites (FOX-A and Simpson Lake) by SENES Consultants (SENES 2003 a,b), and four DEW Line sites (FOX-C, CAM-F, CAM-D, BAR-D) and two additional abandoned military sites (Radio Island and Johnson Point) by Jacques Whitford (2005, 2006). In addition to these sites, the AMSRP remediation guidelines have been used to undertake remediation at numerous other DEW Line sites, other abandoned military sites and non-military sites. A review of the use of the AMSRP guidelines for PHC remediation at selected sites relevant to the current project is presented in Table C below.

Table C: Projects in Nunavut and the Northwest Territories Applying the AMSRP Guidelines to PHC Remediation.

Name, Location	Historical Use	Organization	Guidelines Applied for PHCs	PHC Remediation
Cape Christian, Baffin Island, Nunavut	LORAN communications station	Department of Indian Affairs and Northern Development (DIAND)	RAP proposed the use of AMSRP guidelines for F2 and F3 hydrocarbon-impacted soils (Earth Tech 2007).	NWB approved the use of a landfarm facility to treat Type B hydrocarbon-impacted soils in accordance with the water licence application (and RAP contained therein) (NWB 2008).
Johnson Point, Banks Island, Northwest Territories (NWT)	Former support and staging area for oil and gas exploration throughout Banks Island	INAC	Water licence application proposed the use of 4,750 mg/kg for TPH based on SSTL developed in a HHERA for the tank farm area and 230 mg/kg (F1) and 150 mg/kg (F2) for areas near sensitive aquatic habitats (INAC 2008c).	PHC-contaminated soils were excavated and treated on-site until the TPH concentrations were less than 4,750 mg/kg. The soil was then disposed of in areas that were not near sensitive aquatic habitats (AECOM 2009).
Hope Lake Mines, 55 to 75 km south of Kugluktuk, Nunavut	Three former mining exploration areas: Hope Lake, Willow Creek and Husky Creek	DIAND	2,500 mg/kg for TPH based on SSTL developed using site conditions and the AMSRP as guidance documents (EBA Engineering Consultants Ltd. [EBA] 2011)	Initial soil volume of PHC-contaminated soil was 1,762 m ³ based on CWS generic standards. Application of the SSTL reduced the soil volume by 94%. The NWB approved the excavation and removal for off-site disposal of PHC-contaminated soil with concentrations exceeding 2,500 mg/kg (NWB 2013a) with remaining impacted soil left in place.
CAM-A Sturt Point, 80 km east of Cambridge Bay, Nunavut	Former intermediate DEW Line site	INAC/ Aboriginal and Northern Affairs Development Canada (AANDC)	RAP proposed the use of AMSRP guidelines for Type B hydrocarbons (AECOM 2011).	NWB approved the use of a landfarm facility to treat Type B PHC-contaminated soils in accordance with the AMSRP guidelines (NWB 2013b).
Ennadai Lake, 380 km west of Arviat, Nunavut	Former weather station	AANDC	RAP proposed the use of AMSRP guidelines for Type B hydrocarbons (EBA 2012).	NWB approved the use of landfarms to treat Type B hydrocarbon-contaminated soil in excess of the AMSRP guidelines for F1, F2 and F3 hydrocarbon fractions (NWB 2014). Remedial work was completed in 2014 (Stantec Consulting Ltd. [Stantec] 2016).

Name, Location	Historical Use	Organization	Guidelines Applied for PHCs	PHC Remediation
Contwoyto Lake, 400 km northeast of Yellowknife, Nunavut	Former weather station	AANDC	RAP proposed the use of AMSRP guidelines for Type B hydrocarbons (SENES 2013).	Approximately 2,100 m ³ of Type B PHC-impacted soil was treated in a landfarm until the soil concentrations were less than the AMSRP guidelines (ARCADIS 2016).
CAM-E, Keith Bay, 75 km east of Kugaaruk, Nunavut	Former intermediate DEW Line site	AANDC	RAP proposed the use of AMSRP guidelines for Type A and Type B hydrocarbons (Stantec 2015).	NWB approved the use of landfarms to treat Type B hydrocarbon-contaminated soil in excess of the AMSRP guidelines (NWB 2017).
Tuktoyaktuk Base, NWT	Former explorations logistics base camp	Imperial Oil Limited (Imperial)	RAP proposed the use of AMSRP guidelines for Type A and Type B hydrocarbons (Advisian 2018).	The Inuvialuit Water Board (IWB) approved the implementation of the RAP for on-site treatment of Type A and Type B soils in excess of the AMSRP guidelines (IWB 2019).
BAR-C, Tununuk Point, 80 km north-northwest on Inuvik, NWT	Originally a DEW Line site until 1963; used as a logistics base by Imperial Oil to support oil and gas exploration between 1972 to 1984	Imperial	RAP proposed the use of AMSRP guidelines for Type A and Type B hydrocarbons (WorleyParsons Canada [WorleyParsons] 2013).	Approximately 120 m ³ of Type A PHC-contaminated soil was excavated and disposed of off-site. Approximately 8,196 m ³ of Type B PHC-contaminated soils were remediated in a treatment cell until soil concentrations were less than the AMSRP guidelines after which they were placed in areas at either less than or greater than 0.5 m depth based on results (Advisian 2017).

6.0 PROPOSED GUIDELINES FOR MELIADINE MINE LANDFARMS

Based on the site description of the Project (Section 2.0) and the basis for the development of the AMSRP guidelines (Section 5.1), the Meliadine Mine site is in a similar human and ecological environment as the DEW Line sites and other abandoned military sites in the arctic. In addition, the PHC contaminants being treated in the landfarms (diesel fuel, gasoline, aviation fuel, hydraulic oil and other light oil) are comparable to those found at abandoned military sites (diesel fuel with lesser quantities of soil contaminated with lubricating oils). Therefore, the following section assess the operable pathways at the Project and provides site-specific remediation levels based on the AMSRP guidelines.

The proposed guidelines are applicable to PHC impacted soil undergoing treatment in the landfarms. Other impacts from mine site operations were assessed in and are managed by the HHERA (Golder 2014).

6.1 Summary of Exposure Pathways and Receptors

The possible pathways and receptors at the Project were evaluated to assess which were operable and should be included in the selection of applicable AMSRP guidelines. A summary of the pathways and receptors is presented in Table D below. The only pathway that is considered applicable to the PHC-contaminated soil in the landfarms is the direct contact (ingestion and dermal contact) pathway for humans.

Table D: Exposure Pathway and Receptor Summary

Pathway	Receptor	Operable (Y/N)	Reason
Direct contact (ingestion/dermal contact)	Humans	Yes	The Project area may return to traditional land uses following mine closure. Therefore, incident contact or ingestion of impacted soils is possible.
	Wildlife	No	Treated soils will be placed in the WRSF at a depth greater than 0.5 m, below which the soil is not considered available to terrestrial receptors. Therefore, this pathway is not considered operable.
	Soil invertebrates/vegetation	No	The AMSRP did not include guidelines for this pathway-receptor. In addition, treated soils will be placed in the WRSF at a depth greater than 0.5 m, the depth at which invertebrates and roots are limited to in arctic conditions. Therefore, this pathway is not considered operable.
Vapour inhalation	Humans	No	No existing buildings or planned buildings are within 30 m of the landfarms or the WRSF. Infrastructure in permafrost areas is typically built on piles above the ground surface to prevent heat transfer to the permafrost below. Therefore, the inhalation of indoor air pathway is not considered operable.
Potable groundwater pathway	Humans	No	There are no potable groundwater wells in the Project area. In addition, in zones of continuous permafrost the shallow groundwater in the active layer is unlikely to be used as a potable water source. Therefore, the protection of potable groundwater pathway is not considered operable.
Groundwater discharge to surface water	Freshwater aquatic life	No	The landfarms are greater than 30 m from surface water bodies. Proposed final placement of treated soil in the WRSF will also be greater than 30 m from surface water bodies. Therefore, this pathway is not considered operable.

6.2 Proposed AMSRP Guidelines

The AMSRP remedial objectives in Table B include guidelines for the receptors considered applicable in remote arctic settings. Since humans were retained as the only applicable receptor for the final placement of treated soil from the landfarms, the guidelines for freshwater life and terrestrial wildlife were removed and the human health and management limit were retained. Table E below summarizes the retained guidelines proposed for use in assessing the success of landfarming activities at the Project. Since the management limit is more conservative than the human health guidelines, it is recommended that all soil analytical results, regardless of the hydrocarbon type (i.e., Type A versus Type B hydrocarbons), be compared to the management limit of 5,000 mg/kg. The applicability of these guidelines requires that the final treated soil be placed at least 30 m from any surface water bodies and at depths greater than 0.5 mbgs.

Table E: Summary of AMSRP Remedial Objectives Applied to the Type A and Type B Landfarms.

Hydrocarbon Fraction	Human Health (mg/kg)	Management Limit (mg/kg)
F1	-	-
F2	11,000	-
F3	20,000	-
F4	-	-
Type B Hydrocarbon	-	5,000 ^(a)
Type A Hydrocarbon	20,000	5,000 ^(b)

^(a)Below 0.5 m depth, may be applied based on professional judgement.

^(b)Management limit for Type B hydrocarbons also applied to Type A hydrocarbons.

- not available

7.0 REMEDIAL ACTION PLAN

The landfarm design, operation and management are detailed in the LMP (Agnico Eagle 2019a). The following sections review the historical volume of soil in the landfarms, the PHC concentration of the soil being treated, the proposed changes to the sampling requirements to remove soil from the landfarms and the proposed end use of the soil.

7.1 Landfarm Volume Estimates

The total estimated volume of PHC-contaminated soil placed in the Type A Landfarm between 2017 and 2020 is approximately 3,727 m³ (Agnico Eagle 2019b, 2020, 2021) and in Type B Landfarm is 2,200 m³ (Agnico Eagle 2019a). A summary of contaminated soil volume additions between 2017 and 2020 is presented in Table F below.

Table F: Soil Volume Additions to Type A and Type B Landfarms from 2017 to 2020.

Year	Type A Landfarm	Type B Landfarm
	Additions (m ³)	Additions (m ³)
2017	800	2,200*
2018	2,853	0
2019	17	0
2020	57.5	0
Total	3,727	2,200

*Already in Type B Landfarm in 2017.

Recently, the volume of soil in each landfarm has been estimated through survey data. Based on survey data from November 10, 2020, there was approximately 873 m³ of soil in the Type B Landfarm on that date. In the fall of 2020, the large boulders and rocks in the Type B Landfarm were screened and removed to the WRSF. Based on survey data from August 21, 2021, there was approximately 1,044 m³ of soil in the Type A Landfarm on that date. Material being added to the Type A Landfarm is screened to remove the larger rocks (>2.5 cm) and, when PHC odours are no longer detected in the coarse material using a PID, the material is removed to WRSF (Agnico Eagle 2019a).

7.2 Landfarm Petroleum Hydrocarbon Analytical Results

The PHC analytical results for soils sampled from the Type A and Type B Landfarms between 2019 and 2021 are presented in Tables 1 and 2, respectively. The results have been compared to the GN Tier 1 soil remediation criteria for surface soil in an agricultural/wildlife and industrial setting in addition to the proposed AMSRP guidelines assuming a final placement depth for the remediated soil of greater than 0.5 mbgs and 30 m from any surface water body. To compare the analytical results to the proposed AMSRP guidelines, the PHC analytical results have been identified as either Type A (non-mobile) or Type B (mobile) hydrocarbons, as described in Section 5.1.1, and have been compared to the management limit of 5,000 mg/kg.

The Type A Landfarm soil analytical results from July 2021 are greater than the GN Tier 1 soil remediation criteria for surface soil in an agricultural/wildlife setting in three of the 22 samples, and greater than the GN Tier 1 soil remediation criteria for surface soil in an industrial setting from one of the 22 samples. When compared to the proposed and suitable AMSRP guidelines, the soil analytical results were less than the management limit of 5,000 mg/kg for both Type A and Type B hydrocarbons.

The Type B Landfarm soil analytical results from July 2021 are greater than the GN Tier 1 soil remediation criteria for surface soil in an agricultural/wildlife and industrial setting in the 16 samples analyzed. When compared to the proposed AMSRP guidelines, the soil analytical results were less than the management limit of 5,000 mg/kg. There were no Type A hydrocarbon types identified from the Type B Landfarm from soil sampled in July 2021.

The mean PHC concentration of soil based on the most recent sampling conducted in July 2021 is summarized in Table G below.

Table G: Mean Concentration of PHC in Soil from July 2021 Sampling Event for Type A and Type B Landfarms.

Parameter	Type A Landfarm (mg/kg)	Type B Landfarm (mg/kg)
Benzene	<0.0060	<0.0060
Toluene	<0.010	<0.010
Ethylbenzene	<0.020	<0.020
Total Xylene	<0.020	<0.020
F1 (C ₆ -C ₁₀)	<10	<10
F2 (C ₁₀ -C ₁₆)	93	687
F3 (C ₁₆ -C ₃₄)	102	342
F4 (C ₃₄ -C ₅₀)	<50	54

Based on the analytical and pending final confirmatory soil sampling (Section 7.3), the soil currently in the Type A and Type B Landfarms is below the proposed AMSRP guidelines in Table E and may be removed from the landfarms for placement in the WRSF as discussed in Section 7.4.

7.3 Sampling Requirements

The LMP (Agnico Eagle 2019a) specified sampling requirements for assessing the success of soil treatment by comparing to the GN Tier 1 guidelines. Previously, soil samples were collected for each 10 m of windrow length; one composite sample consisting of three sub-surface (at 1 m depth) and three surface samples collected approximately 3.3 m apart and taken from both sides of the windrow. The application of the AMSRP guidelines as proposed require the treated soil be sampled in a methodological manner that ensures any “hot spots” of higher PHC concentration are identified, sampled and submitted for analytical testing in order to ensure that the soil is fully protective of the receptors specified. Therefore, the sampling requirements below are more extensive than those previously included in the LMP.

When collecting final confirmatory samples for removal of soil from the landfarms, soil samples will be pre-screened in order to select the worst-case soil samples (based on visual observations, odour and PID results) to be submitted to the laboratory for analysis. The worst-case sample of every four field screened samples will be submitted to the laboratory. Sampling will be based on the estimated volume of soil in each windrow according to Table H. For example, a windrow with 1,250 m³ of soil will require a total of 13 samples collected for laboratory analysis (one sample per 96 m³), and thus soil in the windrow should be field screened at a rate of one per 24 m³. Soil samples should be taken from various depths in the windrows, with at least 25% sampled from the core of the windrows. This sampling frequency is adopted from Quebec where biopiles have been extensively used as a treatment option for PHC-impacted soils and also adopted for use for remediations at Tuktoyaktuk Base, NWT (Advisian 2018; Quebec MEF 1996).

To assess the progress of remediation, landfarm windrows will be sampled, at a minimum, at the end of each summer to assess the progress of soil remediation. It is recommended that the performance monitoring sampling be conducted at a rate of 50% of the sampling frequency used when collecting final confirmatory samples (Table H below).

Table H: Windrow Sampling Frequency for Removal of Soil from Landfarm (Quebec MEF 1996).

Soil Volume per Windrow (m ³)	Number of Samples Required
<30	1
30 to 60	2
60 to 100	3
100 to 200	4
200 to 1,000	4 + (1 sample per each 100 m ³ over 200 m ³)
1,000 to 2,000	12 + (1 sample per each 250 m ³ over 1,000 m ³)
>2,000	16 + (1 sample per each 500 m ³ over 2,000 m ³)

Once the PHC concentrations of the final confirmatory samples are less than the proposed AMSRP guidelines for soil at depths greater than 0.5 m (5,000 mg/kg; Table E), the soil can be removed from the landfarm and placed elsewhere at the Project site as described in Section 7.4. If sections of a windrow meet the AMSRP guidelines while other sections do not, the sections that meet the guidelines may be removed and the remainder retained in the landfarm for additional remediation. The retained soil should not be mixed with incoming untreated soils.

7.4 End Use of Soil

According to the LMP (Agnico Eagle 2019a), successfully remediated soil can be placed in the WRSF or used as normal overburden (i.e., cover on the TSF). Since the proposed guideline for assessing the success of soil remediation is the AMSRP management limit for soil at depths greater than 0.5 m (5,000 mg/kg; Table E) and excludes guidelines that are protective of aquatic receptors, successfully remediated soil will be stacked in the WRSF such that the final depth of the soil will be greater than 0.5 m and the final placement will be greater than 30 m from surface water bodies.

At the latest, the treated soil will need to be covered by a minimum of 0.5 m of waste rock or other non-impacted soil when the mine site is undergoing closure; however, an effort should be made to cover the treated soil each fall. In addition, this treated soil will not be placed below the depth of the permafrost table and any other requirements will be met with regards to waste rock placement in the WRSF. Over time, freezing of the WRSF will occur, encapsulating the treated soil and further reducing the likelihood of exposure of treated soil to possible receptors.

8.0 POST-REMEDIATION MONITORING ACTIVITIES

Following the removal of all remediated soil from the landfarm, closure and reclamation will be conducted according to the LMP (Agnico Eagle 2019a), the Interim Closure and Reclamation Plan (SNC 2019) and the final closure and reclamation plan to be submitted prior to mine closure. Prior to closure and reclamation of the landfarm, confirmatory sampling of the landfarm will be done in accordance with Section 8.1 below.

8.1 Soil

According to the LMP (Agnico Eagle 2019a), once all the soil has been remediated to the approved guidelines and placed in the WRSF, the berm and base of the landfarms will be sampled on a 10-m grid to determine if the PHC concentrations of the underlying soils are less than the guidelines. This is in alignment with the AMSRP which provides a practical and simple method for confirmatory testing following the excavation of contaminated soils that is based on excavation area and sampling density (Table I below).

Table I: Sampling Grid Sizes (INAC 2008a).

Size of Area	Grid Size	# Perimeter Samples Analyzed	# Interior Grid Samples Analyzed
<100 squared metres (m ²)	3 m x 3 m	All	All
>100 to 2,500 m ²	6 m x 6 m	50%	40%
>2,500 m ²	12 m x 12 m	50%	50%

Based on the AMSRP guidance, for impacted areas greater than 2,500 m², discrete samples should be collected from each 12 m x 12 m grid and 50% should be submitted for laboratory analyses according to Table I. Soil samples for laboratory analysis should be selected based on physical observations (e.g., evidence of staining, soil colour and/or texture, evidence of odours) and field screening results (e.g., highest PID readings). The Type A Landfarm is approximately 11,000 m² in total area; therefore, discrete sampling on a 10-m grid and submitting 50% of those samples for laboratory analysis would meet the sampling requirements of the AMSRP (INAC 2008a).

If the PHC concentrations of the analyzed soil samples are less than the AMSRP guidelines for soils between 0 and 0.5 m (see Table E), no additional excavation will be required. If the PHC concentrations are greater than the AMSRP guidelines for soils between 0 and 0.5 m but are less than the guidelines for soils at depths greater than 0.5 m, the landfarm will be covered with 0.5 m of waste rock or other reclamation material. If the PHC concentrations exceed the management limit for soils at depths greater than 0.5 m, the soil will be excavated and treated in another landfarm or disposed of at an approved facility. The excavated area will be sampled according to the grid density in Table I to confirm the AMSRP guidelines are met, and the excavation backfilled with waste rock or other reclamation material.

9.0 SUMMARY

A RAP was developed to provide Agnico Eagle with site-specific PHC remediation guidelines for the landfarm based on the AMSRP and the pathways and receptors present at the Project site. The following summarizes the outcomes:

- Based on the Project setting and the basis for the development of the AMSRP guidelines, the Meliadine Mine site is in a similar human and ecological environment as the DEW Line sites and other abandoned military sites in the arctic.
- The AMSRP guidelines have been used successfully to remediate PHC-impacted soil at a number of other sites in the arctic, both military and non-military.

- Based on the pathways and receptors at the Project, it is recommended that all soil PHC analytical results, regardless of the hydrocarbon type (i.e., Type A and Type B hydrocarbons), be compared to the AMSRP management limit of 5,000 mg/kg.
- Treated soils will be sampled following a robust sampling protocol that relies on field screening four samples for each sample that is submitted to the laboratory. The number of samples submitted to the laboratory is dependent on the size of each windrow being sampled. This ensures that any “hot-spot” higher concentration areas are selected for laboratory analysis.
- When treated soil is determined to meet the proposed AMSRP guidelines, it will be placed in the WRSF at depths greater than 0.5 m and at distances of more than 30 m from surface water bodies.
- When the landfarm is no longer receiving PHC-impacted soil and successfully treated soil has been removed, the base and berms of the landfarm will be sampled according to the AMSRP sampling protocol for confirmatory testing of the contaminated area.

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11.0 STATEMENT OF LIMITATIONS

This report was prepared for the exclusive use of Agnico Eagle Mines Limited. The report, which specifically includes all tables, is based on data and information provided by Agnico Eagle Mines Limited as described in this report.

The services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services. Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The content of this report is based on information collected during our investigation, our present understanding of the Site conditions, and our professional judgment in light of such information at the time of this report. This report provides a professional opinion and therefore no warranty is expressed, implied, or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change. The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

Signature Page

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Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-1 SURFACE	LFA-1-SUB	LFA-2 SURFACE	LFA-2 -SUB	LFA-3 SURFACE	LFA-3-SUB	LFA-4 SURFACE	LFA-4-SUB	LFA-5 SURFACE
							BVL Sample ID	KCO156	KCO157	KCO158	KCO159	KCO160	KCO161	KCO162	KCO163	KCO164
							BVL Job Number	B9H5055	B9H5055	B9H5055	B9H5055	B9H5055	B9H5055	B9H5055	B9H5055	B9H5055
							Sample Date	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	71	18	33	<10	16	<10	27	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	1,300	1,700	1,400	1,400	1,100	1,100	240	1,300	470	470
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	150	130	150	160	150	140	160	160	160	160
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	<50	<50	<50	<50	<50	68
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	1,450	1,901	1,568	1,593	1,250	1,256	400	1,487	630	630

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

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^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

Bold/Red - value exceeds GN industrial and agricultural/wildland criteria

Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-5-SUB	LFA-6 SURFACE	LFA-6-SUB	LFA-7-SURFACE	LFA-7-SUB	LFA-8-SURFACE	LFA-8-SUB	LFA-9-SURFACE	LFA-9-SUB
							BVL Sample ID	KCO165	KCO166	KCO167	KCO229	KCO230	KCO231	KCO232	KCO233	KCO234
							BVL Job Number	B9H5055	B9H5055	B9H5055	B9H5065	B9H5065	B9H5065	B9H5065	B9H5065	B9H5065
							Sample Date	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	25	<10	65	<10	24	<10	71	
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	660	660	1,200	110	1,800	840	1,200	1,100	1,400	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	170	130	120	97	140	150	180	140	130	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	66	<50	<50	<50	<50	<50	55	<50	<50	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	830	790	1,345	207	2,005	990	1,404	1,240	1,601	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

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^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

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Bold/Orange - value exceeds GN agricultural/wildland criteria

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BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-10-SURFACE	LFA-10-SUB	LFA-11-SURFACE	LFA-11-SUB	LFA-12-SURFACE	LFA-12-SUB	LFA-1-1	LFA-1-2	LFA-2-1
							BVL Sample ID	KCO235	KCO236	KCO237	KCO238	KCO239	KCO240	KRS205	KRS206	KRS207
							BVL Job Number	B9H5065	B9H5065	B9H5065	B9H5065	B9H5065	B9H5065	B9O6777	B9O6777	B9O6777
							Sample Date	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	18-Jun-19	31-Aug-19	31-Aug-19	31-Aug-19
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0060	<0.0060	<0.0060	
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.010	<0.010	<0.010	
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.020	<0.020	
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.12	0.17	0.13	
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	20	<10	16	<10	<10	71	64	63	
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	860	1,200	530	790	460	800	2,300	2,700	2,700	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	120	140	180	150	130	170	350	400	410	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	<50	<50	<50	<50	<50	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	980	1,360	710	956	590	970	2,721	3,164	3,173	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

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^(e) Assuming depth of 0.50 mbgs for final placement of soil.

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BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

**Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm**

							Sample ID	LFA-2-2	LFA-3-1	LFA-3-2	LFA-4-1	LFA-4-2	LFA-5-1	LFA-5-2	LFA-6-1	LFA-6-2	LFA-7-1	LFA-7-2
							BVL Sample ID	KRS208	KRS209	KRS210	KRS211	KRS212	KRS213	KRS214	KRS215	KRS216	KRS217	KRS218
							BVL Job Number	B9O6777										
							Sample Date	31-Aug-19										
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)												
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	0.15	0.17	0.15	0.13	0.12	0.15	0.19	0.19	0.14	0.16	0.16	0.16
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	110	81	73	87	73	73	85	70	81	65	82	82
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	2,700	2,600	2,700	2,500	2,400	2,500	2,600	2,700	2,500	2,500	2,500	2,700
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	400	330	380	380	350	370	370	410	390	370	360	360
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	3,210	3,011	3,153	2,967	2,823	2,943	3,055	3,180	2,971	2,935	3,142	3,142

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

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F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

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NA - not applicable

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> - greater than

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Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-8-1	LFA-8-2	LFA-9-1	LFA-9-2	LFA-10-1	LFA-10-2	LFA-11-1	LFA-11-2	LFA-12-1	LFA-12-2	LFA-1-SURFACE
							BVL Sample ID	KRS219	KRS220	KRS221	KRS222	KRS223	KRS224	KRS225	KRS226	KRS227	KRS228	NAK646
							BVL Job Number	B9O6777	B9O6777	C0G6034								
							Sample Date	31-Aug-19	31-Aug-19	28-Jun-20								
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)												
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	0.14	0.040	0.11	0.12	0.057	0.074	0.094	0.056	<0.020	0.092	<0.020	
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	64	29	73	62	80	60	55	69	67	89	<10	
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	2,600	1,600	2,400	2,800	2,200	2,100	2,900	2,700	2,000	2,700	190	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	400	250	360	390	380	350	390	380	330	420	160	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	53
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	3,064	1,879	2,833	3,252	2,660	2,510	3,345	3,149	2,397	3,209	350	

Notes:

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^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

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^(e) Assuming depth of 0.50 mbgs for final placement of soil.

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F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

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Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-1-SUB	LFA-2-SURFACE	LFA-2-SUB	LFA-3-SURFACE	LFA-3-SUB	LFA-4-SURFACE	LFA-4-SUB	LFA-5-SURFACE	LFA-5-SUB	
							BVL Sample ID	NAK647	NAK648	NAK649	NAK650	NAK651	NAK652	NAK653	NAK654	NAK655	
							BVL Job Number	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034
							Sample Date	28-Jun-20	28-Jun-20	28-Jun-20	28-Jun-20	28-Jun-20	28-Jun-20	28-Jun-20	28-Jun-20	28-Jun-20	28-Jun-20
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)											
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	26	<10	33	<10	29	<10	15	<10	18		
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	1,100	340	1,200	40	910	160	790	79	650		
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	190	170	190	79	140	260	240	120	190		
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	52	<50	<50	<50	76	190	73	<50	72		
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	450	NA	NA	NA		
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	1,316	510	1,423	119	1,079	NA	1,045	199	858		

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMS RP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

Bold/Red - value exceeds GN industrial and agricultural/wildland criteria

Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-6-SURFACE	LFA-6-SUB	LFA-7-SURFACE	LFA-7-SUB	LFA-8-SURFACE	LFA-8-SUB	LFA-9-SURFACE	LFA-9-SUB	LFA-10-SURFACE
							BVL Sample ID	NAK656	NAK657	NAK658	NAK659	NAK660	NAK661	NAK662	NAK663	NAK664
							BVL Job Number	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034
							Sample Date	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	22	<10	36	<10	49	<10	49	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	130	690	160	1,100	100	1,200	160	1,200	150	150
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	150	160	100	110	110	140	120	160	97	97
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	53	<50	<50	<50	<50	<50	<50	<50	<50
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	280	872	260	1,246	210	1,389	280	1,409	247	247

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

Bold/Red - value exceeds GN industrial and agricultural/wildland criteria

Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-10-SUB	LFA-11-SURFACE	LFA-11-SUB	LFA-12-SURFACE	LFA-12-SUB	LFA-1-SURFACE	LFA-1-SUB	LFA-2-SURFACE	LFA-2-SUB
							BVL Sample ID	NAK665	NAK666	NAK667	NAK668	NAK669	NNZ747	NNZ748	NNZ749	NNZ750
							BVL Job Number	C0G6034	C0G6034	C0G6034	C0G6034	C0G6034	COM9173	COM9173	COM9173	COM9173
							Sample Date	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20	29-Jun-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	34	<10	<10	<10	<10	<10	<10	<10	<10	20
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	1,100	52	510	54	480	41	640	470	1,000	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	140	120	170	120	160	93	140	170	180	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	<50	<50	53	60	61	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	1,274	172	680	174	640	134	780	640	1,200	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

Bold/Red - value exceeds GN industrial and agricultural/wildland criteria

Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-3-SURFACE	LFA-3-SUB	LFA-4-SURFACE	LFA-4-SUB	LFA-5-SURFACE	LFA-5-SUB	LFA-6-SURFACE	LFA-6-SUB	LFA-7-SURFACE
							BVL Sample ID	NNZ751	NNZ752	NNZ753	NNZ754	NNZ755	NNZ756	NNZ757	NNZ758	NNZ759
							BVL Job Number	COM9173	COM9173	COM9173	COM9173	COM9173	COM9173	COM9173	COM9173	COM9173
							Sample Date	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	57	190	210	480	80	240	120	500	570	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	100	100	120	150	110	130	110	160	150	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	52	<50	<50	<50	60	<50	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	157	290	330	630	190	370	230	660	720	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

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Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-7-SUB	LFA-8-SURFACE	LFA-8-SUB	LFA-9-SURFACE	LFA-9-SUB	LFA-10-SURFACE	LFA-10-SUB	LFA-11-SURFACE	LFA-11-SUB
							BVL Sample ID	NNZ760	NNZ761	NNZ762	NNZ763	NNZ764	NNZ765	NNZ766	NNZ767	NNZ768
							BVL Job Number	C0M9173	C0M9173	C0M9173	C0M9173	C0M9173	C0M9173	C0M9173	C0M9173	C0M9173
							Sample Date	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20	28-Aug-20
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	170	140	260	120	91	150	150	300	90	90
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	110	110	130	130	110	100	77	190	490	490
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	52	<50	<50	<50	58	260	260
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	750	750
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	280	250	390	250	201	250	227	490	NA	NA

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMS RP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

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BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-12-SURFACE	LFA-12-SUB	LFA-1-SURFACE	LFA-2-SURFACE	LFA-3-SURFACE	LFA-4-SURFACE	LFA-5-SURFACE	LFA-6-SURFACE
							BVL Sample ID	NNZ769	NNZ770	NSF801	NSF802	NSF803	NSF804	NSF805	NSF806
							BVL Job Number	C0M9173	C0M9173	C0O8791	C0O8791	C0O8791	C0O8791	C0O8791	C0O8791
							Sample Date	28-Aug-20	28-Aug-20	18-Sep-20	18-Sep-20	18-Sep-20	18-Sep-20	18-Sep-20	18-Sep-20
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)									
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	170	270	180	350	80	230	68	440	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	140	140	140	150	94	120	110	140	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	51	<50	<50	<50	<50	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	310	410	320	500	174	350	178	580	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

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F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-7-SURFACE	LFA-8-SURFACE	LFA-9-SURFACE	LFA-10-SURFACE	LFA-11-SURFACE	LFA-12-SURFACE	LFA-1-SURFACE
							BVL Sample ID	NSF807	NSF808	NSF809	NSF810	NSF811	NSF812	QGB241
							BVL Job Number	C0O8791	C0O8791	C0O8791	C0O8791	C0O8791	C0O8791	C1L4387
							Sample Date	18-Sep-20	18-Sep-20	18-Sep-20	18-Sep-20	18-Sep-20	18-Sep-20	19-Jul-21
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)								
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	260	670	260	150	140	95	24	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	160	150	160	130	130	130	70	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	51	<50	52	<50	<50	<50	<50	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	70	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	420	820	420	280	270	225	NA	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

Bold/Red - value exceeds GN industrial and agricultural/wildland criteria

Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-1-SUB	LFA-2-SURFACE	LFA-2-SUB	LFA-3-SURFACE	LFA-3-SUB	LFA-4-SURFACE	LFA-4-SUB	LFA-5-SURFACE	LFA-5-SUB
							BVL Sample ID	QGB242	QGB243	QGB244	QGB245	QGB246	QGB247	QGB248	QGB249	QGB250
							BVL Job Number	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387
							Sample Date	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)										
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	490	83	230	28	160	49	140	15	50	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	150	90	130	70	130	74	120	100	110	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	51	<50	<50	<50	51	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	70	NA	NA	NA	100	161	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	640	173	360	NA	290	123	260	NA	NA	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

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F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

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Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-6-SURFACE	LFA-6-SUB	LFA-7-SURFACE	LFA-7-SUB	LFA-8-SURFACE	LFA-8-SUB	LFA-9-SURFACE	LFA-9-SUB
							BVL Sample ID	QGB251	QGB252	QGB253	QGB254	QGB255	QGB256	QGB257	QGB258
							BVL Job Number	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387	C1L4387
							Sample Date	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)									
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	33	76	120	120	13	45	81	110	110
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	83	94	93	110	100	120	93	94	94
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	<50	<50	<50	<50	<50
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	83	NA	NA	NA	100	120	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	NA	170	213	230	NA	NA	174	204	204

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMS RP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

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Bold/Red - value exceeds GN industrial and agricultural/wildland criteria

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BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 1
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type A Landfarm

							Sample ID	LFA-10-SURFACE	LFA-10-SUB	LFA-11-SURFACE	LFA-11-SUB
							BVL Sample ID	QGB259	QGB260	QGB261	QGB262
							BVL Job Number	C1L4387	C1L4387	C1L4387	C1L4387
							Sample Date	19-Jul-21	19-Jul-21	19-Jul-21	19-Jul-21
							Sample Depth ^(e)	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)					
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	59	64	24	39	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	110	100	95	110	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	95	110	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	169	164	NA	NA	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

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Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 2
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type B Landfarm

							Sample ID	LFB-1	LFB-2	LFB-3	LFB-4	LFB-5	LFB-6	LFB-7	LFB-8	LFB-9	LFB-10	LFB-11	
							BVL Sample ID	KUX756	KUX757	KUX758	KUX759	KUX760	KUX761	KUX762	KUX763	KUX764	KUX765	KUX766	
							BVL Job Number	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972	B9Q1972
							Sample Date	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19	13-Sep-19
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)													
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	38	28	30	34	<10	55	<10	<10	<10	<10	49	25	
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	2,100	2,100	2,400	2,100	730	2,500	650	780	930	2,000	1,800		
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	540	540	470	400	170	380	170	170	170	170	410	550	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	120	100	85	57	<50	<50	<50	<50	<50	<50	66	110	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	2,678	2,668	2,900	2,534	900	2,935	820	950	1,100	2,459	2,375		

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

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BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

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< - less than

Table 2
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type B Landfarm

							Sample ID	LFB-12	LFB-1	LFB-2	LFB-3	LFB-4	LFB-5	LFB-6	LFB-7	LFB-8	LFB-9	LFB-10
							BVL Sample ID	KUX767	NAK558	NAK559	NAK560	NAK561	NAK562	NAK563	NAK564	NAK565	NAK566	NAK567
							BVL Job Number	B9Q1972	C0G6021	C0G6021	C0G6021	C0G6021	C0G6021	C0G6021	C0G6021	C0G6021	C0G6021	C0G6021
							Sample Date	13-Sep-19	26-Jun-20	26-Jun-20	26-Jun-20	26-Jun-20	26-Jun-20	26-Jun-20	26-Jun-20	26-Jun-20	26-Jun-20	26-Jun-20
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)												
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	39	24	12	31	24	10	46	10	10	10	42	
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	1,900	1,300	830	1,600	1,700	500	1,600	630	720	390	1,700	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	570	510	480	370	310	160	340	250	200	160	480	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	110	84	110	50	50	50	50	50	50	50	75	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	2,509	1,834	1,322	2,001	2,034	670	1,986	890	930	560	2,222	

Notes:

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^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

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mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

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Table 2
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type B Landfarm

							Sample ID	LFB-11	LFB-12	LFB-1-SUB	LFB-2-SUB	LFB-3-SUB	LFB-4-SUB	LFB-5-SUB	LFB-6-SUB	LFB-7-SUB	LFB-8-SUB	LFB-9-SUB
							BVL Sample ID	NAK568	NAK569	QGB520	QGB521	QGB522	QGB523	QGB524	QGB525	QGB526	QGB527	QGB528
							BVL Job Number	C0G6021	C0G6021	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414
							Sample Date	26-Jun-20	26-Jun-20	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)												
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	31	37	15	<10	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	1,400	1,300	1200	440	280	1100	370	350	910	1300	290	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	510	410	400	320	390	410	420	440	390	400	250	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	89	64	57	51	59	57	61	67	<50	53	<50	
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	1,941	1,747	1,615	760	670	1,510	790	790	1,300	1,700	540	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

^(c) Abandoned Military Site Remediation Protocol (AMSRP), Protection of Human Health (INAC 2008a,b).

^(d) Abandoned Military Site Remediation Protocol, Management Limit, below 0.5 m depth (INAC 2008a,b), applied to Type A and Type B hydrocarbons.

^(e) Assuming depth of 0.50 mbgs for final placement of soil.

Bold/Underlined - value exceeds proposed AMSRP guideline of 5,000 mg/kg

Bold/Red - value exceeds GN industrial and agricultural/wildland criteria

Bold/Orange - value exceeds GN agricultural/wildland criteria

BTEX - benzene, toluene, ethylbenzene, xylenes

BVL - Bureau Veritas Laboratories

F1, F2, F3, F4 - petroleum hydrocarbon fractions 1, 2, 3, 4

mbgs - metres below ground surface

mg/kg - milligrams per kilogram

n/g - no guideline

NA - not applicable

PHC - petroleum hydrocarbon

RDL - reportable detection limit

> - greater than

< - less than

Table 2
Summary of Soil Analytical Results - Petroleum Hydrocarbons
Type B Landfarm

							Sample ID	LFB-10-SUB	LFB-11-SUB	LFB-12-SUB	LFB-13-SUB	LFB-14-SUB	LFB-15-SUB	LFB-16-SUB
							BVL Sample ID	QGB529	QGB530	QGB531	QGB532	QGB533	QGB534	QGB535
							BVL Job Number	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414	C1L4414
							Sample Date	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21	21-Jul-21
							Sample Depth ^(e)	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Parameters	Units	RDL	Criteria ^(a)	Criteria ^(b)	Criteria ^(c)	Criteria ^(d)								
Benzene	mg/kg	0.0050	0.03	0.03	n/g	n/g	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Toluene	mg/kg	0.010	0.37	0.37	n/g	n/g	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.010	0.082	0.082	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Total Xylenes	mg/kg	0.020	11	11	n/g	n/g	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
F1 (C6-C10) - BTEX	mg/kg	10	30	320	n/g	n/g	<10	<10	<10	<10	<10	<10	<10	<10
F2 (C10-C16 Hydrocarbons)	mg/kg	10	150	260	11,000	n/g	360	720	480	830	790	1100	480	
F3 (C16-C34 Hydrocarbons)	mg/kg	50	300	1,700	20,000	n/g	260	290	310	320	300	320	250	
F4 (C34-C50 Hydrocarbons)	mg/kg	50	2,800	3,300	n/g	n/g	<50	<50	<50	<50	<50	<50	<50	<50
Type A (F3+F4)	mg/kg	NA	n/g	n/g	20,000	5,000	NA	NA	NA	NA	NA	NA	NA	NA
Type B (F1+F2+F3)	mg/kg	NA	n/g	n/g	n/g	5,000	620	1,010	790	1,150	1,090	1,420	730	

Notes:

^(a) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, agricultural/wildland land use (GN 2009).

^(b) Government of Nunavut Environmental Guideline for Contaminated Site Remediation, Tier 1 criteria for PHC in surface soil, industrial land use (GN 2009).

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NA - not applicable

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Appendix E: 2BB-MEL Water Management Plan



AGNICO EAGLE

MELIADINE GOLD MINE

WATER MANAGEMENT PLAN

WATER LICENCE No. 2BB-MEL

February 2024



DOCUMENT CONTROL

Version	Date (YMD)	Revision	Issued by
	2007/10	First version	Comaplex Minerals
	2009/09	Site Water Management Plan Addendum	Comaplex Minerals
	2010/08/25	The 2007 Plan and 2009 addendum were consolidated and updated to include recent license amendments	John Witteman (AEM)
	2013/10/16	Complete document revision	Alexandre Gauthier (AEM) Philip Roy (AEM) David Frenette (AEM)
	2014/02/09	Complete document revision	Alexandre Gauthier (AEM) Philip Roy (AEM) David Frenette (AEM) Josee Noel (AEM)
	2016/03/31	Complete document revision	Jeffrey Pratt (AEM) Jamie Quesnel (AEM)
7	December 2023	Revisions throughout for 2BB-MEL Licence Amendment	Agnico Eagle Permitting Department
7	February 2024	Updated to include possible use of water at the landfarm	Agnico Eagle Permitting Department



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1.0 Introduction

This Water Management Plan pertains to Nunavut Water Board Licence No. 2BB-MEL for the Meliadine Gold Mine. This Plan addresses water use, waste disposal, geotechnical drilling within 31 meters of water body, exploration activities on the property including ongoing surface diamond drilling.

2.0 Plan Objectives

The objectives of this Plan are to:

- Monitor specified water quality parameters at the camp domestic water intake.
- Monitor the performance of the Sewage Treatment Plant (STP; BIODISK Rotating Biological Contactor) for grey and black water.
- Document water use for routine exploration activities.
- Report the quantity of water used and the results of water quality monitoring activities.

3.0 General Water Management

General code of conduct guidelines for exploration activities with respect to water management include the following:

- There is to be no diamond drilling within 31 m of a natural water body or water course unless authorized to do so.
- There is to be no fuel storage or handling of fuel vessels within 31 m of a natural water body or water course unless authorized to do so.
- A spill contingency plan is implemented for fuel, oil, and different type of hazardous materials spill prevention and preparedness.
- Drill cuttings are to be controlled and contained in depressions near the drill hole; sludge line, “Aquadam” (water filled berms) and/or silt fences can be deployed to prevent drill cutting from entering receiving waters.
- If necessary, flocculants can be employed to reduce the Total Suspended Solids (TSS) in the waste water coming from the drills.
- Drill sites are to be rehabilitated (put back to their natural state).
- When drilling through lake ice is planned, water samples are collected before, during, and after the drilling to ensure that the water quality of the lake has not been impacted by the activity.
- Use of freshwater may be used at the landfarm to ensure sufficient soil moisture to prevent dust generation.

3.1 Water Consumption Records

Water Licence No. 2BB-MEL allows for a total of 299 m³ per day of raw water to be drawn. Water consumption is monitored, logged, and reported in the annual report to the NWB.



3.2 Camp Water Management

The domestic camp water system has been in use since 1997. Water is drawn from Meliadine Lake at pumping station labeled MEL-1. Since early June 2019, the treated sewage from the exploration camp STP is deposited in Collection Pond 1 (CP1). If the Exploration Camp STP operators suspect any upsets in the Exploration Camp STP prior to receiving accredited lab results, the effluent will be placed in the arctic corridor lift station for additional treatment in the main camp sewage treatment plant.

Agnico Eagle continues to monitor the quality of the effluent whenever the Exploration Camp STP is operational at the MEL-7 station. Parameters for which the samples are tested include: BOD5, TSS, oil & grease, fecal coliforms and pH. These tests are required by Section J, Item 7.

3.3 Wastewater Management

All wastewater generated by the exploration camp is directed to two equalization tanks (EQ Tanks) in which wastewater is homogenized through the use of aeration diffusers and pumped to the BIODISK and BIONEST units for initial biological treatment. The following information is from the manual provided by BIODISK Corporation regarding its operations.

The wastewater treatment facility at the exploration camp is a tertiary treatment aerobic sewage treatment plant. The unit is designed to remove phosphorus, and destroy nitrogenous products and organic material. It is comprised of a primary clarifier, rotating bacterial contactor (RBC) and final clarifier.

Each BIONEST is designed to operate and discharge final effluent that would meet discharge parameters outlined in the 2BB license, however, the water that is discharged from each unit is piped into the main sewage treatment plant building where it is mixed with the wastewater discharged from the BIODISKS and subsequently disinfected in the disinfection loop.

The contents of EQ tank 2 are pumped into the first chamber of each BIONEST, which is referred to as a septic tank compartment. Once filled, the wastewater passes through an effluent filter and into the second chamber referred to as the bioreactor. It is in the bioreactor where the biological treatment occurs (nitrification, just as in the RBC bio-zone of the BIODISKS). Instead of disk media, the BIONEST bioreactor contains ribbon shaped polymer media onto which bacterial cultures adhere. The third chamber acts as a final clarifier to remove residual solids before the water exits the system. Each BIONEST is equipped with a UV disinfection system at the final outlet, which are redundant in this configuration due to the discharge being later disinfected in the disinfection loop.

Sludge removal for the BIONESTs occurs when the sludge blanket in the septic tank portion of the unit reaches a thickness of approximately 18 inches, which according to the manufacturer occurs approximately every two years.

3.4 Diamond Drilling Water and Sludge Management

Agnico Eagle will not drill within 31 m of an open body of water unless authorized to do so. Drill cuttings (grinded rock) are not allowed to flow into any body of water. If needed, Agnico Eagle uses “Aquadams” and/or silt curtains and/or sludge line to manage TSS. Once the sludge has settled and TSS are removed, the water is allowed to flow into a natural water course.

Quite commonly, the process of drilling creates a depression around the borehole and the sludge is concentrated in and adjacent to that depression. Experience has shown that if the drilling sludge is spread as a thin layer around the hole, the area will re-vegetate completely within a couple of years. If a thick layer of drill sludge is deposited into depressions, re-vegetation is hindered. The present approach to drill site re-habilitation has worked well for the last 15 years.

All efforts are made to stabilize and re-contour the ground upon completion of work. Following the completion in drilling a hole, all attempts are made to pull the casing. Where this is not possible, the casing is cut off at or below the surface. Water flowing into the hole or cut off casing will freeze as all drill holes are in areas of permafrost.

When drilling on ice and passing through the water column, water samples are collected before, during (weekly) and after the drilling. The samples are analyzed for physical parameters and trace metals as set out in Section J, Item 9 of 2BB-MEL Licence.

4.0 Water Monitoring Requirements and Mitigation Measures

The exploration camp supports ongoing surface exploration activities, as well as advanced exploration activities and project development related activities.

Table 3 below outlines the monitoring requirements for the monitoring stations specified in Water License No. 2BB-MEL, while Figure 1 shows their location. The camp water is drawn from Meliadine Lake from station MEL-1, which remains unchanged since 1997. Drill water is obtained from Meliadine and small ponds proximal to the drilling targets.

Table 3: Water License No. 2BB-MEL1424 Water Quality Monitoring Stations

Monitoring Station	Location	Status
MEL-1	Raw water supply intake at Meliadine Lake	No sampling is required, only volume recorded.
MEL-6	Point of discharge for the contaminated soil treatment area	The landfarm is not decommissioned but no water has been released since 2016 as the water is transferred to the Landfarm A oil separator system and treated before being discharged in CP1.
MEL-7	Final effluent discharge from the BIODISK treatment system	Treated water from the exploration STP is trucked to CP1 or to the Main Camp STP depending on recent water quality trends. Monitoring for this station still occurs when the exploration camp STP is in operation to ensure the efficiency of the treatment system, but discharge directly to Meliadine Lake no longer occurs.



Figure 1: Water Sampling Stations Location

