HOPE BAY MINING LIMITED

QUALITY ASSURANCE and QUALITY CONTROL PLAN

Revision 5

In Compliance with

Boston Type B Water Use Licence

2BB-BOS0712

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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.

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1.0 INTRODUCTION

1.1 Overview

This Quality Assurance and 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 regulates the bulk sample and exploration activities for the Boston Project Area in the Hope Bay Belt located in the west Kitikmeot region of Nunavut.

Quality assurance and quality control 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 the *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* published in July 1996 by the Water Resources Division of the Department of Indian and Northern Affairs (now Indian and Northern Affairs Canada) and the Northwest Territories Water Board.

1.2 Purpose and Scope

This QA/QC Plan describes the procedures to be used when conducting environmental sampling, analysis, and reporting for the Boston Project. It outlines the criteria for sample collection, preservation, documentation and transportation, as well as data management and reporting. These procedures have been developed from literature and guidelines and are intended to promote best practice in environmental management. As per the approved water license, this plan will be reviewed annually and updated as needed to maintain compliance with the license requirements and to support the HBML 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

This QA/QC Plan is one component of the EMS that is currently under development. The Environment and Social Responsibility (ESR) Department will use the EMS for guidance when managing site activities. The responsibilities for each position in the ESR Department are divided as follows:

Director, Environment and Social Responsibility (DESR):

- The Environmental Management System, which includes this QA/QC plan;
- Ensuring that sufficient resources are available to allow compliance to this Plan; and
- Reviewing the work accomplished by the environmental staff.

Manager of Environmental Compliance:

- Overseeing and training the environmental staff;
- Reviewing the work accomplished by the environmental staff.
- Reviewing weekly, monthly and annual reports to the DESR; and
- Review and update this Quality Assurance and Quality Control Plan annually;

Environmental Coordinator:

- 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, berms, 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; and
- Provide monthly compliance report to the Nunavut Water Board.

Environmental Technician:

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

2.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance 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 DQOs to ensure that data needed for environmental management is available;
- Laboratory water, reagents and other supplies are of consistent high quality;
- QC programs are developed and implemented, based on recognized best operating practice, to assess the quality of the analytical data and provide warning of unacceptable analytical or samplers errors;
- Prompt remedial action is taken when deficiencies are identified; and
- Analytical results and QC program results are reported internally and externally using standard procedures.

Quality control 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 QC 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

Appendix A summarizes the permit-required monitoring parameters (Table A1), and sample locations and frequency (Table A2). The locations of the SNP sampling points at the 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 on ice to compare water quality before and after a drilling effort, sites of previous petroleum product spills, new spills and spring runoffs, specifically associated with construction activities. All sampling sites coordinates will be recorded using a handheld 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 Licence, defines a specific water-sampling program for the site, including sampling locations, sampling frequency, and parameters to be analyzed. A map of the original 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 samples must always be taken at the same location and these sampling stations must 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. 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 analytical parameters for each of the sampling stations.

3.1.2 Sample Types

Different sample types can be collected at the various sampling locations, such as composites or grabs. Water samples will generally be grab samples. Water samples are normally taken from natural lakes, streams, treatment ponds, process streams, sumps, or effluent discharges. When possible, samples will be taken from approximately 10 cm below the water surface to avoid floating debris that could impact the quality of the sample.

Soil samples will usually be composite samples, although the purpose of the sampling program will dictate whether grab samples or composites will be used. Monitoring of the land treatment area will usually require a composite sample within a homogonized area. Sampling hydrocarbon contaminated sites may require grab samples from various locations with in the area to delineate the zone of contamination.

3.1.3 Sample Containers

The laboratory analytical method and the parameter of interest will dictate the size and type of bottle (i.e., glass, plastic, amber glass) to be used for the sample. All sample containers will be prepared and supplied by the contracted laboratory. Only clean unused containers will be used. This helps limit field generated contamination or preservation errors. Sample containers and preservation needed for the different analyses are shown in Appendix A Table A1. If there is a need for bacterial testing, the bottles must be autoclaved (sterilized) by the contracted laboratory prior to use.

3.1.4 Field Sampling Log Book

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

A scanned copy of the field log book pages should be made and submitted to the Environmental Coordinator and be filed on the ESR server as soon as possible after sample collection. 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 is important to remember that field notes and the field log book itself are considered legal documents and should 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 Field Measurements

Water temperature and pH are typically measured and recorded in the field when the sample is taken. The calibration of the meters must be verified against a known standard solution, as recalibrated as required, prior to each day’s sampling activities. Additionally, the calibration of the meter should be checked against a known standard at the end of the days sampling. Any issues with the meter calibration, or discrepancies with the end of day calibration check should be noted in the field log book along with that day’s sampling data. Calibration check data will not be used to alter any reading taken during the day. Instead, 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 triple rinsed sample jug or pail. It is important that field meters are never introduced into sample bottles that are destined for laboratory analysis to prevent sample contamination. Temperature and pH measurements will be rounded to one decimal place.

3.2 Sampling Methods

Samples will be collected in new sample bottles using new powder-free nitrile gloves at each sampling location. 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 face upstream and wait to allow any sediment that may have been stirred up to settle or wash away.

Some sampling bottle types require rinsing prior to collecting the sample. The contracted laboratory can provide instruction for the type of bottle and the rinsing requirements for each analytical parameter. If the sample bottle requires rinsing, the sample bottles should be partially filled with the water to be sampled and rinsed with the cap in place three times. Rinse water will be emptied downstream from the sampling point, so that surface water is not contaminated and stream sediments are not disturbed. As a general rule, plastic bottles require triple rinsing and glass bottles, such as the oil and grease bottle, should not be triple rinsed because hydrocarbons can adsorb to the glass suface and can, therefore, increase the sample concentrations during the rinsing process. Sample bottles that are pre-charged with sample preservative, such as the bacteria sample bottles, must not be rinsed to prevent loss of the sample preservative.

Ideally, the bottle will be submerged into the stream to a depth of approximately half the total stream depth to collect the sample. At minimum, the sample bottle will be submerged to approximately 10 cm below the water surface. If the stream is too shallow to submerge the bottle to 10 cm below the surface, care will be taken to prevent surface debris or sediments from contaminating the sample. If necessary, a smaller bottle can be used to transfer water to the larger sample bottle, provided that both sample bottles are rinsed as required.

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). Some analytical parameter samples must be collected without leaving head-space, which means that the bottle will be filled in such a way to prevent inclusion of air-bubbles. Typically, the easiest way to accomplish this is to place the cap on the bottle while the bottle is submerged. This is very important when sampling volatile parameters, such at volatile organic carbon or chlorine, which may evaporate out of solution if airspace is present. The contracted laboratory can provide instruction for the specific sampling requirements for each analytical parameter.

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 submerged to a depth of approximately 10 cm 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 weight from the surface down the rope used to lower the sampler. 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, or pre-charged sample bottles, 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 Canadian Council of Ministers of the Environment (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 Technician 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 (i.e., grid, composite) and frequency (number of samples per surface area). Since the LTA material is thinly applied and homogenized through tilling, only one depth of sample collection is required. The samples can 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 will be tested for CWS-PHC fractions (Fraction F1 thru F4), Benzene, Toluene, Ethylbenzene, Xylene (BTEX), Total Petroleum Hydrocarbons (TPH), and total metals using a 36 element ICP-MS scan (see Appendices B and E). Soil samples are usually packed into clear glass jars. Prior to beginning the sampling program, appropriate sample containers will be ordered from ALS laboratory.

The CCME guidelines do not specify the density for collection of soil samples in the LTA. Each separate pile within the LTA can be divided into quadrants, and will be sampled with a target density of one composite of ten samples per 25 m^3 to adequately characterize the soil hydrocarbon levels. As for samples collected at spill sites, a sufficient amount of contaminated soil to analyse for all of the parameters listed above will be sampled. 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

Prior to beginning a sampling event, the required sample bottles and preservatives should be gathered and prepared and organized into sample sets inside a plastic bag.

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. The following information should be included:

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

Prior to taking the bottles to the field, each bottle will be labelled with as many of the items above as possible using waterproof pre-printed labels. The sampling time, temperature and pH (where applicable) will be recorded on the label in the field using

permanent waterproof ink. If preservatives or filtering are required, the sampler will confirm that these sample treatments have been completed by placing a checkmark, or their initials beside the items on the pre-printed labels.

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 dry bottles with pre-printed waterproof labels.

3.3.2 Chain of Custody Forms

A Chain-of-Custody form has to be filled out. The form is located on the shared HBDoris drive.

The completed form is to be printed as a PDF and filed on the shared HBDoris drive in the Environmental Sample Data folder. 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 C.

3.3.3 Preservation

As samples cannot be delivered to the analytical laboratory within two hours of sampling, preservation may be required for some parameters. In many cases, chemical preservatives must be added to the samples to prevent chemical reactions 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.The appropriate preservation and sample container types are listed Appendix A Table A1.

Samples must be kept dark and cool (<10 ºC), but not frozen; therefore, samples will be packed in a cooler with ice packs for shipment to the laboratory. Samples will be stored in a refrigerator if they will not be shipped to the laboratory immediately after sampling. Samples should be delivered to the analytical laboratory as soon as possible after collection.

3.3.4 Transportation

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).

Preserving samples allows for extended storage periods prior to analysis; however, samples for some analytical parameters cannot be preserved in the field. The storage time for samples that are not preserved is typically short (i.e., can be as little as 24 hours). The laboratory can identify parameters with short storage times. It is important

to transport all samples, regardless of preservation method, to the laboratory as quickly as possible; therefore, sample coolers will be labelled as “Time Sensitive. Keep Cool.”

4.0 QUALITY CONTROL

As outlined in Section 2.0, accepted QA/QC practices are employed throughout the environmental sampling program. There are 4 types of QC samples that can be collected and analyzed to verify the quality of the sample collection and analysis methods. The QC sample types include field blanks, replicate, method “spiked”, and split samples. These QC samples are analyzed for the same suite of analytical parameters as the sampling station samples being monitored in the Surveillance Network Program.

4.1 Field Blanks

Field blanks are samples of laboratory-grade de-ionized 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 any 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 QC 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 SNP stations are sampled. New sample bottles will be triple rinsed and filled using de-ionized water provided by the contracted laboratory. The samples will be poured directly from the bottles provided by the laboratory into the sample bottles to replicate grab sample methods, and will be run through the sampling equipment if a Van Dorn, or other, sampler are typically used to collect the samples. 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 samples (or sometimes referred to as duplicate samples) are prepared by collecting 2 separate samples for each given analysis at a given location. The replicate samples are collected, handled, and analyzed using the same procedures applied to routine samples. The samples are also analyzed by the same analytical method in the laboratory. Replicate samples are usually used to identify sampling procedure errors. 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 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. These can also be collected in the field by dividing a composite sample into 2 sets of samples. If field split samples are collected, it is common to label each sample with a different station name, to provide a blind assessment of the laboratory's analytical precision.

4.4 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.

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 D is a copy of the laboratory's QA/QC plan which includes links to the various forms showing their accreditations.

6.0 REPORTING

All analytical results are forwarded in electronic format to HBML's on-site Environmental Coordinator and HBMLenvironmental@newmont.com for filing. Additionally, HBML is in the process of setting up an EQWin electronic database to help manage data and make the data easily accessible. This database will be maintained by the Environmental Coordinator and Environmental Technicians on-site. ALS Laboratory will be able to import the data directly into EQWin once the database is fully implemented.

After receipt, the results are screened for anomalies and/or trends, and are placed into the appropriate environmental files. Results that appear to be anomalous are flagged and either the analysis is repeated. 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

2BB-BOS0712 Sampling Locations, Frequency, and Analytical Parameters

Table A1 Analytical Parameter Groups, Units, Sampling Containers, and Preservation

Group	Analytical Parameters	Measurement Units	Sample Container	Preservative
General (**G**)	pH	pH units	None, field measured	N/A
	TSS	mg/L		
Nutrients (**N1**)	Total Ammonia - N	mg-N/L	500 mL Plastic	2 mL H_2SO_4
	Nitrate - N			
	Nitrite - N			
Nutrients (**N2**)	OrthoPhosphate - P	mg/L		
	Total Phosphate - P			
Total Metals (Unfiltered) (**MT**)	T-Arsenic	mg/L	250 mL Plastic	3 mL 1:3 HNO_3
	T-Cadmium			
	T-Copper			
	T-Chromium			
	T-Iron			
	T-Nickel			
	T-Lead			
	T-Zinc			
Dissolved Metals Filtered (**MD**)	D-Iron	mg/L	250 mL Plastic	3 mL 1:3 HNO3
	D-Copper			
	D-Arsenic			
	D-Zinc			
	D-Cadmium			
	D-Nickel			
Biological (**B**)	Biological Oxygen Demand	mg/L	1 L Plastic	None
	Fecal Coliforms	CFU/100mL (colony forming units)	Sterile	Sodium Thiosulfate (precharged)
Hydrocarbons (**HC**)	Total Oil and Grease	mg/L	1 L Amber Glass	2 mL HCl
	T-Lead		250 mL Plastic	5 mL 20% HNO3
	Benzene		3 x 40 mL clear glass	Sodium Bisulphate (precharged), No headspace
	Toluene			
	Ethyl-Benzene			
Discharge (**D**)	Flow	m^3/day	None, field measured	N/A
	Volume	m^3		
	Duration	day		
Total Trace Metals (ICP-MS)	T-Aluminum	mg/L	250 mL Plastic	3 mL 1:3 HNO_3
	T-Antimony			
	T-Barium			
	T-Beryllium			
	T-Cadmium			
	T-Chromium			
	T-Cobalt			

Group	Analytical Parameters	Measurement Units	Sample Container	Preservative
Total Trace Metals (ICP-MS) cont.	T-Copper	mg/L	250 mL Plastic	3 mL 1:3 HNO_3
	T-Iron			
	T-Lead			
	T-Lithium			
	T-Manganese			
	T-Molybdenum			
	T-Nickel			
	T-Selenium			
	T-Tin			
	T-Strontium			
	T-Thallium			
	T-Titanium			
	T-Uranium			
	T-Vanadium			
	T-Zinc			

Table A2 Monitoring Requirements

Station	Description	Monitoring Parameters	Frequency
BOS-1	Raw water supply intake at Aimaokatalok (Spyder) Lake	**B, G,** Oil and Grease	Monthly
		D	Daily during periods of pumping
BOS-2	Containment Pond discharge	**G,** T-Arsenic, T-Copper, T-Lead, T-Nickel, T-Zinc, Oil and Grease	Prior to discharge, weekly during periods of discharge, and once near the end of discharge
		D	Daily during periods of discharge
BOS-3	Sewage Disposal Facility final discharge	**B, G,** Oil and Grease	Monthly
		D	Daily during periods of discharge
BOS-4	Treated sewage effluent point prior to entry into Aimaokatalok (Spyder) Lake	**B, G,** Oil and Grease	Once before any discharge, daily when discharging onto the tundra
		Acute Lethality	Annually
BOS-5	Effluent from the Bulk Fuel Storage Facility prior to release to a location approved by an Inspector	**G, MT, HC,** T-Mercury, Total Petroleum Hydrocarbons, PAH, Total Hardness, Total Alkalinity, Calcium, Potassium, Sulphate, Sodium, Magnesium, Nitrate-Nitrite, Electrical Conductivity	Once before any discharge, monthly when discharging onto the tundra
		D	Daily during periods of discharge
BOS-6	Effluent from the Landfarm Treatment Facility prior to release	**G, MT, HC,** T-Mercury, Total Petroleum Hydrocarbons, PAH, Total Hardness, Total Alkalinity, Calcium, Potassium, Sulphate, Sodium, Magnesium, Nitrate-Nitrite, Electrical Conductivity	Once before any discharge, monthly when discharging onto the tundra
		D	Daily during periods of discharge
BOS-7	Landfill leachate	**G, MT, HC,** T-Mercury, Total Petroleum Hydrocarbons, PAH, Total Hardness, Total Alkalinity, Calcium, Potassium, Sulphate, Sodium, Magnesium, Nitrate-Nitrite, Electrical Conductivity	Before and after on-ice drilling
BOS-8	Waste Rock and Ore Storage Pad	**G, ICP-MS, HC,** Electrical Conductivity, Total Ammonia, Sulphate	Monthly during periods of observed flow
Drill Sites	Under-ice sampling before and after drilling	**G, ICP-MS,** T-Arsenic, T-Mercury, Electrical Conductivity, Total Ammonia, Sulphate	Before and after on-ice drilling
	Water intake from all sources	**D**	Daily during periods of discharge

APPENDIX B
Boston Camp Sampling Locations

Figure B1 Boston Camp Sampling Stations

APPENDIX C
Example of ALS 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 4B5, 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

CHAIN OF CUSTODY FORM

SEND REPORT TO:

COMPANY:	Hope Bay Mining Limited			ATTN:	Sr. Env. Co-ordinator
ADDRESS:	300-889 Habourside Drive				
CITY:	North Vancouver	PROV:	British Columbia	POSTAL CODE:	V7P 3S1
TEL:	1-604-985-2572	FAX:	1-604-980-0731	SAMPLER:	J. Turk
PROJECT NAME AND NO.:	Compliance Water Samples			QUOTE NO:	
PO NO.:	H00288	ALS CONTACT:	Sean Whitaker		
REPORT FORMAT:	☐ HARDCOPY ☑ EMAIL - ADDRESS: Jill.Turk@Newmont.com ☐ FAX ☑ EXCEL ☑ PDF ☐ OTHER:				

ANALYSIS REQUESTED:

FOR LAB USE ONLY	WO#	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED YYYY-MM-DD	DATE / TIME COLLECTED TIME	MATRIX	Per Quote # Q 21171 + pH	BOD	Oil and Grease (vis and gravimetric)	Fecal Coliform	TSS, pH									NOTES (sample specific comments, due dates, etc.)
		ST-7-6Dec10			water	X													6 bottles
		ST-8-1-6Dec10			water		X												
		ST-8-1-6Dec10			water			X											2mL HCl
		ST-8-1-6Dec10			water				X										Sodium Thiosulfate
		ST-8-1-6Dec10			water					X									
		ST-8-2-6Dec10			water		X												
		ST-8-2-6Dec10			water			X											2mL HCl
		ST-8-2-6Dec10			water				X										Sodium Thiosulfate
		ST-8-2-6Dec10			water					X									

TURN AROUND REQUIRED: ◉ ROUTINE ○ RUSH **SPECIFY DATE:** _____ (surcharge may apply)

SEND INVOICE TO: ☑ SAME AS REPORT ☐ DIFFERENT FROM REPORT (provide details below)

INVOICE FORMAT: ☑ HARDCOPY ☑ PDF ☐ FAX

SPECIAL INSTRUCTIONS: Please send invoice to Attention: HBML Accounting Section using the above address: Please quote this PO #: H00288 Electronic results to:Jill.Turk@Newmont.com and David.Vokey@Newmont.com

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
J. Turk	Nov 1/10	9:00am			
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:

FOR LAB USE ONLY

Cooler Seal Intact?	Sample Temperature: _____°C	Cooling Method?
___Yes ___No ___N/A	Frozen? ___Yes ___No	___Icepacks ___Ice ___None

APPENDIX D
ALS Quality Management System

ALS Quality Management System Summary

ALS is a global diversified testing services organization with a presence on every continent, offering a broad range of services to leading global companies.

The following report summarizes standard practices routinely employed by the ALS Environmental Division in Canada. Our practices exceed accreditation requirements and have been built to meet the needs of our customers and to give them confidence in the reliability of our test data.

Additional information is available on request from the Quality Department. Customers are invited to audit or tour ALS facilities at their convenience.

Documentation and Document Control

Test methods and support procedures are documented in detail to ensure consistency of application, repeatability of test results and traceability of analyses.

Test method requirements include but are not limited to sample handling, sample storage, minimizing interference, sample preparation, reagent and standard specifications, equipment, supplies, calibration requirements, instrumental measurement procedures, quality control requirements, data quality objectives and corrective actions, calculations, reporting requirements, reference information, hazards and their preventive measures.

Administrative support procedures are also documented where needed to ensure quality system procedures and customer services are provided in a controlled, approved manner consistent with ALS policies and client needs.

All procedures are authorized prior to use by the signing authority, ensuring adequate technical and quality oversight.

Distribution of documents is controlled to ensure only the most recent version is available for use. Authorized documents are reviewed periodically by the signing authority to ensure they continue to meet ALS requirements and customer needs.

Test methods and support procedures are available for client viewing on-site.

Internal Audits

Internal audits are scheduled and performed by qualified Quality and Technical staff for all routine analytical procedures and Quality System elements. Such audits ensure that procedures are implemented as intended, that test methods are scientifically defensible and technically sound, and that policies, procedures and records continue to meet the Quality System objectives.

Quality staff may periodically initiate unscheduled audits in response to proficiency testing program results, client feedback, requests from managers or any other circumstance that warrants investigation.

Quality Control (QC)

ALS has established QC procedures for monitoring the validity of tests performed by its laboratories. Individual test methods specify quality control requirements, frequency of use, and Data Quality Objectives (DQOs).

The type of quality control elements used for process monitoring is dependent on the test performed, but typically includes (as appropriate): Calibration Verification Standards, Continuing Calibration Verifications, Instrument Blanks, Method Blanks, Laboratory Control Samples, Reference Materials, Matrix Spikes, Surrogate Spikes, and Internal Standards.

DQOs are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal DQOs.

Test results for selected QC samples are available on test reports. Please contact your Account Manager for more information.

Control Charts

Control charts are used to provide a graphical representation of QC results and test method performance over time. Control charts graphically display DQOs as well as the statistically derived mean and ± 2 and 3 standard deviations ("sigma") around the mean, calculated from recent historical QC results. ALS applies advanced trend monitoring algorithms to identify outliers and non-random data distributions (trends) that may indicate undesirable changes in test method performance. The trend monitoring process has been automated within our LIMS. Upon data entry, each QC result is checked against programmed limits and trends. If a trend is identified, a notification is e-mailed to the analyst and their supervisor, so that it can be investigated and corrected.

Data Validation

ALS analytical data proceeds through several reviews prior to the release of final reports. The ALS data validation process includes test result validation, inter-parameter validation and report validation. Test result validation involves an independent peer review of raw and calculated test results. Inter-parameter validation occurs when all department specific parameters for a sample are completed, and involves an overall review of test results within each sample for consistency among any related test parameters. Report validation occurs when all the requested test results for a work order are completed, and involves a review of the final report before it is sent to the customer.

ALS maintains laboratory records in a traceable manner for five years.

Method Validation

Customers rely on ALS to select test methods that are appropriate to meet their needs. Wherever possible, ALS references the latest versions of published standard methods developed by organizations such as American Public Health Association, United States Environmental Protection Agency, NIOSH, Environment Canada, and other international, regional or regulatory organizations, or equipment manufacturers.

Method validations are conducted to confirm that our test methods are fit for their intended use. The validations are as extensive as necessary to meet the needs of the given application. The extent depends on the source of the method. Test methods are revalidated periodically to ensure continued suitability and fitness for purpose.

Method Detection Limits and Limits of Reporting

ALS Limits of Reporting (LORs) are established using rigorous experimental and statistical procedures that begin with the determination of the Method Detection Limit (MDL) at 99% confidence. The MDL takes into account several factors, like long term Method Blanks, low level Sample Duplicates, and low level Spiked Samples. When detected at or above the MDL, ALS test results are considered to be qualitatively accurate, and a parameter can be reported with 99% confidence as being present in the sample.

$$MDL = (s_0 \times t_{n-1}) + |MBlk|$$

Where:
- s_0 = the standard deviation derived from the analysis of blank or low level samples, whichever gives a higher standard deviation,
- t_{n-1} = the Student's t-distribution with n-1 degrees of freedom for the one-sided 99% confidence interval.
- $|MBlk|$= the absolute value of the mean method blank.

ALS takes a conservative approach to detection limits. Our goal is to minimize false positives, because we recognize that any false positive results can be damaging for our clients. Where possible, we establish LORs at levels well-above the statistical MDL, and ideally at the LOQ_5. This improves the accuracy and precision of results near the detection limit, and reduces the chance of false positives due to sample-specific issues. At or above the LOQ_5, test results are considered to be quantitatively accurate. A reported parameter at the LOQ_5 is considered to be within 40% of the true value 95% of the time.

$$LOQ_5 = 5s_0 + |MBlk|$$

Where:
- s_0 = the standard deviation used in the MDL calculation,
- $|MBlk|$ = the absolute value of the mean method blank.

The D. L. column on ALS analytical reports contains the LOR. The LOR may be the MDL as calculated above, or a higher value. ALS does not report LORs that are less then the calculated MDL.

Measurement Uncertainty (MU)

ALS procedures for calculating measurement uncertainty are based on accepted practices of identifying components contributing to uncertainty, compiling data that represents or includes these components, evaluating the data using appropriate statistical calculations, and reporting in a manner that prevents misunderstanding of the result. The Type A method of calculating measurement uncertainty is followed, however additional factors are considered to ensure the best and most complete information is derived from our evaluation of test method performance.

The ALS model describes the dependency of uncertainty on three factors. The first is a constant contribution to uncertainty attributable to s_0, the standard deviation of the method for concentrations that approach zero. The second is a constant relative uncertainty associated with higher parameter concentrations. The third is a constant contribution to uncertainty attributable to the mean long-term method blank value where it is significant. The following is the ALS equation for measurement uncertainty, using an expansion factor of k=2:

Expanded 95% Uncertainty as a Function of Concentration

$$U(c) = 2 * [\sqrt{\{ s_0^2 + (\Theta c)^2 \}}] + |MBlk_{LT}|$$

Where:
- **U(c)** = The expanded uncertainty at concentration c. The range c ± U(c) represents approximately the 95% confidence interval (two standard deviations).
- **c** = Measured concentration of parameter in the sample.
- $\mathbf{s_0}$ = A constant contribution to standard uncertainty represented by the standard deviation at zero concentration, which is related to the method detection limit.
- **Θ** = Combined relative standard uncertainty, excluding MDL and Method Blank contributions. Theta has no units.
- $|\mathbf{MBlk}_{LT}|$ = Absolute value of the mean long-term Method Blank value, where significant (i.e. if > 1/5 s_0). [Note that the Method Blank term is not expanded because it represents a constant bias, not a variance.]

Uncertainty values obtained from this procedure must be regarded as estimates. Primarily, this is because all environmental samples are different, especially with regard to matrix effects and heterogeneity. It is our intent with this procedure to arrive at an estimate of a 95% confidence level uncertainty value that can be assumed to apply to 95% (or more) of the samples that a laboratory receives for a given test. It follows that for samples where undetected matrix effects or interferences occur, or for samples that are atypically heterogeneous, uncertainty estimates may be low.

Another aspect of reporting MU is the reporting of test method bias. Bias occurs in a small number of test methods that cannot recover 100% of a parameter from a sample. In these cases ALS reports bias along with the MU to aid with the interpretation of the test result.

Participation in Interlaboratory Proficiency Testing (PT) Programs

ALS locations participate in an extensive variety of proficiency testing programs. Where available, formal programs operated by outside agencies are used. When not available, ALS utilizes less formal proficiency testing studies. Root cause analysis is initiated and corrective action plans are developed when PT program results indicate a decline in test method performance.

Staff Training

Formal training procedures are in place to ensure all staff are trained in ALS polices and analytical procedures prior to performing analyses. A staff orientation program communicates ALS polices to newly hired staff. Task specific training is performed, and analyst proficiency is demonstrated and documented before staff are authorized to work independently. On-going analyst proficiency is monitored using proficiency testing programs. Records are maintained in training logs issued to staff upon hiring.

As well, ALS Canada promotes continuing education and learning by offering advanced courses covering technical and quality functions.

Employee Agreements

ALS protects its customers' confidential information and proprietary rights. We require all employees to review and sign a Code of Conduct policy that communicates the ALS confidentiality policy. It is ALS practice to never disclose information about a client's analysis to a third party without prior consent of the client, or unless compelled to by law. If we are obligated by law to disclose such information, we will inform the client prior to doing so.

Our employees avoid involvement in activities that would diminish confidence in their competence, impartiality, judgment, or integrity by complying with the ALS Code of Conduct and Data Integrity Policy.

Sample Tracking

Procedures are in place to track samples from receipt at the lab through to final reporting. A data management system (LIMS – Laboratory Information Management System) is used to generate a work order number for each sample submission, and a unique identification number is generated for each sample within the work order. The system is then used to assign specific analyses for the samples, to identify methods to be used, and to assign due dates for the results. The system is used to manage analytical workloads and track the status of all samples in-house. LIMS is a secure system that can only be accessed using login passwords. Controlling the level of access according to staff needs provides additional security.

When requested by the client, legal sample protocols are implemented to ensure chain of custody defensibility in a court of law. Contact the lab for legal sampling and transportation instructions if this service is needed.

Equipment Calibration

Measuring and testing equipment used by ALS laboratories that can have a significant effect on the accuracy or validity of test results is calibrated using established procedures. The procedures ensure traceability through an unbroken chain of calibrations or comparisons to national measurement standards. Where traceability of measurements to SI units is not possible and/or not relevant, traceability is provided by the use of certified reference materials and/or consensus standards.

Management Reviews (MR)

Management conducts a review at least annually to ensure the management system is effective, and continues to be suitable for its operations, and to identify necessary changes or improvements. Senior management is included in the review process for all locations.

APPENDIX E
ALS Quality Control Protocols

ALS Quality Control Protocols

Quality control samples are introduced into batches of samples at critical points of sample handling, preparation and analysis to demonstrate the processes are performing as expected. In general, quality control samples are considered either Instrument QC or Method QC.

Instrument QC:

Instrument QC samples demonstrate control for the instrumental portion of a method. Instrument QC requirements must be successfully met before the analysis of Method QC or samples may proceed.

- Verification of initial calibration - criteria varies with each test.
- 2nd source Calibration Verification Standard (CVS) – at minimum, with each initial calibration.
- Continuing Calibration Verification (CCV) – frequency varies by test.
- Instrument Blanks – usage and frequency varies by test.

Method QC:

Method QC samples encompass the entire method and are initiated at the earliest point of the method where appropriate. Refer to the QC Definitions below. One set of Method QC is included for each batch of up to 20 client samples. Each set includes:

- 1 Method Blank.
- 1 Sample Duplicate. *
- 1 Lab Control Sample.
- 1 Reference Material or Matrix Spike. **
- Surrogate Compounds.

* Duplicate analyses are not performed where sub-sampling is not possible – e.g. most tests for organics in water.
** Spikes and Reference Materials are unavailable for Microbiology tests.

Method QC must be successfully analyzed before sample results are approved. Method QC results are normally reported to ALS clients with data reports.

Data Quality Objectives (DQOs):

DQOs are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal DQOs. Current DQOs are available upon request.

Detailed descriptions of how DQOs are evaluated for different types of Quality Control samples are described on the following pages.

Types of Quality Control – Definitions and Evaluation Protocols

Method Blank (MB) - A blank sample prepared to represent the sample matrix as closely as possible and analyzed exactly like the calibration standards, samples, and quality control (QC) samples. Results of Method Blanks provide an estimate of the within batch variability of the blank response and an indication of bias introduced by the analytical procedure.

Except in special cases (as outlined in ALS DQO summary documents) the ALS DQO for Method Blanks is for all results to lie below the Limit of Reporting (LOR).

Laboratory Sample Duplicate (DUP) - A second portion of sample taken from the same container as the sub-sample used for the primary analysis, that is analyzed independently through all steps of the laboratory's sampling and analytical procedures. Duplicate samples are used to assess variance of the total method including sampling and analysis.

Duplicate precision is normally measured as Relative Percent Difference (RPD), where RPD = |(Result2 - Result1) / Mean| * 100. Duplicate samples should normally agree to within the ALS Precision DQO for the test and parameter (expressed as RPD), or within ± 2 x the LOR (for low level results). Refer to the ALS DQOs for Precision for specific limits for any given test.

ALS does not establish DQOs for Field Sample Duplicates. However, it is generally understood and accepted that the variability of Field Sample Duplicates is significantly more than what is observed with Laboratory Sample Duplicates.[1]

Laboratory Control Sample (LCS) - A known matrix spiked with compound(s) representative of the target analytes. An LCS is used to verify the accuracy of the laboratory's performance of the test.

LCS accuracy is calculated as the measured amount divided by the target concentration, and is normally expressed as percent recovery. LCS recoveries should normally lie within the ALS Accuracy DQOs for the test and parameter. For a low level LCS, the result should lie within ± 1 x the LOR of the target concentration. Refer to the ALS Accuracy DQOs for specific limits for any given test.

Reference Material (RM) – A material or substance, one or more of whose property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. An RM is similar to an LCS, but encompasses a representative sample matrix. Similar to an LCS, an RM is used to verify the accuracy of the laboratory's performance of the test, but including the challenges of a complex sample matrix.

RM accuracy is calculated, expressed, and evaluated similarly to LCS accuracy. Refer to ALS Accuracy DQOs for specific limits for any given test.

Matrix Spike (MS) - A sample prepared by adding a known amount of a target analyte to a specified amount of a sample for which an independent estimate of the target analyte concentration is available. Spiked samples are used, for example, to determine the effect of the sample matrix on a method's recovery efficiency.

Matrix Spike results are calculated and expressed as percent recovery, by dividing the measured result (minus any analyte contribution from the unspiked sample) by the target analyte concentration. Matrix Spike results should normally lie within the ALS Accuracy DQOs for Matrix

[1] Depending on the type of Field Sample Duplicates being evaluated (e.g. Co-located versus Split Sample Duplicates), ALS recommends DQOs for Field Sample Duplicates that are between 1.5 – 2.0 times higher than our Laboratory Sample Duplicate DQOs. Co-located Sample Duplicates generally require higher DQOs than Split Sample Duplicates.

Spikes. Matrix Spike results cannot be calculated or reported in cases where the background concentration of the test parameter in the sample is too high relative to the spike level.

Surrogate Compounds (SURR) – Surrogate Compounds are added to every sample where applicable (organics tests only). They are substances with properties that mimic the analyte of interest, and which are unlikely to be found in environmental samples. They are added at known concentration to samples to establish that the analytical method has been properly performed.

Surrogate results are calculated and expressed as percent recovery, by dividing the measured result against the expected target concentration. Refer to ALS Accuracy DQOs for specific limits for any given test.