# HOPE BAY MINING LIMITED

## QUALITY ASSURANCE and QUALITY CONTROL PLAN

**In Compliance with**

Boston Type B Water Use Licence

2BB-BOS0712


Prepared by:

ESR
Hope Bay Mining Ltd.
North Vancouver, BC

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## DOCUMENT CONTROL RECORD

**Approved By:**

| Position | Name | Signature | Date |
|---|---|---|---|
| Director, Environment and Social Responsibility | Chris Hanks | | |

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

| DOCUMENT CONTROL REVISION HISTORY | | | | | |
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**Conditional Approval subject to revisions to the original document to include specific concerns raised by Nunavut Water Board*

# 1.0 INTRODUCTION

## 1.1 Overview

This Quality Assurance & Quality Control Plan (QA/QC Plan) was prepared for Hope Bay Mining Limited (HBML), a wholly owned subsidiary of Newmont Mining Company, for use on the Hope Bay Project in the Nunavut Settlement Area. The Plan is intended to meet the requirements of the Surveillance Network Program as outlined in the Nunavut Water Board issued Water Use License 2BB-BOS0712. This license issued to HBML covers mining and exploration activities in the Hope Bay Belt, West Kitikmeot region of Nunavut.

Quality assurance (QA) & Quality Control (QC) are important components of the Environmental Management System (EMS) being implemented in the Hope Bay Belt. This QA/QC Plan has been prepared in accordance with "QA/QC Guidelines for use by Class "A" and "B" Licensees in Meeting Surveillance Network Program Requirements and for Submission of a QA/QC Plan" as published in July 1996 by the Water Resources Division of the Department of Indian and Northern Affairs and the Northwest Territories Water Board.

## 1.2 Purpose and Scope of the QA/QC Plan

This document describes the procedures to be used when conducting environmental sampling, analysis, and reporting. It outlines the criteria, for sample collection, preservation, documentation, transportation, data management, and reporting, established for the HBML project. These procedures have been developed from literature and guidelines and are intended to promote good practices in environmental management. As per the approved water license this plan will be reviewed annually and updated as needed to maintain compliance with license requirements and to support needed Data Quality Objectives (DQO).

Although the QA/QC Plan is submitted to the Nunavut Water Board as a condition of the Surveillance Network Programs annexed to the site Water License, it is primarily intended to be read, understood, and implemented by company personnel involved in water quality monitoring. These procedures are applied to ***all environmental samples***, whether analyzed for the purpose of regulatory compliance monitoring, or for the purpose of internal environmental management.

## 1.3 Responsibility

Director, Environment and Social Responsibility (DESR) – The DESR has overall responsibility for:

- The Environmental Management System of which this plan is a part;
- Ensuring that sufficient resources are available to allow compliance to this Plan;

- Oversight and training of the environmental staff;
- Review of work accomplished by the environmental staff.

Environmental Coordinator – The environmental coordinator's responsibilities include:

- Review and update this Quality Assurance and Quality Control Plan annually;
- Provide training and support to field samplers on the procedures contained in this document;
- Oversight and technical support to environmentally sensitive issues in the project area;
- Ensure that required sampling is carried out in accordance with this plan and permit requirements;
- Sampling water as required in the permits, including lakes, tanks, impoundments, discharges, run off, and opportunistic seepage;
- Review and management of analytical data;
- Ensure sampling equipment is available and in good working condition at the camps;
- Provide weekly, monthly and annual reports to the DESR;
- Provide monthly and annual compliance reports to the Nunavut Water Board.

Environmental Sampler – The sampler's responsibilities include:

- Knowing and understanding appropriate sampling techniques;
- Sampling at correct locations;
- Daily calibration of field testing equipment and documentation of same ;
- Recording, maintaining, and reporting of field data;
- Proper handling and documentation of samples;
- Reporting progress and field test data to the Environmental Coordinator.

## 2.0 QUALITY ASSURANCE AND QUALITY CONTROL

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

- Personnel involved in sampling and analysis are trained and competent;
- Sampling and testing equipment are reliable and kept in good working

condition;

- Standard procedures are implemented for the collection and transportation of samples, based on acceptable and approved operating practices;
- Use of certified external laboratories to conduct chemical analyses;
- Review of Data Quality Objectives (DQO) to ensure that data needed for environmental management is available;
- Laboratory water, reagents and other supplies are of consistent high quality;
- Quality Control (QC) programs are developed and implemented, based on recognized good operating practice, to assess the quality of the analytical data and provide warning of unacceptable analytical or samplers errors;
- Prompt remedial action is taken when deficiencies are identified; and
- Analytical results and QC program results are reported internally and externally using standard procedures.

Quality control (QC) is a set of specific procedures used to assess the quality of the data produced and correct deficiencies in sampling or analysis, as they occur. Quality control is used by the analyst and sampler to achieve standards of measurement for the three principal components of quality: precision, accuracy and reliability. The components are defined as follows:

***Precision:*** A measure of the closeness with which multiple analyses of a given sample agree with each other.

***Accuracy:*** A measure of the closeness of the analytical result to the true value.

***Reliability:*** A measure of the frequency at which the standards of precision and accuracy are achieved.

Although each component of quality can be achieved without the other, true quality can only be achieved with a combination of all three components.

Different quality control methods can be used to measure each of the components of quality and can isolate the probable source of errors detected. For this reason, a good QC program is made up of a number of recognized methods.

## 3.0 FIELD SAMPLING

The permit required sample names, locations, and parameters are listed in Table 1 of Appendix A. The locations currently monitored at Boston Camp are illustrated in Appendix B. Additional sampling sites will be added on an as needed basis. These additional sampling locations will be added in response to regulatory requirement or identified DQO needs. These include samples taken below ice to compare water quality before and after a drilling effort, sites of previous petroleum product spills, new spills

and spring runoffs, especially associated with construction activities. All sampling sites coordinates will be recorded using GPS.

## 3.1 SAMPLE COLLECTION

Environmental sampling of water and soil is conducted to provide information required by the company for effective environmental management of the site, to provide information on follow-up monitoring of previous spill sites and to monitor regulatory compliance. It is necessary to ensure sample integrity is maintained for all samples collected whether for regulatory compliance or internal management decisions.

### 3.1.1 Sampling Locations and Frequency

The Surveillance Network Program (SNP) as required by the Water License prescribes a specific water-sampling program for the site, including sampling locations, sampling frequency, and parameters to be analyzed. A map of the property showing the prescribed sampling locations is on file with the Nunavut Water Board. A site specific photograph with details of sampling locations is provided in Appendix B.

The SNP sampling stations are to be clearly identified in the field by posted signs. The location of signs and the precise location of sampling will be approved by the designated Inspector for the site. Samples must always be taken at the same location. Sampling locations will be relocated as required by the water use permits or as recommended by the designated site Inspector.

Appendix A outlines the sampling frequency and parameters to be analyzed for, at each of the sampling stations. This table covers sampling at Boston Camp.

### 3.1.2 Sample Types

Different sample types can be collected at the various sampling locations. With the exception of soil samples these will generally be grab samples.

Samples are normally taken from natural lakes, streams, treatment ponds, process streams, sumps, or effluent discharges. When possible, samples should be taken from just under the surface to avoid floating debris that could impact the quality of the sample.

### 3.1.3 Sample Containers

Sample containers vary in size and material of construction, depending on the analysis to be conducted. The laboratory method to be used will dictate the size and type of bottle to be used for the sample. All samples containers will be prepared and supplied by the contracting laboratory. Only clean unused containers should be used. This helps limit field generated contamination or preservation errors. Sample containers and preservation needed for the different analyses are shown in Tables 1 and 2. If there is a need for bacterial testing the bottles should be used directly from the laboratory that is conducting the analysis, as the bottles must be autoclaved (sterilized) prior to use.

### 3.1.4 Field Sampling Log Book

Details of all sampling activities are recorded in a field logbook. The sampler should record the date and time for each sample collected, the sampling stations visited, and the samples taken at each station. The results of any field measurements (i.e. temperature, pH, etc) should be recorded along with information on sample preservation.

Additional information can be useful when attempting to interpret analytical data. The sampler should, therefore, record any information that may have a bearing on water quality, such as weather conditions, stream flow rates and unusual conditions at the site. Any necessary deviations from standard procedures or sampling location need to be documented and include the reason for the changes.

As soon as possible a copy of the field log book pages should be made and submitted to the Environmental Coordinator. This copy serves as backup, in the event the log book were lost or destroyed, and as a reference for others who may need to review this data. It should be remembered that the field notes and the field log book itself are considered legal documents and should therefore be kept legibly in permanent ink. In the event that an error is made it should be crossed out with a single line and initialled by the one making the correction. Pages should never be removed and space or pages being left blank should be labelled as such with a single diagonal line and the phrase "intentionally left blank". When filled the field book should be filed and retained in case of future need.

### 3.1.5 Sampling Requirements

**Table 1:** Boston Exploration Project lake water, sewer water and contaminated soil sampling requirements: 2BB-BOS0712

| | Parameters (Analysis) | Bottle Type | Preservative | Supplier | BOS-1 | BOS-2 | BOS-3 | BOS-4 | BOS-5 | BOS-6 | BOS-7 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Water | Fecal Coliforms | Sterile | None | Taiga | 1 | | 1 | 1 | | | |
| | $BOD_5$ | 500 mL plastic | None | | 1 | | 1 | 1 | | | |
| | Routine | 250 mL plastic | None | ALS Laboratories | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Acute Lethality – Rainbow Trout | 2 x 20 L carboy | None | | | | | 2* | | | |
| | Acute Lethality – Daphnia Magna | 2 x 1 L clear glass | None | | | | | 2* | | | |
| | Total Metals | 250 mL plastic | 5 mL 20% nitric acid | | | 1 | | | 1 | 1 | 1 |
| | Oil & Grease (HEM) | 1 L amber glass | 2 mL HCl | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Phenols | 100 mL amber glass | 1 mL $H_2SO_4$ | | | | | | 1 | 1 | 1 |
| | PAH | 2 x 1 L clear glass | None | | | | | | 2 | 2 | 2 |
| | BTEX, F1 | 3 x 40 mL vials | Sodium bisulphate (precharged) | | | | | | 3 | 3 | 3 |
| | F2, F3, F4 | 1 L amber glass | None | | | | | | 1 | 1 | 1 |
| | Ammonia | 250 mL plastic/glass | 1 mL 1:1 $H_2SO_4$ | | | | | | | | |
| Soil | Jars | 125 mL | No headspace | | | | | | | | |
| | | 250 mL | | | | | | | | | |
| | | 500 mL | | | | | | | | | |
| | Bags | 2 lb Ziploc | No headspace | | | | | | | | |

** Samples taken annually instead of monthly.*
*Note: Quantity required annually is based on a projected 12 months of operation to include extras.*

### 3.1.6 Environmental Surveillance Monitoring

Some of the monitoring required under the Boston permit does not involve collection of samples or laboratory analysis. This monitoring, such as water usage and discharge is an important aspect of how the site is functioning. The timely acquisition, preservation, and reporting of this data allows monitoring of how the camp is affecting the local environment and show compliance to the permit requirements. Therefore, the notes and field measurements for these programs are an important part of the site environmental management.

### 3.1.7 Field Measurements

On most samples pH and temperature of the water are measured and recorded in the field when the sample is taken. The meters need calibration prior to each days sampling activities, and all calibration should be recorded in the field notebook.. Additionally, the calibration of the meter should be checked against a known standard at the end of the days sampling. Any issues with calibration or discrepancies with the end of day calibration check should be noted in the field log book along with the sampling data from that day. Calibration check data will not be used to alter any reading taken during the day. These results may be used to help explain anomalous data. Measurements should be taken directly from the water body being sampled. Where this is impractical, perhaps due to the high velocity of a sample stream, the measurements can be taken from a sample bottle. Temperature and pH measurements should be rounded to one decimal place.

## 3.2 Sampling Methods

The following procedures should be used to collect water samples, as appropriate to the sampling location.

### 3.2.1 Streams

The sample should be collected as close as practical to the middle of the stream, where water flows freely and is free of debris. After getting into position, the sampler should wait to allow any sediment that may have been stirred up to settle or wash away.

The sample bottle should be partially filled with the water to be sampled and rinsed with the cap in place at least three times. Note that sampling for Oil and Grease and Bacteria are the exceptions to this procedure - Oil & Grease, and Bacteria sample bottles should NOT be field rinsed before taking the sample. Care should be taken to empty rinse water downstream from the sampling point, so that stream sediments are not disturbed.

If possible, plunge the bottle into the stream to a depth of approximately half the total stream depth and allow it to fill with the mouth facing upstream. In shallow streams, where plunging the sample bottle will not allow it to fill completely and may disturb sediment; a smaller bottle can be used to transfer water to the larger sample bottle. Bottles should be filled to near full capacity, allowing enough room for preservative addition and mixing (the neck of wide-mouthed bottles is sufficient space for this).

### 3.2.2 Lakes and Ponds

Surface samples from lakes and ponds should be collected using the same procedures as above. Subsequent samples should always be taken at the same location. Sample bottles should be plunged into the water to a depth of about six inches below the water surface.

Although not currently required for SNP sampling, information on water quality at depth in lakes and ponds may be required at times. These samples will usually be collected with a Van Dorn type sampler, which is lowered to the required depth and triggered to trap a sample of water by releasing a "messenger" from the surface. Both the sampler and sample bottle are rinsed with the water to be sampled a total of three times and the sample is retrieved on the fourth submersion of the sampler to the given depth.

### 3.2.3 Process Streams (Pipes, Valves and Auto-Samplers)

Some sampling of process streams may be required by the Surveillance Network Program and for environmental management purposes. These may be grab samples, which are taken from a valve or a pipe discharge, or composite samples collected over an extended time period by an automated sampling system.

The same principles used in natural stream sampling should be applied when collecting grab samples. The sample bottle should be rinsed with the water to be sampled three times, with the exception of sampling for Oil and Grease analysis, as noted above. Valves should be open for at least one minute before taking the sample, to help ensure that the water is representative of the process stream.

### 3.2.4 Soil Sampling

The Environmental Protection Service of the Nunavut Department of Sustainable Development has a published an "Environmental Guideline for Soil Remediation" that provides guidance as to acceptable levels for the remediation of hydrocarbon contaminated soils in Nunavut. These guidelines are derived from the CCME 1991 Interim Criteria and the CCME 1997 Recommended Soil Quality Guidelines.

HBML will use the industrial remediation guidelines for hydrocarbon contaminated soils as the basis for determining when soil has been remediated. Once remediated the soils can be removed from the Land Treatment Area (LTA) facility and used in site reclamation activities.

A record will be kept by HBML's on-site Environmental Coordinator documenting the amount of contaminated soil and snow placed in the LTA. This record will also include the location of each batch of contaminated material/soil within the LTA by contaminant type and length of remediation. The LTA will be monitored weekly during summer months by the Environmental Coordinator to help ensure that conditions conducive to the attenuation of hydrocarbon contaminants are present (i.e. soil moisture, pH, and aeration).

The sampling plan will include sampling methods (grid, composite) and frequency (number of samples per surface area). Since the LTA material is relatively thinly applied and homogenized through tilling, only one depth of sample collection is required. The samples should then be analyzed for the contaminants of interest and compared with the remediation guidelines. When the contaminant levels are found to be below the

industrial screening levels the soils have been remediated and the LTA can be closed or the soils removed for use elsewhere. Monitoring of contaminant levels in the leachate is only required prior to discharging the leachate, to the environment. During recirculation, testing may be done for purposes of tracking remediation progress.

Soil samples will be collected at least twice per year and tested for CWS-PHC fractions (Fraction F1 thru F4), Benzene, Toluene, Ethyl benzene, Xylene (BTEX), Total Petroleum Hydrocarbons (TPH) and total metals using a 36 element ICP-MS scan (see Appendices B & E). There are no CCME guidelines for density of soil sampling in LTA. Each separate pile within the LTA be divided into quadrants, and sampled with a target density of one composite of ten samples per 25 $m^3$ to adequately characterize the soil's hydrocarbon levels. As for samples collected at spill sites, sufficient amount of contaminated soil will be sampled depending on the amount of topsoil in the area. Care should be taken not to expose the underlying tundra.

## 3.3 SAMPLE HANDLING

Best Management Practices are employed during collection of all samples, whether they are for regulatory compliance or site environmental management.

### 3.3.1 Sample Identification

Before starting a sampling event, the required sample bottles should be gathered and prepared. This would include the necessary preservatives and a cooler to help maintain a more constant temperature in the samples. At a minimum the sample location (SNP station number), the sampling date, and parameters to be analyzed should be marked on each bottle using previously prepared printed labels before heading into the field. If labelled in the field care must be taken to ensure that the ink used is permanent, waterproof, and legible.

When sampling and sample preservation is completed, the bottles should be clearly marked with all information that the laboratory analyst will need to report the result. As a minimum, the following information should be included:

- Sample location (or SNP station number),
- Date of sampling,
- Parameters to be analyzed,
- Preservation method used,
- Name or initials of sampler, and
- Temperature and pH where applicable.

As the samples are to be sent to an external laboratory, the company and property name must also be included.

In some cases permanent markers can be used to identify sample bottles, however these markings can be erased with wear and may not be clearly legible. Whenever possible, and always when sending samples to external laboratories, mark the bottles with pre-printed gummed labels. Labels should be applied to dry surfaces.

### 3.4 Chain of Custody Forms

A Chain of Custody form has to be filled out. The form is located on the Shared drive at S:\HBDorisCamp\ESR\Replicated\2009\Environmental Compliance Monitoring and Potable Water Sampling\Compliance Sampling The filled out form is to be printed as a PDF and filed on the shared drive in the same location. A copy of this form also needs to be printed out, signed, and sent accompanying the samples. An example of the form can be seen in Appendix F.

### 3.5 Preservation

As samples cannot be delivered to the analytical laboratory within two hours of sampling, preservation may be required. In many cases, chemical preservatives must be added to the samples to prevent chemical changes that may affect the concentration of the parameter of interest. In any case the samples must be preserved within two hours of sampling. This means that in most cases chemical preservatives can be added at the end of the sampling event prior to shipment. Some types of samples can be affected by either freezing or exposure to elevated temperatures. So some type of temperature control is often required. For example bacteria such as fecal coli form are killed if the sample gets too cold. Thus the cooler used to ship the samples is to protect the samples from temperature extremes. The appropriate preservation and sample container types are listed Table 1 of Appendix A.

### 3.6 Transportation

A major objective of the field sampler is to minimize any chemical changes to the sample between the time of sample collection and delivery to the laboratory, and which may alter the concentration of the parameter of interest. Heat, light, and agitation can all impact the water chemistry and the samples should be protected as much as possible from these effects.

Care should be taken when packing samples for shipment. To help prevent leakage and cross contamination, sample bottles should be packed standing upright in the cooler. Sample bottles laid on their side are much more likely to leak especially if they have other samples on top of them. Additionally, when possible, samples known or suspected to have elevated contaminate levels should not be shipped together with samples expected to be clean (i.e. sewage samples not shipped in same cooler as potable water samples). Package or cushion breakable glass bottles carefully to prevent breakage.

Samples should be delivered to the analytical laboratory as soon as possible after collection. All samples should be stored and transported at a temperature <10 degrees

Celsius. Coolers and ice packs are provided for field transportation and samples should be refrigerated as soon as possible following arrival at the laboratory.

## 4.0 QUALITY CONTROL

As outlined in Section 2.0, accepted quality control practices are employed throughout the environmental sampling program. The following samples are collected and analyzed for the same constituents being monitored in the Surveillance Network Program as part of the quality control check on monitoring activities:

### 4.1 FIELD BLANKS

Field blanks are samples of pure water that are subjected to the same procedures as routine field samples. Any measurement of the parameter of interest, above method detection limits, will indicate an analytical error, impurities in the laboratory distilled water supply, contaminated sample preservatives, or contamination of the sample during the handling process. Combined with the results of other quality control procedures, analysis of field blanks can help identify sources of contamination and error.

A set of field blanks should be made up once each month and taken into the field when the active SNP stations are sampled. New sample bottles should be used and prepared using distilled water. This set should represent all of the parameters routinely analyzed. They should be preserved using the same protocol as the regular samples and submitted to the laboratory identified as field blanks.

### 4.2 REPLICATE SAMPLES

Replicate sampling (or sometimes referred to as duplicate sampling) is the collection of more than one sample for a given analysis at a given location. The replicate samples are collected, handled, and analyzed using the same procedures applied to routine samples. The samples would also be analyzed by the same analytical method. Generally the samples would be sent to separate laboratories to allow comparison. Replicate sampling, combined with the results of other quality control procedures, can help indicate sources of error and are particularly useful in identifying problems with accuracy and sampling methods. Once per operating season, for each active SNP, a set of duplicate samples will be taken, representing as many of the routine analyses as possible. Where possible, this should be carried out in conjunction with audit sampling conducted by the designated inspector. Replicate sampling should rotate between the prescribed SNP stations.

### 4.3 METHOD "SPIKED" SAMPLES

The recovery of "known additions" from "spiked" samples is used as a check on the recovery of the parameter to be analyzed using a given analytical procedure. It is periodically carried out at the laboratories employed to analyze the samples and forms part of that laboratory's normal QA/QC program.

### 4.4 SPLIT SAMPLES

Two or more representative sub-samples are removed from one collected sample and analyzed separately at the laboratory. This data is used as a check of the precision of the analytical procedure employed by the laboratory and is a normal part of the laboratory's QA/QC program.

## 5.0 LABORATORY ANALYSIS

As HBML does not maintain an analytical laboratory on site, all analyses are performed at an accredited Environmental Laboratory. Currently HBML uses ALS Environmental Laboratory for all of their environmental analyses. Attached in Appendix G is a copy of the laboratory's QA/QC plan which includes links to the various forms showing their accreditations and certifications.

## 6.0 REPORTING

All analytical results are forwarded in electronic format to HBML's on-site Environmental Coordinator. Copies of all results are also sent to MHBLEnvironmental@Newmont.com for filing purposes. Additionally, HBML is in the process of installing an electronic database to help manage and make the data collected more accessible. This database will be maintained by the Technical Support group at HBML's Vancouver office.

After receipt these results are screened for anomalies and/or trends, following which they are placed into the appropriate environmental files. Results that appear to be anomalous are flagged and either the analysis is repeated or, if possible, a new sample is taken to confirm the value. Analyses that indicate contamination or changes are subjected to further study and reported to the appropriate agencies. The environmental files are maintained on the server and filed on the HBML Vancouver electronic filing system as a management tool for environmental risk assessment and in preparation of summary reports for the regulatory agencies and company officials. In compliance with the Surveillance Network Program, reports of analytical results for SNP samples are submitted in hard copy and electronically to the Nunavut Water Board within 30 days following the month in which the samples were taken. The Nunavut Water Board distributes the reports to other agencies and interested parties.

# APPENDIX A

## Environmental Sampling and Requirements of Permit 2BB-BOS0712

| | Old Station Number | Description | Frequency of Sampling | Parameters of An |
|---|---|---|---|---|
| BOS-1 | 1652-1a | Raw water supply intake at Spyder Lake | Does not specify | Volume |
| BOS-2 | 1652-2 | Containment Pond discharge | Once prior to discharge<br>Weekly<br>Once near end of discharge | See D8 (refers to condition in 2I |
| BOS-3 | 1652-3 | Sewage Disposal Facility final discharge | Monthly during discharge | $BOD_5$, TSS, Oil and Grease (and Fecal Coli forms, pH |
| BOS-4 | 1652-4 | Treated sewage effluent point prior to entry into Spyder Lake | Monthly during discharge | |
| | | | Annually | Acute lethality to Rainbow Trou<br>Acute lethality to Daphnia magn |
| BOS-5 | N/A | Effluent from the Bulk Storage Facility prior to release to a location | Monthly during water removal | CCME TPH, PAH, BTEX (F1),<br>$NO_2$, Oil and Grease (and visual |
| BOS-6 | N/A | Effluent from the Landfarm Treatment Facility prior to release | Monthly during water removal | Total Phenols, Total Alkalinity<br>Total Hardness, Ca, Mg, K, NaS |
| BOS-7 | N/A | Landfill leachate | During periods of observed flow | (As, Cd, Cu, Cr, Fe, Pb, Mg, Ni |
| BOS-8 | N/A | Waste Rock and Ore Storage Pad | Initially during spring thaw<br>Monthly, at minimum, during flow | pH, $SO_4$, EC, TSS, Total N, Tota<br>Scan 36 metals - Al, Sb, Ba, Be,<br>Fe, Pb, Li, Mn, Mo, Ni, Se, Sn,<br>Zn) |

| Location Non-specific Description | Frequency of Sampling | Parameters of Ana |
|---|---|---|
| Water column below any ice (Part F, Item 7) | Representative samples (Before & after drilling) | TSS, pH, EC, Total Trace Metals (IC<br>Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Li, M<br>Sr, Tl, Ti, U, V, Zn, As, Hg) |
| | | |

# APPENDIX B

Current Boston Camp Sampling Locations

# APPENDIX C Chain-of-Custody Form

ALS Environmental
ANALYTICAL CHEMISTRY & TESTING SERVICES

www.alsenviro.com

Vancouver BC, 1988 Triumph Street, V5L 1K5, Tel: 604-253-4188 Toll Free: 1-800-665-0243 Fax: 604-253-6700
Fort St. John BC, Box 256, 9831 - 98A Avenue, V1J 6W7, Tel: 250-261-5517 Fax: 250-261-5587
Grand Prairie AB, 9505 - 111 Street, T8V 5W1, Tel: 780-539-5196 Toll Free: 1-800-668-9878 Fax: 780-513-2191
Fort McMurray AB, Bay 1, 245 Macdonald Cr, T9H 4B6, Tel: 780-791-1524 Fax: 780-791-1586
Edmonton AB, 9936 - 67th Avenue, T6E 0P5, Tel: 780-413-5227 Toll Free: 1-800-668-9878 Fax: 780-437-2311
Calgary AB, Bay 7, 1313 - 44th Avenue NE, T2E 6L5, Tel: 403-291-9897 Toll Free: 1-800-668-9878 Fax: 403-291-0298
Saskatoon SK, 819 - 58th Street East, S7K 6X5, Tel: 306-668-8370 Toll Free: 1-800-667-7645 Fax: 306-668-8383

SEND REPORT TO:

## CHAIN OF CUSTODY FORM

PAG

| | | | | | |
|---|---|---|---|---|---|
| COMPANY: | Miramar Hope Bay Limited | | | ATTN: | Matt Kawel |
| ADDRESS: | 300-889 Harbourside Drive | | | | |
| CITY: | North Vancouver | PROV: | British Columbia | POSTAL CODE: | V7P 3S1 |
| TEL: | 1-604-985-2572 | FAX: | 1-604-980-0731 | SAMPLER: | April Pigalak |
| PROJECT NAME AND NO.: | Compliance Water Samples | | | QUOTE NO: | |
| PO NO.: | | | ALS CONTACT: | Randy Fournier | |
| REPORT FORMAT: | ☑ HARDCOPY ☑ EMAIL - ADDRESS: mkawel@miramarmining.com | | | | |
| | ☐ FAX ☐ EXCEL ☑ PDF ☐ OTHER: | | | | |

| FOR LAB USE ONLY | WO# | SAMPLE IDENTIFICATION | DATE / TIME COLLECTED YYYY-MM-DD | TIME | MATRIX | General | Total Metals (36 ICP) | Benzene, Toluene, Ethylbenzene, Xylen | F1, F2, F3, F4 (CCME PHC) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 8 - S Impact Area | 2007-06-09 | | water | x | | | | | | | | | | | | | | Not |
| | | 8 - S Impact Area | 2007-06-09 | | water | | x | | | | | | | | | | | | | Prs |
| | | 8 - S Impact Area | 2007-06-09 | | water | | | x | | | | | | | | | | | | Psn |
| | | 8 - S Impact Area | 2007-06-09 | | water | | | | x | | | | | | | | | | | Psn |
| | | 9 - Muster Lake | 2007-06-09 | | water | x | | | | | | | | | | | | | | Not |
| | | 9 - Muster Lake | 2007-06-09 | | water | | x | | | | | | | | | | | | | Prs |
| | | 9 - Muster Lake | 2007-06-09 | | Water | | | x | | | | | | | | | | | | Psn |
| | | 9 - Muster Lake | 2007-06-09 | | Water | | | | x | | | | | | | | | | | Psn |
| | | 10 - LTA | 2007-06-09 | | water | x | | | | | | | | | | | | | | Not |
| | | 10 - LTA | 2007-06-09 | | water | | x | | | | | | | | | | | | | Prs |
| | | 10 - LTA | 2007-06-09 | | water | | | x | | | | | | | | | | | | Psn |
| | | 10 - LTA | 2007-06-09 | | Water | | | | x | | | | | | | | | | | Psn |
| | | 11 - Fuel Farm | 2007-06-09 | | water | x | | | | | | | | | | | | | | Not |
| | | 11 - Fuel Farm | 2007-06-09 | | water | | x | | | | | | | | | | | | | Prs |
| | | 11 - Fuel Farm | 2007-06-09 | | water | | | x | | | | | | | | | | | | Psn |
| | | 11 - Fuel Farm | 2007-06-09 | | water | | | | x | | | | | | | | | | | Psn |
| | | 12 - LTA Coconut Mat | 2007-06-09 | | water | x | | | | | | | | | | | | | | Not |
| | | 12 - LTA Coconut Mat | 2007-06-09 | | water | | x | | | | | | | | | | | | | Prs |
| | | 12 - LTA Coconut Mat | 2007-06-09 | | water | | | x | | | | | | | | | | | | Psn |
| | | 12 - LTA Coconut Mat | 2007-06-09 | | water | | | | x | | | | | | | | | | | Psn |

| | | | | | |
|---|---|---|---|---|---|
| TURN AROUND REQUIRED: | ◉ ROUTINE ○ RUSH | SPECIFY DATE: _____ (surcharge may apply) | RELINQUISHED BY: | DATE: | RECEIVED BY: |
| | | | | TIME: | |
| SEND INVOICE TO: | ☑ SAME AS REPORT ☐ DIFFERENT FROM REPORT (provide details below) | | RELINQUISHED BY: | DATE: | RECEIVED BY: |
| INVOICE FORMAT: | ☑ HARDCOPY ☑ PDF ☐ FAX | | | TIME: | |
| SPECIAL INSTRUCTIONS: | Please send Invoice to Attention: MHBL Accounting Section using the above address: Please quote this Project Cost Centre: WCAMP-025200-1505 on your invoice unless stated differently on the next Chain of Custody. Electronic results to:mkawel@miramarmining.com | | FOR LAB USE ONLY | | |
| | | | Cooler Seal Intact? ___Yes ___No ___N/A | Sample Temperature: _____°C Frozen? ___Yes ___No | Cooling M ___Icepac |

# APPENDIX D : Laboratory's Quality Manual