



**NIBLACK MINING CORPORATION
NIBLACK PROJECT**

**WATER QUALITY BASELINE AND SITE MONITORING PLAN
(REF. NO. VA102-00205/02-11)**

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Knight Piésold Ltd.

Suite 1400
750 West Pender Street
Vancouver, British Columbia
Canada V6C 2T8

Telephone: (604) 685-0543
Facsimile: (604) 685-0147
E-mail: kpl@knightpiesold.com

Knight Piésold
CONSULTING

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SECTION 1.0 - INTRODUCTION

1.1 OBJECTIVES OF REPORT

The objectives of this report are to provide a 'plan' for surface and groundwater quality monitoring activities to be done during advanced mineral exploration activities (Phase 1) and post-closure monitoring at the Niblack property. Data collected will provide an overview of the existing baseline water quality conditions to ensure that compliance with Alaska Water Quality Standards is being achieved at locations down gradient of various facilities. A visual monitoring plan is also part of this document

1.2 BACKGROUND

The Niblack property is located approximately 30 miles southwest of the town of Ketchikan, Alaska, near the head of Niblack Anchorage, a small inlet on the southeastern shore of the Prince of Wales Island, as shown on Figure 1.1. The property is in the Ketchikan Recording District on Craig A 1 USGS Map Quadrangle geographic map sheet. The property is composed of 17 patented claims, 101 staked federal lode claims and 2 Alaska State tideland claims. All claims are owned 100% by Niblack Mining Corporation (NMC) subject to a variable 1%-3% NSR to Barrick Gold Corporation and a 15% NPI to Cook Inlet Region Inc. NMC acquired the Niblack property in 2005 as a result of a spin-out from Abacus Mining and Exploration Corporation (Abacus), with the objective of advancing the Niblack property through the delineation of an economically viable ore deposit. A number of mineralized zones have been explored since the late 1800's. NMC and predecessor Abacus have completed work on the Dama Zone, Niblack Mine, Trio Braudgauge Zone, Mammoth Zone, Lindsay Zone and Lookout Zone.

1.3 GENERAL PHYSICAL AND HYDROLOGICAL SETTING

Most of the Niblack Project area is undeveloped and forested. The Project site is situated along the bottom and lower slopes of a small, steep-sided watershed that drains directly into Niblack Anchorage. Four perennial streams generally referred to as Waterfall Creek, Camp Creek, Unnamed Creek 1 and Unnamed Creek 2, flow through the project area. Many small intermittent drainages, swales and rivulets flow through the project area and eventually feed into these creeks or directly into Niblack Anchorage.

The terrain is mountainous and rugged, with steep to moderate slopes. Elevations range from sea level to peaks of 2,600 feet and greater. Lookout Mountain, where the proposed adit will be built, has an elevation of 2,300 feet. The slopes are covered with temperate rain forest and gives way to sparse vegetation only at the highest elevations, generally 1800 feet and above. In the lower elevations of the Project area much of the land surface is occupied by wetlands that are classified as saturated needleleaf forest wetlands and saturated needleleaf forest/broadleaf scrub-shrub mix wetlands.

Temperatures in the area are moderate and rainfall is high, with annual average precipitation of approximately 190 inches. Winter brings mixed snow, rain and sunshine, with January temperatures hovering around the freezing point.

Recharge from precipitation forms the shallow groundwater system that discharges to surface streams, either by overland flow or saturated interflow, and likely has a short residence time unless it reaches the bedrock. The valley bottom is likely composed of unconsolidated alluvium, colluvium/landslide deposits, and glacial sediments. Subsurface water may temporarily flow through these sediments and will likely report to streamflow, or wetlands at lower elevation. The amount of groundwater from the shallow system that percolates downward to the deeper bedrock flow system is not known. Despite high rainfall, downward percolation may be limited by glacial till.

The Niblack property is underlain by a bimodal sequence of volcanic flows and volcanoclastic rocks that have undergone regional greenschist facies metamorphism. The sequence has undergone three episodes of folding. Hydrothermal alteration has been documented visually and chemically, as has gossan development. Stratabound massive sulphide mineralization is found dominantly within the felsic rocks.

SECTION 2.0 - QA/QC, SAMPLING METHODOLOGY AND DATA HANDLING

2.1 GENERAL CONSIDERATIONS

2.1.1 Preparing to Go to the Field

2.1.1.1 Necessary Equipment

Prior to each field trip the necessary field equipment should be organized to ensure that there are no critical oversights. A checklist of the necessary equipment for both surface water and groundwater sampling is provided in Appendix A. All sampling personnel should consult this list prior to each sampling event and this checklist should be updated as necessary.

2.1.1.2 Field Equipment Calibration and Maintenance

Prior to each field trip all equipment should be inspected and tested to ensure that they are operating as per the manufacturer's specifications. All *in situ* water quality probes should be maintained and calibrated as per the manufacturer's recommendations. The pre-calibration and post-calibration data readings should be recorded in a designated calibration log book, along with the calibration dates and any maintenance activities. Calibration of all sensors may not be necessary prior to every field trip, but some sensors such as dissolved oxygen may require calibration several times in one day given changes in atmospheric pressure and elevation. Be certain to record each calibration in the field log book if the calibration log book is not available at the time.

2.1.2 Field Notes and Observations

Detailed field notes and observations are an important aspect to sampling protocols. Field notes should be directly recorded into a bound field book or onto field data sheets. The minimum information to be collected each sampling day and at each site is summarized in Table 2.1. Any unusual conditions or deviations from standard protocols should be documented in the field notes. The contents of the field notes should be entered into a database immediately upon return from the field and the field notes should be photocopied and placed in a filing system separate from the originals.

2.2 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

A strict QA/QC program will be implemented to ensure that representative data of the highest quality is obtained in a manner which is scientifically defensible, repeatable and well documented. In order to ensure the highest level of QA/QC, standard methods and protocols will be used for the collection of all environmental media samples. Quality assurance is obtained at the project management level through organization and planning and the enforcement of both external and internal quality control. The following lists summarize the QA/QC procedures and practices that will be followed from the onset of the monitoring program:

- Internal Quality Control:
- Staffing the project with experienced/trained individuals;
- Ensuring that representative, meaningful data are collected, through thorough planning and efficient research;
- Use of standard protocols for sample collection, preservation and documentation,
- Regular calibration and maintenance of all field equipment;
- Collection of blind duplicate, blank and filter blank samples to be submitted for analysis (approximately 10% of overall samples).

External Quality Control:

- Employment of a fully accredited analytical laboratory for the analysis of all of the water quality samples;
- Determination of analytical precision and accuracy through the interpretation of the analysis reports for the blind duplicate, blank and filter blank samples.

The quality of the data obtained for a project is assessed via their adherence to the pre-set data quality objectives (DQOs). DQOs provide a means of assessing whether the data in question are precise, accurate, representative and complete.

Analytical and field precision is determined using the analytical results obtained for the blind duplicate samples, through the application of relative percent difference (RPD) calculations. Data are considered to be imprecise if the RPD between the duplicate samples is 20% or greater, for concentrations that are 5 times greater than the method detection limits (MDL). All imprecise data sets are flagged and may be considered invalid; further investigation may be warranted to determine the source of error and to ensure that all efforts are made to prevent similar errors from occurring. The blind duplicate analysis data should be processed as soon as possible after it is received from the laboratory as the samples may need to be re-analyzed.

Analytical precision is determined by the laboratory via the internal analysis of split samples, method blanks, certified reference materials (known concentration) and matrix spiked samples. The analytical data for the method blank samples should not exceed the MDL for any parameters. For the split samples, the RPD should not exceed 20%, though individual laboratories have their own set of internal DQOs. Analytical precision is usually determined by the laboratory, but the data sets may be included with the analysis report and should be reviewed upon receipt.

Analytical accuracy is evaluated via the analysis of the data obtained from the certified reference materials and matrix spiked samples. The accuracy for these samples should be between 80% to 120% recovery, and the analysis of these data is done by the laboratory itself. If the data is included with the laboratory report they should be reviewed to ensure accuracy. Field accuracy is ensured by staffing a project with qualified individuals, following standard sampling and handling protocols and via the proper use and calibration of all field equipment.

Field blank and filter samples are used to assess the potential sources of contamination associated with the sample containers, preservatives, filters and filter apparatus, sample handling and transportation, as well as any potential contamination from the analytical procedures. Analytical results for field blank samples should not exceed their respective MDLs, and should definitely not exceed more than 5 times the MDL. The blank sample analysis data should be assessed upon receipt of the analytical data and any exceedances should be noted and investigated to determine the source of error and all efforts should be made to prevent similar errors from occurring.

2.3 SURFACE WATER SAMPLING

2.3.1 *In Situ* Measurements

In situ parameters will be monitored at every water quality sampling station during each sampling event. A multi parameter probe or several individual probes will be used *in situ* to measure the following key parameters: dissolved oxygen (DO), specific conductance (SpC) (temperature compensated to 25°C), temperature and pH. The unit will be regularly calibrated and maintained to ensure the accuracy of the data collected. A calibration and maintenance log book will be kept, with each calibration event recorded (pre and post calibration values); this book will be separate from the field log book. The *in situ* parameters and other observations will be recorded into a field log book and later the data will be transferred to a database and field data sheets will be photocopied, to ensure that the data are preserved.

2.3.2 Surface Water Sampling, Field Filtration and Preservation Techniques

Surface water samples will be collected by experienced field staff using standard protocols. The water quality samples will be submitted for analysis for the parameters that are specified in Table 2.2. The surface water samples to be collected for the Niblack Project are grab samples (not composite) from streams and creeks and, if possible, these samples should be collected from the top foot (0.3 m), mid-stream, away from back eddies and salt water interference. Samples will be collected only when and where the conditions are safe. The following steps briefly outline the sampling methods:

- Ensure that you are well anchored to the shoreline if the bank is steep and do not sample alone (i.e. one arm holding onto bank object and other is sampling);
- The sampler must reach out, one full arms length towards the middle of the stream to achieve the optimal sample location;
- Remove lid of sample bottle and be careful to ensure that you do not come in contact with the inside of the cap or the bottle. *Do not pre-rinse the bottles as they should be clean – as provided by the supplying laboratory;*
- To sample, grasp the bottle well below the neck and plunge it beneath the surface of the water with the bottle opening facing downwards (this method reduces the amount of surface residue collected);
- Once submersed, turn the bottle so that the mouth is facing into the current;

- When it is full, remove it from the water by forcing it forward and upwards and replace the cap immediately.

The following outlines the basic protocols that will be adhered to during the collection, filtration and preservation of the surface water samples:

- When sampling several locations within the same stream, samples should always be collected in order from downstream to upstream;
- When the technician arrives at the site they will first place the *in situ* probe(s) into the stream, just downstream from the sample collection location (ensures that sediment disturbance does not impact the water quality samples);
- Samples must be clearly labelled, using an indelible marker, indicating the water quality sample site name, the date, the required analysis, the preservation (i.e. HNO₃ for metals samples) and any field filtration done (dissolved metals only);
- New disposable, powder-free sample gloves will be worn during the collection, filtration and preservation of each new set of samples. The gloves should not come into contact with the sample, the interior of the container or the interior of the cap;
- General chemistry (physical parameters, dissolved anions and nutrients) will be collected into a 1 litre plastic bottle. Do not pre-rinse the bottles;
- Total metals samples will be collected directly from the stream into a 250 ml verified clean sample bottle (do not rinse) and preserved using one vial of the reagent grade nitric acid (HNO₃) that is provided by the laboratory. After the acid has been added, replace the cap and invert the sample bottle several times to ensure that the preservative is fully mixed. *The nitric acid should be handled with care (gloves and goggles), with further safety information outlined in the WHMIS material safety data sheet.*
- Dissolved metals samples will be initially collected into the general chemistry bottle and dispensed into the filtration apparatus and the filtered sample is then transferred to the 250 ml verified clean sample bottle (do not rinse) and preserved using one vial of the reagent grade nitric acid (HNO₃) that is provided by the laboratory. Filtration is achieved using Acrodisc® 32 mm Syringe Filters with 0.45 µm Supor® membranes and 60 cc syringes. Prior to pulling the plunger from the syringe, the filter is attached to the end. The filter is activated when the plunger is pulled from the syringe. Fill the syringe with sample water, replace the plunger and dispense at least 10 ml to the ground (not to the sample bottle), push the remaining water through the filter into the sample bottle. If the water is high in suspended solids (turbid), several filters may be needed to fill the sample bottle, ensure that the filter is activated and that the first 10 ml from each new filter is disposed of prior to filling the sample bottle. Fill the sample bottle with filtered water, leaving sufficient room for the preservative. After the acid has been added, replace the cap and invert the sample bottle several times to ensure that the preservative is fully mixed. *The nitric acid should be handled with care*

(gloves and goggles), with further safety information outlined in the WHMIS material safety data sheet;

- Record the *in situ* parameters in field log book and also record any other relevant field observations. The minimum information to be collected at each sampling day and at each site is summarised in Table 2.1.

2.4 GROUNDWATER SAMPLING

2.4.1 Water Levels and Purging

In order to ensure that samples are representative of the formation groundwater, a minimum of three well volumes must be purged prior to sampling. The field measurements for water level, depth to bottom of well, well stick-up, purge volume and *in situ* parameters are recorded as the data is collected. One or a combination of several *in situ* meters should be used to simultaneously measure dissolved oxygen, specific conductivity, temperature and pH directly from the buckets of purged water. The most accurate means of measuring the *in situ* parameters is to lower a multi-probe into the well immediately after all of the samples have been collected, wait for the meters to stabilize and record the data. If the well depth exceeds the probe(s) cable length, the parameters can be assessed in a bucket of freshly purged water, though temperature and dissolved oxygen may not be as representative of *in situ* conditions when collected in this manner.

Each well will be equipped with dedicated systems that included a D-25 Waterra foot valve paired with 5/8" high or low-density polyethylene tubing. This tubing may need to be replaced periodically due to leaks or blockages as a result of regular use. The field environmental coordinator must ensure that sufficient replacement supplies are available at all times. The water is purged from each well, using the dedicated apparatus, either manually or using a pump system (i.e. Waterra Hydrolift II pump).

2.4.2 In Situ Measurements

The *in situ* measurements are recorded in the field book during the well purging process.

2.4.3 Groundwater Sampling, Field Filtration and Preservation Techniques

Groundwater samples will be collected by experienced field staff using standard protocols. The water quality samples will be submitted for analysis for the parameters that are specified in Table 2.2. Samples are to be collected directly from the dedicated tubing, into sterile sample containers provided by the laboratory. Individual sample container specifics, preservation and filtration procedures are outlined below:

- Samples must be clearly labelled, using an indelible marker, indicating the water quality sample site name, the date, the required analysis, the preservation (i.e. HNO₃ for metals samples) and any field filtration done (dissolved metals only);

- New disposable, powder-free, sample gloves will be worn during the collection, filtration and preservation of each new set of samples. The gloves should not come into contact with the sample, the interior of the container or the interior of the cap;
- General chemistry (physical parameters, dissolved anions and nutrients) will be collected into a 1 litre plastic bottle. Do not pre-rinse the bottles;
- Total metals samples will be collected directly into a 250 ml verified clean sample bottle (do not rinse) and preserved using one vial of the reagent grade nitric acid (HNO₃) that is provided by the laboratory. After the acid has been added, replace the cap and invert the sample bottle several times to ensure that the preservative is fully mixed. *The nitric acid should be handled with care (gloves and goggles), with further safety information outlined in the WHMIS material safety data sheet;*
- Dissolved metals samples are filtered using a 0.45 µm QuickFilter® in-line high-capacity polyethersulfone groundwater filter. Prior to collecting the sample a minimum of approximately 100 ml should pass through the filter and be discarded, then the sample bottle should be filled directly from the flowing water passing through the filter. The sample must then be preserved using one vial of the reagent grade nitric acid (HNO₃) that is provided by the laboratory. After the acid has been added, replace the cap and invert the sample bottle several times to ensure that the preservative is fully mixed. *The nitric acid should be handled with care (gloves and goggles), with further safety information outlined in the WHMIS material safety data sheet.*

2.5 HYDROLOGY

Flow measurements for the Niblack Project are being recorded via an automatic datalogger hydrology station that was established in August 2006 in Camp Creek, just upstream from WQ6, immediately upstream from the walking bridge. The datalogger is a Lakewood “Ultra-Logger R-X-2” with an Instrumentation Northwest PS9800 pressure transducer. Approximately ten manual flow measurements will be taken at the site, over a full range of flow conditions, in order to establish a reliable stage discharge relationship. After this stage discharge relationship has been established, annual flow measurements at this site will be taken to confirm that the relationship has not changed.

Manual flow measurements will be taken by trained professionals and the datalogger will be downloaded at this time and at regular intervals when manual flow measurements are not being taken.

2.6 SAMPLE STORAGE, CHAIN OF CUSTODY AND SAMPLE SHIPPING

The purpose of Chain of Custody (COC) procedures is to provide evidence that a sample has not been tampered with. This is achieved by creating an accurate written record tracing the possession of the sample from collection through final analysis and possible introduction as court

evidence. Custody indicates that a sample is either in actual physical possession or locked up to prevent unauthorized access. The person taking the sample is responsible for the care and custody of the sample and must assure that each container is in his/her physical possession or view at all times, or that the sample is safely stored.

All samples will be stored in coolers with ice packs at approximately 4°C (do not freeze the samples) until they are transported to the laboratory for analysis. The COC must be fully filled out, listing all of the samples and the required analysis. An example COC form is provided in Appendix B. The environmental technician should sign the COC and retain a copy of this report and the remaining copies should be enclosed in a Ziploc bag and sealed into the coolers to accompany the samples via courier to the laboratory. Prior to shipping the samples the individual bottles and labels should be re-examined to ensure that all information is filled in and that the bottles are sealed. The coolers should be packed with paper or other clean packing materials to prevent excess bottle movement and then they should be sealed very securely with packing tape. Clearly label the exterior of each of the coolers with the address of the laboratory and with all of the necessary handling stickers (“This Side Up”, “Test Samples – Not For Drinking Water”, “Fragile”, etc.). Samples are now ready to be shipped to the laboratory for analysis. All efforts should be made to ensure that the samples arrive to the laboratory in less than 48 hours from the time of sampling as several parameters have very specific holding times.

2.7 LABORATORY ANALYTICAL TECHNIQUES AND RECOMMENDED HOLDING TIMES

Water quality samples collected for the Niblack Project since 1996 have been sent to ALS Environmental (ALS) for analysis. ALS is accredited by the Standards Council of Canada (SCC), in co-operation with the Canadian Association for Environmental Analytical Laboratories (CAEAL) to ISO/IEC 17025 standards.

The analyses conducted by ALS were carried out using methods and procedures that were adapted from “Standard Methods for Examination of Water and Wastewater” (21st Edition 2005) published by the American Public Health Association (APHA) and from “Test Methods for Evaluating Solid Waste” SW-846 published by the United States Environmental Protection Agency (EPA). Some of the instrumentation used for analysis consisted of atomic absorption/emission spectrophotometry, inductively coupled plasma-optical emission spectrophotometry and/or inductively coupled plasma-mass spectrometry and cold vapour fluorescence spectrophotometry. The analytical techniques and recommended sample holding times for each specific analysis are provided in Appendix C.

2.8 DATA MANAGEMENT

The environmental technician will, upon completion of every sampling event, photocopy the field notes and record the *in situ* data and COC numbers into a computer database program. The photocopied field notes will be filed in a separate location than the original field notes.

Laboratory analysis data will be added to the database upon receipt and all data should be inspected to ensure that the DQOs have been met. Immediate attention should be given to the blind duplicate, blank and filter blank analysis results as re-analysis of the samples may be possible if data quality problems are noted.

The water quality will be reported according to the requirements in Section 5.3 – Water Quality Reporting Requirements and Frequency.

SECTION 3.0 - APPLICABLE STATE AND FEDERAL WATER QUALITY STANDARDS

United States Environmental Protection Agency (USEPA) compiled the National Recommended Water Quality Criteria, which are pursuant to Section 304(a) of the Clean Water Act (CWA). The State of Alaska, Alaska Department of Environmental Conservation (ADEC) used these criteria to develop Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, which was amended through May 15, 2003. ADEC also presents the Water Quality Standards for Fresh Water Uses, which fall under the Water Quality Standards 18 AAC 70, ADEC, as amended through September 1, 2006. The relevant criteria for the Niblack Project are presented in Table 3.1. Baseline *in situ* and analytical surface water and groundwater data are compared to the above mentioned water quality standards.

Compliance with state standards shall be determined by the use of concurrent monitoring. ADEC criteria for concurrent monitoring are presented in the Guidance for the Implementation of Natural-Condition Based Water Quality, November, 2006. In general, concurrent monitoring compares the water quality analysis results of downstream sample sites against upstream sample sites that are outside the influence of human activity.

SECTION 4.0 - SURFACE WATER AND GROUNDWATER MONITORING SITES

4.1 SURFACE WATER MONITORING SITES

4.1.1 Baseline Surface Water Quality Monitoring Sites

Baseline characterization of the surface waters within the Niblack Project study area was initiated in 1996, though sampling at regular intervals only began in early 2006. Samples were collected in October 1996, September 1997, April 2005 and February, May, August and October of 2006, and sampling will continue through 2007 and during advanced exploration activities. The locations of the baseline water quality monitoring sites are shown on Figure 4.1 and the GPS coordinates and general site details are in Table 4.1.

The current sample site layout accounts for up-gradient and down-gradient water quality within three of the creeks and streams within the immediate project area. From south to north the names of these creek systems are: Waterfall Creek, Camp Creek and Unnamed Creek 1 (adjacent to old camp facilities). Upon ADEC recommendation a down-gradient sample site has been added to a fourth creek, Unnamed Creek 2, a short stream system located southeast of Waterfall Creek. This sample site is called WQ13. Baseline data are not yet available for Unnamed Creek 2, but the site will be included in all future water sample surveys.

Within Waterfall Creek two water quality sites have been established, WQ4 and WQ8. WQ4 is located near the creek outlet, just upstream from the high tide water line, and WQ8 is located on the northern headwaters tributary, upstream of the exploration road. WQ8 is considered to be the upstream control site for the Waterfall Creek stream system.

Three sites have been established within the Camp Creek stream system: WQ6, WQ5 and WQ7. WQ6 is located near the creek outlet, just upstream of the high tide water line; WQ5 is located upstream, and approximately 50 to 100 m below the exploration road; and WQ7 is located further upstream, just above the exploration road. WQ7 is considered to be the upstream control site for the Camp Creek stream system. An automatic datalogger hydrology station has been established in Camp Creek, just upstream from WQ6, immediately upstream from the walking bridge. Future sampling within Camp Creek will only occur at sites WQ6 and WQ7.

There are three water quality sample sites within the Unnamed Creek 1 drainage system: WQ10, WQ12 and the 'Seep'. WQ10 is situated just upstream of the old camp site (outside the influence of any historic mining) and downstream of the exploration road and potentially acid generating (PAG) waste disposal area. WQ12 is located upstream of the exploration road in the southern most headwater tributary to this stream. The 'Seep' site was unearthed during the construction of the exploration road and is a well defined groundwater channel, originally several meters below the natural ground surface. This seep has a strong flow that is directly related to precipitation events and water from this

site now enters into the Unnamed Creek 1 drainage system just below WQ10. Water from the 'Seep' and WQ12 are considered to be upstream control sites within Unnamed Creek 1. Future sampling within Unnamed Creek 1 will be limited to water quality sites WQ10 and WQ12.

Three other water quality sites have been established further from the central core of the study area in creeks generally referred to as Dear Pasture Creek, Lookout Creek, and Myrtle Creek (Figure 4.1). WQ1 is a reference site located at the base of Dear Pasture Creek, just above the high tide line. This site is located near the mouth of the inlet, approximately 1.4 miles (2.2 km) to the southeast of the main property. WQ2 is situated at the base of Lookout Creek, just above the high tide line. This site is located on the southern side of the inlet approximately 0.8 miles (1.3 km) to the southeast of the main property. Lookout Creek is technically not a reference site as water is withdrawn from this creek and used for drilling activities (under permit). WQ3 is located at the base of Myrtle Creek, just above the high tide line. Myrtle Creek is the main drainage point to the isolated small lake to the north of the main property. Both Dear Pasture Creek and Myrtle Creek should be treated as reference sites until future site development plans indicate otherwise.

4.1.2 Advanced Exploration (Phase 1) Water Quality Monitoring Sites

The water quality sites WQ1, WQ2, WQ3, WQ4, WQ6, WQ7, WQ8, WQ10 and WQ12 will continue to be sampled as part of the background environmental data collection effort during construction and operation. Site WQ13, located on Unnamed Creek 2, will be added to the list of sites sampled during the advanced exploration (Phase 1) activities. Select sites located down gradient of the proposed PAG waste site and water treatment facilities will be used as compliance points to ensure water quality standards are maintained.

A sample station will be established below the PAG waste disposal area as part of a leak detection system. This site is called the "leak detection sample site" and it is shown on Figure 4.3. The station will consist of a covered catchment bucket at the end of a pipe that runs beneath the PAG site liner to daylight. Sampling will be done concurrent with sampling of the regular sample sites contingent upon water collecting at the sample station; however, no water is anticipated to collect at this point unless there is a breach in the liner.

Because natural waters are high in metals and low in pH, compliance with state standards will be determined by the use of concurrent monitoring in the streams. Sample sites located up-gradient of facilities provide natural background conditions for the purpose of concurrent monitoring. NMC will propose to the agencies changes to the monitoring plan should new or additional monitoring sites be determined necessary as the project proceeds into construction, operation, and closure. The locations of the Phase 1 water quality monitoring sites are shown on Figure 4.2 and a close-up view of

the sites in the vicinity of the proposed facilities are shown on Figure 4.3. The GPS coordinates and general site descriptions are provided in Table 4.1.

4.1.3 Location of Surface Water Quality Sites in Relation to Phase 1 Activities and Facilities

As previously mentioned, water quality sites WQ1, WQ2 and WQ3 are not located in the vicinity of any of the Phase 1 activities or project components. The remaining water quality sites are interspersed throughout the area that houses the existing and the proposed facilities. Sites WQ8, WQ7 and WQ12 are all situated as upstream control/concurrent monitoring sites on Waterfall Creek, Camp Creek and Unnamed Creek 1 respectively. Because of its short length, Unnamed Creek 2, located southeast of Waterfall Creek, does not have an upstream control site to enable concurrent monitoring. If the water quality in this small stream is similar to that in the other streams being monitored, then those streams will be used as the basis for determining compliance.

Surface water compliance points apply to two components of the ADEC Waste Management Permit which are as follows:

- Industrial Solid Waste Application for temporary PAG waste disposal area - The monitoring sites are WQ6, WQ10 and the Leak Detection site below the PAG waste disposal area;
- Waste Water Treatment and Disposal Application – The monitoring sites are WQ4, WQ6, WQ10 and WQ13.

Just below WQ8, on Waterfall Creek, there is an exploration road, alongside which will run the proposed pipeline that will transfer water to the settling ponds. To the immediate north of Waterfall Creek, below the road is the location of the proposed settlement/treatment ponds and the proposed land application areas. WQ4 is located downstream of all of these proposed and existing components, as well there are several smaller tributaries that feed into Waterfall Creek that intersect the road and proposed pipeline at several locations and run immediately adjacent to the proposed non-acid generating (NAG) waste disposal area.

On Camp Creek, WQ7 is located upstream of the existing road and above the proposed pipeline and adjacent (but still upstream) to the proposed PAG waste disposal area. WQ5 is located immediately downstream from all of these facilities and the proposed land application areas, and adjacent to the proposed settlement/treatment ponds. WQ6 is downstream from all of these facilities and is isolated from any potential direct surface water impacts from the NAG waste disposal area.

On Unnamed Creek 1, WQ12 is located upstream of the existing road and adjacent to the proposed PAG waste disposal area. The location of WQ12 may have to be moved further upstream from its current location in order to ensure that it is representative of up-gradient, un-impacted water quality. WQ10 is downstream of both the road, the

proposed PAG waste disposal area and is within the general land application area, though it is located in a position upstream from the influence of historic mining.

4.2 GROUNDWATER MONITORING SITES

4.2.1 Preliminary Groundwater Sample Sites

The two preliminary groundwater sample sites were created in two exploration drill holes that are located in the lower reaches of the exploration property. GW Site 1 is between Camp Creek and the Unnamed Creek 1 and GW Site 2 is located at a slightly lower elevation, between Camp Creek and Waterfall Creek (closer to Camp Creek). The location of these drill holes are shown on Figure 4.1 and the GPS coordinates are in Table 4.1. These drill holes were furnished with 2 inch diameter PVC pipe, with a 5 foot slotted PVC section and a bottom cap. Plastic caps were threaded onto the top of the PVC pipe to prevent rainfall from entering the wells. The slotted PVC section was located in bedrock from 5 to 10 feet below the bedrock/overburden interface, at vertical depths of 28 to 30 feet below ground surface. Steel casing runs the length of the overburden, blocking downward migration of near surface colluvial groundwater into the wells.

4.2.2 Permanent Groundwater Monitoring Well Locations

Five permanent monitoring wells (MW1, MW2, MW3, MW4, and MW7) were established in February 2007. The number, location, and depth of the wells are based on ADEC guidance and recommendation. The wells are located in wetland at depths of 24 to 36 inches with four located down gradient of surface facilities and one located outside the area impacted by human activities to act as a control point for concurrent monitoring. The approximate location of these wells is shown on Figures 4.2 and 4.3. The GPS coordinates and general site descriptions are provided in Table 4.1. The wells consist of a stainless steel mesh, silica sand pre-packed 2.5 foot PVC screen with 2.5 foot riser. The well inner diameter is 1.5 inches and the outer diameter is 2.4 inches. Locking caps and bentonite mounded at the base of the riser prevent downward infiltration of rain and surface waters.

4.2.3 Location of Permanent Wells in Relation to Phase 1 Activities and Facilities

The permanent monitoring wells (MW1, MW2, MW3, and MW4) were installed in order to monitor the groundwater quality reporting to wetland in the region of the proposed treated wastewater land application areas and in the area down-gradient of the waste disposal facilities. Monitoring well MW1 is located down gradient of the NAG waste disposal area. Wells MW2, MW3, and MW4 are located down-gradient of the land application areas within 50 feet or less of the interface between upland land application areas and wetland. Wells MW2 and MW3 are also down gradient of the PAG waste disposal area and the settlement/treatment ponds. Monitoring well MW7 is located in a small area of wetland

approximately 600 feet east of the patented mineral claim boundary and well outside the influence of waste rock storage, water treatment/land application facilities, and other types of human disturbance.

The groundwater compliance points for the ADEC Waste Management Permit – Waste Water Treatment and Disposal Application are MW1, MW2, MW3 and MW4.

**SECTION 5.0 - PROPOSED SURFACE WATER AND GROUNDWATER MONITORING
FREQUENCY AND REPORTING REQUIREMENTS**

5.1 SURFACE WATER MONITORING FREQUENCY

In situ data and water quality samples will be collected every two months or less until commencement of the underground exploration/excavation program, in order to further establish baseline conditions. Upon commencement of the underground program, surface water sites will be sampled monthly until 20 competent pairs of upstream and downstream sample results are obtained, then quarterly thereafter unless any parameter is greater at the downstream site than at the upstream site. If the downstream concentration of one or more parameters is greater than the upstream concentration then monitoring shall be monthly (or more frequent) until either the cause is shown to be natural, or until the cause has been corrected if caused by project activity, at which time the monitoring frequency shall revert to quarterly.

Surface water quality monitoring during temporary closure will be quarterly. Post-closure monitoring of surface water sites will include only those sites influenced by the NAG site. No post-closure monitoring is deemed necessary below the PAG site and land application areas as the facilities are temporary, with all PAG waste rock returning underground upon closure.

Post-closure sampling of surface water sites WQ4 and WQ13 will occur annually in the following post-closure years: 1, 2, 5, 10, 20, and 30.

5.2 GROUNDWATER MONITORING FREQUENCY

In situ data and water quality samples will be collected every two months or less until commencement of the underground exploration/excavation program in order to further establish baseline conditions. Unless results indicate more frequent sampling and corrective action, upon commencement of the underground program, sampling will be monthly until 20 competent sample results are obtained, then quarterly thereafter unless any parameter increases more than 10% over the natural background level recorded prior to work commencing or infiltration commencing from treated water and/or is greater than the control point (MW7), whichever is applicable.

Groundwater quality monitoring during temporary closure will be quarterly. Post-closure monitoring of groundwater sites will occur in post-closure years 1 and 2 for sites MW2, MW3, and MW4, which are located below land application areas. Post-closure monitoring of site MW1, located below the influence of the NAG site drainage, will occur in post-closure years 1, 2, 5, 10, 20, and 30.

5.3 WATER QUALITY REPORTING REQUIREMENTS AND FREQUENCY

On a yearly basis the operational water quality monitoring results will be summarized and reported to the Alaska Department of Natural Resources (ADNR) and Alaska Department of Environmental Conservation (ADEC). The annual report will include a summary that explains

exceedances, the extent of contamination, whether migration from the disposal or treatment facilities was the cause of the change in water quality, and what was done to correct the issues. The annual report will show time-series graphs of the data that show drifts, and graphs that show trends in the data for each parameter, for each station. The annual report will be submitted in hard copy and electronically.

In addition to the yearly summary, monitoring reports will be submitted monthly showing the water quality analytical results of the previous month. The monthly reports will consist of electronic transmission of the data files and field notes. The Company will retain all records of operational monitoring activities for the duration of the project, including the post-closure monitoring period. The monitoring program will be modified as needed to comply with future permitting requirements including any potential future National Pollutant Discharge Elimination System (NPDES) requirements in the event a discharge to waters of the U.S. may be necessary. Future operational water quality data collection will provide information pertaining to compliance monitoring for permit criteria as well as trend monitoring.

If it is discovered that water quality standards have been exceeded during any of the sampling events, ADEC will be notified of the results within 30 days of detecting the violation of water quality standards. The report will include:

- A determination of the extent of contamination;
- A determination as to whether or not migration from the disposal or treatment facilities was the cause of the change in water quality.

ADEC will determine the extent of further sampling and corrective action if needed.

Reports of exception will be prepared to communicate changes or unanticipated problems and resulting actions. Exceptions are very short-term temporary conditions and an example is the taking of additional samples for a short period of time to verify an unusual result. The reports of exception will also document the event for the historical record. The content of a report of exception varies depending on the exception. The information provided should be clear and fully explained. Reports of exception are made as needed and may be either an emergency or not an emergency.

SECTION 6.0 - BASELINE WATER QUALITY CHARACTERIZATION

6.1 BASELINE SURFACE WATER QUALITY

The surface waters within the Niblack Project area can be generally characterized as follows: Slightly acidic, very soft (median hardness of 10.1 mg/L CaCO₃), elevated dissolved oxygen, with low concentrations of total dissolved and suspended solids, nutrients and metals (with a few exceptions). The very high volumes of annual precipitation within the area result in super saturated soils, thus the rain waters have a low residency time within the soils and very little time to mobilize nutrients and other constituents into the surface water system.

In situ and analytical water quality data were checked against the Alaska Water Quality Criteria for Fresh Water Aquatic Life (chronic criteria). *In situ* pH values were low throughout the study area, with 71% of the values falling below the 6.5 value specified in the criteria. The *in situ* parameters are summarized in Table 6.1.

Total and dissolved copper concentrations were elevated in many of the samples collected from throughout the study area. The majority of the samples from Lookout Creek (WQ2) exceeded the copper criteria and at least one sample from each water quality site on Waterfall Creek, Camp Creek and Unnamed Creek 1 exceeded the criteria for this parameter. The criteria exceedances for copper are summarized in Table 6.2. Total aluminium criteria exceedances were noted for every creek within the study area. However, not every site had a sample that exceeded the limit. This information is summarized in Table 6.3.

Cadmium and zinc concentrations were elevated above criteria limits in one set of samples from site WQ4 (Waterfall Creek). Total lead concentrations exceeded the chronic criteria in one set of samples from WQ4, WQ5, and WQ6, all collected on October 16, 1996. Measurable concentrations of this parameter have not been found since at this or any other sites within the property. For the baseline samples total chromium concentrations were analysed for and no criteria exist for this parameter, though they do exist for Cr III and Cr VI. Measured chromium concentrations were consistently below the method detection limits and these detection limits were below the criteria values for Cr III and Cr VI. No other parameters have exceeded any of the relevant guidelines. Summary statistics for each water quality station are provided in Tables 6.4 to 6.14.

6.2 INITIAL BASELINE ESTIMATES FOR GROUNDWATER QUALITY

The groundwater analysis results presented in the section are for samples that were obtained from exploration drill holes that were not completed as proper monitoring wells. The measured groundwater table in the two drill holes were below the depth of the overburden and thus the samples are representative of bedrock groundwater chemistry and should not be used to interpret the chemistry of the shallow groundwater. Though based on the preliminary assessment, the groundwater chemistry of these two samples is similar to the general surface water chemistry for the site, with the exception of certain parameters such as TDS, hardness and alkalinity. The

analysis results and the criteria exceedances for the two groundwater samples are summarized in Table 6.15. Chemistry of shallow groundwater is best represented by samples of the 'Seep'. Sample data for the 'Seep' is included with surface water quality data described in Section 6.1 and provided in Table 6.14.

The predominant major ions composition of the groundwater samples from the two preliminary groundwater characterization sites were calcium and bicarbonate, with relative amounts of sodium of some importance in the GW Site 1 sample but not in the GW Site 2 sample. The SpC for the groundwater samples was 77 and 109 $\mu\text{S}/\text{cm}$ for GW Site 1 and GW Site 2 respectively, and alkalinity concentrations were 32.1 and 98.5 mg/L CaCO_3 respectively. For GW Site 1, the pH was 6.30, a value which is below the freshwater aquatic life ADEC criteria level.

Total metals concentrations for aluminium exceeded the 0.087 mg/L ADEC chronic criteria for both samples, with concentrations of 1.68 and 4.10 mg/L for GW Site 1 and GW Site 2 respectively. Dissolved aluminium concentrations were lower at 0.211 and 0.0109 mg/L respectively. Total concentrations for copper exceeded the criteria limits for both samples with concentrations of 0.0297 and 0.0408 mg/L for GW Site 1 and GW Site 2 respectively, though only the dissolved copper sample for GW Site 1 exceeded the criteria, with a concentration of 0.0135 mg/L. The dissolved copper concentrations were below the limits of detection in the sample from GW Site 2 (<0.0010 mg/L). Total iron concentrations exceeded the 1 mg/L chronic criteria limit in samples from GW Site 1 and 2, though the dissolved concentrations did not. Total and dissolved lead concentrations in the sample from GW Site 1 exceeded the criteria, with measured concentrations of 0.0148 and 0.00364 mg/L respectively. No other samples for total or dissolved metals exceeded any of the criteria limits.

Samples from seeps within the proposed tunnel will add to the project database and provide information on groundwater quality and quantity within the project area. This information will be useful in the event an economically viable ore deposit is defined on the project, and NMC plans to pursue an underground mining operation. This information will be necessary for the development of the final adit closure plans and as such the tunnel seeps will be sampled as part of the baseline program.

SECTION 7.0 - VISUAL MONITORING

Monthly visual monitoring of the entire facility will be carried out for signs of damage or potential damage to waste piles, waste water settlement/treatment and land application systems, roads, and stormwater management structures. Facilities will be inspected for settlement, leakage, erosion, thermal instability, frost action, thawing of waste or operations at the site. Monitoring of facilities shall also include above-grade portions of groundwater monitoring devices, visible portions of liners (including slippage of flexible liners or damage to its anchor(s)) containment structures, retaining walls, erosion control structures, run-on control structures and diversion structures to ensure that all are not damaged and are operating as designed. Visual monitoring will be done with a visual inspection checklist form. The visual inspection reports will include a brief summary of observations (completed Visual Site Inspection Form) and any actions taken. Visual inspections will be carried out by a person who is familiar with the ADEC solid waste management permit application, and permit, which includes this monitoring plan, the closure plan, and the operations plan.

Visual monitoring of the lined PAG waste disposal facility and PAG staging area will consist of monthly formal visual checks and more frequent inspections depending upon conditions at the facility. A visual monitoring form will be used for monthly checks and will be incorporated into the above mentioned monitoring form for the overall site. The form is used to record all observations and conditions. Copies of the completed visual monitoring forms will be available for ADEC inspection. ADEC will be immediately notified of significant changes as a result of visual monitoring.

The inspection will consist of walking the overall facility including a path at the lower aspects of the landfill footprint and documenting observations using the Visual Site Inspection Form.

The visual monitoring checklist, designed specifically for the PAG facilities (lined and staging area), will include, at a minimum, the following items:

- a) Conduct weekly and monthly visual inspections of the PAG waste disposal facility while in operation; this is in addition to routine daily inspections as part of the operation. Check for visible signs of damage to the liner system including slippage of the liner or its anchor(s);
- b) Check for signs of potential damage to the facility from settlement, operator negligence, frost action, erosion, or other risks to both the liner integrity and waste pile sealant/cover;
- c) Check for violations of conditions of the Waste Management Permit;
- d) Observe any escape of leachate;
- e) Observe any damage to the structural integrity of the seepage structure or "backwall", or the diversion berm, or stormwater diversion structures, containment structures, retaining walls, erosion control structures, run-on control structures and ensure that all are operating as designed;
- f) Check for blockages in the diversion channels;
- g) Evidence of death or stress to fish, wildlife or vegetation cover caused by the facility.

Visual monitoring will be done quarterly during temporary closure at the time surface water samples are taken. Post-closure visual monitoring will be done for 30 years for the overall facility including the PAG waste disposal facility according to the schedule in Section 5.1 and 5.2.

SECTION 8.0 - CORRECTIVE ACTION

If any structural change in, or damage to, a facility is found such that environmental damage is likely to occur, or any violation of a permit condition is observed during monitoring or an inspection, NMC will take appropriate action to correct the damage or violation, prevent the escape of waste or leachate, and clean up any improperly disposed wastes.

If a significant change in water quality is detected at a point of compliance as a result of the surface water monitoring program based on the criteria established in this monitoring plan, or if a water quality standard is exceeded at any surface water point of compliance or downgradient groundwater monitoring well, NMC will:

- Orally notify and consult with the ADEC within one working day;
- Submit to the ADEC documentation of the occurrence and a plan to determine the cause and/or source of the exceedance within 5 working days;
- Evaluate whether the water quality standards in 18 AAC 70 are threatened to be or are exceeded at the point of compliance;
- Determine if migration of waste or leachate from the disposal or treatment facilities is the cause of the change in water quality;
- Determine the extent of the waste or leachate migration contamination;
- Submit for ADEC approval, within 10 working days, a plan of corrective actions to prevent adverse environmental impacts and further exceedances of applicable water quality standards or permit limits;
- Implement the corrective action plan as approved by ADEC.

If the engineered liner to the PAG waste disposal facility has visually observable damage, NMC shall submit to ADEC, within 30 days of the problem being noticed, details of the problem and a proposal on how to mitigate the problem.

SECTION 9.0 - REFERENCES

Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2005.

<http://www.dec.state.ak.us/water/wqsar/wqs/pdfs/70wqsmanual.pdf>

Alaska Department of Environmental Conservation (ADEC). 2006. Water Quality Standards. 18 AAC 70. State of Alaska. As amended through September 1, 2006.

http://www.dec.state.ak.us/water/wqsar/wqs/pdfs/18_AAC_70_sept_2006.pdf

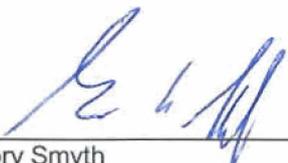
SECTION 10.0 - CERTIFICATION

This report was prepared and approved by the undersigned.

Prepared by:

 Apr 13/07
Apr: Jessica Mackie
Project Technologist

Reviewed by:

 Apr 13/07
Gregory Smyth
Senior Scientist

Approved by:


Ken J. Brouwer, P.Eng.
Managing Director

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TABLE 2.1

**NIBLACK MINING CORPORATION
NIBLACK PROJECT**

**WATER QUALITY BASELINE AND SITE MONITORING PLAN
MINIMUM INFORMATION TO BE RECORDED IN FIELD NOTES**

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<p>Data to be collected each day of sampling:</p> <ul style="list-style-type: none">- Project name and number.- Names of field crew.- Date.- Weather conditions.- Make and model of field equipment used that day.- QA/QC samples collected that day<ul style="list-style-type: none">- Deionized Water Blank/Filter Blank Samples<ul style="list-style-type: none">- Record dummy ID name(s)- Blind Duplicate Sample(s)<ul style="list-style-type: none">- Record dummy ID name(s) <p>Data to be collected at each surface water quality sample site:</p> <ul style="list-style-type: none">- Water Quality Station Name- Date and time- Site location<ul style="list-style-type: none">GPS Coordinantes.Stream name.- Description of site conditions<ul style="list-style-type: none">Any unusual circumstances.- Sampling<ul style="list-style-type: none">Type and number of samples collected.Sampling method if varied from standard procedures.QA/QC - Blind Duplicate Samples (if collected).- In Situ Parameters:<ul style="list-style-type: none">TemperatureSpecific Conductance (SpC)pHDissolved Oxygen (DO)Others <p>Additional information to be collected at groundwater sampling locations:</p> <ul style="list-style-type: none">- Depth to water (from top of casing)- Depth to bottom of well (from top of casing)- Casing stick-up- Purge volume (3 x the casing volume of water)- Record the change of in situ parameters to determine that they have stabilized prior to sampling.

TABLE 2.2

**NIBLACK MINING CORPORATION
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**WATER QUALITY BASELINE AND SITE MONITORING PLAN
ANALYSIS PARAMETERS AND DETECTION LIMITS**

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Physical Tests	MDL	Total and Dissolved Metals	MDL
Conductivity (uS/cm)	2.0	Aluminum Al	0.0050
Total Dissolved Solids	10	Antimony Sb	0.00050
Hardness mg/L CaCO ₃	0.54	Arsenic As	0.00050
pH	0.010	Barium Ba	0.020
Total Suspended Solids	3.0	Beryllium Be	0.0010
Turbidity (NTU)	0.10	Boron B	0.10
		Cadmium Cd	0.000017
		Calcium Ca	0.10
Dissolved Anions		Chromium Cr	0.0010
Alkalinity-Total mg/L CaCO ₃	2.0	Cobalt Co	0.00030
Bromide Br	0.050	Copper Cu	0.0010
Chloride Cl	0.50	Iron Fe	0.030
Fluoride F	0.020	Lead Pb	0.00050
Sulphate SO ₄	0.50	Lithium Li	0.0050
		Magnesium Mg	0.10
Nutrients		Manganese Mn	0.00030
Ammonia Nitrogen N	0.0050	Mercury Hg	0.000020
Nitrate Nitrogen N	0.0050	Molybdenum Mo	0.0010
Nitrite Nitrogen N	0.0010	Nickel Ni	0.0010
Dissolved ortho-Phosphate P	0.0010	Potassium K	2.0
Total Dissolved Phosphate P	0.0020	Selenium Se	0.0010
Total Phosphate P	0.0020	Silver Ag	0.000020
		Sodium Na	2.0
		Thallium Tl	0.00020
		Tin Sn	0.00050
		Titanium Ti	0.010
		Uranium U	0.00020
		Vanadium V	0.030
		Zinc Zn	0.0050

Notes:

- (1) Units are mg/L, unless otherwise specified.
- (2) Method detection limit.
- (3) Turbidity analysis is not required for groundwater samples.

TABLE 3.1

**NIBLACK MINING CORPORATION
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**WATER QUALITY BASELINE AND SITE MONITORING PLAN
FEDERAL AND STATE WATER QUALITY CRITERIA - FRESH WATER AQUATIC LIFE**

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Parameter	Units	State of Alaska - Department of Environmental Conservation Alaska Water Quality Criteria Aquatic Life Fresh Water - Chronic ⁽²⁾⁽³⁾ (May 15, 2003)	United States Environmental Protection Agency National Recommended Water Quality Criteria Freshwater Aquatic Life - Chronic (2006)
pH		6.5 - 9	6.5 - 9
Temperature	°C	May not exceed 20°C. <15°C for migration or rearing, <13°C for spawning or egg/fry incubation.	-
Dissolved Oxygen	mg/L	Between 7 and 17 mg/L.	-
Chloride	mg/L	230	230
Ammonia	mg/L N	$((0.0577/(1+10^{7.688-pH}))+(2.487/(1+10^{pH-7.688})))\times\text{MIN}(2.85,1.45\cdot 10^{0.028\cdot(25-T)})$	$((0.0577/(1+10^{7.688-pH}))+(2.487/(1+10^{pH-7.688})))\times\text{MIN}(2.85,1.45\cdot 10^{0.028\cdot(25-T)})$
Aluminum	Total	0.087	0.087
	Dissolved		
Arsenic	Total	0.150	0.150
	Dissolved		
Cadmium	Total	$(e^{0.7409(\ln \text{ hardness})-4.719})/1000$	$(e^{0.7409(\ln \text{ hardness})-4.719})/1000$
	Dissolved	$(\text{total Cd limit})\cdot(1.101672-((\ln \text{ hardness})\cdot(0.041838)))$	$(\text{total Cd limit})\cdot(1.101672-((\ln \text{ hardness})\cdot(0.041838)))$
Chromium III	Total	$(e^{0.819(\ln \text{ hardness})+0.6848})/1000$	$(e^{0.819(\ln \text{ hardness})+0.6848})/1000$
	Dissolved	(Tot Cr III)(0.860)	(Tot Cr III)(0.860)
Chromium VI	Total	0.011	0.011
	Dissolved	0.011	0.0106
Copper	Total	$(e^{0.8545(\ln \text{ hardness})-1.702})/1000$	$(e^{0.8545(\ln \text{ hardness})-1.702})/1000$
	Dissolved	(tot Cu limit)(0.960)	(tot Cu limit)(0.960)
Iron	Total	1	1
	Dissolved	1	1
Lead	Total	$(e^{1.273(\ln \text{ hardness})-4.705})/1000$	$(e^{1.273(\ln \text{ hardness})-4.705})/1000$
	Dissolved	(total Pb limit)(1.46203-((ln hardness)(0.145712))	(total Pb limit)(1.46203-((ln hardness)(0.145712))
Mercury	Total	0.0009081	0.0009081
	Dissolved	0.00077	0.00077
Nickel	Total	$(e^{0.846(\ln \text{ hardness})+0.0584})/1000$	$(e^{0.846(\ln \text{ hardness})+0.0584})/1000$
	Dissolved	(Total Ni limit)(0.997)	(Total Ni limit)(0.997)
Selenium	Total	0.0050	0.0050
	Dissolved	0.0046	
Zinc	Total	$(e^{0.8473(\ln \text{ hardness})+0.884})/1000$	$(e^{0.8473(\ln \text{ hardness})+0.884})/1000$
	Dissolved	(total Zn limit)(0.986)	(total Zn limit)(0.986)

- Note:
- (1) The criteria were in ug/L and have therefore been converted to mg/L.
 - (2) Temperature and Dissolved Oxygen criteria were taken from the following reference document:
Alaska Department of Environmental Conservation, 2006. Alaska Water Quality Standards, 18 AAC 70. State of Alaska. As amended through September 1, 2006.
 - (3) Criteria for the remaining parameters were obtained from the following reference document:
Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 - (4) The criteria for chromium are in the form of Cr III and Cr VI, though total Cr was analyzed for in the baseline samples.

TABLE 4.1

**NIBLACK MINING CORPORATION
NIBLACK PROJECT**

**WATER QUALITY BASELINE AND SITE MONITORING PLAN
BASELINE AND PHASE 1 WATER QUALITY MONITORING SITES**

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Watercourse	Site ID	Water Type	GPS Coordinates		Site Description	Phase 1 Sample Site	
			(NAD27, UTM08 Alaska)			Yes	No
			Easting	Northing			
Dear Pasture Creek	WQ1	Surface	684358	6104664	Reference Site	x	
Lookout Creek	WQ2	Surface	683575	6105162	Downgradient Site	x	
Myrtle Creek	WQ3	Surface	683179	6105980	Potential Downgradient Site	x	
Waterfall Creek	WQ4	Surface	682283	6105592	Downgradient Site	x	
	WQ8	Surface	682057	6105539	Up Stream Control Site	x	
Camp Creek	WQ6	Surface	682259	6105677	Downgradient Site	x	
	WQ5	Surface	682043	6105631	Downgradient Site - Middle Reach of Creek		x
	WQ7	Surface	681989	6105606	Up Stream Control Site	x	
Unnamed Creek 1 (Between Old Camp and Camp Creek)	WQ10	Surface	682171	6105725	Downgradient Site (upgradient from old camp)	x	
	WQ12	Surface	682001	6105719	Up Stream Control Site	x	
	SEEP	Surface	682030	6105724	Up Stream Control Site - groundwater seep		x
Unnamed Creek 2	WQ13	Surface	682171	6105725	Downgradient Site	x	
Leak Detection System					Downgradient of PAG waste disposal area	x	
Preliminary Groundwater Sites	GW1	Groundwater	682134	6105711	Preliminary groundwater quality estimate		x
	GW2	Groundwater	682178	6105640	Preliminary groundwater quality estimate		x
Permanent Monitoring Wells (Wetland areas)	MW1	Groundwater	682309	6105529	Downgradient Site	x	
	MW2	Groundwater	682203	6105595	Downgradient Site	x	
	MW3	Groundwater	682215	6105685	Downgradient Site	x	
	MW4	Groundwater	682313	6105784	Downgradient Site	x	
	MW7	Groundwater	682600	6105466	Control Site (Outside area of disturbance)	x	

Notes:

(1) GPS Coordinates were collected in October 2006 using a Garmin GPSmap 60CSx.

TABLE 6.1

**NIBLACK MINING CORPORATION
NIBLACK PROJECT**

**WATER QUALITY BASELINE AND SITE MONITORING PLAN
SUMMARY OF *IN SITU* WATER QUALITY DATA**

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Rev'd: Apr 11/07

M:\1\02\00205\02\A\Report\11-Water Quality Baseline and Site Monitoring Plan\Rev 0\Tables Rev 0.xls\Table 6.1

Alaska Water Quality Standards ⁽¹⁾	Temperature (°C)			Specific Conductance (µS/cm)			Dissolved Oxygen (mg/L)			pH		
	May not exceed 20°C <15°C for migration or rearing, <13°C for spawning or egg/fry incubation						between 7 and 17 mg/L			between 6.5 and 8.5		
	Mean	Range	# Samples	Mean	Range	# Samples	Mean	Range	# Samples	Median	Range	# Samples
Deer Pasture Creek WQ1	6	1 - 10	3	37	27 - 42	4	13.88	12 - 19	4	6.14	5.5 - 6.5	4
Lookout Creek WQ2	6	1 - 10	3	46	38 - 52	4	13	12 - 18	4	6.17	5.8 - 6.8	4
Myrtle Creek WQ3	9	4 - 15	3	28	27 - 30	4	13	10 - 16	4	5.95	5.7 - 6.8	4
Waterfall Creek WQ4	7	3 - 10	4	47	22 - 70	4	14	11 - 18	4	6.51	5.8 - 6.7	4
WQ8	7	3 - 10	4	41	17 - 57	4	13	11 - 16	4	6.34	5.9 - 6.8	4
Camp Creek WQ6	7	2 - 10	4	34	25 - 40	4	13	12 - 16	4	6.29	5.9 - 6.5	4
WQ5	6	2 - 10	4	31	19 - 40	4	14	11 - 17	4	5.67	4.9 - 6.2	4
WQ7	6	2 - 10	4	31	19 - 40	4	14	12 - 17	4	5.79	5.2 - 6.3	4
Unnamed Creek 1 WQ10	10	-	1	34	28 - 40	2	12	11 - 12	2	6.44	6.1 - 6.8	2
WQ12	10	9 - 10	2	47	30 - 63	2	12	11 - 12	2	6.62	6.4 - 6.8	2
Seep	9	8 - 10	2	37	30 - 43	2	12	11 - 13	2	6.32	6.2 - 6.4	2

Notes: (1) Alaska Department of Environmental Conservation, 2006. Alaska Water Quality Standards. State of Alaska. As amended through September 1, 2006

TABLE 6.2

**NIBLACK MINING CORPORATION
NIBLACK PROJECT**

**WATER QUALITY BASELINE AND SITE MONITORING PLAN
SUMMARY OF COPPER EXCEEDANCES**

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Rev'd: Apr 11/07

	Copper Concentration				Number of Samples Collected
	Range		Number of Exceedances		
	Total	Dissolved	Total	Dissolved	
Deer Pasture Creek WQ1	<0.001 - 0.0011	<0.001 - 0.0012	0	0	7
Lookout Creek WQ2	<0.002 - 0.0041	<0.002 - 0.0044	5	5	7
Myrtle Creek WQ3	<0.001 - <0.002	<0.001 - <0.002	0	0	7
Waterfall Creek WQ4	<0.001 - 0.028	<0.001 - 0.0016	1	0	7
WQ8	<0.001 - 0.0013	<0.001 - 0.0013	1	0	4
Camp Creek WQ6	<0.001 - 0.0017	<0.001 - 0.0017	2	2	7
WQ5	<0.001 - 0.0016	<0.001 - 0.0016	2	1	7
WQ7	<0.001 - 0.0016	<0.001 - 0.0016	1	1	4
Unnamed Creek 1 WQ10	0.002 - 0.0039	0.0014 - 0.0018	2	2	2
WQ12	<0.001 - 0.0015	<0.001 - 0.0014	1	1	2
Seep	0.0012 - 0.0018	0.0010 - 0.0018	1	1	2

Notes:

- (1) Sites on a stream are listed in order, from the most downstream to most upstream site.
- (2) Units are mg/L.
- (3) State of Alaska, Department of Environmental Conservation, Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances. As ammended through May 15, 2003.
- (4) Chronic criteria for copper depends upon hardness:

$$\text{Total Cu criteria: } (e^{0.8545(\ln \text{ hardness}) - 1.702}) / 1000$$

$$\text{Dissolved Cu criteria: } (\text{total Cu limit})(0.960)$$

TABLE 6.3

**NIBLACK MINING CORPORATION
NIBLACK PROJECT**

**WATER QUALITY BASELINE AND SITE MONITORING PLAN
SUMMARY OF ALUMINUM EXCEEDANCES**

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Rev'd: Apr 11/07

	Aluminum Concentration		Number of Samples Collected
	Range	Number of Exceedances	
Deer Pasture Creek WQ1	0.0368 - 0.108	4	6
Lookout Creek WQ2	0.029 - 0.101	1	6
Myrtle Creek WQ3	0.0503 - 0.0984	1	6
Waterfall Creek WQ4	0.0177 - 0.106	1	6
WQ8	0.172 - 0.0680	0	4
Camp Creek WQ6	0.0200 - 0.0911	1	6
WQ5	0.0206 - 0.0822	0	5
WQ7	0.0251 - 0.0892	1	4
Unnamed Creek 1 WQ10	0.116 - 0.514	2	2
WQ12	0.0408 - 0.1630	1	2
Seep	0.0735 - 0.127	1	2

Notes:

- (1) Sites on a stream are listed in order, from the most downstream to most upstream site.
- (2) Units are mg/L.
- (3) State of Alaska, Department of Environmental Conservation, Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances. As ammended through May 15, 2003.
- (4) Chronic criteria for total recoverable aluminum is 0.087 mg/L.

TABLE 6.4

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ1

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	WQ1						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		7	24.0	43.8	31.9	29.0	7.4	-
TDS	mg/L		7	10	28	22	22	6	-
Hardness	mg/L CaCO ₃		7	6.70	14.90	11.14	10.78	2.81	-
pH (lab)			7	6.96	7.36	-	7.15	0.13	-
pH (<i>in situ</i>)		6.5 - 9	4	5.50	6.50	-	6.14	0.42	3
Acidity	mg/L		1	15.00	15.00	15.00	15.00	-	-
TSS	mg/L		7	3.0	4.0	3.3	3.0	0.5	-
Settleable Solids	mg/L		2	0.1	0.1	0.1	0.1	0.0	-
Turbidity	NTU		7	0.22	1.34	0.45	0.28	0.40	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		7	5.5	12.1	8.3	7.7	2.6	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	7	2.49	6.09	3.49	3.10	1.23	0
Fluoride (F)	mg/L		7	0.020	0.100	0.043	0.020	0.039	-
Sulphate (SO ₄)	mg/L		7	1.03	2.23	1.74	1.83	0.40	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.777-7.888-pH)})))\times\text{MIN}(2.85, 1.45 \times 10^{(0.088 \times (pH-7))})$	5	0.0050	0.0200	0.0081	0.0050	0.0067	0
Nitrate	mg/L		7	0.0071	0.1000	0.0455	0.0306	0.0395	-
Nitrite	mg/L		7	0.0010	0.1000	0.0293	0.0010	0.0483	-
Dissolved Ortho-Phosphate	mg/L		7	0.0010	0.0500	0.0150	0.0010	0.0239	-
Total Dissolved Phosphate	mg/L		5	0.0020	0.0023	0.0021	0.0020	0.0001	-
Total Phosphate	mg/L		5	0.0020	0.0034	0.0025	0.0020	0.0007	-
Carbonate	mg/L		2	0.004	0.009	0.007	0.007	0.004	-
Bi-Carbonate	mg/L		2	6.83	8.29	7.56	7.56	1.03	-
Sodium	mg/L		2	1.78	2.45	2.12	2.12	0.47	-
Metals									
Total Aluminum	mg/L	0.087	6	0.0368	0.5000	0.1578	0.1035	0.1697	4
Dissolved Aluminum	mg/L	0.087	6	0.0338	0.5000	0.1566	0.1035	0.1705	4
Total Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Dissolved Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Total Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		7	0.05	0.10	0.09	0.10	0.02	-
Dissolved Boron	mg/L		5	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.749 \times (\text{hardness} - 4.75)) / 1000})$	7	0.000017	0.000200	0.000074	0.000017	0.000087	0
Dissolved Cadmium	mg/L	$(\text{total Cd limit}) \times (1.101672 - ((\text{ln hardness}) / (0.041838)))$	7	0.000017	0.000200	0.000074	0.000017	0.000087	0
Total Calcium	mg/L		7	1.94	4.60	3.31	2.97	0.91	-
Dissolved Calcium	mg/L		5	1.96	4.68	3.42	3.64	1.08	-
Total Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Dissolved Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Total Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.3545 \times (\text{hardness} - 1.75)) / 1000})$	7	0.0010	0.0020	0.0013	0.0011	0.0005	0
Dissolved Copper	mg/L	$(\text{tot Cu limit}) \times (0.960)$	7	0.0010	0.0020	0.0013	0.0011	0.0005	0
Total Iron	mg/L	1	7	0.030	0.099	0.066	0.054	0.028	0
Dissolved Iron	mg/L	1	7	0.030	0.103	0.062	0.058	0.023	0
Total Lead	mg/L	$(e^{(1.273 \times (\text{hardness} - 4.75)) / 1000})$	7	0.00050	0.00200	0.00093	0.00050	0.00073	0
Dissolved Lead	mg/L	$(\text{total Pb limit}) \times (1.46203 - ((\text{ln hardness}) / (0.145712)))$	7	0.00050	0.00200	0.00093	0.00050	0.00073	0
Total Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		7	0.43	1.00	0.77	0.76	0.23	-
Dissolved Magnesium	mg/L		5	0.44	0.90	0.66	0.74	0.20	-
Total Manganese	mg/L		7	0.00127	0.01500	0.00474	0.00167	0.00551	-
Dissolved Manganese	mg/L		7	0.00042	0.01500	0.00446	0.00163	0.00573	-
Total Mercury	mg/L	0.0009081	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Dissolved Mercury	mg/L	0.00077	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Total Molybdenum	mg/L		6	0.0010	0.5000	0.0842	0.0010	0.2037	-
Dissolved Molybdenum	mg/L		6	0.0010	0.5000	0.0842	0.0010	0.2037	-
Total Nickel	mg/L	$(e^{(0.846 \times (\text{hardness} - 0.058)) / 1000})$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Dissolved Nickel	mg/L	$(\text{Total Ni limit}) \times (0.997)$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Total Potassium	mg/L		7	1.0	2.0	1.7	2.0	0.5	-
Dissolved Potassium	mg/L		5	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Dissolved Selenium	mg/L	0.0046	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Total Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Dissolved Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Total Sodium	mg/L		5	2.0	3.6	2.5	2.3	0.7	-
Dissolved Sodium	mg/L		5	2.0	3.5	2.5	2.3	0.6	-
Total Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.3473 \times (\text{hardness} - 0.88)) / 1000})$	7	0.0050	0.0140	0.0070	0.0050	0.0036	0
Dissolved Zinc	mg/L	$(\text{total Zn limit}) \times (0.986)$	7	0.0050	0.0100	0.0060	0.0050	0.0019	0

Notes:

(1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.

(2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.5

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ2

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	WQ2						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		7	27.0	54.4	38.2	37.2	10.1	-
TDS	mg/L		7	10	34	24	26.0	8	-
Hardness	mg/L CaCO ₃		7	7.37	19.50	14.46	13.97	3.97	-
pH (lab)			7	7.00	7.40	-	7.08	0.13	-
pH (<i>in situ</i>)		6.5 - 9	4	5.79	6.82	-	6.17	0.43	3
Acidity	mg/L		1	10.00	10.00	10.00	10.00	-	-
TSS	mg/L		7	3.0	4.0	3.3	3.0	0.5	-
Settleable Solids			2	0.1	0.1	0.1	0.1	0.0	-
Turbidity	NTU		7	0.18	0.63	0.33	0.31	0.16	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		7	4.4	13.8	9.8	9.8	3.9	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	7	2.56	5.31	3.55	3.48	0.88	0
Fluoride (F)	mg/L		7	0.020	0.100	0.043	0.020	0.039	-
Sulphate (SO ₄)	mg/L		7	1.83	4.58	3.06	3.28	1.02	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.77-7.888))}))\times\text{MIN}(2.85, 1.45 \times 10^{(0.088 \times (pH-7))})$	5	0.0050	0.0200	0.0102	0.0050	0.0073	0
Nitrate	mg/L		7	0.0050	0.1000	0.0381	0.0162	0.0432	-
Nitrite	mg/L		7	0.0010	0.1000	0.0293	0.0010	0.0483	-
Dissolved Ortho-Phosphate	mg/L		7	0.0010	0.0500	0.0150	0.0010	0.0239	-
Total Dissolved Phosphate	mg/L		5	0.0020	0.0023	0.0021	0.0020	0.0001	-
Total Phosphate	mg/L		5	0.0020	0.0043	0.0025	0.0020	0.0010	-
Carbonate	mg/L		2	0.003	0.011	0.007	0.007	0.006	-
Bi-Carbonate	mg/L		2	5.37	10.70	8.04	8.04	3.77	-
Sodium	mg/L		2	1.87	2.51	2.19	2.19	0.45	-
Metals									
Total Aluminum	mg/L	0.087	6	0.0290	0.5000	0.1423	0.0757	0.1768	1
Dissolved Aluminum	mg/L	0.087	6	0.0277	0.5000	0.1400	0.0724	0.1779	1
Total Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Dissolved Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Total Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		7	0.05	0.10	0.09	0.10	0.02	-
Dissolved Boron	mg/L		5	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.749 \ln \text{hardness} - 4.77)})/1000$	7	0.000041	0.000200	0.000090	0.000046	0.000075	0
Dissolved Cadmium	mg/L	$(\text{total Cd limit}) \times (1.101672 - ((\ln \text{hardness}) / (0.041838)))$	7	0.000034	0.000200	0.000088	0.000050	0.000077	0
Total Calcium	mg/L		7	2.14	5.83	4.18	3.89	1.45	-
Dissolved Calcium	mg/L		5	2.19	6.03	4.65	5.44	1.58	-
Total Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Dissolved Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Total Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545 \ln \text{hardness} - 1.76)})/1000$	7	0.0014	0.0041	0.0030	0.0033	0.0009	5
Dissolved Copper	mg/L	$(\text{tot Cu limit}) \times (0.960)$	7	0.0015	0.0044	0.0030	0.0032	0.0010	5
Total Iron	mg/L	1	7	0.030	0.085	0.054	0.050	0.019	0
Dissolved Iron	mg/L	1	7	0.030	0.076	0.050	0.050	0.017	0
Total Lead	mg/L	$(e^{(1.273 \ln \text{hardness} - 4.76)})/1000$	7	0.00050	0.00200	0.00093	0.00050	0.00073	0
Dissolved Lead	mg/L	$(\text{total Pb limit}) \times (1.46203 - ((\ln \text{hardness}) / (0.145712)))$	7	0.00050	0.00200	0.00093	0.00050	0.00073	0
Total Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		7	0.46	1.07	0.81	0.81	0.23	-
Dissolved Magnesium	mg/L		5	0.46	1.08	0.74	0.76	0.24	-
Total Manganese	mg/L		7	0.00162	0.01500	0.00517	0.00282	0.00524	-
Dissolved Manganese	mg/L		7	0.00090	0.01500	0.00484	0.00214	0.00547	-
Total Mercury	mg/L	0.0009081	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Dissolved Mercury	mg/L	0.00077	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Total Molybdenum	mg/L		6	0.0010	0.5000	0.0842	0.0010	0.2037	-
Dissolved Molybdenum	mg/L		6	0.0010	0.5000	0.0842	0.0010	0.2037	-
Total Nickel	mg/L	$(e^{(0.846 \ln \text{hardness} - 0.058)})/1000$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Dissolved Nickel	mg/L	$(\text{Total Ni limit}) \times (0.997)$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Total Potassium	mg/L		7	1.0	2.0	1.7	2.0	0.5	-
Dissolved Potassium	mg/L		5	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Dissolved Selenium	mg/L	0.0046	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Total Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Dissolved Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Total Sodium	mg/L		5	2.0	3.4	2.6	2.5	0.6	-
Dissolved Sodium	mg/L		5	2.0	3.5	2.6	2.5	0.6	-
Total Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \ln \text{hardness} - 0.88)})/1000$	7	0.0084	0.0150	0.0102	0.0099	0.0023	0
Dissolved Zinc	mg/L	$(\text{total Zn limit}) \times (0.986)$	7	0.0084	0.0190	0.0116	0.0109	0.0036	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.6

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ3

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	WQ3						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		7	23.0	28.2	26.0	27.0	1.9	-
TDS	mg/L		7	10	20	16	17	3	-
Hardness	mg/L CaCO ₃		7	7.30	8.56	7.77	7.77	0.42	-
pH (lab)			7	6.97	7.31	-	7.10	0.12	-
pH (<i>in situ</i>)		6.5 - 9	4	5.68	6.75	-	5.95	0.46	3
Acidity	mg/L		1	10.00	10.00	10.00	10.00	-	-
TSS	mg/L		7	3.0	4.0	3.3	3.0	0.5	-
Settleable Solids			2	0.1	0.1	0.1	0.1	0.0	-
Turbidity	NTU		7	0.14	0.69	0.29	0.19	0.20	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		7	3.0	7.4	5.3	5.8	1.6	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	7	2.94	4.43	3.77	3.77	0.60	0
Fluoride (F)	mg/L		7	0.020	0.100	0.043	0.020	0.039	-
Sulphate (SO ₄)	mg/L		7	0.79	2.00	1.24	1.00	0.53	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.77-7.888))}))\times\text{MIN}(2.85, 1.45 \cdot 10^{(0.088 \cdot (pH-7))})$	5	0.0050	0.0400	0.0120	0.0050	0.0157	0
Nitrate	mg/L		7	0.0353	0.1000	0.0576	0.0430	0.0292	-
Nitrite	mg/L		7	0.0010	0.1000	0.0293	0.0010	0.0483	-
Dissolved Ortho-Phosphate	mg/L		7	0.0010	0.0500	0.0151	0.0010	0.0239	-
Total Dissolved Phosphate	mg/L		5	0.0020	0.0032	0.0022	0.0020	0.0005	-
Total Phosphate	mg/L		5	0.0020	0.0034	0.0025	0.0025	0.0006	-
Carbonate	mg/L		2	0.002	0.003	0.003	0.003	0.001	-
Bi-Carbonate	mg/L		2	3.66	3.90	3.78	3.78	0.17	-
Sodium	mg/L		2	1.72	2.17	1.95	1.95	0.32	-
Metals									
Total Aluminum	mg/L	0.087	6	0.0503	0.5000	0.1399	0.0681	0.1773	1
Dissolved Aluminum	mg/L	0.087	6	0.0472	0.5000	0.1279	0.0503	0.1826	0
Total Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Dissolved Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Total Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		7	0.05	0.10	0.09	0.10	0.02	-
Dissolved Boron	mg/L		5	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.7499 \cdot \text{hardness} - 4.77)})/1000$	7	0.000017	0.000200	0.000074	0.000017	0.000087	0
Dissolved Cadmium	mg/L	(total Cd limit)/(1.101672 - ((ln hardness)/(0.041838)))	7	0.000017	0.000200	0.000074	0.000017	0.000087	0
Total Calcium	mg/L		7	2.05	2.76	2.40	2.33	0.24	-
Dissolved Calcium	mg/L		5	2.26	2.74	2.44	2.41	0.19	-
Total Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Dissolved Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Total Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545 \cdot \text{hardness} - 1.76)})/1000$	7	0.0010	0.0020	0.0013	0.0010	0.0005	0
Dissolved Copper	mg/L	(tot Cu limit)/(0.960)	7	0.0010	0.0020	0.0013	0.0010	0.0005	0
Total Iron	mg/L	1	7	0.030	0.050	0.036	0.030	0.010	0
Dissolved Iron	mg/L	1	7	0.030	0.050	0.036	0.030	0.010	0
Total Lead	mg/L	$(e^{(1.273 \cdot \text{hardness} - 4.76)})/1000$	7	0.00050	0.00200	0.00093	0.00050	0.00073	0
Dissolved Lead	mg/L	(total Pb limit)/(1.46203 - ((ln hardness)/(0.145712)))	7	0.00050	0.00200	0.00093	0.00050	0.00073	0
Total Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		7	0.35	1.00	0.57	0.40	0.30	-
Dissolved Magnesium	mg/L		5	0.37	0.45	0.41	0.41	0.03	-
Total Manganese	mg/L		7	0.00065	0.01700	0.00441	0.00082	0.00653	-
Dissolved Manganese	mg/L		7	0.00030	0.01000	0.00311	0.00036	0.00471	-
Total Mercury	mg/L	0.0009081	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Dissolved Mercury	mg/L	0.00077	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Total Molybdenum	mg/L		6	0.0010	0.5000	0.0842	0.0010	0.2037	-
Dissolved Molybdenum	mg/L		6	0.0010	0.2000	0.0342	0.0010	0.0812	-
Total Nickel	mg/L	$(e^{(0.846 \cdot \text{hardness} - 0.058)})/1000$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Dissolved Nickel	mg/L	(Total Ni limit)/(0.997)	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Total Potassium	mg/L		7	1.0	2.0	1.7	2.0	0.5	-
Dissolved Potassium	mg/L		5	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Dissolved Selenium	mg/L	0.0046	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Total Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Dissolved Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Total Sodium	mg/L		5	2.0	2.4	2.1	2.0	0.2	-
Dissolved Sodium	mg/L		5	2.0	2.4	2.1	2.0	0.2	-
Total Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \cdot \text{hardness} - 0.88)})/1000$	7	0.0050	0.0100	0.0061	0.0050	0.0020	0
Dissolved Zinc	mg/L	(total Zn limit)/(0.986)	7	0.0050	0.0100	0.0060	0.0050	0.0019	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.7

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ4

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	Number of Samples	WQ4					Criteria Exceedances
				Minimum	Maximum	Mean	Median	Standard Deviation	
Physical Tests									
Conductivity	uS/cm		7	17.0	60.4	37.8	40.3	17.5	-
TDS	mg/L		7	10	36	23	21	9	-
Hardness	mg/L CaCO ₃		7	6.70	26.20	14.83	12.93	7.30	-
pH (lab)			7	6.80	7.61	-	7.06	0.25	-
pH (<i>in situ</i>)		6.5 - 9	4	5.83	6.73	-	6.51	0.40	2
Acidity	mg/L		1	16.00	16.00	16.00	16.00	-	-
TSS	mg/L		7	3.0	4.0	3.3	3.0	0.5	-
Settleable Solids			2	0.1	0.1	0.1	0.1	0.0	-
Turbidity	NTU		7	0.15	1.07	0.35	0.25	0.33	-
Dissolved Anions									
Alkalinity- Total	mg/L CaCO ₃		7	2.0	23.4	11.2	7.1	8.0	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	7	2.07	5.41	3.21	2.83	1.23	0
Fluoride (F)	mg/L		7	0.020	0.100	0.043	0.020	0.039	-
Sulphate (SO ₄)	mg/L		7	0.99	5.01	2.35	2.00	1.39	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.777-7.888-pH)})))\times\text{MIN}(2.85, 1.45 \cdot 10^{(0.058 \cdot (25-pH))})$	5	0.0050	0.0200	0.0080	0.0050	0.0067	0
Nitrate	mg/L		7	0.0150	0.1010	0.0721	0.0926	0.0379	-
Nitrite	mg/L		7	0.0010	0.1000	0.0293	0.0010	0.0483	-
Dissolved Ortho-Phosphate	mg/L		7	0.0010	0.0500	0.0150	0.0010	0.0239	-
Total Dissolved Phosphate	mg/L		5	0.0020	0.0020	0.0020	0.0020	0.0000	-
Total Phosphate	mg/L		5	0.0020	0.0039	0.0024	0.0020	0.0008	-
Carbonate	mg/L		2	0.001	0.004	0.003	0.003	0.002	-
Bi-Carbonate	mg/L		2	0.01	6.34	3.17	3.17	4.48	-
Sodium	mg/L		2	1.27	3.11	2.19	2.19	1.30	-
Metals									
Total Aluminum	mg/L	0.087	6	0.0177	0.5000	0.1355	0.0698	0.1810	1
Dissolved Aluminum	mg/L	0.087	6	0.0176	0.5000	0.1273	0.0653	0.1839	0
Total Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	7	0.00039	0.00050	0.00048	0.00050	0.00004	0
Total Barium	mg/L		6	0.020	0.500	0.100	0.020	0.196	-
Dissolved Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Total Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		7	0.05	0.10	0.09	0.10	0.02	-
Dissolved Boron	mg/L		5	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.749 \ln \text{hardness} - 4.77)})/1000$	7	0.000017	0.000370	0.000098	0.000017	0.000137	1
Dissolved Cadmium	mg/L	$(\text{total Cd limit}) \cdot (1.101672 - ((\ln \text{hardness}) / (0.041838)))$	7	0.000017	0.027000	0.003903	0.000017	0.010185	1
Total Calcium	mg/L		7	2.08	8.87	4.45	3.51	2.72	-
Dissolved Calcium	mg/L		5	2.11	8.88	5.12	5.32	3.01	-
Total Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Dissolved Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Total Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545 \ln \text{hardness} - 1.76)})/1000$	7	0.0010	0.0280	0.0051	0.0010	0.0101	1
Dissolved Copper	mg/L	$(\text{tot Cu limit}) / (0.960)$	7	0.0010	0.0020	0.0014	0.0010	0.0005	0
Total Iron	mg/L	1	7	0.030	0.076	0.047	0.030	0.022	0
Dissolved Iron	mg/L	1	7	0.015	0.050	0.032	0.030	0.010	0
Total Lead	mg/L	$(e^{(1.273 \ln \text{hardness} - 4.76)})/1000$	7	0.00050	0.00270	0.00103	0.00050	0.00093	1
Dissolved Lead	mg/L	$(\text{total Pb limit}) \cdot (1.46203 - ((\ln \text{hardness}) / (0.145712)))$	7	0.00050	0.00200	0.00093	0.00050	0.00073	0
Total Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		7	0.35	1.00	0.77	0.98	0.30	-
Dissolved Magnesium	mg/L		5	0.35	1.02	0.68	0.67	0.32	-
Total Manganese	mg/L		7	0.00030	0.02100	0.00581	0.00396	0.00756	-
Dissolved Manganese	mg/L		7	0.00030	0.01000	0.00389	0.00307	0.00437	-
Total Mercury	mg/L	0.0009081	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Dissolved Mercury	mg/L	0.00077	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Total Molybdenum	mg/L		6	0.0010	0.2000	0.0342	0.0010	0.0812	-
Dissolved Molybdenum	mg/L		6	0.0010	0.2000	0.0342	0.0010	0.0812	-
Total Nickel	mg/L	$(e^{(0.846 \ln \text{hardness} - 0.058)})/1000$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Dissolved Nickel	mg/L	$(\text{Total Ni limit}) / (0.997)$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Total Potassium	mg/L		7	1.0	2.0	1.7	2.0	0.5	-
Dissolved Potassium	mg/L		5	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Dissolved Selenium	mg/L	0.0046	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Total Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Dissolved Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Total Sodium	mg/L		5	2.0	3.4	2.5	2.0	0.7	-
Dissolved Sodium	mg/L		5	2.0	3.5	2.6	2.7	0.7	-
Total Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \ln \text{hardness} - 0.88)})/1000$	7	0.0050	0.0900	0.0174	0.0050	0.0320	1
Dissolved Zinc	mg/L	$(\text{total Zn limit}) / (0.986)$	7	0.0050	0.1100	0.0203	0.0050	0.0396	1

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.8

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ5

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	WQ5						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		6	14.0	41.3	27.0	26.6	09.6	-
TDS	mg/L		6	10	24	18	20	05	-
Hardness	mg/L CaCO ₃		6	05.5	13.5	10.3	09.9	02.9	-
pH (lab)			6	6.70	7.81	-	7.17	0.38	-
pH (<i>in situ</i>)		6.5 - 9	4	4.89	6.15	-	5.67	0.63	4
Acidity	mg/L		1	44.00	44.00	44.00	44.00	-	-
TSS	mg/L		6	3.0	4.0	3.3	3.0	0.5	-
Settleable Solids			2	0.1	0.1	0.1	0.1	0	-
Turbidity	NTU		6	0.10	0.46	0.23	0.21	0.13	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		6	03.6	12.3	08.1	08.3	03.4	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	6	1.73	5.47	2.83	2.33	1.40	0
Fluoride (F)	mg/L		6	0.02	0.1	0.0466667	0.02	0.0413118	-
Sulphate (SO ₄)	mg/L		6	0.77	2.00	1.31	1.10	0.55	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.77-7.888))}))\times\text{MIN}(2.85, 1.45-10^{(0.088-(25-pH))})$	4	0.005	0.02	0.00875	0.005	0.0075	0
Nitrate	mg/L		6	0.0171	0.1000	0.0722	0.0771	0.0310	-
Nitrite	mg/L		6	0.001	0.1	0.034	0.001	0.0511234	-
Dissolved Ortho-Phosphate	mg/L		6	0.0010	0.0500	0.0174	0.0011	0.0253	-
Total Dissolved Phosphate	mg/L		4	0.002	0.012	0.0045	0.002	0.005	-
Total Phosphate	mg/L		4	0.002	0.031	0.00925	0.002	0.0145	-
Carbonate	mg/L		2	0.001	0.008	0.0045	0.0045	0.0049497	-
Bi-Carbonate	mg/L		2	4.4	7.55	5.975	5.975	2.2273864	-
Sodium	mg/L		2	1	2.13	1.565	1.565	0.7990307	-
Metals									
Total Aluminum	mg/L	0.087	5	0.0206	0.5000	0.1427	0.0686	0.2011	0
Dissolved Aluminum	mg/L	0.087	5	0.0202	0.5000	0.1401	0.0605	0.2025	-
Total Antimony	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	6	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	6	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		6	0.02	0.50	0.18	0.02	0.248	-
Dissolved Barium	mg/L		6	0.02	0.50	0.18	0.02	0.248	-
Total Beryllium	mg/L		4	0.001	0.001	0.001	0.001	0	-
Dissolved Beryllium	mg/L		4	0.001	0.001	0.001	0.001	0	-
Total Boron	mg/L		6	0.05	0.10	0.08	0.10	0.03	-
Dissolved Boron	mg/L		4	0.1	0.1	0.1	0.1	0	-
Total Cadmium	mg/L	$(e^{(1.7499 \ln \text{hardness} - 4.77)})/1000$	6	0.000017	0.000200	0.000078	0.000017	0.000095	0
Dissolved Cadmium	mg/L	$(\text{total Cd limit}) \times (1.101672 - ((\ln \text{hardness}) / (0.041838)))$	6	0.000017	0.000200	0.000078	0.000017	0.000095	0
Total Calcium	mg/L		6	1.57	4.11	2.84	2.83	1.10	-
Dissolved Calcium	mg/L		4	1.73	4.08	3.26	3.62	1.10	-
Total Chromium	mg/L		6	0.0010	0.0200	0.0073	0.0010	0.0098	-
Dissolved Chromium	mg/L		6	0.0010	0.0200	0.0073	0.0010	0.0098	-
Total Cobalt	mg/L		4	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		4	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545 \ln \text{hardness} - 1.76)})/1000$	6	0.0010	0.0020	0.0015	0.0014	0.0005	2
Dissolved Copper	mg/L	$(\text{tot Cu limit}) / (0.960)$	6	0.0010	0.0020	0.0014	0.0013	0.0005	1
Total Iron	mg/L	1	6	0.03	0.05	0.0366667	0.03	0.010328	0
Dissolved Iron	mg/L	1	6	0.03	0.05	0.0366667	0.03	0.010328	0
Total Lead	mg/L	$(e^{(1.273 \ln \text{hardness} - 4.76)})/1000$	6	0.0005	0.0022	0.0010333	0.0005	0.0008287	1
Dissolved Lead	mg/L	$(\text{total Pb limit}) \times (1.46203 - ((\ln \text{hardness}) / (0.145712)))$	6	0.0005	0.002	0.001	0.0005	0.0007746	0
Total Lithium	mg/L		4	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		4	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		6	0.29	1.00	0.72	0.76	0.28	-
Dissolved Magnesium	mg/L		4	0.29	0.84	0.58	0.60	0.24	-
Total Manganese	mg/L		6	0.00033	0.01000	0.00405	0.00154	0.00463	-
Dissolved Manganese	mg/L		6	0.00030	0.01000	0.00385	0.00124	0.00479	-
Total Mercury	mg/L	0.0009081	6	0.000020	0.200000	0.066680	0.000020	0.103269	0
Dissolved Mercury	mg/L	0.00077	6	0.000020	0.200000	0.066680	0.000020	0.103269	0
Total Molybdenum	mg/L		5	0.0010	0.2000	0.0408	0.0010	0.0890	-
Dissolved Molybdenum	mg/L		5	0.0010	0.2000	0.0408	0.0010	0.0890	-
Total Nickel	mg/L	$(e^{(0.846 \ln \text{hardness} - 0.058)})/1000$	6	0.0010	0.0100	0.0040	0.0010	0.0046	0
Dissolved Nickel	mg/L	$(\text{Total Ni limit}) / (0.997)$	6	0.0010	0.0100	0.0040	0.0010	0.0046	0
Total Potassium	mg/L		6	1.0	2.0	1.7	2.0	0.5	-
Dissolved Potassium	mg/L		4	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	6	0.0010	0.0050	0.0023	0.0010	0.0021	-
Dissolved Selenium	mg/L	0.0046	6	0.0010	0.0050	0.0023	0.0010	0.0021	-
Total Silver	mg/L	none	6	0.000020	0.000500	0.000180	0.000020	0.000248	-
Dissolved Silver	mg/L	none	6	0.000020	0.000500	0.000180	0.000020	0.000248	-
Total Sodium	mg/L		4	2.0	3.2	2.4	2.2	0.6	-
Dissolved Sodium	mg/L		4	2.0	3.3	2.4	2.2	0.6	-
Total Thallium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		4	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		4	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		4	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		4	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \ln \text{hardness} - 0.88)})/1000$	6	0.0050	0.0070	0.0057	0.0050	0.0010	0
Dissolved Zinc	mg/L	$(\text{total Zn limit}) / (0.986)$	6	0.0050	0.0100	0.0062	0.0050	0.0020	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.9

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ6

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	WQ6						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		7	14.0	41.0	28.0	27.0	9.7	-
TDS	mg/L		7	10	22	17	20	5	-
Hardness	mg/L CaCO ₃		7	4.82	13.10	9.58	9.00	2.86	-
pH (lab)			7	6.60	7.53	-	7.06	0.29	-
pH (<i>in situ</i>)		6.5 - 9	4	5.91	6.51	-	6.29	0.26	3
Acidity	mg/L		1	28.00	28.00	28.00	28.00	-	-
TSS	mg/L		7	3.0	4.0	3.3	3.0	0.5	-
Settleable Solids	mg/L		2	0.1	0.1	0.1	0.1	0.0	-
Turbidity	NTU		7	0.11	0.66	0.35	0.29	0.18	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		7	3.0	12.0	7.5	9.0	3.6	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	7	1.63	5.47	3.19	2.85	1.45	0
Fluoride (F)	mg/L		7	0.020	0.100	0.043	0.020	0.039	-
Sulphate (SO ₄)	mg/L		7	0.63	2.00	1.33	1.27	0.56	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.77-7.888-pH)})))\times\text{MIN}(2.85, 1.45 \cdot 10^{(0.088 \cdot (pH-7))})$	5	0.0050	0.0200	0.0080	0.0050	0.0067	0
Nitrate	mg/L		7	0.0104	0.1070	0.0700	0.0670	0.0357	-
Nitrite	mg/L		7	0.0010	0.1000	0.0293	0.0010	0.0483	-
Dissolved Ortho-Phosphate	mg/L		7	0.0010	0.0500	0.0150	0.0010	0.0239	-
Total Dissolved Phosphate	mg/L		5	0.0020	0.0023	0.0021	0.0020	0.0001	-
Total Phosphate	mg/L		5	0.0020	0.0022	0.0020	0.0020	0.0001	-
Carbonate	mg/L		2	0.001	0.005	0.003	0.003	0.003	-
Bi-Carbonate	mg/L		2	3.67	4.87	4.27	4.27	0.85	-
Sodium	mg/L		2	1.12	2.23	1.68	1.68	0.78	-
Metals									
Total Aluminum	mg/L	0.087	6	0.0200	0.5000	0.1288	0.0588	0.1834	1
Dissolved Aluminum	mg/L	0.087	6	0.0185	0.5000	0.1261	0.0542	0.1847	1
Total Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	7	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Dissolved Barium	mg/L		7	0.020	0.500	0.157	0.020	0.234	-
Total Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		5	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		7	0.05	0.10	0.09	0.10	0.02	-
Dissolved Boron	mg/L		5	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.749 \ln \text{hardness} - 4.77)})/1000$	7	0.000017	0.000200	0.000074	0.000017	0.000087	0
Dissolved Cadmium	mg/L	(total Cd limit)/(1.101672 - ((ln hardness)/(0.041838)))	7	0.000017	0.000200	0.000074	0.000017	0.000087	0
Total Calcium	mg/L		7	1.41	4.12	2.70	2.59	1.07	-
Dissolved Calcium	mg/L		5	1.41	4.12	3.00	3.04	1.10	-
Total Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Dissolved Chromium	mg/L		7	0.0010	0.0200	0.0064	0.0010	0.0093	-
Total Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		5	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545 \ln \text{hardness} - 1.76)})/1000$	7	0.0010	0.0020	0.0014	0.0010	0.0005	2
Dissolved Copper	mg/L	(tot Cu limit)/(0.960)	7	0.0010	0.0020	0.0014	0.0012	0.0005	2
Total Iron	mg/L	1	7	0.030	0.050	0.036	0.030	0.010	0
Dissolved Iron	mg/L	1	7	0.030	0.050	0.036	0.030	0.010	0
Total Lead	mg/L	$(e^{(1.273 \ln \text{hardness} - 4.76)})/1000$	7	0.00050	0.00250	0.00100	0.00050	0.00087	1
Dissolved Lead	mg/L	(total Pb limit)/(1.46203 - ((ln hardness)/(0.145712)))	7	0.00050	0.00250	0.00100	0.00050	0.00087	1
Total Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		5	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		7	0.32	1.00	0.69	0.69	0.26	-
Dissolved Magnesium	mg/L		5	0.32	0.80	0.57	0.56	0.19	-
Total Manganese	mg/L		7	0.00030	0.01000	0.00336	0.00111	0.00455	-
Dissolved Manganese	mg/L		7	0.00030	0.01000	0.00317	0.00054	0.00467	-
Total Mercury	mg/L	0.0009081	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Dissolved Mercury	mg/L	0.00077	7	0.000020	0.200000	0.057157	0.000020	0.097580	0
Total Molybdenum	mg/L		6	0.0010	0.2000	0.0342	0.0010	0.0812	-
Dissolved Molybdenum	mg/L		6	0.0010	0.2000	0.0342	0.0010	0.0812	-
Total Nickel	mg/L	$(e^{(0.846 \ln \text{hardness} - 0.058)})/1000$	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Dissolved Nickel	mg/L	(Total Ni limit)/(0.997)	7	0.0010	0.0100	0.0036	0.0010	0.0044	0
Total Potassium	mg/L		7	1.0	2.0	1.7	2.0	0.5	-
Dissolved Potassium	mg/L		5	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Dissolved Selenium	mg/L	0.0046	7	0.0010	0.0050	0.0021	0.0010	0.0020	-
Total Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Dissolved Silver	mg/L	none	7	0.000020	0.000500	0.000157	0.000020	0.000234	-
Total Sodium	mg/L		5	2.0	3.2	2.5	2.4	0.5	-
Dissolved Sodium	mg/L		5	2.0	3.2	2.5	2.4	0.5	-
Total Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		5	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		5	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		5	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		5	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \ln \text{hardness} - 0.88)})/1000$	7	0.0050	0.0070	0.0056	0.0050	0.0010	0
Dissolved Zinc	mg/L	(total Zn limit)/(0.986)	7	0.0050	0.0070	0.0056	0.0050	0.0010	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.10

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ7

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	WQ7						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		4	17.2	40.9	29.5	30.0	10.3	-
TDS	mg/L		4	14	22	18	17	4	-
Hardness	mg/L CaCO ₃		4	4.60	13.40	10.28	11.55	4.06	-
pH (lab)			4	6.92	7.39	-	7.08	0.20	-
pH (<i>in situ</i>)		6.5 - 9	4	5.20	6.28	-	5.79	0.52	4
Acidity	mg/L		0	0.00	0.00	-	-	-	-
TSS	mg/L		4	3.0	3.0	3.0	3.0	0.0	-
Settleable Solids			0	0.0	0.0	-	-	-	-
Turbidity	NTU		4	0.12	0.73	0.28	0.14	0.30	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		4	5.5	12.5	9.5	10.0	3.0	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	4	1.65	5.45	2.86	2.18	1.74	0
Fluoride (F)	mg/L		4	0.020	0.020	0.020	0.020	0.000	-
Sulphate (SO ₄)	mg/L		4	0.75	1.20	0.95	0.93	0.19	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.777-7.888-pH)})))\times\text{MIN}(2.85, 1.45 \cdot 10^{(0.058 \cdot (pH-7))})$	4	0.0050	0.0240	0.0098	0.0050	0.0095	0
Nitrate	mg/L		4	0.0107	0.0857	0.0569	0.0655	0.0323	-
Nitrite	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Ortho-Phosphate	mg/L		4	0.0010	0.0011	0.0011	0.0011	0.0001	-
Total Dissolved Phosphate	mg/L		4	0.0020	0.0020	0.0020	0.0020	0.0000	-
Total Phosphate	mg/L		4	0.0020	0.0027	0.0022	0.0020	0.0004	-
Carbonate	mg/L		0	-	-	-	-	-	-
Bi-Carbonate	mg/L		0	-	-	-	-	-	-
Sodium	mg/L		0	-	-	-	-	-	-
Metals									
Total Aluminum	mg/L	0.087	4	0.0251	0.0892	0.0590	0.0609	0.0323	1
Dissolved Aluminum	mg/L	0.087	4	0.0231	0.0869	0.0563	0.0575	0.0316	0
Total Antimony	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		4	0.020	0.020	0.020	0.020	0.000	-
Dissolved Barium	mg/L		4	0.020	0.020	0.020	0.020	0.000	-
Total Beryllium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		4	0.10	0.10	0.10	0.10	0.00	-
Dissolved Boron	mg/L		4	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.7409 \cdot \text{hardness} - 4.775)} / 1000)$	4	0.000017	0.000024	0.000019	0.000017	0.000004	0
Dissolved Cadmium	mg/L	(total Cd limit) * (1.101672 - ((ln hardness) / (0.041838)))	4	0.000017	0.000017	0.000017	0.000017	0.000000	0
Total Calcium	mg/L		4	1.47	4.19	3.17	3.50	1.21	-
Dissolved Calcium	mg/L		4	1.44	4.21	3.18	3.54	1.23	-
Total Chromium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Chromium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Cobalt	mg/L		4	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		4	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.9545 \cdot \text{hardness} - 1.76)} / 1000)$	4	0.0010	0.0016	0.0012	0.0010	0.0003	1
Dissolved Copper	mg/L	(tot Cu limit) / (0.960)	4	0.0010	0.0016	0.0012	0.0010	0.0003	1
Total Iron	mg/L	1	4	0.030	0.030	0.030	0.030	0.000	0
Dissolved Iron	mg/L	1	4	0.030	0.030	0.030	0.030	0.000	0
Total Lead	mg/L	$(e^{(1.273 \cdot \text{hardness} - 4.76)} / 1000)$	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Lead	mg/L	(total Pb limit) / (1.46203 - ((ln hardness) / (0.145712)))	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Lithium	mg/L		4	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		4	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		4	0.23	0.81	0.56	0.60	0.26	-
Dissolved Magnesium	mg/L		4	0.24	0.80	0.56	0.60	0.25	-
Total Manganese	mg/L		4	0.00030	0.00076	0.00046	0.00038	0.00021	-
Dissolved Manganese	mg/L		4	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Mercury	mg/L	0.0009081	4	0.000020	0.000020	0.000020	0.000020	0.000000	0
Dissolved Mercury	mg/L	0.00077	4	0.000020	0.000020	0.000020	0.000020	0.000000	0
Total Molybdenum	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Molybdenum	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Nickel	mg/L	$(e^{(0.846 \cdot \text{hardness} - 0.059)} / 1000)$	4	0.0010	0.0010	0.0010	0.0010	0.0000	0
Dissolved Nickel	mg/L	(Total Ni limit) / (0.997)	4	0.0010	0.0010	0.0010	0.0010	0.0000	0
Total Potassium	mg/L		4	2.0	2.0	2.0	2.0	0.0	-
Dissolved Potassium	mg/L		4	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Selenium	mg/L	0.0046	4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Silver	mg/L	none	4	0.000020	0.000020	0.000020	0.000020	0.000000	-
Dissolved Silver	mg/L	none	4	0.000020	0.000020	0.000020	0.000020	0.000000	-
Total Sodium	mg/L		4	2.0	3.2	2.4	2.2	0.6	-
Dissolved Sodium	mg/L		4	2.0	3.2	2.4	2.2	0.6	-
Total Thallium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		4	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		4	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		4	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		4	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \cdot \text{hardness} - 0.88)} / 1000)$	4	0.0050	0.0050	0.0050	0.0050	0.0000	0
Dissolved Zinc	mg/L	(total Zn limit) / (0.986)	4	0.0050	0.0050	0.0050	0.0050	0.0000	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.11

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ8

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	Number of Samples	WQ8					
				Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		4	19.6	59.3	41.3	43.1	16.7	-
TDS	mg/L		4	15	31	22	21	8	-
Hardness	mg/L CaCO ₃		4	5.50	22.60	15.45	16.85	7.32	-
pH (lab)			4	6.92	7.44	-	7.08	0.23	-
pH (<i>in situ</i>)		6.5 - 9	4	5.93	6.77	-	6.34	0.35	3
Acidity	mg/L		0	0.00	0.00	-	-	-	-
TSS	mg/L		4	3.0	3.0	3.0	3.0	0.0	-
Settleable Solids			0	0.0	0.0	-	-	-	-
Turbidity	NTU		4	0.11	0.30	0.20	0.20	0.10	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		4	6.3	18.1	14.0	15.8	5.4	-
Bromide (Br)	mg/L		3	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	4	2.32	5.25	3.25	2.72	1.38	0
Fluoride (F)	mg/L		4	0.020	0.020	0.020	0.020	0.000	-
Sulphate (SO ₄)	mg/L		4	0.92	2.81	1.77	1.68	0.80	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.7788-pH)})))\times\text{MIN}(2.85, 1.45 \cdot 10^{(0.058 \cdot (pH-7))})$	4	0.0050	0.0200	0.0088	0.0050	0.0075	0
Nitrate	mg/L		4	0.0183	0.1040	0.0707	0.0802	0.0371	-
Nitrite	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Ortho-Phosphate	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Dissolved Phosphate	mg/L		4	0.0020	0.0020	0.0020	0.0020	0.0000	-
Total Phosphate	mg/L		4	0.0020	0.0031	0.0023	0.0020	0.0006	-
Carbonate	mg/L		0	-	-	-	-	-	-
Bi-Carbonate	mg/L		0	-	-	-	-	-	-
Sodium	mg/L		0	-	-	-	-	-	-
Metals									
Total Aluminum	mg/L	0.087	4	0.0172	0.0680	0.0425	0.0423	0.0236	0
Dissolved Aluminum	mg/L	0.087	4	0.0166	0.0603	0.0396	0.0407	0.0209	0
Total Antimony	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		4	0.020	0.020	0.020	0.020	0.000	-
Dissolved Barium	mg/L		4	0.020	0.020	0.020	0.020	0.000	-
Total Beryllium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		4	0.10	0.10	0.10	0.10	0.00	-
Dissolved Boron	mg/L		4	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.7409 \cdot \text{hardness} - 4.77)})/1000$	4	0.000017	0.000017	0.000017	0.000017	0.000000	0
Dissolved Cadmium	mg/L	(total Cd limit)/(1.101672 - ((ln hardness)/(0.041838)))	4	0.000017	0.000017	0.000017	0.000017	0.000000	0
Total Calcium	mg/L		4	1.68	7.40	4.99	5.44	2.43	-
Dissolved Calcium	mg/L		4	1.71	7.22	4.95	5.43	2.36	-
Total Chromium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Chromium	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Cobalt	mg/L		4	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		4	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545 \cdot \text{hardness} - 1.76)})/1000$	4	0.0010	0.0013	0.0011	0.0011	0.0001	1
Dissolved Copper	mg/L	(tot Cu limit)/(0.960)	4	0.0010	0.0013	0.0011	0.0010	0.0002	0
Total Iron	mg/L	1	4	0.030	0.030	0.030	0.030	0.000	0
Dissolved Iron	mg/L	1	4	0.030	0.030	0.030	0.030	0.000	0
Total Lead	mg/L	$(e^{(1.273 \cdot \text{hardness} - 4.76)})/1000$	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Lead	mg/L	(total Pb limit)/(1.46203 - ((ln hardness)/(0.145712)))	4	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Lithium	mg/L		4	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		4	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		4	0.30	1.10	0.76	0.81	0.35	-
Dissolved Magnesium	mg/L		4	0.30	1.10	0.76	0.81	0.35	-
Total Manganese	mg/L		4	0.00037	0.00174	0.00119	0.00132	0.00062	-
Dissolved Manganese	mg/L		4	0.00030	0.00124	0.00076	0.00074	0.00053	-
Total Mercury	mg/L	0.0009081	4	0.000020	0.000020	0.000020	0.000020	0.000000	0
Dissolved Mercury	mg/L	0.00077	4	0.000020	0.000020	0.000020	0.000020	0.000000	0
Total Molybdenum	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Molybdenum	mg/L		4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Nickel	mg/L	$(e^{(0.846 \cdot \text{hardness} - 0.058)})/1000$	4	0.0010	0.0010	0.0010	0.0010	0.0000	0
Dissolved Nickel	mg/L	(Total Ni limit)/(0.997)	4	0.0010	0.0010	0.0010	0.0010	0.0000	0
Total Potassium	mg/L		4	2.0	2.0	2.0	2.0	0.0	-
Dissolved Potassium	mg/L		4	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Selenium	mg/L	0.0046	4	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Silver	mg/L	none	4	0.000020	0.000020	0.000020	0.000020	0.000000	-
Dissolved Silver	mg/L	none	4	0.000020	0.000020	0.000020	0.000020	0.000000	-
Total Sodium	mg/L		4	2.0	3.5	2.6	2.5	0.8	-
Dissolved Sodium	mg/L		4	2.0	3.5	2.6	2.5	0.8	-
Total Thallium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		4	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		4	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		4	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		4	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		4	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		4	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \cdot \text{hardness} - 0.88)})/1000$	4	0.0050	0.0050	0.0050	0.0050	0.0000	0
Dissolved Zinc	mg/L	(total Zn limit)/(0.986)	4	0.0050	0.0050	0.0050	0.0050	0.0000	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.12

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ10

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	Number of Samples	WQ10					Criteria Exceedances
				Minimum	Maximum	Mean	Median	Standard Deviation	
Physical Tests									
Conductivity	uS/cm		2	32.9	33.3	33.1	33.1	0.3	-
TDS	mg/L		2	11	24	18	18	9	-
Hardness	mg/L CaCO ₃		2	7.57	9.65	8.61	8.61	1.47	-
pH (lab)			2	7.05	7.15	-	7.10	0.07	-
pH (<i>in situ</i>)		6.5 - 9	2	6.06	6.82	-	6.44	0.54	1
Acidity	mg/L		0	0.00	0.00	-	-	-	-
TSS	mg/L		2	3.0	3.0	3.0	3.0	0.0	-
Settleable Solids			0	0.0	0.0	-	-	-	-
Turbidity	NTU		2	1.61	5.58	3.60	3.60	2.81	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		2	4.6	8.1	6.4	6.4	2.5	-
Bromide (Br)	mg/L		2	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	2	3.37	3.55	3.46	3.46	0.13	0
Fluoride (F)	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Sulphate (SO ₄)	mg/L		2	1.36	1.41	1.39	1.39	0.04	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.777-7.888-pH)})))\times\text{MIN}(2.85, 1.45-10^{(0.058-(28-pH))})$	2	0.0050	0.0050	0.0050	0.0050	0.0000	0
Nitrate	mg/L		2	0.0523	0.0558	0.0541	0.0541	0.0025	-
Nitrite	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Ortho-Phosphate	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Dissolved Phosphate	mg/L		2	0.0021	0.0057	0.0039	0.0039	0.0025	-
Total Phosphate	mg/L		2	0.0097	0.0210	0.0154	0.0154	0.0080	-
Carbonate	mg/L		0	-	-	-	-	-	-
Bi-Carbonate	mg/L		0	-	-	-	-	-	-
Sodium	mg/L		0	-	-	-	-	-	-
Metals									
Total Aluminum	mg/L	0.087	2	0.1160	0.5740	0.3450	0.3450	0.3239	2
Dissolved Aluminum	mg/L	0.087	2	0.0885	0.0939	0.0912	0.0912	0.0038	2
Total Antimony	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Dissolved Barium	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Total Beryllium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		2	0.10	0.10	0.10	0.10	0.00	-
Dissolved Boron	mg/L		2	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(7.409(pH-7.75))}/1000)$	2	0.000017	0.000017	0.000017	0.000017	0.000000	0
Dissolved Cadmium	mg/L	$(\text{total Cd limit})\times(1.101672-(\ln \text{ hardness})/(0.041838)))$	2	0.000017	0.000017	0.000017	0.000017	0.000000	0
Total Calcium	mg/L		2	2.20	2.91	2.56	2.56	0.50	-
Dissolved Calcium	mg/L		2	2.14	2.80	2.47	2.47	0.47	-
Total Chromium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Chromium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Cobalt	mg/L		2	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		2	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545(pH-7.75))}/1000)$	2	0.0020	0.0039	0.0030	0.0030	0.0013	2
Dissolved Copper	mg/L	$(\text{tot Cu limit})/(0.960)$	2	0.0014	0.0018	0.0016	0.0016	0.0003	2
Total Iron	mg/L	1	2	0.086	0.541	0.314	0.314	0.322	0
Dissolved Iron	mg/L	1	2	0.044	0.088	0.066	0.066	0.031	0
Total Lead	mg/L	$(e^{(1.273(pH-7.75))}/1000)$	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Lead	mg/L	$(\text{total Pb limit})\times(1.46203-(\ln \text{ hardness})/(0.145712))$	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Lithium	mg/L		2	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		2	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		2	0.55	0.72	0.64	0.64	0.12	-
Dissolved Magnesium	mg/L		2	0.54	0.65	0.60	0.60	0.08	-
Total Manganese	mg/L		2	0.00543	0.01750	0.01147	0.01147	0.00853	-
Dissolved Manganese	mg/L		2	0.00351	0.00675	0.00513	0.00513	0.00229	-
Total Mercury	mg/L	0.0009081	2	0.000020	0.000020	0.000020	0.000020	0.000000	0
Dissolved Mercury	mg/L	0.00077	2	0.000020	0.000020	0.000020	0.000020	0.000000	0
Total Molybdenum	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Molybdenum	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Nickel	mg/L	$(e^{(0.846(pH-7.05))}/1000)$	2	0.0010	0.0010	0.0010	0.0010	0.0000	0
Dissolved Nickel	mg/L	$(\text{Total Ni limit})/(0.997)$	2	0.0010	0.0010	0.0010	0.0010	0.0000	0
Total Potassium	mg/L		2	2.0	2.0	2.0	2.0	0.0	-
Dissolved Potassium	mg/L		2	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Selenium	mg/L	0.0046	2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Silver	mg/L	none	2	0.000020	0.000020	0.000020	0.000020	0.000000	-
Dissolved Silver	mg/L	none	2	0.000020	0.000020	0.000020	0.000020	0.000000	-
Total Sodium	mg/L		2	2.8	3.4	3.1	3.1	0.4	-
Dissolved Sodium	mg/L		2	2.6	3.4	3.0	3.0	0.6	-
Total Thallium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		2	0.010	0.034	0.022	0.022	0.017	-
Dissolved Titanium	mg/L		2	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		2	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		2	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473(pH-7.75))}/1000)$	2	0.0050	0.0097	0.0074	0.0074	0.0033	0
Dissolved Zinc	mg/L	$(\text{total Zn limit})/(0.986)$	2	0.0050	0.0050	0.0050	0.0050	0.0000	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.13

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR WQ12

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Rev'd: Apr 11/07

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	WQ12						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		2	22.5	64.1	43.3	43.3	29.4	-
TDS	mg/L		2	28	34	31	31	4	-
Hardness	mg/L CaCO ₃		2	7.11	24.90	16.01	16.01	12.58	-
pH (lab)			2	7.05	7.23	-	7.14	0.13	-
pH (<i>in situ</i>)		6.5 - 9	2	6.42	6.82	-	6.62	0.28	1
Acidity	mg/L		0	0.00	0.00	-	-	-	-
TSS	mg/L		2	3.0	3.0	3.0	3.0	0.0	-
Settleable Solids	mg/L		0	0.0	0.0	-	-	-	-
Turbidity	NTU		2	0.46	0.64	0.55	0.55	0.13	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		2	6.6	24.0	15.3	15.3	12.3	-
Bromide (Br)	mg/L		2	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	2	2.01	4.25	3.13	3.13	1.58	0
Fluoride (F)	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Sulphate (SO ₄)	mg/L		2	1.06	2.16	1.61	1.61	0.78	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{(7.888-pH)}))+(2.487/(1+10^{(2.77-8.888-pH)})))\times\text{MIN}(2.85, 1.45 \cdot 10^{(0.088 \cdot (pH-7))})$	2	0.0050	0.0050	0.0050	0.0050	0.0000	0
Nitrate	mg/L		2	0.0299	0.0931	0.0615	0.0615	0.0447	-
Nitrite	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Ortho-Phosphate	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Dissolved Phosphate	mg/L		2	0.0020	0.0100	0.0060	0.0060	0.0057	-
Total Phosphate	mg/L		2	0.0020	0.0100	0.0060	0.0060	0.0057	-
Carbonate	mg/L		0	-	-	-	-	-	-
Bi-Carbonate	mg/L		0	-	-	-	-	-	-
Sodium	mg/L		0	-	-	-	-	-	-
Metals									
Total Aluminum	mg/L	0.087	2	0.0480	0.1630	0.1055	0.1055	0.0813	1
Dissolved Aluminum	mg/L	0.087	2	0.0395	0.1610	0.1003	0.1003	0.0859	1
Total Antimony	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Dissolved Barium	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Total Beryllium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		2	0.10	0.10	0.10	0.10	0.00	-
Dissolved Boron	mg/L		2	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{(1.7489 \cdot \text{hardness} - 4.77)})/1000$	2	0.000017	0.000017	0.000017	0.000017	0.000000	0
Dissolved Cadmium	mg/L	(total Cd limit)/(1.101672 - ((ln hardness)/(0.041838)))	2	0.000017	0.000017	0.000017	0.000017	0.000000	0
Total Calcium	mg/L		2	2.15	8.64	5.40	5.40	4.59	-
Dissolved Calcium	mg/L		2	2.19	8.58	5.39	5.39	4.52	-
Total Chromium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Chromium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Cobalt	mg/L		2	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		2	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{(0.8545 \cdot \text{hardness} - 1.76)})/1000$	2	0.0010	0.0015	0.0013	0.0013	0.0004	1
Dissolved Copper	mg/L	(tot Cu limit)/(0.960)	2	0.0010	0.0014	0.0012	0.0012	0.0003	1
Total Iron	mg/L	1	2	0.030	0.032	0.031	0.031	0.001	0
Dissolved Iron	mg/L	1	2	0.030	0.031	0.031	0.031	0.001	0
Total Lead	mg/L	$(e^{(1.273 \cdot \text{hardness} - 4.76)})/1000$	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Lead	mg/L	(total Pb limit)/(1.46203 - ((ln hardness)/(0.145712)))	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Lithium	mg/L		2	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		2	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		2	0.40	0.86	0.63	0.63	0.33	-
Dissolved Magnesium	mg/L		2	0.40	0.85	0.63	0.63	0.32	-
Total Manganese	mg/L		2	0.00067	0.00090	0.00079	0.00079	0.00016	-
Dissolved Manganese	mg/L		2	0.00030	0.00034	0.00032	0.00032	0.00003	-
Total Mercury	mg/L	0.0009081	2	0.000020	0.000020	0.000020	0.000020	0.000000	0
Dissolved Mercury	mg/L	0.00077	2	0.000020	0.000020	0.000020	0.000020	0.000000	0
Total Molybdenum	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Molybdenum	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Nickel	mg/L	$(e^{(0.846 \cdot \text{hardness} - 0.058)})/1000$	2	0.0010	0.0010	0.0010	0.0010	0.0000	0
Dissolved Nickel	mg/L	(Total Ni limit)/(0.997)	2	0.0010	0.0010	0.0010	0.0010	0.0000	0
Total Potassium	mg/L		2	2.0	2.0	2.0	2.0	0.0	-
Dissolved Potassium	mg/L		2	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Selenium	mg/L	0.0046	2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Silver	mg/L	none	2	0.000020	0.000020	0.000020	0.000020	0.000000	-
Dissolved Silver	mg/L	none	2	0.000020	0.000020	0.000020	0.000020	0.000000	-
Total Sodium	mg/L		2	2.5	3.0	2.8	2.8	0.4	-
Dissolved Sodium	mg/L		2	2.4	3.0	2.7	2.7	0.4	-
Total Thallium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		2	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		2	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		2	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		2	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{(0.8473 \cdot \text{hardness} - 0.88)})/1000$	2	0.0050	0.0050	0.0050	0.0050	0.0000	0
Dissolved Zinc	mg/L	(total Zn limit)/(0.986)	2	0.0050	0.0050	0.0050	0.0050	0.0000	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.14

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND SITE MONITORING REPORT
ANALYTICAL WATER QUALITY DATA SUMMARY STATISTICS FOR SEEP

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Parameter	Units	Alaska Water Quality Criteria - Chronic Criteria Values ⁽¹⁾	SEEP						
			Number of Samples	Minimum	Maximum	Mean	Median	Standard Deviation	Criteria Exceedances
Physical Tests									
Conductivity	uS/cm		2	24.7	42.8	33.8	33.8	12.8	-
TDS	mg/L		2	17	26	22	22	6	-
Hardness	mg/L CaCO ₃		2	7.81	15.30	11.56	11.56	5.30	-
pH (lab)			2	7.00	7.15	-	7.08	0.11	-
pH (<i>in situ</i>)		6.5 - 8.5	2	6.20	6.43	-	6.32	0.16	2
Acidity	mg/L		0	0.00	0.00	-	-	-	-
TSS	mg/L		2	3.0	3.0	3.0	3.0	0.0	-
Settleable Solids			0	0.0	0.0	-	-	-	-
Turbidity	NTU		2	0.25	3.79	2.02	2.02	2.50	-
Dissolved Anions									
Alkalinity-Total	mg/L CaCO ₃		2	6.9	13.6	10.3	10.3	4.7	-
Bromide (Br)	mg/L		2	0.050	0.050	0.050	0.050	0.000	-
Chloride (Cl)	mg/L	230	2	2.25	3.56	2.91	2.91	0.93	0
Fluoride (F)	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Sulphate (SO ₄)	mg/L		2	0.92	1.53	1.23	1.23	0.43	-
Nutrients									
Ammonia	mg/L N	$((0.0577/(1+10^{-(7.688-pH)}))+(2.487/(1+10^{-(pH-7.885))}))\times\text{MIN}(2.85;1.45\cdot 10^{-(0.028(pH-1))})$	2	0.0050	0.0050	0.0050	0.0050	0.0000	0
Nitrate	mg/L		2	0.0402	0.1230	0.0816	0.0816	0.0585	-
Nitrite	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Ortho-Phosphate	mg/L		2	0.0010	0.0013	0.0012	0.0012	0.0002	-
Total Dissolved Phosphate	mg/L		2	0.0020	0.0020	0.0020	0.0020	0.0000	-
Total Phosphate	mg/L		2	0.0020	0.0020	0.0020	0.0020	0.0000	-
Carbonate	mg/L		0	-	-	-	-	-	-
Bi-Carbonate	mg/L		0	-	-	-	-	-	-
Sodium	mg/L		0	-	-	-	-	-	-
Metals									
Total Aluminum	mg/L	0.087	2	0.0735	0.1270	0.1003	0.1003	0.0378	1
Dissolved Aluminum	mg/L	0.087	2	0.0691	0.1230	0.0961	0.0961	0.0381	1
Total Antimony	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Antimony	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Arsenic	mg/L	0.150	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Arsenic	mg/L	0.150	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Barium	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Dissolved Barium	mg/L		2	0.020	0.020	0.020	0.020	0.000	-
Total Beryllium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Beryllium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Boron	mg/L		2	0.10	0.10	0.10	0.10	0.00	-
Dissolved Boron	mg/L		2	0.10	0.10	0.10	0.10	0.00	-
Total Cadmium	mg/L	$(e^{0.7429(\ln \text{hardness}-4.715)})/1000$	2	0.000017	0.000017	0.000017	0.000017	0.000000	0
Dissolved Cadmium	mg/L	$(\text{total Cd limit})\cdot(1.101672-\{(\ln \text{hardness})\cdot(0.041838)\})$	2	0.000017	0.000017	0.000017	0.000017	0.000000	0
Total Calcium	mg/L		2	2.38	5.02	3.70	3.70	1.87	-
Dissolved Calcium	mg/L		2	2.36	5.03	3.70	3.70	1.89	-
Total Chromium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Chromium	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Cobalt	mg/L		2	0.00030	0.00030	0.00030	0.00030	0.00000	-
Dissolved Cobalt	mg/L		2	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Copper	mg/L	$(e^{0.8545(\ln \text{hardness}-1.705)})/1000$	2	0.0012	0.0018	0.0015	0.0015	0.0004	1
Dissolved Copper	mg/L	$(\text{tot Cu limit})(0.960)$	2	0.0010	0.0018	0.0014	0.0014	0.0006	1
Total Iron	mg/L	1	2	0.030	0.030	0.030	0.030	0.000	0
Dissolved Iron	mg/L	1	2	0.030	0.030	0.030	0.030	0.000	0
Total Lead	mg/L	$(e^{1.2293(\ln \text{hardness}-4.705)})/1000$	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Dissolved Lead	mg/L	$(\text{total Pb limit})(1.46203-\{(\ln \text{hardness})\cdot(0.145712)\})$	2	0.00050	0.00050	0.00050	0.00050	0.00000	0
Total Lithium	mg/L		2	0.0050	0.0050	0.0050	0.0050	0.0000	-
Dissolved Lithium	mg/L		2	0.0050	0.0050	0.0050	0.0050	0.0000	-
Total Magnesium	mg/L		2	0.47	0.65	0.56	0.56	0.13	-
Dissolved Magnesium	mg/L		2	0.47	0.66	0.57	0.57	0.13	-
Total Manganese	mg/L		2	0.00030	0.00039	0.00035	0.00035	0.00006	-
Dissolved Manganese	mg/L		2	0.00030	0.00030	0.00030	0.00030	0.00000	-
Total Mercury	mg/L	0.0009081	2	0.000020	0.000020	0.000020	0.000020	0.000000	0
Dissolved Mercury	mg/L	0.00077	2	0.000020	0.000020	0.000020	0.000020	0.000000	0
Total Molybdenum	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Molybdenum	mg/L		2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Nickel	mg/L	$(e^{0.846(\ln \text{hardness})+0.0584})/1000$	2	0.0010	0.0010	0.0010	0.0010	0.0000	0
Dissolved Nickel	mg/L	$(\text{Total Ni limit})(0.997)$	2	0.0010	0.0010	0.0010	0.0010	0.0000	0
Total Potassium	mg/L		2	2.0	2.0	2.0	2.0	0.0	-
Dissolved Potassium	mg/L		2	2.0	2.0	2.0	2.0	0.0	-
Total Selenium	mg/L	0.0050	2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Dissolved Selenium	mg/L	0.0046	2	0.0010	0.0010	0.0010	0.0010	0.0000	-
Total Silver	mg/L	none	2	0.000020	0.000020	0.000020	0.000020	0.000000	-
Dissolved Silver	mg/L	none	2	0.000020	0.000020	0.000020	0.000020	0.000000	-
Total Sodium	mg/L		2	2.5	2.6	2.6	2.6	0.1	-
Dissolved Sodium	mg/L		2	2.5	2.6	2.6	2.6	0.1	-
Total Thallium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Thallium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Tin	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Dissolved Tin	mg/L		2	0.00050	0.00050	0.00050	0.00050	0.00000	-
Total Titanium	mg/L		2	0.010	0.010	0.010	0.010	0.000	-
Dissolved Titanium	mg/L		2	0.010	0.010	0.010	0.010	0.000	-
Total Uranium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Dissolved Uranium	mg/L		2	0.00020	0.00020	0.00020	0.00020	0.00000	-
Total Vanadium	mg/L		2	0.030	0.030	0.030	0.030	0.000	-
Dissolved Vanadium	mg/L		2	0.030	0.030	0.030	0.030	0.000	-
Total Zinc	mg/L	$(e^{0.8473(\ln \text{hardness})+0.8854})/1000$	2	0.0050	0.0050	0.0050	0.0050	0.0000	0
Dissolved Zinc	mg/L	$(\text{total Zn limit})(0.986)$	2	0.0050	0.0050	0.0050	0.0050	0.0000	0

Notes:
 (1) Alaska Department of Environmental Conservation (ADEC). 2003. Alaska Water Quality Criteria Manual for Toxic and Deleterious Organic and Inorganic Substances. State of Alaska. As amended through May 15, 2003.
 (2) Parameters that had concentrations that were below the method detection limits were assumed to have a concentration equal to the detection limit for the purposes of calculating the summary statistics.

TABLE 6.15

**NIBLACK MINING CORPORATION
NIBLACK PROJECT**

**WATER QUALITY BASELINE AND MONITORING PLAN
ANALYTICAL RESULTS FOR INITIAL GROUNDWATER QUALITY SAMPLES**

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Rev'd:Apr 11/07

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Sample ID	Method Detection Limits		Analysis Results		Alaska Water Quality Criteria Aquatic Life Fresh Water - Chronic ⁽²⁾ (May 15, 2003)
	GW Site 1	GW Site 2	GW Site 1	GW Site 2	
Date Sampled	17-Oct-06	17-Oct-06	17-Oct-06	17-Oct-06	
Physical Tests					
Conductivity (uS/cm)	2.0	2.0	70.5	189	
Total Dissolved Solids	10	10	77	109	
Hardness CaCO3	0.54	0.54	36.3	98.1	
pH ⁽⁴⁾	0.010	0.010	6.30	6.61	6.5 - 8.5
Total Suspended Solids	4.5	3.0	311	248	
Turbidity (NTU)	0.10	0.10	143	157	
Dissolved Anions					
Alkalinity-Total CaCO3	2.0	2.0	32.1	98.5	
Bromide Br	0.25	0.050	0.32	<0.050	
Chloride Cl	2.5	0.50	<2.5	5.13	230
Fluoride F	0.10	0.020	<0.10	<0.020	
Sulphate SO4	2.5	0.50	<2.5	2.00	
Nutrients					
Ammonia Nitrogen N	0.020	0.0050	<0.020	<0.0050	$((0.0577/(1+10^{7.688-pH}))+(2.487/(1+10^{pH+7.688})))\times\text{MIN}(2.85,1.45-10^{0.028-(25-T)})$
Nitrate Nitrogen N	0.025	0.0050	0.230	0.0509	
Nitrite Nitrogen N	0.0050	0.0010	<0.0050	<0.0010	
Dissolved ortho-Phosphate P	0.0050	0.0010	<0.0050	<0.0010	
Total Dissolved Phosphate P	0.010	0.0020	0.028	0.0023	
Total Phosphate P	0.010	0.020	0.183	0.145	
Total Metals					
Aluminum T-Al	0.0050	0.0050	1.68	4.10	0.087
Antimony T-Sb	0.00050	0.00050	<0.00050	<0.00050	
Arsenic T-As	0.00050	0.00050	<0.00050	<0.00050	0.150
Barium T-Ba	0.020	0.020	0.243	0.033	
Beryllium T-Be	0.0010	0.0010	<0.0010	<0.0010	
Boron T-B	0.10	0.10	<0.10	<0.10	
Cadmium T-Cd	0.000017	0.000017	0.000086	0.000090	$(e^{0.7409(\ln \text{hardness}-4.719)})/1000$
Calcium T-Ca	0.10	0.10	13.0	36.4	
Chromium T-Cr	0.0010	0.0010	0.0066	0.0151	
Cobalt T-Co	0.00030	0.00030	0.00220	0.00332	
Copper T-Cu	0.0010	0.0010	0.0297	0.0408	$(e^{0.8545(\ln \text{hardness}-1.702)})/1000$
Iron T-Fe	0.030	0.030	3.51	8.08	1
Lead T-Pb	0.00050	0.00050	0.0148	0.00162	$(e^{1.273(\ln \text{hardness}-4.705)})/1000$
Lithium T-Li	0.0050	0.0050	<0.0050	<0.0050	
Magnesium T-Mg	0.10	0.10	2.35	4.87	
Manganese T-Mn	0.00030	0.00030	0.231	0.307	
Mercury T-Hg	0.000020	0.000020	<0.000020	<0.000020	0.0009081
Molybdenum T-Mo	0.0010	0.0010	0.0036	0.0011	
Nickel T-Ni	0.0010	0.0010	0.0061	0.0069	$(e^{0.846(\ln \text{hardness}+0.0584)})/1000$
Potassium T-K	2.0	2.0	<2.0	<2.0	
Selenium T-Se	0.0010	0.0010	<0.0010	<0.0010	
Silver T-Ag	0.000020	0.000020	0.00217	0.00173	none
Sodium T-Na	2.0	2.0	5.2	5.8	
Thallium T-Tl	0.00020	0.00020	<0.00020	<0.00020	
Tin T-Sn	0.00050	0.00050	0.00306	0.00125	
Titanium T-Ti	0.010	0.010	0.047	0.298	
Uranium T-U	0.00020	0.00020	<0.00020	<0.00020	
Vanadium T-V	0.030	0.030	<0.030	<0.030	
Zinc T-Zn	0.0050	0.0050	0.0238	0.0272	$(e^{0.8473(\ln \text{hardness}+0.884)})/1000$

TABLE 6.15

NIBLACK MINING CORPORATION
NIBLACK PROJECT

WATER QUALITY BASELINE AND MONITORING PLAN
ANALYTICAL RESULTS FOR INITIAL GROUNDWATER QUALITY SAMPLES

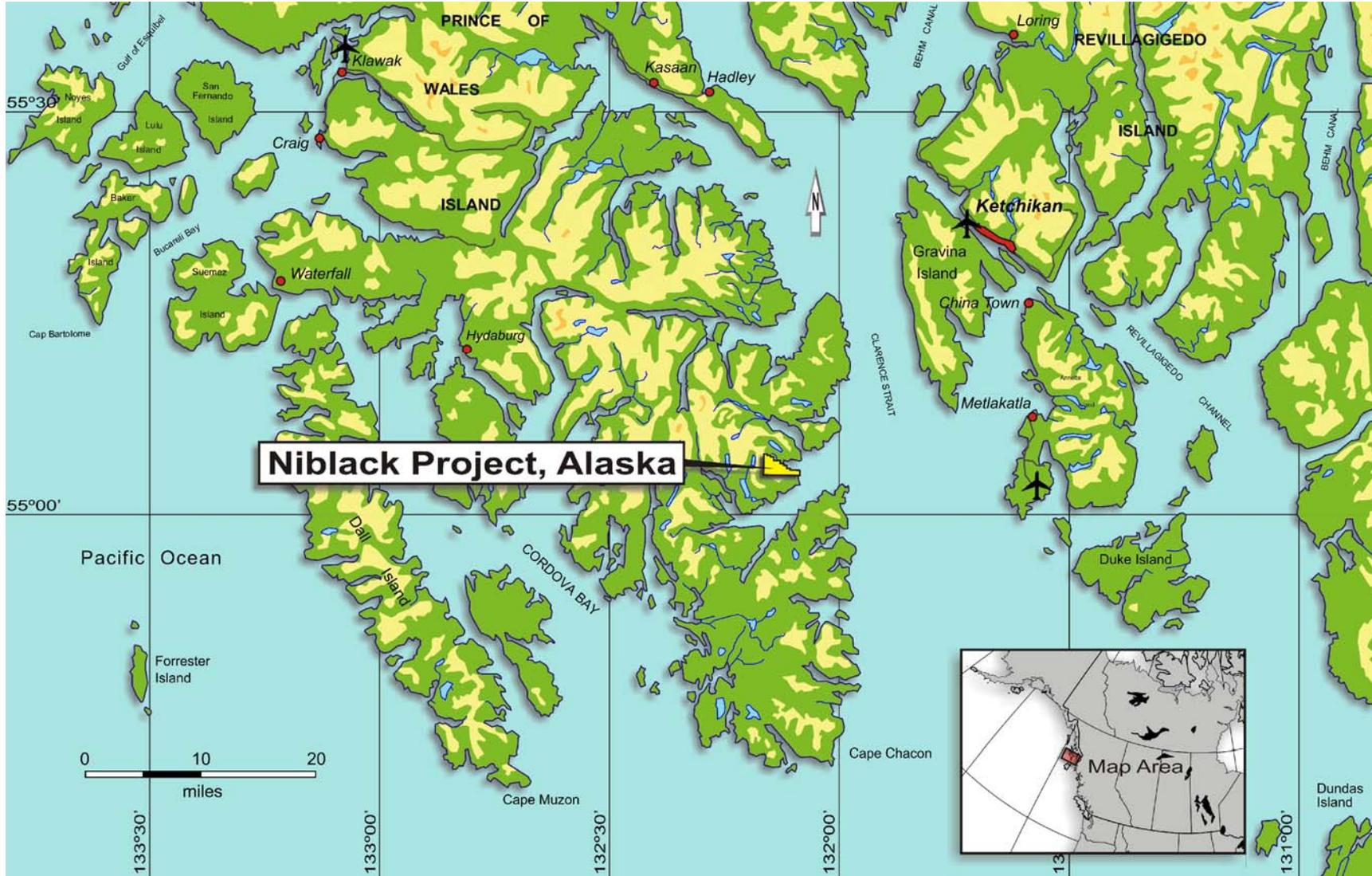
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Sample ID	Method Detection Limits		Analysis Results		Alaska Water Quality Criteria Aquatic Life Fresh Water - Chronic ⁽²⁾ (May 15, 2003)
	GW Site 1	GW Site 2	GW Site 1	GW Site 2	
Date Sampled	17-Oct-06	17-Oct-06	17-Oct-06	17-Oct-06	
Dissolved Metals					
Aluminum D-Al	0.0050	0.0050	0.211	0.0109	0.087
Antimony D-Sb	0.00050	0.00050	<0.00050	<0.00050	
Arsenic D-As	0.00050	0.00050	<0.00050	<0.00050	0.150
Barium D-Ba	0.020	0.020	0.227	0.022	
Beryllium D-Be	0.0010	0.0010	<0.0010	<0.0010	
Boron D-B	0.10	0.10	<0.10	<0.10	
Cadmium D-Cd	0.000017	0.000017	0.000053	<0.000017	(total Cd limit)*(1.101672-((ln hardness)/(0.041838)))
Calcium D-Ca	0.050	0.050	12.6	36.7	
Chromium D-Cr	0.0010	0.0010	0.0011	<0.0010	
Cobalt D-Co	0.00030	0.00030	0.00035	<0.00030	
Copper D-Cu	0.0010	0.0010	0.0135	<0.0010	(tot Cu limit)(0.960)
Iron D-Fe	0.030	0.030	0.258	0.315	1
Lead D-Pb	0.00050	0.00050	0.00364	<0.00050	(total Pb limit)(1.46203-((ln hardness)/(0.145712))
Lithium D-Li	0.0050	0.0050	<0.0050	<0.0050	
Magnesium D-Mg	0.10	0.10	1.17	1.58	
Manganese D-Mn	0.00030	0.00030	0.167	0.152	
Mercury D-Hg	0.000020	0.000020	<0.000020	<0.000020	0.00077
Molybdenum D-Mo	0.0010	0.0010	0.0031	<0.0010	
Nickel D-Ni	0.0010	0.0010	0.0029	<0.0010	(Total Ni limit)(0.997)
Potassium D-K	2.0	2.0	<2.0	<2.0	
Selenium D-Se	0.0010	0.0010	<0.0010	<0.0010	
Silver D-Ag	0.000020	0.000020	0.000094	<0.000020	none
Sodium D-Na	2.0	2.0	5.0	5.2	
Thallium D-Tl	0.00020	0.00020	<0.00020	<0.00020	
Tin D-Sn	0.00050	0.00050	0.00211	0.00053	
Titanium D-Ti	0.010	0.010	<0.010	<0.010	
Uranium D-U	0.00020	0.00020	<0.00020	<0.00020	
Vanadium D-V	0.030	0.030	<0.030	<0.030	
Zinc D-Zn	0.0050	0.0050	0.0104	<0.0050	(total Zn limit)(0.986)

Notes:

- (1) Units are mg/L unless otherwise specified.
- (2) State of Alaska, Department of Environmental Conservation, Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances. As amended through May 15, 2003.
- (3) **BOLD** - Indicates that the parameter exceeds the Criteria Limit.
- (4) pH value is the in situ value not the lab value.
- (5) Analysis was conducted by ALS Environmental, File No. Z3908.
- (6) GW Site 1 and GW Site 2 are not legal groundwater wells and the data presented in this table is an estimate of groundwater quality, legal wells will be installed during advanced baseline activities.



Niblack Project, Alaska

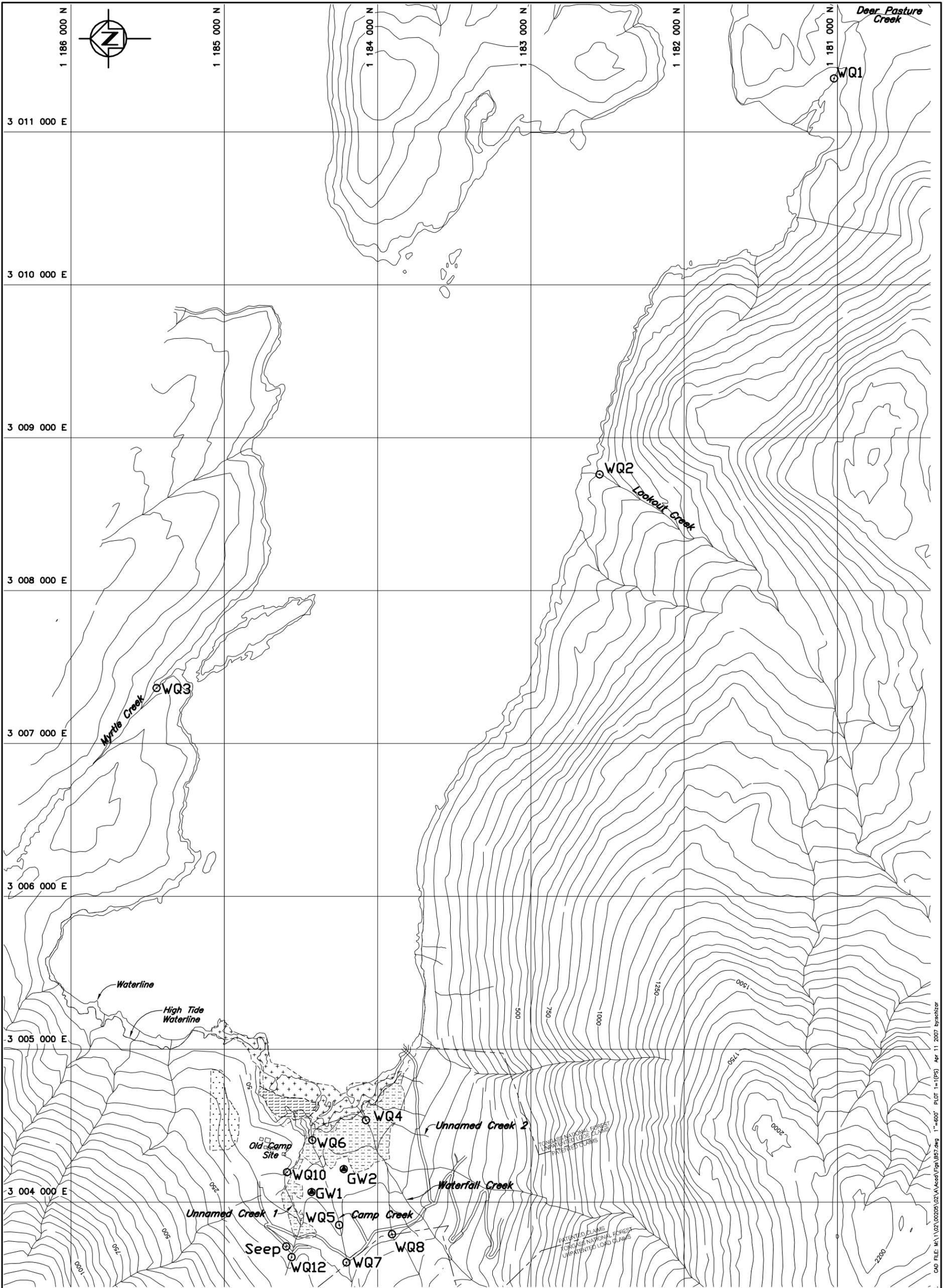


NIBLACK MINING CORP.
 WATER QUALITY BASELINE AND SITE MONITORING PLAN

**NIBLACK PROPERTY
 PROJECT LOCATION**



PROJECT/ASSIGNMENT NO. VA102-205/2	REF. NO. 11
FIGURE 1.1	
REV. 0	



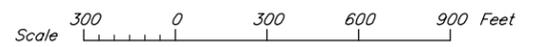
LEGEND

- Baseline GW Site
- Baseline Water Quality Station
- E1UBL Estuarine - Subtidal
- ⊕ E2US1N Estuarine - Unvegetated Intertidal

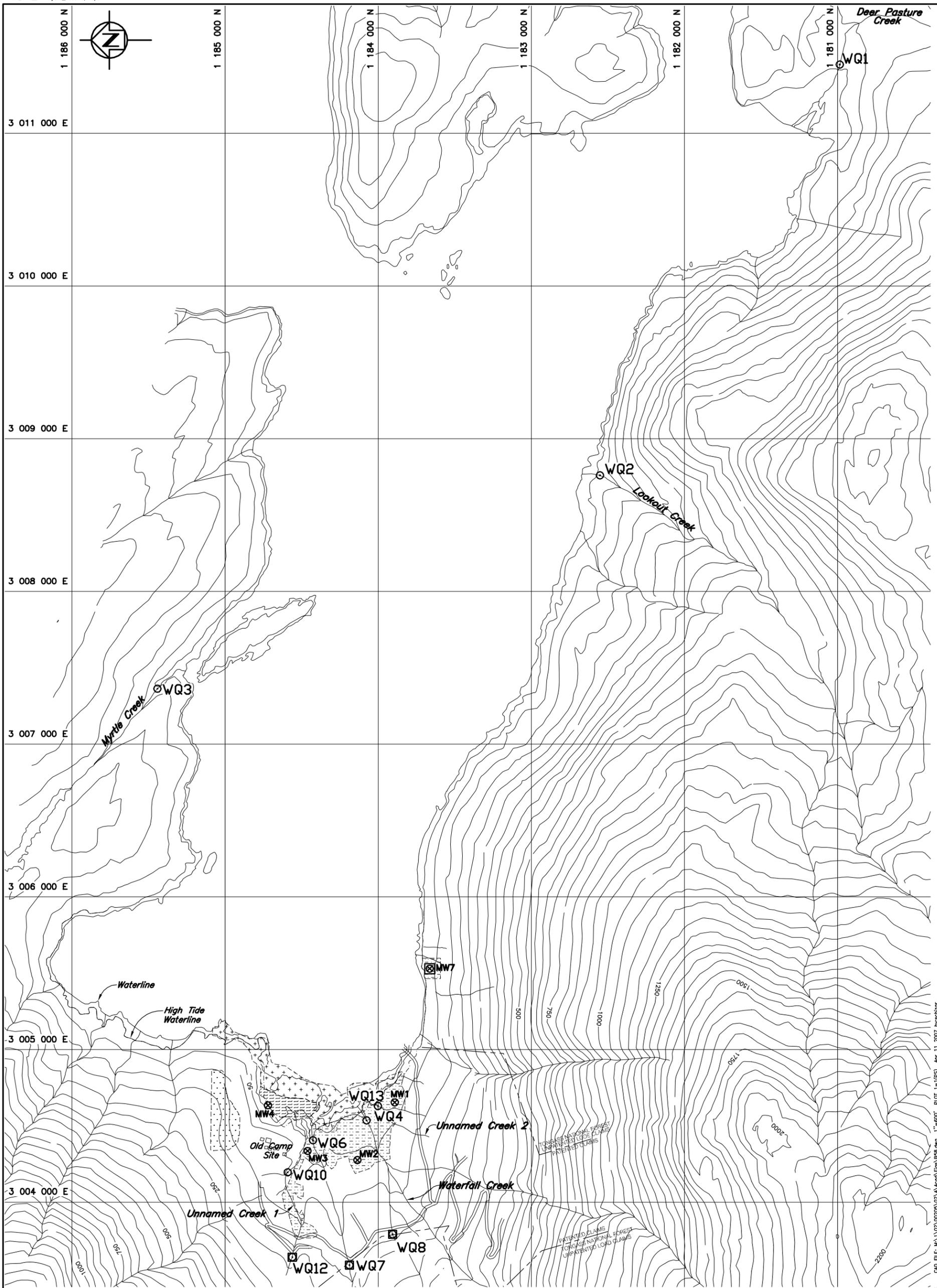
- ▨ PFO-SS4B - Needleleaf Forest/Scrub-Shrub Wetland
- ▨ PFO4B - Needleleaf Forest Wetland
- ▨ E2EM1P Estuarine - Emergent Intertidal

NOTES

1. This figure produced from information provided by Beacon Hill Consultants (1988) Ltd.
2. All dimensions and elevations are in feet unless otherwise noted.



NIBLACK MINING CORP.		
WATER QUALITY BASELINE AND SITE MONITORING PLAN		
BASELINE WATER QUALITY MONITORING SITES		
<i>Knight Piésold</i> CONSULTING	PROJECT/ASSIGNMENT NO. VA102-205/2	REF. NO. 11
FIGURE 4.1		REV. 0



LEGEND

- ⊗ Monitoring Wells
- ⊠ Background Monitoring Wells
- Water Quality Stations - Compliance Point
- ⊙ Water Quality Stations - Background
- E1UBL Estuarine - Subtidal
- ⊕ E2US1N Estuarine - Unvegetated Intertidal

- ▤ PFO-SS4B - Needleleaf Forest/Scrub-Shrub Wetland
- ▥ PFO4B - Needleleaf Forest Wetland
- ▧ E2EM1P Estuarine - Emergent Intertidal

NOTES

1. This figure produced from information provided by Beacon Hill Consultants (1988) Ltd.
2. All dimensions and elevations are in feet unless otherwise noted.

Scale 300 0 300 600 900 Feet

NIBLACK MINING CORP.		
WATER QUALITY BASELINE AND SITE MONITORING PLAN		
PHASE 1 WATER QUALITY MONITORING SITES		
<i>Knight Piésold</i> CONSULTING		PROJECT/ASSIGNMENT NO. VA102-205/2
FIGURE 4.2		REF. NO. 11
		REV. 0

APPENDIX A

WATER QUALITY SAMPLING FIELD EQUIPMENT CHECKLIST

(Pages A1 to A2)

APPENDIX A
WATER QUALITY SAMPLING FIELD EQUIPMENT CHECKLIST

Basic Equipment List:

- Coolers with sufficient quantity of frozen ice packs,
- Disposable powder-free sample gloves (at least a full box – 50 pairs),
- In situ water quality probe(s) for measuring pH, temperature, conductivity/specific conductance, dissolved oxygen and turbidity. Note that turbidity is optional.
- Waterproof field notebook or set data sheets and clipboard,
- Pencils,
- Indelible markers,
- Knife and or sharp blade (for cutting PE tubing and string),
- Large Ziploc bags,
- Camera,
- GPS and site coordinates,
- Maps,
- Extra batteries for all electronic equipment, and
- Small multipurpose tool kit.

Surface Water Sampling Equipment:

- Surface water quality sample containers, which will include the following:
 - 11 sets of *labeled* sample bottles for the following:
 - General chemistry containers (1 L plastic),
 - Total metals containers (250 ml plastic with HNO₃ preservative), and
 - Dissolved metals containers (250 ml plastic with HNO₃ preservative).
 - o Note – 2 sets are for QC samples, as follows:
 - o Blind duplicate, and
 - o Blank/filter blank sample (also submitted blind to the lab).
- Syringes and 0.45 µm filter disks (12 syringes and at least 25 filters - many more for silty water conditions).
- Deionized water for blank/filter blank sample.

Groundwater Sampling Equipment:

- Groundwater quality sample containers, which will include the following:
 - 6 sets of *labeled* sample bottles for the following:
 - General chemistry containers (1 L plastic),
 - Total metals containers (250 ml plastic with HNO₃ preservative), and
 - Dissolved metals containers (250 ml plastic with HNO₃ preservative).
 - o Note – 1 set is for a QC blind duplicate sample.
- Water level meter,
- Disposable in-line 0.45 µm groundwater filters (at least 7),
- Measuring tape (for measuring well stick-up),
- Extra 5/8" high or low density polyethylene tubing (at least enough for one to two wells),
- Extra foot-valves, and
- Extra groundwater bailers and suitable string/rope.

Personal Gear:

- Waterproof jacket and pants,
- Waterproof protective footwear (sufficient height for wading into shallow streams), and
- Gloves and hats.

Basic Safety Equipment:

- First aid kit,
- Radio and/or satellite phone,
- Survival kit – if working alone at site,
- Extra change of clothing, and
- Extra food and water.

APPENDIX B

EXAMPLE CHAIN OF CUSTODY FORM

(Page B1)

APPENDIX C

LABORATORY ANALYSIS TECHNIQUES AND RECOMMENDED HOLDING TIMES

(Pages C1 to C3)

APPENDIX C
LABORATORY ANALYSIS TECHNIQUES AND RECOMMENDED HOLDING TIMES

All data in Appendix C were taken verbatim from the Methodolgy section of ALS Environmental File Number Z3908, issued October 31, 2006.

Conductivity in Water

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Recommended Holding Time:

Sample: 28 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

Solids in Water

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total dissolved solids (TDS) and total suspended solids (TSS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius, TSS is determined by drying the filter at 104 degrees celsius. Total solids are determined by evaporating a sample to dryness at 104 degrees celsius. Fixed and volatile solids are determined by igniting a dried sample residue at 550 degrees celsius.

Recommended Holding Time:

Sample: 7 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

pH in Water

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Sample: 2 hours

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

Turbidity of Water

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

Recommended Holding Time:

Sample: 2 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

Alkalinity in Water by Colourimetry

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

Recommended Holding Time:

Sample: 14 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

Dissolved Anions in Water by Ion Chromatography

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG17 anion exchange column with a hydroxide eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

Recommended Holding Time:

Sample: 28 days (bromide, chloride, fluoride, sulphate)

Sample: 2 days (nitrate, nitrite)

Reference: APHA and EPA

Laboratory Location: ALS Environmental, Vancouver

Ammonia in Water by Colourimetry

This analysis is carried out, on unpreserved samples, using procedures adapted from APHA Method 4500-NH₃ "Nitrogen (Ammonia)". Ammonia is determined using the phenate colourimetric method.

Recommended Holding Time:

Sample: 72 hours

Reference: BC WLAP

Laboratory Location: ALS Environmental, Vancouver

Phosphate in Water

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". All forms of phosphate are determined by the ascorbic acid colourimetric method. Dissolved ortho-phosphate (dissolved reactive phosphorous) is determined by direct measurement. Total phosphate (total phosphorous) is determined after persulphate digestion of a sample. Total dissolved phosphate (total dissolved phosphorous) is determined by filtering a sample through a 0.45 micron membrane filter followed by persulfate digestion of the filtrate.

Recommended Holding Time:

Sample: 2 days

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Metals in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 21th Edition 2005 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotplate or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption/emission spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Recommended Holding Time:

Sample: 6 months

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Mercury in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

Recommended Holding Time:

Sample: 28 days

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Ammonia in Water by Selective Ion Electrode

This analysis is carried out, on sulphuric acid preserved samples, using procedures adapted from APHA Method 4500-NH3 "Nitrogen (Ammonia)". Ammonia is determined using an ammonia selective electrode.

Recommended Holding Time:

Sample: 28 days

Reference: APHA

Laboratory Location: ALS Environmental, Vancouver