Boston Exploration Camp
Closure and Reclamation Plan

Environmental Summer Student: Spreading of peat moss over a drill site at Boston, August 2006

MIRAMAR HOPE BAY LIMITED

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1 INTRODUCTION

This Closure and Reclamation Plan is intended to outline how the Boston exploration camp will be closed and reclaimed once there will be no further planned use of the site. This exercise is intended to ensure that issues associated with the effective closure and reclamation of the site are considered in sufficient detail at the earliest possible stage. The Closure Plan is considered to be a "living" document. It is anticipated that the Plan will undergo annual review and further revision as needed to address any changes in the site conditions. The level of detail of closure and reclamation planning contained within the Plan will continue to increase with subsequent revisions. Those revisions will incorporate the lessons learnt from ongoing operation and progressive reclamation completed at this site. Moreover, the revisions will also reflect the input form the Kitikmeot Inuit Association (KIA) as representative of the land owner (the Inuit), local communities, the Nunavut Water Board (NWB) and other stakeholders who have an interest in how the Boston exploration camp is ultimately reclaimed. This document provides a basis for continuing discussions with stakeholders regarding closure and reclamation at this site.

2 SITE LOCATION AND DESCRIPTION

Boston Camp is located (UTM 441150 E and 7505575 N) approximately 80 km south of Windy Lake. The site is located within the zone of continuous permafrost on the Hope Bay Belt. Table 1 provides geo-reference coordinates for the Boston Camp.

Table 1: Geo-reference points for the Boston Exploration Camp, Hope Bay Greenstone Belt

Reference: Grid NAD83	Latitude	Longitude
DMS	67°39'N	106°22 W
Universal Transverse Mercator (UTM)		
Zone	**Easting (meters)**	**Northing (meters)**
13	441150	7505575

The Boston Camp is located above the high water mark on the south East bank slope of Spyder Lake. The Camp provides support services directed towards the MHBL exploration activity in and around the Boston mineral resource area, in particular servicing of exploration drills operating within and around the Boston resource area (south end of the Hope Bay Greenstone Belt).

The Boston exploration camp is located on a peninsula with Spyder Lake to the north and west of the camp and Stickleback Lake to the east and south. The camp sits on an esker that is slightly higher than the surrounding water bodies. There is an elevation drop of less than 6° slope gradient towards the west into Spyder Lake and a slope gradient of slightly greater than 6° to the east extending into Stickleback Lake.

The camp is serviced by a short all weather airstrip, located immediately to the south of the camp. The airstrip is too short for large aircraft and is limited to Twin Otters and Dornier type aircraft. In a situation where a larger aircraft is required, an ice strip has previously been constructed on Spyder Lake.

3 ENVIRONMENTAL ASPECTS AND IMPACTS

Operating and managing an exploration project north of 60º latitude is challenging due to the remote location, harsh climate and short summer season. The area (tundra) is environmentally sensitive to all aspects of exploration. Consequently, it is good management practise for site personnel to identify and consider all aspects of their planned exploration activities and to develop operational plans that will avoid or mitigate all of these identified resulting adverse impacts to the receiving environment prior to carrying out these actions.

The following two (2) bullet points are taken directly from MHBL's Environmental Policy, and set the tone for the Closure and Reclamation Planning process.

- *On a continuous basis, determine the MHBL impact to the environment and through continuous improvement, strive to attain higher level of environmental performance.*
- *Progressively rehabilitate disturbed area, develop closure plans that can be continually improved and incorporate new technologies where practical.*

The environmental ***aspects*** are those MHBL activities, products or services that interact with the surrounding environment and may produce either a beneficial or an adverse impact. An environmental ***impact*** is the change that occurs to the receiving environment because of the aspect.

Identification of every aspect of a project and its subsequent impact at the early stage of the planning process enables MHBL to be aware of both the long-term and short-term risks and liabilities associated with its exploration programs. The intent is to ensure that all project aspects and impacts are systematically identified; risk assessed, and ranked. For significant negative impacts, management protocols are then developed, implemented, and communicated to employees, interested parties and suppliers of products or services to eliminate or minimize identified negative impacts to the receiving environment; and measure the effectiveness of the control measures and report feedback to continually improve the Closure and Reclamation Plan.

The information obtained from this process is important to MHBL in;

- Setting priorities in allocating resources for managing the significant negative impacts using engineered controls or other alternative control measures;
- Understanding long-term risks that may in future develop into significant issues if proper management controls are not in place to mitigate such issues;
- Recognizing and understanding long-term liabilities and the associated costs if proper management controls are not in place to mitigate such; and
- Providing the information required to develop a workable and realistic Closure and Reclamation Plan.

The preparation and submission of this C&R Plan is a condition for acquiring regulatory permits/license to carryout exploration activities in Nunavut and on Inuit Owned Land managed by the Kitikmeot Inuit Association. Miramar Hope Bay Limited will implement this C&R Plan in accordance with its commitment under the Corporate Environment Policy and in accordance with its obligations under its regulative and legislative requirements (such as under the Water Use License and land leases).

4 CLOSURE AND RECLAMATION (C& R) OBJECTIVES

In 2002 the Department of Indian and Northern Affairs Canada (DIAND) published a "Mine Site Reclamation Policy for Nunavut" – "*A policy for the protection of the environment and disposition of liability relating to mine closures in Nunavut*". This policy sets out the principles and objectives that guide how DIAND will apply its authority in matters relating to the management of the environmental and liability issues relating to mine closure and reclamation in Nunavut. The policy sets out what is expected from project proponents in relation to reclamation planning in project design and what proponents can expect from regulatory decision makers, thereby "fixing the goal posts" and thereby reducing ad hoc, case-by-case interpretation. MHBL have incorporated, wherever possible, the principles and guidelines as set out in this policy into it's planning for the abandonment and restoration of the Boston exploration camp.

In January of 2006, the Water Resources Division of Indian and Northern Affairs Canada issued "*Mine Site Reclamation Guidelines for the Northwest Territories*". The guidelines are intended to assist proponents of mining projects in understanding the expectations of DIAND for closure and reclamation planning in the Northwest Territories and Nunavut. The guidelines acknowledge that there are also land owners and other agencies, such as First Nations, Environment Canada, Fisheries and Oceans Canada, Natural Resources Canada, Government of Nunavut and various co-management boards who play a role in the reclamation of lands and waters which are affected by mining activities.

The Mine Reclamation Policy for Nunavut was developed for the protection of the environment and the disposition of liability relating to mine closures. The policy states that all mines in Nunavut should be planned, operated, closed and decommissioned in an environmentally sound manner in accordance with current mine closure and reclamation practices.

These practices include:

- Submission of a mine reclamation plan to regulators and landowners, approval of the plan before the commencement of mine production, regular plan updates, and annual progress reclamation reports;

- Progressive mine reclamation, consistent with the approved plans and current mine reclamation practices;

- Financial assurance that fully covers the outstanding liabilities at any period of the mine operations; and

- Sites are reclaimed and monitored at the financial expense of the mining company.

Mining is considered to be a temporary use of the land. At closure, the mine site and the land affected by the mining operations are to be reclaimed to achieve the following objectives (listed in order of priority):

- Protection of public health and safety through the use of safe and responsible reclamation practices;

- Reduction or elimination of environmental effects once the mine ceases operation;

- Re-establish conditions that permit the land to return to a similar pre-mining land use; and

- Reduce the need for long-term monitoring and maintenance by establishing physical and chemical stability of disturbed areas.

These broad reclamation objectives are drawn from the Mine Site Reclamation Guidelines for the NWT that issued by Indian and Northern Affairs Canada (INAC) in 2006. Miramar Hope Bay Limited (MHBL) has adopted these objectives as the basis for establishing site specific reclamation objectives for the Boston exploration camp.

The goal of reclamation is to prevent progressive degradation of a closed mining site, and to enhance natural recovery of areas affected by mining. Landscape reclamation is driven by the following specific objectives:

- To establish stable landforms;

- To protect the water resources in the local area;

- To facilitate natural recovery of areas affected by mining and the mining related activities at the project site; and

- To re-establish productive use of the land and water in the vicinity of the mine site for future generations in a manner that is consistent with the pre-development use of the land and water. In this case, productive use refers to use of the area by wildlife and for traditional activities as practised by the local communities and First Nations prior to the development of the mine.

This does not mean that the Boston site will not result in a permanent change to the landscape. Certain features of the project, such as the mine adit will become permanent changes to the current landscape. Other features, such as roads, airstrips and building pads, will alter the landscape for many years (perhaps centuries) until natural forces obliterate or disguise their presence even after they are reclaimed. In other words, reclamation cannot totally remove the entire disturbance caused by development and operation of the mine.

Reclamation cannot return the site to a pristine condition. Reclamation can however ensure that these disturbances are not causing degradation of the surrounding water, air and land after the mine no longer continues to operate.

The establishment of stable landforms (primarily establishment of stable slopes and drainage pathways) through proper engineering practises will reduce the requirements for prolonged maintenance of the site after reclamation is complete. It is MHBL's intention to create a stable site where long term care and maintenance is reduced to the minimal practical extent. In other

words, it is MHBL objective that reclamation be completed at the Boston Project site in a manner where future maintenance requirements are minimal, limited to periodic site visits, inspections and periodic maintenance of erosion damage and cleaning of drainage pathways. No long-term maintenance presence on site is a key objective of reclamation planning for the site. The objective is to get as close as possible to a "maintenance free" site through proper reclamation techniques, in other words to strive for a "walk away" reclaimed site. This means that drainage pathways, such as drainage swales and ditches, will be designed wherever possible and practical to be self-cleaning or immune to erosion problems that could otherwise require an ongoing maintenance requirement.

The targeted post-closure land use for the Boston Project site is wildlife habitat. This end land use is a reflection of the current use of the tundra area surrounding the Project site by wildlife (both resident and migratory). It is acknowledged that local communities and First Nations make use of the surrounding area for traditional activities and reclamation of the site will target leaving a reclaimed site that is protective of the surrounding water, air and land to enable such traditional activities to continue.

It is also recognized that aesthetics (how a reclaimed site looks) is of concern to the Inuit, local communities, and other stakeholders. This concern is acknowledged by MHBL and aesthetics have been considered in the design of the specific reclamation activities to be applied at the Boston Project site. The first and foremost approach in this respect is to leave a "clean" site. In other words, all remaining potentially hazardous materials (chemicals, reagents, hydrocarbons, explosives, etc.) will be removed from the site after exploration ceases. These products will be transported south for use elsewhere (re-cycling) or for appropriate disposal in a licensed disposal facility. All non-hazardous materials such as buildings, demolition debris, steel, vehicles, general garbage and debris will be removed from the surface and disposed of in an engineered non-hazardous landfill sites to be constructed on-site. This landfill will then be closed out and covered with a "clean" cap of quarried rock. It is expected that permafrost will become established within the closed out landfill in a short time frame after closure. Precipitation runoff will be directed away from the reclaimed landfill by a series of upslope berms. All building foundations and above ground concrete structures will be demolished and removed so that only rock fill pads remain as evidence of the existing use of the site as an exploration camp. There will be visual changes to the pre-development landscape primarily associated with the remaining remnants of the airstrip, site roads and building and laydown rock fill pads. Roads will be reclaimed to allow restoration of natural drainage pathways in a low maintenance fashion (i.e., no culverts, bridges or berms) but the gravels used to construct the roads, airstrip and building pads will largely remain in place and be evident for many years before natural processes obliterate or disguise their presence.

5 LEGAL REQUIREMENTS

Under the terms of KIA Land Use License (KTL399C029), and the NWB Water Use License (2BB-BOS0106), MHBL is obligated to rehabilitate Boston Camp as per Clause Part G; sub clause five (5) "*All disturbed areas shall be stabilized and re-vegetated as required, upon completion of work and restore to pre-disturbed state."* as stipulated in the operating NWB issued WU license.

6 LIST OF INFRASTRUCTURES AT THE BOSTON EXPLORATION CAMP

The following is a listing of the infrastructure and facilities currently at the Boston exploration camp that must be reclaimed once all exploration or development activity has been completed:

- 2 - Maintenance Shops
- 2 - Generator shacks
- 2 - helipads
- 2 – Non-combustible Solid Waste lay down areas
- 1 - Waste Incinerator
- 6 - 80,000 Upright AST Tanks
- 2 - 50,000 Upright AST Tanks
- 4 – Enviro-Tanks (1,045 L)
- 1 - land airstrip
- All weather road from Camp to Airstrip
- 1 lined secondary containment berm
- Accommodation Tents and Trailer
- 1 – RBC Sewer Treatment Plan
- An underground shaft and workings
- Drill rods & Drills
- Grey water & potable water lines
- Water uptake shed
- Waste Rock and Ore stock pile
- 3- Core lay down areas

7 PROGRESSIVE RECLAMATION

MHBL is committed to progressive reclamation of the Boston camp where practical and to reclaim its regional diamond drilling sites supported from this exploration camp as soon as practical following completion of the holes. To this end MHBL will continue to inspect and reclaim each of its drill sites as soon as practical following the completion of each hole.

8 CURRENT WASTE MANAGEMENT PRACTICES

MHBL currently applies the following operating procedures at the Boston exploration camp to manage waste materials generated by its ongoing exploration activities

Recycle of Contaminated Diesel Fuel

All contaminated diesel fuel generated on site is currently used as an accelerant in the on-site garbage incinerator. To date the full inventory of contaminated fuel has been consumed by this means. Other options should the amount of contaminated fuel increase include use of this contaminated fuel oil to generate heat for the maintenance shops at the Boston Camp.

Contaminated Soil

All hydrocarbon contaminated soils generated by accidents/incidents associated with the exploration activity at the Boston camp are currently excavated and then transported to the approve Land Treatment Areas (LTA) located at the Boston or Windy Lake exploration camps for treatment. In areas, where it is difficult to remove the contaminated soil or where removing the contaminated soil will pose other environmental hazards; fuel absorbent corncobs are spread over the area that is contaminated, either directly or indirectly by the spilled fuel. The objective is to utilize a proven environmentally safe product to adsorb the spilled hydrocarbon material that remains trapped in the soil particles. The ground corncobs are used after standard adsorbent pads have been applied and are no longer effective. Once the individual pieces of the ground corncobs are saturated, then new corncobs are spread over the same impacted area until the corncobs are visibly no longer saturated with hydrocarbon. Where practical, the saturated corncobs are then collected and disposed of in the approved incinerator installed at the Boston Camp. Alternatively, the corncobs can be placed inside the approved LTA at Boston Camp until they decompose.

Non Combustible – Non Hazardous Solid Waste

Non-combustible, non-hazardous solid wastes generated from ongoing exploration activity are collected, segregated and packaged for shipment off-site during winter months when larger aircraft are available to backhaul this material to Yellowknife. MHBL has received authorization to construct and operate a non-hazardous landfill on-site to dispose of this non combustible non-hazardous waste through burial under waste rock as the volume of waste generated has in the past exceeded the backhaul capacity.

Hazardous Waste

Hazardous waste such as waste antifreeze, batteries, waste solvent are collected and packaged in appropriate labelled containers pending removal from site. These wastes are shipped south to be disposed of or recycled at licensed disposal facilities for the specific waste types. No hazardous waste is to be disposed of into the on-site landfill.

Drill Cuttings

All drill cuttings are collected in sumps and transferred to bulk bags for on-site storage. The cuttings are occasionally used as fine rockfill material for bedding for HDPE liners or for

protective coverings on similar liners within the fuel containment facilities. The water from the drill sumps is recycled as per the drilling procedure.

9 INTERIM OR TEMPORARY SHUTDOWN MEASURES

Interim reclamation planning has been developed for two scenarios: (1) temporary shutdown such as at the end of each drilling season, and (2) indefinite shutdown. Both scenarios are based on the full intention of resuming operations once the source or reason for the shutdown has been rectified.

9.1 Temporary Shutdown

For the purposes of reclamation planning, a temporary shutdown is defined as a cessation of exploration activity for a finite period, generally three to six months, with the intention of resuming operations as soon as possible after the reason for the shutdown has been resolved. Possible causes for such a shutdown could be the suspension of exploration activity at the end of the Fall when the lakes freeze, a major mechanical equipment failure, late delivery of critical equipment or supplies, or labour conflict.

For example, the winter shutdown plan is a short-term closure of the Boston Camp that normally takes places each year after the summer/fall drilling program is completed, once ice begins to form on the local lakes.

During a temporary shutdown, such as the annual winter shutdown, the following actions are taken to secure the Boston Camp facilities and to hold them under care and maintenance pending resumption of exploration activity:

Site Buildings and Content

The camp facilities are secured for the winter. Shop equipment and other mobile heavy equipment is winterized and left secured at site.

Portable Water Pumps

Portable water pumps, water lines and any other equipment associated with the water pumping system are drained, winterised, and secured.

Combustible Waste Incinerator

Drain and secure the incinerator fuel tank. Store the remaining fuel in an approved container, labelled with an appropriate WHIMS label and stored together with all other petroleum products for future use. Disconnect the power source, cord rolled up and stored in the workshop. Secure the incinerator, remove all the ash, and disposed of the ash in the LTA at Boston Camp for further treatment. Inspect the area for petroleum spills or contamination. If contamination is evident, spread corncobs over the impacted area.

Electrical System

Inspect the generator shed and the surrounding area for signs of hazardous spills and remaining wastes such as oil and grease. If topsoil is contaminated, apply corncobs over the area to absorb the remaining hazardous wastes trapped in the soil particles. Drain the generator of its remaining fuel. Store the remaining waste fuel, oil and grease in approved storage containers, labelled for reused during summer operations. Label the containers with appropriate WHIMS labels. Secure the shed for winter. Electrical wires, plugs and sockets will remain in their installed locations. Unplug all electrical cords temporarily connected to a building or machinery during summer work program, roll and store in the workshop.

Workshop Heating System

Secure the Tidy tank connected to the workshop. Allow the remaining fuel in the line to burn out. Secure the fuel line and close the valve on the lead line. Get the final dip reading of the tank. Count and secure all full propane cylinders with a chain. Stack and secure all empty propane cylinders for despatch to Yellowknife for recycle.

Petroleum Products and Storage Facilities

Of great importance is the care involved in reducing the onsite fuel cache to a minimal level during non-exploration operations over the beginning of winter months. The MHBL exploration manager will determine the minimum level for Jet B and diesel fuel required for emergencies and the coming year's start up. Make an inventory list of the remaining fuel. Inspect all storage containers and secured during winter. Fly all empty fuel containers at remote drill sites back to Boston Camp. Count and secure empty drums for shipment to Yellowknife for recycle.

Lined fuel farm secondary containment area will be cleared of any debris and decanted of any water. The decanted water will be pumped into a lined pond, tested for BTEX and F1 (C6-C10) and F2 (>C10-C16), benzene, toluene, ethyl benzene, and xylene. Once the analytical data confirms that the water quality meets CCME guidelines, the water then is released onto the tundra.

Chemicals

Chemicals stored at Boston Camp consist of drill additives, oil, grease, drill salt (Sodium chloride and Calcium chloride) and household biodegradable cleaners. Count and store all drill additives and the remaining salt in designated areas of the property. Drill salt is in impermeable bags and stored on pallets. Empty bags will be disposed with combustible garbage. Inspect the area will be inspected for spills and contamination.

Spill Response Kits

Carry out an inventory list of all the Spill kits and their contents at Boston Camp. Relocate all kits into the workshop, except for kits designated for the remaining petroleum areas over the winter months.

Transportation

Inspect all transport landing areas for possible soil contamination. This includes the helipad and areas around the stationary mobile equipment. If contamination is evident, spread corncobs over the impacted area.

Drill Sites

Dismantle the drill into its main components as per the drilling contractor procedure, packaged and secured along with its ancillary equipment and rods. Move the drills by helicopter over the tundra and left on designated areas on property until the next drilling season. Inspect all drill sites for soil contamination. If contamination is evident, spread corncobs over the impacted area. Once corncobs have absorbed the remaining petroleum products, removed flakes and disposed-of in approved facilities on property. Remaining solid wastes brought back to Boston Camp and disposed of accordingly. Drill site restored immediately after the drill relocated to the next site. Drill sumps, when dry are level off to follow the surrounding landscape. Catalogued drill cores and core boxes are stored at a designated area on property.

General Workshop Area

Carry out a general inspection of the camp area with intent to identify and reclaim areas contaminated by petroleum products and have gone unnoticed before abandonment. Corncobs will spread over the impacted area to absorb the remaining contaminants trapped in the soil particles.

Final Documentation

Carry out an inventory of all equipment and buildings left on site prior to leaving site. Ensure to take photographs of the camp and drill lay down storage area. Complete final site inspections and collect water samples as required by regulative requirement. Submit report to regulative authorities as required per conditions in operating permits.

10 FINAL RECLAMATION MEASURES

The following sections present a summary of final reclamation measures that will be implemented once all exploration activity centered on the Boston exploration camp has been complete and no further exploration activity is envisioned either due to economics or other reason:

10.1 General Reclamation Measure

Inert Solid Materials

Prior to final closure and reclamation activities, it will be necessary to obtain appropriate authorization for a non-hazardous demolition waste disposal site (a demolition landfill) through

the regulatory agencies dealing with land leases and water use (KIA, NWB, DIAND). This site will be used for the disposal of all non-hazardous debris generated by the demolition of all non-salvageable equipment, buildings and other materials from the Boston Project site. MHBL anticipates that this demolition landfill will be located in the area adjacent to the existing underground decline entry. The demolition debris will be placed in compacted layers and then buried under a minimum final waste rock cover of 1 m to ensure that large voids within the demolition debris are filled and that buried material will not protrude from the closed out landfill cap as a result of future frost heaving.

Materials destined for burial in the demolition landfill will be dismantled as safely and efficiently as possible and stacked in a stockpile within the exploration camp site area. The materials will then be cut by flame, hydraulic shears or saw, into manageable sizes for safe transport and placement in the demolition landfill.

Hazardous and Salvageable Materials

All potentially hazardous materials will be removed from equipment prior to disposal. This will typically involve draining and removal of all remaining fuels, hydraulic fluid, engine oil, antifreeze, batteries and other lubricating fluids (transmission fluid, grease, etc.). Hazardous materials will be transferred into and stored in sealed containers and drums and loaded into shipping containers pending removal from site on the next sealift. These materials will be packaged and shipped off site for disposal at an appropriate licensed disposal site. The only potential exception to off-site disposal will be the use of recovered fuel in other mobile equipment used in carrying out reclamation related activities and the use of waste oil to generate heat during the reclamation period.

Given the remote location of the Boston exploration camp, the salvage value of most pieces of equipment and buildings materials is likely to be insufficient to cover the cost of removal and transport. Consequently for the purposes of this Plan it has been assumed that no salvage credits will be obtained and that all equipment and building materials will be disposed of on site in an appropriate solid waste disposal facility.

Some of the larger pieces of equipment may have economic salvage value. This Plan includes an allowance for one shipment south during the post-closure period to facilitate the removal of hazardous materials for off-site disposal. Removal of the higher value pieces of equipment from site will be done at the same time, dependent on longer term plans for mineral activities on the Hope Bay Belt.

Site Infrastructure and Buildings

Specific materials will be dealt with as follows:

- Where they exist concrete foundations will be broken down to nominal ground level and the concrete rubble buried in the on-site demolition landfill.
- All piping will be removed and buried in the on-site solid waste landfill.

- All above ground electrical cables will be removed and buried in the on-site solid waste disposal facility.

The potential for soil/rockfill contamination at facility sites will be assessed. This will include fuel storage pads, fuel tank areas, power plant, accommodations complex, service shop, waste management facilities and storage facilities. Soils in these areas will be sampled during decommissioning and analyzed for contaminants such as hydrocarbons and metals. A soil remediation plan will be developed to address such contamination assuming that some contamination is discovered. Best available practice and research studies for contaminant remediation in arctic soil will be assessed and used in the design and development of the soil remediation plan. Typically remediation plans will involve either:

- The in-situ treatment of some soils, such as lightly hydrocarbon contaminated soils;
- The excavation and treatment of some soils using conventional land farming techniques using biologically enhanced treatment techniques, such as more heavily hydrocarbon contaminated soils;
- The excavation and placement of some soils into the underground mine, such as those soils identified as being contaminated with metals to levels above accepted remediation criteria; and
- The excavation and placement of some soils in drums and sent offsite to a licensed disposal facility.

Risk Assessment techniques will be applied in determining which soils are to be remediated and to what degree. Regulatory agencies and representatives of the land owner will be involved in this process. Government guidelines such as the CCME's Canada-wide Standards for Petroleum Hydrocarbons in Soil, and soil quality guidelines for the protection of environmental and human health; as well as Nunavut standards for industrial soils in place during Closure time will be consulted on an individual chemical basis.
It should be noted that remediation of hydrocarbon contaminated soils by landfarming techniques has been successfully achieved in Arctic regions with similar climate conditions to those experienced at the Boston Camp. The performance of remediation tends to be slower in the Arctic than in more temperate climates but the procedure still works. Landfarming is not successful for all forms of hydrocarbon contamination. It typically is more successful for the lighter hydrocarbons than for heavier oils.

10.2 Underground Mine & Mine Openings

The decline access to the underground mine workings will be permanently sealed by the placement of a 15 m thick rockfill plug and then sealed with a welded steel cover to make the underground workings inaccessible to people or wildlife in compliance with mine safety requirements. The Plan assumes that 300 m^3 of broken rock will be placed inside the decline to form the plug followed by the construction of a welded steel barricade.

The decline is currently plugged with ice and it is assumed that this ice would remain in a frozen condition thus there will be no further anticipated movement of groundwater into or out of the

mine, thus no water treatment of mine water will be required. The frozen ground combined with the lack of groundwater movement will retard any sulphide mineral oxidation and prevent the transport of any contaminants away from the mine workings.

The ventilation raise will be either capped with a reinforced concrete cap or backfilled. The Plan assumes that this vertical mine opening will be closed off and permanently sealed by the placement of a concrete cap. The fans, fan housings and associated ducting will be removed from the surface over top of the raise and disposed of in the on-site solid waste disposal facility. The collars for the raise will then be capped with a reinforced concrete cap founded on solid rock. The concrete cap will be designed and constructed for a uniformly distributed load of 12 kPa and a concentrated load ranging from 24 to 54 kN as suggested in the Mine Site Reclamation Guidelines for the NWT. Provision for the venting of gas accumulation under the concrete cap will be provided as part of the cap design.

Following installation of the concrete cap, low-profile warning signs will be installed.

The concrete raise cap will be designed and constructed in accordance with the regulations established in Ontario for that purpose (with the exception that the uniform and point load specifications contained in the Mine Site Reclamation Guidelines for the NWT will be substituted). Schedule 1, Part 1 of Ontario Regulation 240/00 under the Ontario Mining Act provides a standard for the installation of a reinforced concrete cap to seal mine openings, specifically:

Concrete Caps:

1) Before installation of a concrete cap to stop shafts, raises and stopes,
   a) A qualified professional engineer shall examine the competency of the rock at the supports and no construction shall be undertaken unless the engineer approves the rock as competent;
   b) All loose rock shall be removed from the rock anchorages leaving only competent rock;
   c) All concrete work shall meet or exceed the minimum standards set out in the CAN/CSA-A23.1-M90 or latest revision;
   d) The formwork for the concrete, shoring and temporary support shall be designed by a qualified professional engineer.

2) The concrete cap may be left exposed to the elements or may be buried.

3) Where the cap is to be left exposed, consideration shall be given to providing a slope to the surface of the cap to prevent the collection of water on the surface.

4) All reinforced concrete caps shall meet or exceed the following specifications:
The reinforced concrete cap shall be designed for the following minimum design live loads:

- *1.4 metres cover of saturated soil uniformly distributed with a unit weight of 19 kN/cubic metre, and*

- the greater effect of either,
  - *an 18 kPa uniformly distributed load, or*
  - *an 81 kN concentrated load applied over an area 300 mm by 300 mm anywhere on the cap, and*
- *the weight of the cap as the dead load.*

5) The 28-day concrete strength shall be a minimum of 30 Mpa.

6) The reinforcing bars yield strength shall be a minimum of 400 Mpa.

7) The concrete cap minimum thickness shall be,
- *450 mm as per MNDM Drawing No. 94103-M1: "Monolithic Concrete Cap Typical Plan and Section" and Drawing No. 94103-M2: "Typical Monolithic Concrete Cap Reinforcement Schedule", or*
- *300 mm if an alternate design with all calculations is provided.*

8) All supports shall be founded on sound rock having a minimum bearing capacity of 600 Kpa.

9) All concrete design shall be as per CAN3-A23.3-M84 or it most recent revision.

10) The reinforced concrete cap shall be vented with a stainless steel pipe that is at least 75 mm in diameter and extends above the cap or soil cover to permit airflow.

11) The reinforced concrete cap shall be securely attached to the bedrock or to the concrete collar if one exists.

12) Appropriate reinforcing steel bars and concrete shall be used in areas where corrosive conditions may exist.

Reinforced Concrete

1) The concrete design shall meet the following specifications:
- *The minimum 28-day concrete strength shall not be less than 30 MPa.*
- *The maximum slump shall not be greater than 75 mm +/- 25 mm.*
- *The maximum aggregate size shall not be greater than 20 mm.*
- *The air entrainment content shall be 6 percent +/- 1 percent.*
- *The maximum water/cement ratio by weight shall not be greater than 0.50.*
- *The aggregates used in the concrete mix shall be non-alkali-silica reactive type.*

2) The concrete cover shall be as follows:
- *75 mm thick on the top of reinforcing bars.*
- *50 mm thick on the bottom of reinforcing bars.*
- *40 mm thick on the stirrups.*

3) The concrete shall be cured as per CSA-A23.1-M90 or its latest revision. Curing compounds shall be clear liquid conforming to Canadian General Standards Board

(CGSB) Standard 90-GP-1a, Type 1 or latest revision and applied as directed by the manufacturer.

Inspection and Testing

1. *Before the placement of concrete, a qualified professional engineer shall inspect and approve any reinforcing steel bars that have been installed.*
2. *The concrete shall be tested for air content and slump in the field.*
3. *A minimum of one set of four cylinders shall be cast and tested for compressive strength.*
4. *The cylinders shall be cured under the same field conditions as the shaft cap and seat support (if applicable).*
5. *The testing shall be done in accordance with CAN/CSA-A23.2-M90 or its latest revision.*

A qualified professional engineer shall certify all test results obtained and the certified results submitted to the Director no later than 30 days after testing.

10.3 Mine Waste Rock Piles

The mine waste rock piles that are on surface contain waste rock and ore from the underground decline development. This material has been shown to be chemically stable through ongoing runoff monitoring conducted since the mid 1990's. The piles will be regraded and levelled to shed snowmelt and precipitation runoff and to ensure long-term physical stability.

Some of this rock will be used to seal the underground decline and to cap the on-site non-hazardous material landfill.

10.4 Buildings and Equipment

All surface mobile equipment is assumed to have no off-site salvage value. Consequently the equipment will be cleaned, decontaminated to remove all potentially hazardous materials such as batteries, hydrocarbons, glycol, fuel, etc. and then be disposed of through burial in the proposed on-site demolition landfill site.

All stationary equipment (generators, etc) is assumed to have no off-site salvage value. Consequently the equipment will be cleaned, decontaminated to remove all potentially hazardous materials such as process residues, chemicals, hydrocarbons, glycol, etc. and then be dismantled and disposed of through burial in the proposed on-site demolition landfill.

For the purposes of reclamation planning, all of the site buildings are assumed to have no-off site salvage value. Consequently all of the buildings will be checked to identify and create a listing of all potentially hazardous materials that need to be removed. The buildings will then be cleaned to remove all potentially hazardous materials such as chemicals, reagents, hydrocarbons and then dismantled and/or demolished with the debris being disposed of through burial in the proposed on-site demolition landfill.

These buildings will all be single story buildings. An allowance has been included for clean up and removal of miscellaneous bone yard materials from around the buildings for disposal in the demolition landfill.

Where concrete slabs are present, the slabs will be broken and removed with the concrete rubble placed in the demolition landfill.

10.5 Portable Water Supply System

The potable water system will be removed as follows:

- The water pumps, filtering systems, water lines and any other equipment associated with the water supply system will be removed and buried in the on-site demolition debris landfill.

10.6 Waste Incinerator

Once the camp is entirely dismantled, all remaining combustible waste stored will be burnt. The camp incinerator will then be cleaned and demolished with the debris place in the on-site demolition landfill.

10.7 Workshop Heating System

The workshop heating system will be removed as follows:

- The fuel tank attached to the workshop will be drained and cleaned. The tanks will then be removed (portable tanks) for use elsewhere or demolished with the debris placed in the on-site landfill.
- The area around each tank will be inspected for visual contamination and sampled where staining is evident to determine extent and depth of contaminated soil. If spill or contamination is evident, reclaim the area as per the procedures outlined in the Boston Camp Spill Contingency Plan.
- All propane cylinders will be removed from site for recycle.

10.8 Petroleum Products, Storage Facilities and Land Treatment Facility

All remaining hydrocarbon fuels and lubricants will be consumed on site during the reclamation period. Any remaining inventory not used during this period will be removed from site.

Empty 45 Gallons drums

All empty 45 gallon drums will be drained, cleaned and then crushed with the debris place in the on-site landfill where they will be buried under a layer of capping waste rock.

Tidy Tanks

All Tidy tanks from the workshop and other facilities will be drained, cleaned and shipped off site for use elsewhere.

Above Ground Storage Tanks (AST)

All of the AST will be drained and cleaned. Envirotanks will be removed from site for use elsewhere. Other tanks will be demolished with the demolition debris placed within the site landfill.

Fuel Tank Farm Containment

The contaminated liner cover material will be taken to the site landfarm for remediation. The HDPE liner will be washed and then cut up with the demolition debris placed in the on-site landfill. The containment berms will be pushed inward and levelled. The area will then be contoured to match the surrounding landscape and to shed snowmelt and precipitation runoff.

10.9 Land Treatment Area (LTA)

The Boston LTA will be reclaimed after all the treated contaminated soil has been removed from the facility. The HDPE liner will be removed and incinerated on site. The existing berms will be used as fill-in materials for the farm. The area will then be graded to conform to the surrounding topography.

10.10 Chemicals

At final closure all unused chemicals and additives will be removed from the Boston site.

10.11 Airstrip and Helipads

The airstrip will be graded to conform to the surrounding topography to shed precipitation runoff and snowmelt. The helipads will be cleared and then graded in a similar manner.

10.12 Exploration Drill Sites

Drill Site Reclamation

All drilling equipment will be removed from site by the drilling contractor. Each drill site will be visually inspected for general housekeeping, erosion damage and hydrocarbon contamination. Peat moss or ground corncobs will be applied to areas contaminated with petroleum products to adsorb residual hydrocarbon from the contaminated soil. All other garbage and wastes will be removed from the drill sites to the Boston Camp for appropriate disposal either within the on-fill landfill (non-hazardous) or transported off-site (hazardous) for disposal at an appropriate disposal facility. The drill sites will be hand graded and levelled to repair ground damage and to conform to the surrounding landscape profile to shed precipitation runoff and snowmelt. The drill sites will then be seeded (with native plant species where practical).

Drill Casing Removal

All drill casings protruding above ground will be cut to a level that will not pose a hazard. The cut portion will be disposed off in the on-site landfill. Drill holes that encounter artesian water

flow or those drilled under the lake will be plugged with cement. GPS positions for all drill holes will be recorded.

Drill Core

Drill core will be secured on-site for long-term storage at a designated area.

11 ENVIRONMENTAL MONITORING

Long-term Monitoring

Environmental monitoring as laid out in the Water License SNP will continue during summer months with the results submitted to the regulatory authorities. This monitoring is intended to collect water quality data that will confirm that the area has been cleared of any hazards that may cause significant adverse impact to the receiving environment. This monitoring will continue for a minimum of 5 years or until the results indicate that no environmental degradation is occurring.

Documentation and Final Inspection

Photographs of the camp, drill sites will be taken at every stage of the decommissioning and reclamation process. MHBL will document what the reclamation objectives were, what is being done, what is the outcome, and develop objectives for the next phase.

Land Relinquishment

Once the reclamation process is complete and has been approved by the KIA and NWB water license inspector, MHBL will invite and organise a final site inspection visit with community representatives, Land Inspectors, Nunavut Water Board and Kitikmeot Inuit Association. Visits by Environment Canada and the Department of Fisheries and Oceans personnel are welcome. A written submission will be send to the regulatory authorities asking to close out and terminate the land leases.

12 RECLAMATION COST ESTIMATE

MHBL retained Nuna Logistics in 2002 to estimate the reclamation liability to reclaim the Boston exploration camp. Nuna provided an estimated cost of $1.4 million to complete the reclamation activity as outlined in this C&R Plan. MHBL has not updated the Nuna Logistics estimate. MHBL believes that this remains a valid estimate of the reclamation liability at this site at the current time, given that there have been no significant changes in the infrastructure or facilities at this site.