HOPE BAY JOINT VENTURE

Miramar Hope Bay Ltd. – Hope Bay Gold Corporation Inc.

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14 January 2002 *(via e-mail only)*

Mr. Philippe di Pizzo
Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0E 1J0

JAN 17 2002

Dear Mr. di Pizzo,

Re: Water Licence No: NWB1BOS0106 - Quality Control/Quality Assurance Plan Surveillance Network Program – Part A, Item 3.

We are pleased to provide one electronic copy of the above captioned plan as required by Part A, Item 3 of the Surveillance Network Program as appended to Boston Water Licence No: NWB1BOS0106. We look forward to receiving approval from the NWB in due course.

Should you require clarification on anything related to this submiassion, please do not hesitate to contact the undersigned at the numbers above, on cell # 780-975-2550 or by e-mail to: **hwilson@miramarmining.com**; **hugh_r_wilson@hotmail.com** **terrbear@powersurfr.com**.

Yours truly,

Original signed by "H.R.Wilson"

Hugh R. Wilson
Manager, Environmental Affairs

Cc: HBJV Management Committee
A. Fleming, Exploration Manager.

Attach. Quality Assurance/Quality Control Plan

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HOPE BAY JOINT VENTURE

WATER LICENSE NWB1BOS0106

QUALITY ASSURANCE
&
QUALITY CONTROL PLAN

Prepared by: Hope Bay Joint Venture

DATE: JANUARY, 2002

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1.0 INTRODUCTION

1.1 GENERAL

Miramar Hope Bay Ltd and Hope Bay Gold Corporation have entered into **Hope Bay Joint Venture**, an exploration program designed to identify and evaluate potential new gold deposits in the Hope Bay and Elu gold belts, in addition to those already identified at Boston, Doris North, Doris Central, and Madrid.

This plan is prepared for the **Boston Gold Project** in the Nunavut Settlement Area. The Boston Gold Project is located about 450 km west southwest of Gjoa Haven and about 175 km southwest of Cambridge Bay in the Hope Bay Belt. This plan is intended to meet the requirements of the Surveillance Network Program as outlined in License NWB1BOS0106 issued October 5, 2001 by the Nunavut Water Board.

Quality assurance (QA) and Quality Control (QC) are vitally important components of the environmental management program for this project. This QA/QC Plan has been prepared in accordance with "QA/QC Guidelines for use by Class "A" 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 and the Northwest Territories Water Board. It should be noted that currently only a Class "B" License is required for the Boston Gold Project.

Through our Quality Assurance and Quality Control (QA/QC) Plan, we ensure that our sampling methods and analytical data are of the highest caliber. Best management practices are employed throughout the sampling program. All samples are delivered to an accredited environmental laboratory for analysis

This document describes the procedures to be used by Hope Bay Joint Venture personnel when conducting environmental water sampling. Minimum criteria for sample collection, preservation, documentation, transportation, and data management are established and applied to samples from the Hope Bay Joint Venture. These procedures have been developed from literature and guidelines intended to promote good practices in field sampling and sample handling, which will provide assurance of the quality of the resulting data.

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. The procedures are applied to ***all environmental water samples***, whether analyzed for the purpose of regulatory compliance monitoring, or for the purpose of internal environmental management.

1.2 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 defensible quality. As such, the accuracy of the analytical result can be stated with a high level of confidence. A high level of quality assurance can be achieved by applying the following principles:

- X Personnel involved in water sampling and analysis are well trained
- X Facilities and equipment are suitable, well maintained, and always kept clean
- X Standard procedures are implemented for the collection and transportation of samples, based on recognized good operating practice
- X Standard analytical procedures are developed and implemented, based on recognized methods suited to the samples being analyzed and required data quality
- X Laboratory instruments are calibrated using procedures, and at a frequency, recommended by the manufacturer, or recognized as good operating practice
- X Laboratory water, reagents and other supplies are of consistent high quality
- X 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 errors
- X Prompt remedial action is taken when deficiencies are identified
- X 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 measure 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.

2.0 FIELD SAMPLING

2.1 SAMPLE COLLECTION

Environmental water sampling at Hope Bay Joint Venture is conducted to provide information required by the company for effective environmental management of the site and to monitor regulatory compliance. Although the majority of sampling and analytical work is related to compliance monitoring, it is necessary to ensure sample integrity is maintained for all samples collected. Therefore, Best Management Practices are employed during collection of all samples, whether they are for regulatory compliance or site environmental management.

2.1.1 Sampling Locations and Frequency

A Surveillance Network Program (SNP) as attached to 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.

The SNP sampling stations will 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 on each sampling occasion, unless the Inspector has approved a new location.

The frequency of sampling at a given location can be quarterly, monthly, bi-weekly, weekly or four times weekly, as prescribed in the SNP. Charts are included in the SNP that outline the sampling frequency and parameters analyzed for each of the sampling stations.

2.1.2 Sample Types

At any given location, either grab samples or composite samples may be taken, as prescribed in the SNP. All of the samples taken will be grabs.

Samples are normally taken from natural lakes, streams, treatment ponds or process streams. Wherever possible, where possible, samples should be taken from just under the surface to avoid floating debris that may contaminate the sample.

2.1.3 Sample Containers

Sample containers vary in size and material of construction, depending on the analysis to be conducted. The method used to analyze for a particular parameter dictates the minimum size of the sample bottle. At Hope Bay Joint Venture, we elected to use new one liter chemically resistant polyethylene bottles and closures with inert liners as the standard sample container, with the one exception being that for Oil & Grease. Samples to be analyzed for Oil & Grease must be collected in glass containers as hydrocarbons are attracted to the walls of plastic bottles and may not be released when sample aliquots are transferred from the bottle. Plastic bottles are suitable for all other analyses. Sample containers for each analysis are shown in Table 1.
Sample containers may be new or previously used. The risk of cross contamination should be reduced with careful preparation and handling of the bottles. At present all sample containers utilized at Hope Bay Joint Venture are new. In the event used sample bottles are put into service, they would be prepared as follows:

- X Rinse well with hot tap water for 30 seconds
- X Empty the bottle and add 10% nitric acid (HNO_3) to about 1/3 capacity. Shake well for 60 seconds
- X Rinse vigorously with hot tap water for 60 seconds
- X Rinse three times with distilled water
- X Empty bottle and rinse again three times with distilled water

On occasion there is a request for bacterial testing, usually in respect to the potable water systems. As bottles to be used for bacterial testing must be autoclaved (sterilized), they are obtained directly from the laboratory that is conducting the analysis.

Table 1. – Sample Containers

Parameter to be analyzed	Sample Size	Container Material
Total Ammonia	1000 ml	Polyethylene
Total Arsenic	1000 ml	Polyethylene
Total Copper, Lead, Nickel & Zinc	1000 ml	Polyethylene
Total Cyanide	1000 ml	Polyethylene
Total Suspended Solids	1000 ml	Polyethylene
Oil & Grease	1000 ml	Glass

2.1.4 Field Sampling Log Book

Details of all sampling exercises are recorded in a field logbook. The individual collecting the samples should record the date and time that sampling was conducted, the sampling stations visited, and the samples taken at each station. The results of any field measurements should be recorded. The sampler should indicate whether the sample was preserved and should initial each entry.

Additional information can be useful when inquiries are made into the meaning of sample data at a later date. The sampler should 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 must be recorded.

2.1.5 Field Measurements

On most samples pH and temperature of the water are measured and recorded in the field when the sample is taken. The field pH meter is calibrated prior to each sampling campaign, using two calibration standards of known pH. 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. Record pH and temperature to one place decimal.

2.1.6 Sampling Methods

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

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).

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.

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 ensure that the water is representative of the process stream.

2.2 SAMPLE HANDLING

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

2.2.1 Sample Identification

Before starting a campaign of water sampling, the required number of sample bottles, of the correct size and material, should be selected. 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.

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:

- X Sample location (or SNP station number)
- X Date of sampling
- X Parameters to be analyzed
- X Preservation method used
- X Name or initials of sampler
- X 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 preprinted gummed labels. Labels should only be applied to dry surfaces.

2.2.2 Preservation

As samples cannot be delivered to the analytical laboratory within two hours of sampling, preservation is required. In all cases, specific preservatives must be added to the samples to prevent chemical changes that may alter the concentration of the parameter of interest. The samples must be preserved within two hours of sampling. In most cases samples can be preserved away from the field at the end of the campaign.

The appropriate preservation methods are provided in Table 2.

Table 2. – Sample Preservation

Parameter to be analyzed	Preservation Method
Total Ammonia	Lower pH below 2 using sulphuric acid, refrigerate
Total Arsenic	Lower pH below 2 using nitric acid, refrigerate
Total Cyanide	Raise pH above 12 using sodium hydroxide, refrigerate, and store in the dark
Total Copper, Lead, Nickel, Zinc	Lower pH below 2 using nitric acid, refrigerate
Total Suspended Solids	Refrigerate
Oil and Grease	Lower pH below 2 using hydrochloric acid, refrigerate

2.2.3 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 from these effects.

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.

3.0 QUALITY CONTROL

As outlined in section 1.2, 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:

3.1 FIELD BLANKS

Field blanks are samples of pure water that are subjected to exactly the same procedures as routine samples, following which they are analyzed for the same parameters as the 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 quality control procedures, analysis of field blanks can help identification of sources of contamination.

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 from the normal laboratory water supply. This set should represent all of the parameters routinely analyzed. They should be preserved in the field and submitted to the laboratory identified as field blanks.

3.2 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 standard procedures applied to routine samples. 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 alternate between the prescribed SNP stations.

3.3 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 normally forms part of that laboratory's QA/QC program.

3.4 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 normally forms part of the laboratory QA/QC program.

4.0 LABORATORY ANALYSIS

As Hope Bay Joint Venture does not maintain an analytical laboratory on site, all analyses are performed at an accredited Environmental Laboratory.

5.0 REPORTING

In all cases analytical results are forwarded to the Manager, Environmental Affairs for the Hope Bay Joint Venture. These results are screened for anomalies, 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. The environmental files are maintained by the Manager, Environmental Affairs, 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 reports present all required analytical results for SNP sampling stations that were sampled during the month. The Nunavut Water Board distributes the reports to other agencies and interested parties.