Sherwood Park, August 24, 2004

CONFIDENTIAL

Mr. John Stard MIRAMAR CON MINE Box 2000 Yellowknife, NWT X1A 2M1

Nunavut Water Board OCT 1 9 2004 Public Registry

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DESIGN OF SECONDARY CONTAINMENT FOR ABOVEGROUND SUBJECT:

STORAGE TANKS - BOSTON CAMP, WINDY LAKE CAMP, AND GOOSE

LAKE CAMP, NUNAVUT (O/REF.: MM4206)

Dear Mr. Stard:

Biogenie S.R.D.C. Inc. (hereinafter called "Biogenie") is pleased to provide Miramar Mining Corporation (hereinafter called "Miramar") with secondary containment design for aboveground storage tanks (ASTs) at Boston Camp, Windy Lake Camp, and Goose Lake Camp, Nunavut.

Kitnuna Corporation (hereinafter called "Kitnuna") will be the construction contractor for the projects at the three sites. Miramar will be responsible for the health and safety of workers for the duration of the project. A Biogenie representative will be present at all times during construction to monitor progress and verify final secondary containment dimensions.

This letter provides a summary of applicable regulations, the proposed location and design of the secondary containment at Boston Camp, Windy Lake Camp, and Goose Lake Camp, Nunavut.

# REGULATORY REQUIREMENTS FOR PETROLEUM STORAGE TANKS

As no guidelines currently exist for storage requirements in Nunavut, Alberta Energy and Utilities Board (EUB) Guide 55 - Storage Requirements for the Upstream Petroleum Industry (December 2001) was used for reference purposes.

Tel.: 780-416-0414

Fax: 780-416-0417

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A summary of applicable Guide 55 secondary containment measures for ASTs with an internal volume of 5 m<sup>3</sup> or greater is as follows:

- The area around a single walled AST must have a secondary containment system designed to contain leakage and prevent it from impacting the surrounding environment.
- Secondary containment must consist of an impervious liner and a dike.
- The area within the secondary containment system must be graded to a sump
  or low-lying area (within the diked area) to allow for the collection of
  rainwater, snowmelt water, and any possible leakage from the tanks.
- The dike must be constructed of soil, steel, concrete, solid masonry, or synthetic material and designed to contain liquids within the diked area.
- The dike must be sized to have a volumetric capacity of not less than 110% of the capacity of the tank when the diked area contains one tank.
- When several tanks are within the diked area, the size must be the capacity
  of the largest tank, plus 10% of the largest tank or 10% of the aggregate
  capacity of all other tanks located in the diked area.
- The dike must have no openings in it and be maintained in good condition.

Secondary containment for the ASTs at each site was designed based upon the above conditions.

# TANK FARM LOCATIONS

#### BOSTON CAMP

A site visit was conducted on August 18, 2004, to determine a suitable location of the proposed tank farm and, based upon data acquired during the site visit, the tank farm shall be constructed directly north of the maintenance building as illustrated on Figure 1.

Currently 1 - 35,000-litre tank is located on site with 2 additional 70,000-litre tanks scheduled for installation in winter 2004/2005. The 3 tanks will be placed within the secondary containment following its construction. The total volume of fuel to be stored within the ASTs will be 175,000 litres. Based upon G-55 regulations, the required containment volume of the dikes is 80,500 litres.

The length and height of the containment dikes to be constructed is shown in Figure 2. The dikes will be constructed from waste rock piles (identified to Kitnuna by Miramar)

Mr. John Stard

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August 24, 2004

to a minimum height of 0.7 m. The tank farm will be constructed upon an existing rock pad and lined with 30 mil Enviroliner® supplied and recommended by Layfield Plastics (Layfield) of Edmonton, Alberta. The pad will be graded slightly towards one corner (to be determined at time of construction) to allow for the collection of rainwater, snowmelt, and any possible leakage. Once the liner has been placed, a 0.3-m-thick layer of backfill (waste rock) will be placed over the liner to protect it from damage and degradation.

As waste rock will be used for dike and backfill material, a layer of 60-mil high density polyethylene (HDPE) will be used directly above and below the Enviroliner® for protection purposes. Welding of the HDPE material is not required as it is for protection and not containment purposes.

The total volume of the secondary containment at Boston Camp will be 147,600 litres.

#### WINDY LAKE CAMP

A site visit was conducted on August 17, 2004, to determine a suitable location of the proposed tank farm and, based upon data acquired during the site visit, the tank farm shall be constructed in the location of the current ASTs as illustrated in Figure 3.

Currently 1 - 50,000-litre tank and 2 - 70,000 litre tanks are located on site with 2 additional 70,000-litre tanks scheduled for installation in winter 2004/2005. The 5 tanks will be placed within the secondary containment following its construction. The total volume of fuel to be stored within the ASTs will be 330,000 litres. Based upon G-55 regulations, the required containment volume of the dikes is 96,000 litres.

The length and height of the containment dikes to be constructed is shown in Figure 4. The dikes will be constructed, to a minimum height of 0.7 m, from native sand by excavating the footprint of the tank farm for the required material. Once the dike heights have been achieved, the area within will be lined with 30 mil Enviroliner®. The pad will be graded slightly towards one corner (to be determined at time of construction) to allow for the collection of rainwater, snowmelt, and any possible leakage. Once the liner has been placed, a 0.3-m-thick layer of backfill (sand) will be placed over the liner to protect it from damage and degradation.

The total volume of the secondary containment at Windy Lake Camp will be 220,000 litres.

August 24, 2004

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### GOOSE LAKE CAMP

Dogardo

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A site visit was conducted on August 16, 2004, to determine a suitable location of the proposed tank farm and, based upon data acquired during the site visit, the tank farm will be constructed south of the camp as illustrated in Figure 5.

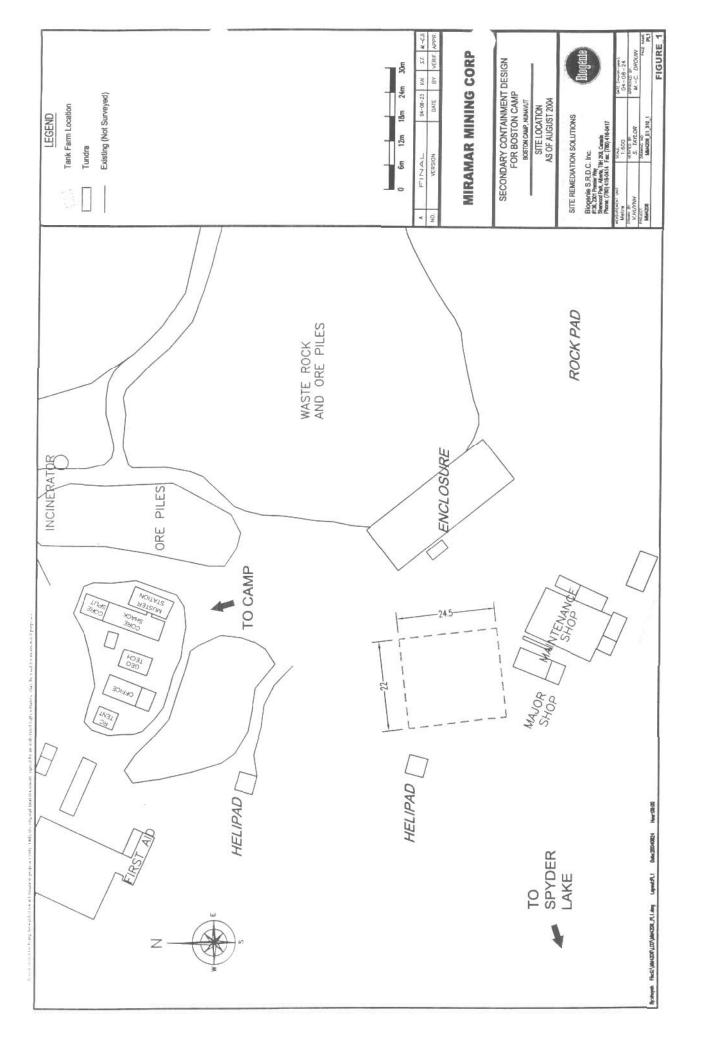
Miramar plans to install 5 - 70,000-litre tanks on site during winter 2004/2005. The 5 tanks will be placed within the secondary containment. The total volume of fuel to be stored within the ASTs will be 350,000 litres. Based upon G-55 regulations, the required containment volume of the dikes is 98,000 litres.

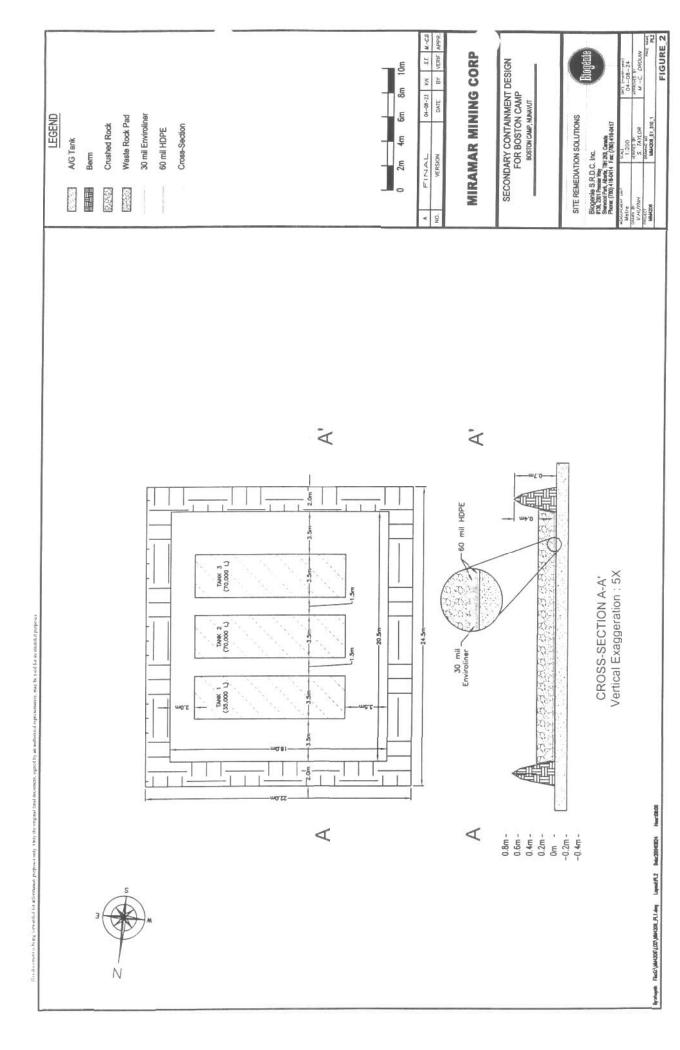
The length and height of the containment dikes to be constructed is shown in Figure 6. The dikes will be constructed, to a minimum height of 0.7 m, from native sand by excavating the footprint of the tank farm for the required material. Once the dike heights have been achieved, the area within will be lined with 30 mil Enviroliner®. The pad will be graded slightly towards one corner (to be determined at time of construction) to allow for the collection of rainwater, snowmelt, and any possible leakage. Once the liner has been placed, a 0.3-m-thick layer of backfill (sand) will be placed over the liner to protect it from damage and degradation.

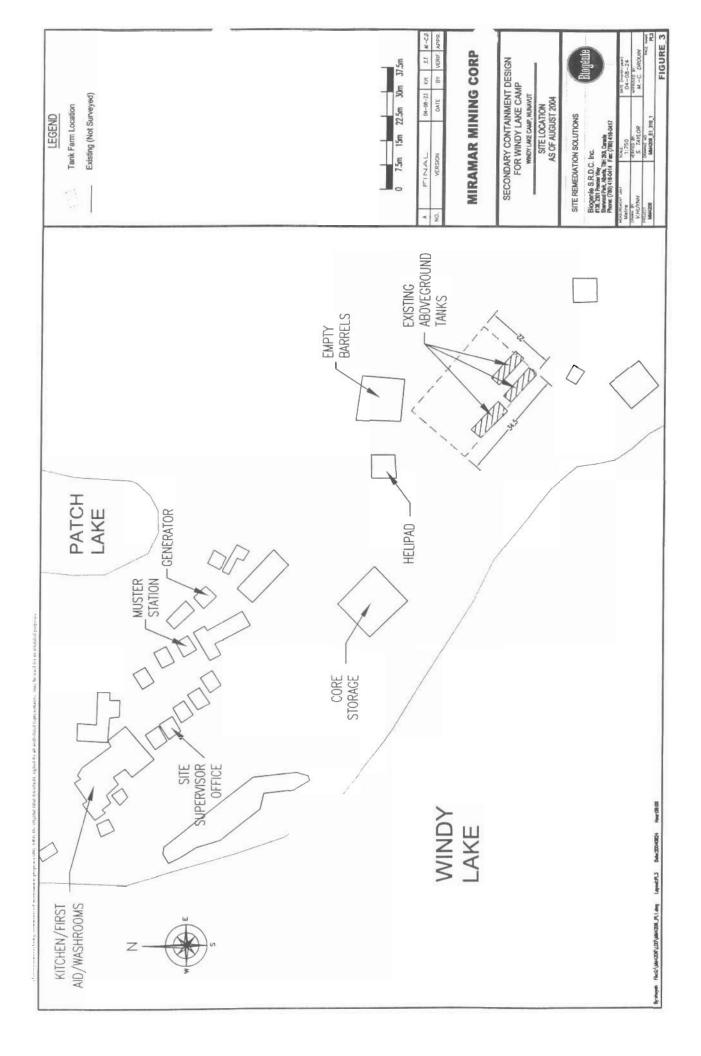
The total volume of the secondary containment at Goose Lake Camp will be 220,000 litres.

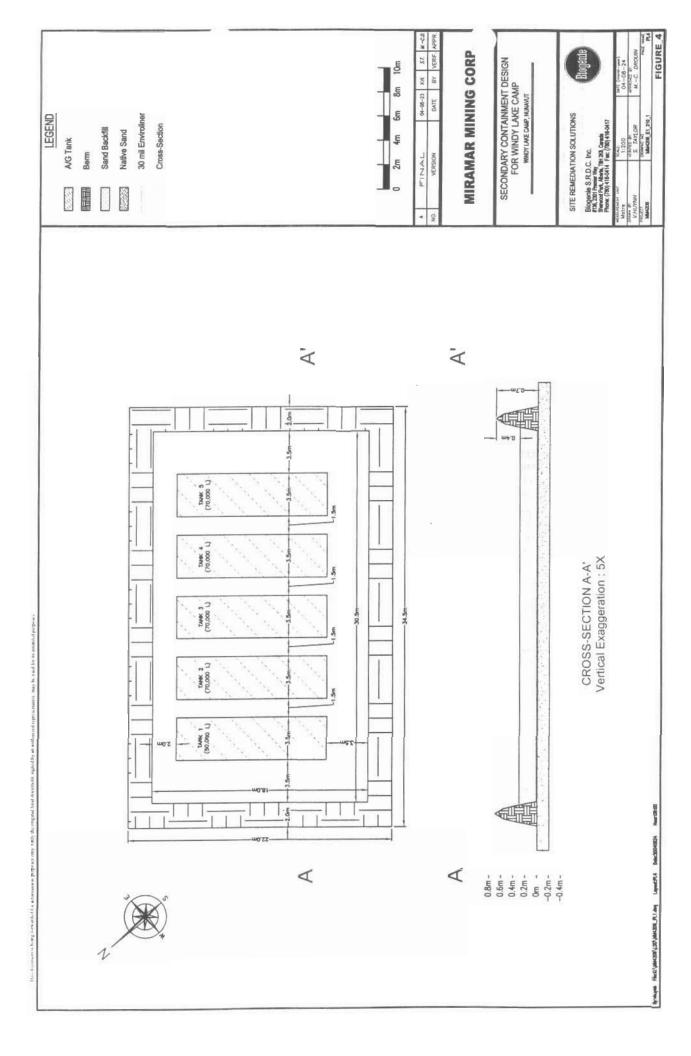
We trust the above meets with your expectations. Should you have any questions or require additional information, please do not hesitate to contact us.

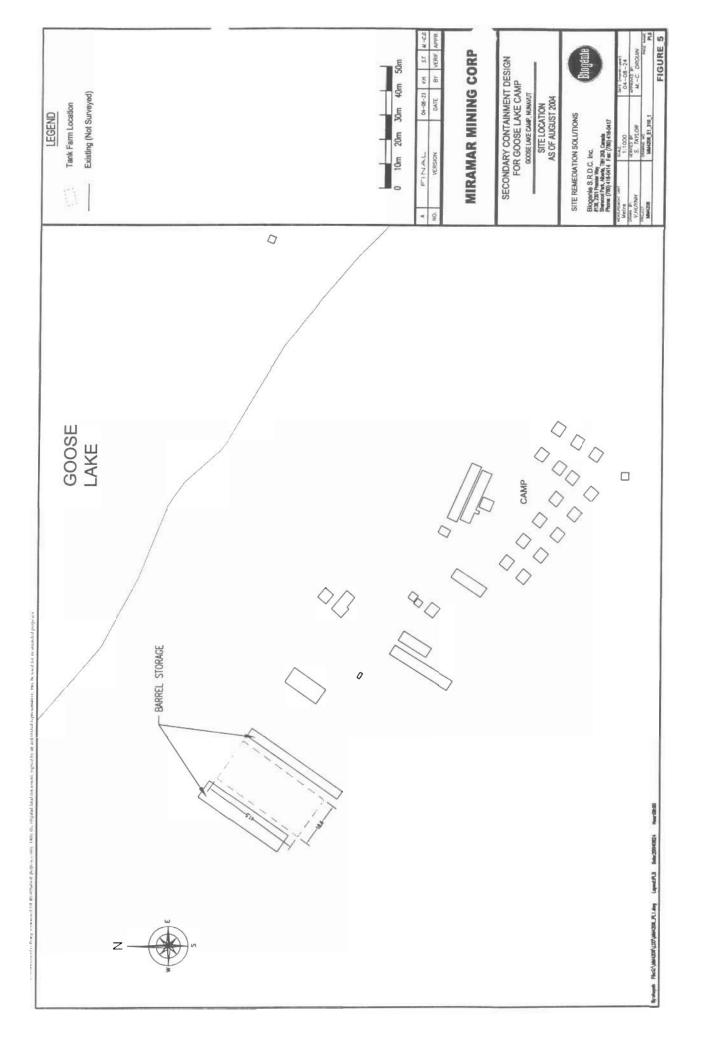
Regards,		
Prepared by:	Steve Taylor, B.Sc., Geol.I.T. Project Manager	
Verified and approved by:	Marie-Claude Drouin, P.Eng., M.Sc.A. General Manager, Alberta	
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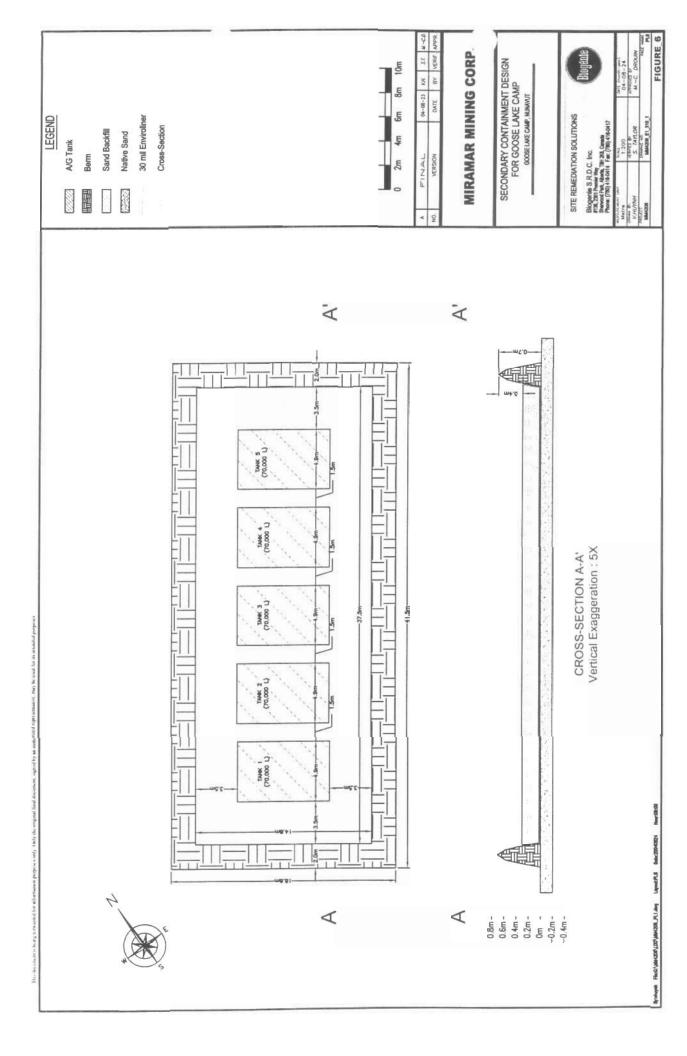














# Geomembranes - Enviro Liner

Enviro Liner® is our premium quality geomembrane material designed for top performance in all geomembrane applications.

Enviro Liner® is a proprietary polyolefin material designed for outstanding durability, chemical resistance, and flexibility. Enviro Liner® is manufactured by Layfield at our facility in Vancouver, B.C. Every step in the production of an Enviro Liner® geomembrane is completed according to our ISO 9002 Quality System, ensuring your liner adheres to stringent standards for all geomembrane applications. Whether you require manufactured roll stock, fabricated geomembrane panels, or complete installation services, Layfield's Enviro Liner® is your first choice in geomembrane technology.

Enviro Liner® is ideal for applications such as water and waste water, secondary containment and soil

remediation, and pond and canal liners. Enviro Liner® has been specially formulated for long term UV durability. Enviro Liner® contains special additives to optimize UV life expectancy. Our goal in developing the Enviro Liner® formulation has been to offer a highly UV stabilized flexible liner, that provides the same exposed service life at 30 mil as can be expected from 60 mil HDPE.

The flexibility of Enviro Liner® allows us to prefabricate large panels of liner in our plant. Often, entire ponds can be lined in one piece, speeding construction and minimizing field work. Enviro Liner® is ideally suited to cold temperature installations and is flexible in temperatures that would damage other lining materials.

Enviro Liner® has excellent chemical resistance and can be used for secondary containment in a variety of applications. Enviro Liner® is also used in water containment, canal, and most other liner applications.

25 Nov 2003	Enviro Liner® Minimum Material Properties					
Style	ASTM	Enviro Liner® 20 (U)	Enviro Liner® 30 (U)	Enviro Liner® 40 (U)		
Thickness (Nominal)	D5199	20 mil 0.5 mm	30 mil 0.75 mm	40 mil 1.0 mm		
Tensile Strength at Break	D638	77 ppi 13.5 N/mm	115 ppi 20.1 N/mm	152 ppi 26 N/mm		
Elongation	D638	800%	800%	800%		
Tear Resistance	D1004	11 lbs 49 N	16 lbs 71 N	22 lbs 98 N		
Low Temperature Impact Resistance	D1790	-94°F -70°C	-94°F -70°C	-94°F -70°C		
Dimensional Stability	D1204 Max Chng	1.5%	1.5%	1.5%		
Puncture Resistance	D4833	32 lbs 142 N	48 lbs 213 N	61 lbs 271 N		

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# Layfield Geosynthetics and Industrial Fabrics Ltd.

www.geomembranes.com service@geomembranes.com

#### Geosynthetics, North America

Toll Free: 800-840-2884 Tel: 780-453-6731 Fax: 780-455-5218

## Geosynthetics, US West Coast

Toll Free: 800-796-6868 Tel: 425-254-1075 Fax: 425-254-1575

25 Nov 2003	Enviro Liner® Minimum Shop Seam Strengths				
Style	ASTM	Enviro Liner® 20 (U)	Enviro Liner® 30 (U)	Enviro Liner® 40 (U)	
Heat Bonded Seam Strength	D6392 25.4 mm (1") Strip	37 ppi 6.5 N/mm	50 ppi 8.8 N/mm	70 ppi 12.2 N/mm	
Heat Bonded Peel Adhesion Strength	D6392 25.4 mm (1") Strip	FTB 30 ppi 5.3 N/mm	FTB 45 ppi 7.9 N/mm	FTB 60 ppi 10.5 N/mm	

25 Nov 2003	Enviro Liner® Minimum Field Seam Strengths				
Style	ASTM	Enviro Liner® 20 (U)	Enviro Liner® 30 (U)	Enviro Liner® 40 (U)	
Heat Bonded Seam Strength	D6392 25.4 mm (1") Strip	30 ppi 5.3 N/mm	45 ppi 7.9 N/mm	60 ppi 10.5 N/mm	
Heat Bonded Peel Adhesion Strength	D6392 25.4 mm (1") Strip	FTB 26 ppi 4.6 N/mm	FTB 40 ppi 7.0 N/mm	FTB 53 ppi 9.3 N/mm	

Each and every liner panel we produce is a custom panel. The way we set up our shop is unique in that our shop welders produce prefabricated panels to best match your containment area. We size each panel to fit, without waste, in a logical sequence in your containment area. In containments with irregular shapes we size our panels to best accommodate the irregular size.

There are no theoretical limits to the size of the liner panels that we can prefabricate but there are some practical limits, notably panel weight. Panel weight is important because of the limits of handling equipment that will be vailable in the field. Enviro Liner® is

Enviro Line	ner® FABRICATION SIZES				
Material Style	2500 lb Panel size 1120 kg	4000 lb Panel size 1800 kg			
Enviro Liner <sup>®</sup> 20 mil (0.50 mm) Unsupported	25,000 ft <sup>2</sup> 2,300 m <sup>2</sup>	40,000 ft <sup>2</sup> 3,700 m <sup>2</sup>			
Enviro Liner <sup>®</sup> 30 mil (0.75 mm) Unsupported	17,000 ft <sup>2</sup> 1,600 m <sup>2</sup>	27,000 ft <sup>2</sup> 2,500 m <sup>2</sup>			
Enviro Liner <sup>®</sup> 40 mil (1.0 mm) Unsupported	12,500 ft <sup>2</sup> 1,200 m <sup>2</sup>	20,000 ft <sup>2</sup> 1,900 m <sup>2</sup>			

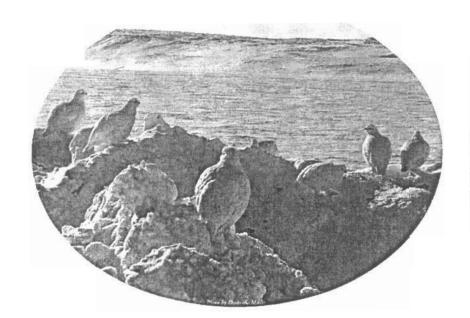
normally limited to a maximum panel weight of 2,500 lbs (1,200 kg); however, if a skilled installation crew is available then a panel of up to 4,000 lbs (1,800 kg) is possible.

Panels are accordion folded in one direction and then rolled in the other direction. Unfolding instructions and dimensions are marked on the individual liner panel. Each panel is wrapped in an opaque, weather resistant covering suitable for shipment and storage.

All shop fabricated seams are 100% visually inspected by the welding operator. Every fifth seam is tested for Film Tear Bond and destructively tested in peel and shear. Quality control reports are prepared with each panel produced.

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# Miramar Hope Bay Ltd Standard Operating Procedure Spill Contingency Plan



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# Update - July 2004

# Approved By:

Position	Name	Signature	Date
Manager, Environmental Affairs	Hugh Wilson		
Human Resource Superintendent	Scott Stringer		
Site Supervisor (Representative)			
Occupational Joint Health & Safety (Co-chairperson)			
Quality Assurance			

Document No:		MHBL-SCP-R.02	Revision:	R.02	Date:	July 04
Authorised By:		Hugh R Wilson	Author:	Matthew H Kawei	Page:	2 of 39
Title:	Spill Co	ntingency Plan - Hope Bay Pro	ject 2004.			

#### **Document Control Record**

The re-issues of this document, listed below, have been reviewed and approved by Quality Assurance and Management and are authorised for use within the Miramar Hope Bay Ltd organisation.

Rev No	Page No	Details of Issue	Aut	horisation	
			Name	Initial	Date
0	All	Original Document	Hugh Wilson		Feb 2002
0	All	Conditional Approval	NWB*		Mar 2004
1	All	Review	Hugh Wilson		Mar 2004
2	All	Review to include NWB specific concerns	Matthew Kawei		May 2004

<sup>\*</sup>Conditional Approval subject to revisions to the original document to include specific concerns raised by Nunavut Water Board

# **Distribution List**

Date	Copy #	Name	Department/Location	Type
Original copy	0	Hugh Wilson	Manager, Environmental Affairs	Electronic, pfd & doc
			Boston Camp	
			Windy Lake Camp	
			Patch Lake (Major)	
			Doris	
			Goose Lake	

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#### 1 Introduction

### 1.1 General Description of Property

Miramar Hope Bay Ltd (MHBL) is a 100% owner of the Hope Bay Belt. Extensive advanced exploration programs have been carried out on the belt from 2000 through the 2003 operating seasons. Similar activities are anticipated in 2004 and beyond as MHBL continues to advance the project to eventual production.

The project area is located approximately 175 km southwest of Cambridge Bay, 450 km west southwest of Gjoa Haven, and 60 km east of Umingmaktok, the closet community to the project area.

# 2 Purpose and Scope

This document is a review and analysis of the preparedness for events, which may occur due to unforeseen circumstances. The plans and predetermined lines of response detail actions to be taken in the event of unintentional materials release during the ongoing exploration programs MHBL plans to carry out on the belt and includes wastewater, sewage treatment, fuel or chemical storage areas. This Spill Contingency Plan addresses all project areas within the Hope Bay Belt including camps at Boston and Windy Lake. The campsite on Wolverine Lake was fully decommissioned in 2001 and KIA has given full clearance at this site. The plan will be updated periodically and would address any significant changes in operating plans, should they occur.

This contingency plan is a living document, and would be amended as required, to accommodate change. It first describes the main facilities to be operated as a component of the ongoing exploration drilling programs, followed by contingency measures to support them. On site activity is planned to run from approximately January to September of each year, due mainly to access limitations. Should operations extend beyond these times, and if operational scenarios change, this plan will continue to apply and notification will be made to the appropriate agency(s).

An abbreviated version of the plan will be posted for all exploration staff and visitors to the MHBL's project site as part of MHBL's field orientation program. The new employee, visitor or contractor is inducted within 24 hours on his/her arrival to site.

# 2.1 MHBL Policy on Initiating Cleanup Activities

It is the policy of MHBL to initiate clean up activity when, in the opinion of management, MHBL is clearly associated, or likely associated with the spilled product. The guiding principles of MHBL's Spill Contingency Plan is to comply with existing regulations to ensure protection of the environment, and to keep employees, government officials and the stakeholders aware of our plans.

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#### 2.2 Environmental Policy

Miramar Hope Bay Limited is committed to maintaining sound environmental practices in all of its activities from exploration through to closure and land relinquishment.

To achieve this, MHBL in working with its employees and contractors will:

- Examine the potential impact to the environment of all proposed activities and take steps to minimize or where possible eliminate the impact.
- · Ensure all activities are in compliance will all environmental legislation and regulations.
- On a continuous basis, determine the MHBL impact to the environment and through continuous improvement, strive to attain higher level of environmental performance.
- Maintain a high level of environmental protection by applying practices and technologies that minimise impacts and enhance environmental quality.
- Maintain dialogue with communities and other stakeholders within the area of influence of the Hope Bay Project.
- Progressively rehabilitate disturbed area, develop closure plans that can be continually improved and incorporate new technologies where practical.
- Encourage cooperative research programs with government and other stakeholders to better understand and monitor impacts associated with the Hope Bay Project.
- Train all employee and contractors to understand their environmental responsibility related to MHBL.

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# 3 Project Facility Description

#### 3.1 Existing Facilities and Previous Work

MHBL operates the existing camps initially constructed by BHP at Boston (Aimaogaktak Lake) and Windy Lake. There are caches of fuel and other consumables at Windy Lake Camp, and Doris Lake. A drill service area and workshop is located on the western shore of Patch Lake.

#### 3.1.1 Doris North

There are two 75,000 L above ground storage tanks (ASTs). These ASTs are double walled structures and are Underwriter's Laboratory of Canada (ULC) approved. Double walled ULC tanks are commonly known as Enviro-tanks. The ASTs are located on the rocky high ground a short distance south overlooking Doris Lake.

#### 3.1.2 Patch Lake - Major Drilling Maintenance Shop

Major Drilling's maintenance shop is located approximately 2 km east of Windy Lake Camp on Patch Lake. There are two ULC approved 75,000 L double walled ASTs at the site.

#### 3.1.3 Windy Lake Camp

Windy Camp is located on 400-meters of land below a rocky bluff bordering the shore of Windy Lake (see Appendix 15.2). Bulk fuel storage at Windy Lake consists of one 50,000 L double walled, ULC approved tank and two 75,000 L doubled walled, ULC approved tanks. The tanks are located in a natural berm, close proximity to each other south of the main camp.

The main fuel supply for the camp consists of six new 1,200 L doubled walled, ULC approved Tidy tanks, four of which are connected to dedicated fuel distribution lines for the majority of the accommodation and the genset shacks. This reduces the frequency of fuel handling requirements from the previous system, (some still in use), where individual 45 gallon drums are used to supply fuel for each sleeping tent.

#### 3.1.4 Boston Camp

Boston Camp is located on a high ridge overlooking the Spyder Lake 45 km south of Windy Lake camp. A general layout area is provided in Appendix 15.1. There are eight ASTs (2 x 50,000 L and 6 x 70,000 L) bermed in an engineered secondary containment area. South of the main camp and near the Procon shop is a 50,000 L ULC approved enviro-tank.

Tidy tanks are used for fuelling ski doos and the main commendation area. Individual 45 gallon drums are used to supply fuel for the remaining sleeping and core logging tents.

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#### 3.2 Environmental Aspects and Impacts

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 environment as a result of the aspect. Information on the significance of aspects and impacts is important for setting priorities and allocating resources for managing the environmental changes through the use of engineering and other controls. The intent is to ensure that aspects and impacts are systematically identified and assessed, an action plan is implemented for controlling impacts and the effectiveness of controls is measured and reported to provide feedback for continual improvement.

An Issue Management Plan (IMP) shall be developed for each significant environmental aspect and impact associated with MHBL's operations by the end of 2004. The IMPs shall be documented in the Environmental Operating Plan that will include information on the program for addressing significant environmental aspects.

The information summarised in Appendix 15.2 for each camp is based on current knowledge and will vary over time. There are procedures in place at each location for ensuring data reported are current.

# 3.3 Domestic Greywater Sewage

At Boston, all domestic greywater and sewage are treated in the Rotating Biological Contactor (RBC), which treats and clarifies effluent prior to discharge on the tundra as approved by the Nunavut Water Board.

In 2000, a Rotating Biological Contactor (RBC) sewage treatment system was constructed at Windy Lake camp and was commissioned at the start of the 2001 field program. The previous latrine system remains in place as a back-up system at Windy Lake. All greywater from the camp is also directed to the RBC, which discharges on land well away from Windy Lake. This system has been approved by the Nunavut Water Board and includes a monitoring and sampling program when operating during open water periods.

#### 3.4 Solid Waste

Combustible solid wastes generated from the camp facilities continue to be incinerated on a regular basis. Commercial incinerators are strategically located at each camp. Products such as combustible domestic and office waste are burned. Non combustible waste such as scrap metal, non-reusable barrels, incinerator ash etc., have, as reported previously, been removed from site using backhaul flights to Yellowknife or placed on the barges returning to Hay River. Since the practice of hauling these types of material off site is impractical, MHBL has applied for an on-site Solid Waste Disposal Facility (SWDF), to be located at the Boston camp. Once regulatory authorities grant approvals, all non-hazardous and non-combustible material, including that stored at Windy Lake will be disposed of into this facility.

#### 3.5 Waste Rock Management

The waste rock currently stored at Boston is unlikely to produce any adverse impact to the environment. The waste runoffs would be monitored and waste rock would be disposed of in an approved location and under acceptable practices.

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#### 3.6 Fuel Storage

Diesel fuel is required to generate power on-site, heat buildings and to fuel mobile equipment. The diesel fuel storage requirement for the continuing exploration program by MHBL consists of both bulk storage and storage in Jet B drums.

In September 2000, 2001 and 2003, diesel fuel was transported to the Hope Bay belt by Northern Transportation Company Limited (NTCL) using approved fuel storage barges that can remain at site and frozen in the ice at Roberts Bay. The fuel is then pumped off and transported to the various storage facilities (by a contractor) for use in the exploration programs. It is expected that this method of fuel resupply will continue throughout the advanced exploration phase and could continue into the operations phase, when it occurs. To facilitate this increase in fuel requirements, the following storage is available:

As previously reported, an engineered and lined tank farm was constructed at Boston in 2001. This facility consists of six (6) by 70,000 L and two (2) by 41,000 L tanks. These tanks are filled annually during the winter program. The engineers report was previously filed with the Nunavut Water Board in 2001 and is not included with this plan.

- As of September 2001, there were eight (8) self berming enviro-tanks strategically located in the
  belt, two (2) of which are 75,000 Litres, four (4) are 70,000 Litres and two (2) are 50,000 litres.
  There are also three (3) contractor owned portable tanker/sloops, strategically located within the
  Hope Bay Belt, which are empty and are used in winter to transport fuel to the various storage
  tanks as operations dictate.
- As previously reported, the construction of the tank farm and the increased number of self-berming
  tanks has minimized the need to store diesel fuel in 205 litre barrels. As such, this has decreased
  the number of used barrels on the belt and the barrels remaining are used for camp tent heating,
  remote drill operations or as markers for the ice strip. All bulk tanks and barrels are stored at least
  30 metres above the high water mark of any water body.

In addition to diesel fuel mentioned above, Jet-B fuel and gasoline are stockpiled in 205 litre barrels at Boston and Windy Camps, and is relocated to activity areas as required. Specialized oils and greases used by the drilling contractors are strategically stored in the appropriate manner. Inventories at each site are dynamic.

The spill contingency plan and associated response equipment will be available on-site to handle potential spill incidents.

#### 3.7 Chemicals and Household detergents

MHBL is committed to the safe and proper handling of waste materials to ensure minimal environmental impact and land disturbance. Waste chemicals that require special attention and handling are waste oil, hydraulic oil, lubricating oils, calcium hypochlorite (CaCl), sodium chloride (NaCl), grease and ethylene glycol.

The waste oil burner installed at the Windy camp continues to operate and the heat generated is used to heat some of the administration tents. Waste oil and oil from filters not used in the waste oil burner mentioned above, will continue to be used as incinerator fuel. This eliminates the need to remove the waste oil from the project area, resulting in considerable cost savings. Drained, spent oil filters will be stored in drums for removal from the site for disposal at an authorized disposal facility or could be cleaned and incinerated. There are no reagents used on site at this time. Calcium Chloride (commonly called Rock