

Golder Associates Inc.
1750 Abbott Road, Suite 200
Anchorage, AK USA 99507
Telephone: (907) 344-6001
Fax: (907) 344-6011



**MYSTERY CREEK RESOURCES, INC
NIXON FORK MINE
MONITORING PLAN**

Submitted to:

*Alaska Department of Environmental Conservation
Northern Region Office
610 University Avenue
Fairbanks, Alaska 99709-3726*

and

*Anchorage Field Office
Bureau of Land Management
68812 Abbott Loop Road
Anchorage, Alaska 99507*

Submitted by:

*Mystery Creek Resources, Inc
2221 East Street, Suite 200
Golden Colorado 804401*

Prepared by:

*Golder Associates Inc.
1750 Abbott Road, Suite 200
Anchorage, Alaska 99507*

Distribution:

- 2 Copies - Alaska Department of Environmental Conservation
- 2 Copies - Golder Associates Inc.

June 28, 2005

033-5632x002.004

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	General.....	1
1.2	Administrative Information	2
1.3	Location and Site Description.....	3
1.4	Objectives	4
2.0	SURFACE WATER BASELINE MONITORING	5
2.1	Monitoring Locations and Rationale	5
2.1.1	Ruby Creek.....	5
2.1.2	Mystery Creek	6
2.1.3	Nixon Fork	6
2.2	Sampling Procedures	6
2.2.1	Sample Collection and Preservation.....	6
2.2.2	Frequency	7
2.2.3	Shipping and Chains of Custody.....	7
2.3	Parameters and Analytical Methods	7
2.4	Quality Assurance/Quality Control Program.....	10
3.0	OPERATION AND CLOSURE MONITORING	11
3.1	Permit Management.....	11
3.2	Visual Monitoring Program	13
3.2.1	Filtered Tailings Disposal Site	13
3.2.2	Tailings Impoundment	14
3.2.3	Development Rock Dump.....	14
3.2.4	Solid Waste Landfill.....	14
3.2.5	Wildlife.....	14
3.3	Geotechnical Monitoring	14
3.3.1	Filtered Tailings Disposal Site	15
3.3.2	Development Rock Dump	15
3.3.3	Solid Waste Landfill.....	16
3.4	Geochemical Monitoring	16
3.4.1	Filtered Tailings Disposal Site	16
3.4.1.1	Reprocessed and New Ore Tailings – Solids Chemistry	16
3.4.1.2	Reprocessed and New Ore Tailings – Pore Water Chemistry	19
3.4.2	Tailings Impoundment	21
3.4.2	Development Rock - Solids.....	21
3.5	Tailings Impoundment Water	22
3.6	Seeps and Groundwater Monitoring.....	25
3.6.1	FTDS	25
3.6.2	Tailings Impoundment	25
3.6.3	Development Rock Dump.....	26
3.7	Storm Water Monitoring.....	26
3.7.1	FTDS Percolation Pond.....	26
3.7.2	Development Rock Dump.....	27

3.7.3	Infrastructure	27
3.8	Closure and Reclamation Monitoring	27
4.0	MONITORING RECORDS AND REPORTING	29
4.1	Field Measurements and Records	29
4.2	Retention of Records	29
4.3	Monitoring Reports and Submission Schedules	29
5.0	OTHER MONITORING AND REPORTING.....	30
5.1	Revegetation Monitoring Program	30
5.2	Impacts to Avian and Terrestrial Wildlife	30

LIST OF TABLES

Table 2-1	Surface Water Baseline Samples – Major Ions
Table 2-2	Surface Water Baseline Samples – Minor & Trace Ions
Table 3-1	Operational ND Closure Monitoring Summary
Table 3-2	Visual Monitoring of FTDS Physical Condition
Table 3-3	Filtered Tailings Geotechnical Monitoring
Table 3-4	Tailings Geochemical Testing – Solids
Table 3-5	MWMP Test Parameter List
Table 3-6	Filtered Tailings Pore Water Chemistry
Table 3-7	Development Rock Geochemical Testing - Solids
Table 3-8	Development Rock MWMP Test Profile
Table 3-9	Tailings Impoundment Water Samples – Major Ions
Table 3-10	Tailings Impoundment Water Samples – Minor & Trace Ions

LIST OF FIGURES

Figure 1	Vicinity Map
Figure 2	Project Location
Figure 3	Site Plan
Figure 4	Water Monitoring Locations

LIST OF APPENDICES

Appendix A	Quality Assurance/Quality Control and Field Procedures Manual Attachment A
Appendix B	Development Rock Collection Procedures

1.0 INTRODUCTION

1.1 General

Mystery Creek Resources, Inc. (MCRI), current lessee and operator of the Nixon Fork Mine, has been restoring the existing mining and milling facilities, and conducting exploration activities at the mine since May 2003. This work has been accomplished under an Exploration Plan of Operation approved by the Bureau of Land Management (BLM), and various permits issued by the Alaska Department of Natural Resources (ADNR), and the Alaska Department of Environmental Conservation (ADEC). No production has occurred at the mine since 1999. MCRI proposes to reinstitute mining and gold production from the facility in 2005. MCRI is a wholly owned subsidiary of St. Andrew Goldfield, Ltd., a publicly listed mine company headquartered in Oakville (Toronto), Ontario, Canada. All mining activities will occur on existing unpatented federal mining claims administered by BLM.

The goal of MCRI is to operate the Nixon Fork Mine in a manner that will assure the protection of air, surface and groundwater quality. This Monitoring Plan will assist MCRI with the establishment of operating procedures to ensure the long-term protection of these natural resources. Periodic updates of the Monitoring Plan will coincide with regulatory changes, five year reviews, process modifications, or anomalies noted as a result of the monitoring activities prescribed in this plan. This Monitoring Plan is a comprehensive facility wide plan that includes a description of the environmental monitoring that will be performed at the Nixon Fork Mine. This plan does not cover internal mill process monitoring of fluids not released outside the mill or resource assay work. To minimize duplication of information, the Monitoring Plan works with the Plan of Operations (POO) document, and although an effort was made to present applicable background information, the reviewer may need to reference the POO for operation specifics to understand the rationale for the monitoring contained herein.

MCRI is submitting this Monitoring Plan for the Nixon Fork Mine to the ADEC in accordance with AS 46.03.010 et. seq and 18 AAC60.015 et. seq and 18 AAC80.005 et. seq. ADEC has stated that they intend to forward this Monitoring Plan to other applicable regulatory agencies.

1.2 Administrative Information

This section contains specific legal and corporate information about the applicant.

Corporate Information

Business Name: Mystery Creek Resources, Inc.
Address: 2221 East Street, Suite 200
Golden, Colorado 80401
Telephone: 303-277-1222
Fax: 303-277-0006
President: Paul C. Jones
Secretary: J.P. Tangen
Address: Attorney at Law
1600 A Street, Suite 310
Anchorage, Alaska 99501-5148
Telephone: 907-222-3985

Designated Facility Contact Person

Name: William J. Burnett
Title: Exploration Manager
Telephone: (907) 743-0451

Alaska Registered Agent

Name: J.P. Tangen
Address: Attorney at Law
1600 A Street, Suite 310
Anchorage, Alaska 99501-5148
Telephone: (907) 222-3985

Designated Contact Person for Regulatory Issues:

Business Name: Mystery Creek Resources, Inc.
Address: 2221 East Street, Suite 200
Golden, Colorado 80401
Telephone: (303) 277-1222
Fax: (303) 277-0006
President: Paul C. Jones

1.3 Location and Site Description

The Nixon Fork Mining District is located approximately 32 miles northeast of McGrath and 8 miles north of Medfra in west central Alaska (Figure 1, Vicinity Map). The mine site consists of federal and state mining claims that lie on either side of the line between Township 26 South, Ranges 21 and 22 East, Kateel River Meridian (KRM). The mine site is located in a northeast to southeast trending highland that reaches an elevation of approximately 1500 feet (ft) (500 meters [m]) (Figure 2, Project Location).

The existing Nixon Fork Mine area road network, airstrips, exploration areas, and other improvements that have been made since the early 1900s are shown on Figure 4, Site Plan. The mine is underground where the ore is accessed by the Crystal and Mystery Portals and milled at the surface. The mill tailings during the previous operation were disposed of in the zero discharge tailings impoundment shown on Figure 3. MCRI intends to reprocess these existing tailings and new ore at a refurbished mill that will utilize a combination gravity, flotation, cyanide leach and gold recovery.. The milling operation will generate three types of tailings based on the source of the ore and consistency of the tailings as described below:

1. Filtered Reprocessed Tailings: Existing tailings will be milled generating a “reprocessed tailings” that are filtered to a low moisture content and placed (dry stacked) in a Filtered Tailings Disposal Site (FTDS) located near the north end of the airport runway.
2. Filtered New Ore Tailings: Since all the existing tailings cannot be processed the first season of warm weather, new ore will be mined from underground and milled in the winter with the resulting tailings filtered and placed in the FTDS.
3. Slurried New Ore Tailings: After all the existing tailings are milled, and the tailings impoundment inspected and repaired as needed, new ore tailings will be piped to the pond as a slurry or dry stacked at that facility.

In addition, it is possible that at times both the filtered reprocessed tailings and filtered new ore tailings may be generated concurrently.

The Nixon Fork area mines are located along a contact between a quartz monzonite stock that has intruded into carbonate rocks (i.e., limestone). The ore is limestone-hosted. The highlands where the mining operation occurs is characterized by shallow unconsolidated sediments over bedrock generally consisting of limestone and quartz monzonite. The Crystal Mine decline has advanced from previous

operations from a ground surface elevation of approximately 1280 ft (390 m) to an elevation of approximately 475 ft (145 m) from 1995 through 1999. The water table is deep within the bedrock at an approximate elevation of 492 ft (150 m) which is 788 ft (240 m) below the Crystal Portal, although it varies seasonally.

Development rock created during mining of new ore will be used as stope backfill or transported to the surface and disposed of in the existing development rock dump located on the slope below the milling area. The majority of the development rock is limestone because the quartz monzonite is generally avoided where possible because of geotechnical considerations of this rock type near the contact zone. MCRI will use the quartz monzonite as stope backfill whenever possible so that the majority of development rock placed on the surface is carbonate rock such as limestone and marble.

1.4 Objectives

The general types of monitoring described in this plan are: surface water baseline monitoring, and compliance monitoring. The objective of the baseline monitoring is to collect data that describes the pre-mining surface water quality in the project area and where appropriate, document the current conditions related to potential historic mining impacts since mining has been active in the project area since the 1920's (i.e. Stamp Mill tailings at head of Ruby Creek). The objective is also to describe the surface water quality prior to the start of MCRI operating the mine. The baseline monitoring will include collecting water samples at Mystery Creek, Ruby Creek, and the in the Nixon Fork River. The objective for compliance monitoring, also referred to as "Operation and Closure Monitoring" is to ensure that MCRI operates and closes the Nixon Fork within permit limitations, minimizing impacts to the environment. As discussed below, surface water and shallow groundwater, where collection is possible, will be monitored to characterize the environmental performance of the facilities. Additional baseline or operational monitoring of deep groundwater in the bedrock is not proposed at this time.

2.0 SURFACE WATER BASELINE MONITORING

This section of the monitoring plan for surface water baseline monitoring will provide information on the following:

- Monitoring locations and rationale;
- Sampling procedures;
- Parameters and analytical methods; and
- Quality Assurance / Quality Control (QA/QC) Program.

2.1 Monitoring Locations and Rationale

The baseline surface water sampling program covers the surface waters nearest to the mine operations, which include: Ruby and Mystery Creek, and the Nixon Fork of the Takotna River. In the upper reaches of Ruby and Mystery Creek the flow is ephemeral and locally comprised of isolated ponded water without connected surface flow. The monitoring locations for the surface water sampling are presented on Figures 2 and 4 and discussed in more detail below.

2.1.1 Ruby Creek

The downgradient baseline sample location (RC-1) for Ruby Creek was the most upstream location with detectable stream flow during the June 2004 sampling event (Figure 4). This sampling location monitors water quality below the proposed mining activities and historic mining impacts as discussed below. In order to collect a sample that represented the flow through the Ruby Creek basin and not ponded water in local low spots, visible flow was a criterion in choosing an appropriate sampling location. Further, depending on flow conditions at later times of the year, especially further into July, this location may not contain flowing water. Therefore, future samples may be collected further downstream at the first location of flowing water as needed.

A second Ruby Creek water sampling location is proposed for baseline sampling. It is located further up the Ruby Creek drainage as shown on Figure 4, just below the spring near the historic stamp mill (RC-2). This sample location, while upgradient of the current mining activities, is within an area of historic mining impacts. Due to the historic mining activity and deposition of tailings in Crystal Gulch, there is no continuous stream flow above human influence in this drainage. Even the springs

that flow periodically at the head of the drainage contact tailings from pre-1990 mining operations. Any water samples collected at the spring during rain or spring runoff will represent the chemical signature of melting snow/permafrost or local perched groundwater flow and would not be representative of the Ruby Creek drainage basin further downstream as measured at RC-1.

2.1.2 Mystery Creek

There are two proposed sampling locations on Mystery Creek: one downstream (MC-1) and one upstream (MC-2) of the mine drinking water in-take structure location shown on Figures 3 and 4. Samples collected previously (June 2004) were from an area just downstream of the drinking water in-take structure. The intent of collecting the sample downstream of the in-take structure is to assess the quality of water in the limestone geologic terrain below the mineralized limestone/monzonite contact, which crosses Mystery Creek near the water in-take structure. MC-1 monitors water quality below the existing development rock dump and road fill below the Mystery Creek Portal. The second sample location is planned upstream of the existing mine facilities, water in-take and geologic contact zone. MC-2 will provide upgradient baseline water quality data.

2.1.3 Nixon Fork

The Nixon Fork of the Takotna River located approximately 4.5 miles downstream receives flow from both Ruby and Mystery Creek. In order to assess the baseline water quality of the first significant receiving water body, samples will be collected from the Nixon Fork of the Takotna River upstream (NF-1) and downstream (NF-2) of the confluence with Ruby Creek. The approximate sampling locations are shown on Figure 2.

2.2 Sampling Procedures

2.2.1 Sample Collection and Preservation

All samples will be collected in bottles provided by the analytical laboratory with appropriate preservatives in the bottles. Field parameters (pH/Temperature/Conductivity) will be measured in the field when weather conditions allow and in the mine laboratory during inclement weather.

Sampling procedures to preserve the integrity of the water quality samples will include:

- Collection of representative and undisturbed water from flowing portions of the stream;
- Using new disposable sample collection equipment for each sample (i.e. gloves, tubing, and 0.45 micron filter for the peristaltic pump); and
- Collection and documentation of field parameters at each location (except as noted above).

After collection, the samples will be returned directly to the mine and placed in a refrigerator or preserved with ice. If filtration is required, this will be performed at the mine before refrigeration or preservation. The samples will then remain in a refrigerator or on ice until they are shipped, in ice packed coolers, to the laboratory for analysis.

2.2.2 Frequency

Ruby and Mystery Creek samples will be collected twice a year, in the spring and fall to represent the seasonal hydrologic conditions. The Nixon Fork sample location requires the use of a helicopter or snowmobile, when conditions allow to safely access the area. Therefore, Nixon Fork water quality sampling will be limited or incidental to when a helicopter is at the mine on other business for MCRI. Access by snowmobile will also be considered when snow conditions allow access without damaging vegetation. The goal for the Nixon Fork samples will be once per year coincidental with the availability of a helicopter or conditions that allow the use of a snowmobile at the site.

2.2.3 Shipping and Chains of Custody

Standard methods will be followed for shipping the collected samples including preservation in coolers with ice, completing a chain of custody, and attaching seals to each cooler to detect any potential tampering. Samples will be flown out of the mine in order to meet the shortest holding times for analyses.

2.3 Parameters and Analytical Methods

Tables 2-1 and 2-2 list the parameters and analytical methods that will be utilized for the surface water samples collected at the Nixon Fork Mine. Trace metals will be analyzed for both total

recoverable and dissolved values. Due to the short holding time (48 hours) for analysis of speciated NO_3 and NO_2 (nitrate and nitrite, respectively) and shipping limitations from the Nixon Fork Mine, MCRI proposes to analyze for total NO_3/NO_2 as Nitrogen (N) after preliminary characterization of these species.

TABLE 2-1
MAJOR IONS
SURFACE WATER BASELINE SAMPLES

Parameter	Method	Units	Method Detection Limit (MDL)	Practical Quantitation Limit (PQL)	Potential Regulatory Criteria ⁽¹⁾
Major Ion Chemistry					
pH (field & Lab)	EPA 150.1	Standard	n/a	n/a	6.5 to 8.5
Temperature (field)	Elect. probe	Degrees C	n/a	n/a	
Conductivity (field & lab)	SM2510B	umhos/cm	0.477	1	
Settleable Solids (field)	Cone	mL/L/hr	n/a	n/a	
Total Dissolved Solids	EPA 160.1	mg/L	3.1	10.0	
Total Suspended Solids	EPA 160.1	mg/L	0.15	0.5	
Turbidity (lab)	EPA 180.1	NTU	0.05	0.1	
Alkalinity, Total	SM 2320B	mg/L as CaCO_3	3.1	10.0	Min. of 20
Alkalinity, Bicarbonate	SM 2320B	mg/L as CaCO_3	3.1	10.0	
Alkalinity, Carbonate	SM 2320B	mg/L as CaCO_3	3.1	10.0	
Alkalinity, Hydroxide	SM 2320B	mg/L as CaCO_3	3.1	10.0	
Calcium ^(T&D)	EPA 200.7	mg/L	0.062	0.2	
Iron ^(T&D)	EPA 200.7	mg/L	0.0124	0.04	1
Magnesium ^(T&D)	EPA 200.7	mg/L	0.062	0.2	1
Potassium ^(T&D)	EPA 200.8	ug/L	150	500	
Silicon ^(T&D)	EPA 200.8	ug/L	62	200	
Sodium ^(T&D)	EPA 200.8	ug/L	150	500	

Note: (T&D) = Analyzed for total recoverable and dissolved

(1) Potential Criteria based on the Ruby Creek average hardness of 65 mg/L.

umhos/cm is micromhos per centimeter

mL/L/hr is milliliters per liter per hour

mg/L is milligrams per liter

NTU is Nephelometric Turbidity Units

ug/L is micrograms per liter

TABLE 2-2
MINOR & TRACE IONS
SURFACE WATER BASELINE SAMPLES

Parameter	Method	Units	Method Detection Limit (MDL)	Practical Quantitation Limit (PQL)	Potential Regulatory Criteria ^(1&2)
Minor Ion Chemistry					
Phosphorus, Total	EPA 200.8	ug/L	62	200	
Manganese ^(T&D)	EPA 200.8	ug/L	0.31	1	.05
Chloride	EPA 300.0	mg/L	0.031	0.1	230
Fluoride	EPA 300.0	mg/L	0.031	0.1	1
Nitrate-Nitrogen	EPA 300.0	mg/L	0.0031	0.01	10
Sulfate	EPA 300.0	mg/L	0.031	0.1	250
Nitrate/Nitrite-Nitrogen	EPA 300.0	mg/L	0.0031	0.01	1
Cyanide, Total	SM 4500-CN C,E	mg/L	0.0025	0.005	
Cyanide (WAD) Dissolved	SM 4500CN-I	mg/L	0.0025	0.005	.0052
Nitrogen, Ammonia-	SM 4500NH3-F	mg/L	0.0258	0.0500	
Trace Ion Chemistry^(T&D)					
Aluminum	EPA 200.8	ug/L	6.20	20	87
Antimony	EPA 200.8	ug/L	0.31	1	6
Arsenic ⁽⁴⁾	EPA 200.8	ug/L	1.5	5	50 ⁽⁴⁾
Barium	EPA 200.8	ug/L	0.94	3	2000
Bismuth	EPA 200.8	ug/L	0.31	1	
Cadmium	EPA 200.8	ug/L	0.05	0.5	0.20/(0.18)
Chromium, Total	EPA 200.8	ug/L	0.31	1	60.56/(52.08)
Copper	EPA 200.8	ug/L	0.31	1	6.46/(6.20)
Lead	EPA 200.8	ug/L	0.062	0.2	1.84/(1.57)
Manganese	EPA 200.8	ug/L	0.31	1	50
Nickel	EPA 200.8	ug/L	0.62	2	36.23/(36.12)
Selenium	EPA 200.8	ug/L	1.5	5	5/(4.6)
Silver	EPA 200.8	ug/L	0.31	1	1.93/(1.64)
Zinc	EPA 200.8	ug/L	1.5	5	83.18/(81.35)
Mercury	EPA 1631A	ng/L		1	50

Note: (T&D) = Analyzed for total recoverable and dissolved

(1) Potential Criteria based on the Ruby Creek average hardness of 65 mg/L.

(2) Criteria (i.e. 0.20/(0.18)) show the total recoverable with dissolved criteria when a conversion factor is established in 18 AAC 70.

Arsenic maximum contaminant level (MCL) to change to 10 ug/L in Jan. 2006.

ng/L is nanograms per liter

2.4 Quality Assurance/Quality Control Program

The Nixon Fork Mine QA/QC Program for the baseline and compliance monitoring is presented in Appendix A. Samples will be submitted to a laboratory certified to conduct analysis in the State of Alaska. The MCRI contract laboratory QA/QC program, incorporated into the Nixon Fork Mine QA/QC Program, will be reviewed whenever there is a change in laboratories used for the monitoring program.

3.0 OPERATION AND CLOSURE MONITORING

3.1 Permit Management

The operation and closure monitoring plans in this section are intended to meet the requirements of the Multi-Sector General Permit (MSGP-2000), and the solid waste regulations 18 AAC 60.800-860, and include monitoring of materials placed in the FTDS, tailings impoundment, development rock dump, and solid waste landfill. The monitoring and reporting activities will be tracked through MCRI in-house personnel. Laboratory data will be managed using in-house personnel with assistance from a MCRI consultant. Copies of inspection and sampling logs will be filed in the MCRI project files for a minimum of five years.

The mine facilities where operation and closure monitoring activities are performed are summarized in Table 3-1.

TABLE 3-1
OPERATION AND CLOSURE MONITORING SUMMARY

Monitored Operation/Facility	Sampling Point	Comment/Purpose of Sampling	
Filtered Tailings Disposal Site (FTDS or Dry Stack Area)			
Filtered Reprocessed Tailings	Mill	Disposed of in FTDS	These will likely be commingled
Filtered New Ore Tailings	Mill	Disposed of in FTDS	
FTDS Percolation Pond			
Water in Pond (storm water)	Pond	Grab sample per specified storm event or as water collects in pond	
Perched Groundwater	Modified wells	Shallow unconsolidated sediments and deep groundwater. The need for groundwater monitoring will be based on storm water sampling results	
Tailings Impoundment			
Slurried New Ore Tailings	Mill	Slurried & pumped to tailings impoundment	
Pond Water	Pond	Water that collects in tailings pond	
Perched Groundwater/Seeps	Wells/Seeps (if any)	Seasonally perched groundwater on bedrock so wells typically dry. Seeps will be monitored, if any.	
Development Rock Dump			
Rock (acid generating potential)	Dump	Bulk samples from dump	
Groundwater/Seeps	Seeps (if any)	Shallow unconsolidated sediments and deep groundwater. Wells are typically dry so seeps will also be monitored, if any	
Storm Water Runoff	Varies/Water	Grab sample down slope of rock dump per specified storm event	
Solid Waste Landfill			
Seepage	Unknown	Sampling only if discolored seepage observed	
Other Monitoring			
Revegetation Monitoring	Various	Closure monitoring as need (i.e. FTDS, tailing pond, roads, development rock dump, etc.)	
Impacts to Avian and Terrestrial Wildlife	Various	Tailings pond and other areas as needed	

3.2 Visual Monitoring Program

The visual monitoring program will include inspections of the mine facilities or operations for signs of instability, erosion, or chemical contamination. The mining facilities will be observed on a regular basis, with MCRI employees encouraged to report conditions that could impact the environment. Facilities operating under the solid waste and/or dam safety permits that will have formally scheduled visual monitoring include: the FTDS, tailings impoundment, development rock dump and solid waste landfill.

3.2.1 Filtered Tailings Disposal Site

Visual monitoring of the FTDS physical characteristics will be conducted on a daily basis by the operational staff and noted in daily logs. Operation personnel will be instructed to look for unusual signs of settlement, seeps, and erosion in the FTDS, as well as any unusual water color or sheens. Annual inspections by the qualified engineer-of-record will be completed and documented in a report. A qualified engineer will conduct formal Facility Safety Inspection (FSI) using a checklist. The operational life of the FTDS is about 2 years, after which the facility will be closed per the closure plan. Visual monitoring will continue per the closure plan requirements.

Details for the visual monitoring of the FTDS are presented in Table 3-2.

TABLE 3-2
VISUAL MONITORING OF FTDS PHYSICAL CONDITION

Item	Personnel	Scope	Frequency	Deliverable
Inspections	Operational Personnel	Visual Assessment	Daily ⁽¹⁾ Weekly ⁽²⁾	Daily log Weekly log
Facility Safety Inspection (FSI)	Qualified Engineer	Detailed visual assessment and review of placement records	Annually	Comparable to dam safety format
Closure Monitoring	Qualified Engineer	Review of design and compliance with closure requirements	Closure and as specified in the closure plan	Report to MCRI and applicable regulatory agency

(1) Daily inspections completed on days when mechanical equipment is operating on the FTDS.

(2) Weekly completed inspections during warm weather or thawed conditions for periods when mechanical equipment is not operating on the FTDS.

3.2.2 Tailings Impoundment

Operation personnel will view the dam and maintain a record per the Dam Safety Operations Manual, which will include at least weekly visual inspections. Other monitoring, such as the Dam Safety Review (DSR) will be performed by a qualified engineer as specified in the Dam Safety Operation Manual, with the results reported to MCRI and the State Dam Safety official and other applicable agencies.

3.2.3 Development Rock Dump

The physical characteristics of the development rock dump will be monitored regularly by mine personnel with periodic inspection by a qualified engineer. Details for the visual monitoring will be similar to the FTDS schedule presented in Table 3-2. Operation personnel will be instructed to look for unusual signs of settlement, seeps, erosion, as well as any unusual water color or sheens. A qualified engineer will conduct formal FSI using a checklist.

3.2.4 Solid Waste Landfill

The solid waste landfill visual monitoring will be performed by operation personnel that visit the facility on a regular basis. Operation personnel will be instructed to look for unusual signs of settlement, seeps, or erosion, as well as any unusual water color or sheens. A qualified engineer will conduct the formal reviews on an annual basis. Visual monitoring will continue per the closure plan requirements.

3.2.5 Wildlife

Operations personnel will be required to report any wildlife mortality observed at any of the mine waste and solid waste facilities at the mine. Any wildlife mortalities that are observed will be recorded in a log maintained with the mine manager and reported to the Alaska Department of Fish & Game (ADF&G).

3.3 Geotechnical Monitoring

Geotechnical monitoring of the FTDS, tailings impoundment, and development rock dump is required periodically to verify stability and to make sure that each facility is operated within the geotechnical design parameters.

3.3.1 Filtered Tailings Disposal Site

The FTDS pile has been designed using soil strength parameters based on laboratory testing and the site investigation conducted by MCRI. The filtered tailings pile is expected to be stable based on its design parameters and with the design for the tailings to be placed directly on bedrock within a shallow pit for containment. As a result, limited confirmation geotechnical testing, consisting of moisture content, is proposed to compare the FTDS materials with the samples used for design as specified in Table 3-3.

TABLE 3-3

FILTERED TAILINGS GEOTECHNICAL MONITORING

Test Description	ASTM Method	Frequency⁽¹⁾	Test Criteria and Design Basis
Moisture Content	D-2216	Daily for 2 weeks, then weekly, and repeat when there is a feed stock change.	Less than 15% and field capacity

(1) All samples will be grab samples collected at mill from the pile at the end of the filter belt.

Formal placement and compaction criteria are not established or required for structural integrity, but some general guidelines for placing the filtered tailings in the facility are important to maximize the reduction of permeability of the tailings. In addition to the sampling program listed in Table 3-3, the compaction program will include placing and spreading the tailings in lifts of 1 foot or less and compacting the tailings lift with the available heavy equipment, either the end loader or bull dozer, until compaction is achieved. The compaction at the FTDS will be visually assessed by MCRI personnel on a daily basis of each week. A qualified engineer will inspect the FTDS annually, during the summer, up until closure.

3.3.2 Development Rock Dump

No geotechnical testing or inspection is anticipated for the development rock dump, except the visual monitoring that will be conducted per the schedule in Section 3.2. Signs of instability or erosion will be reported to a qualified engineer for consideration of further testing and solutions for stabilizing the development rock dump.

3.3.3 Solid Waste Landfill

No geotechnical testing or inspection is anticipated for the landfill, except the visual monitoring that will be conducted per the schedule in Section 3.2. Signs of instability or erosion will be reported to a qualified engineer for consideration of further testing and solutions for stabilizing the landfill.

3.4 Geochemical Monitoring

Geochemical monitoring of the tailings and development rock is needed to confirm the previous testing concerning the long-term leaching potential of mostly metals and acid generating potential of the tailings and development rock. Three types of tailings will be disposed at the mine: filtered reprocessed tailings; filtered new ore tailings; and slurried new ore tailings. The first two types will be placed in the FTDS and the later possibly placed in the tailings impoundment as a slurry as shown in Table 3-1.

3.4.1 Filtered Tailings Disposal Site

3.4.1.1 Reprocessed and New Ore Tailings – Solids Chemistry

The reprocessed tailings (solids) will be analyzed for acid generating potential, trace metals, WAD CN, and leaching potential and compared to the previous results to evaluate trends in tailings composition. The solids will be analyzed using the Acid-Base Accounting (ABA) procedure and the trace metals per the methods and frequency presented in Table 3-4. The leaching potential will be evaluated per the Meteoric Water Mobility Procedure (MWMP), and the list of parameters presented in Table 3-5, as long as the neutralization potential (NP) is 3 or greater based on the ABA results. If the NP is less than 3, then kinetic testing (12-week Humidity Cell Testing) will be performed to further evaluate the material.

TABLE 3-4

TAILINGS GEOCHEMICAL TESTING – SOLIDS

Parameter	Units	Method	Sample Type and Frequency
Modified Acid Base Accounting (ABA)			
Paste pH	Standard Units	Standard	Twice per week for 4 weeks, then monthly and repeat cycle when there is feed stock change.
Sulfur-total (S)	wt. %	EPA 9-20-3	
Sulfide (S ⁻²)	wt. %	EPA 9-20-3	
Sulfate(SO ₄)	wt. % SO ₄	EPA 9-20-3	
Total Inorganic Carbon (TIC)	wt. %	EPA 9-20-3	
Carbonate (CO ₃)	wt. %	EPA 9-20-3	
Neutralization Potential (NP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Acid Generating Potential (AP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Net Neutralization Potential (NNP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Neutralization Potential Ratio (NP/AP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Long-term Leaching Potential			
MWMP ⁽¹⁾	mg/L	NDEP ⁽²⁾	Twice per week for 4 weeks, then monthly and repeat cycle when there is feed stock change
Kinetic	mg/L	See note (3)	Applicable if NP/AP ratio becomes < 3
Other Testing			
CN, WAD	mg/Kg	SM4500-CN I	Daily for 2 weeks then twice per week and repeat cycle when there is feed stock change.

Notes: t = U.S. ton

(1) Meteoric Water Mobility Procedure (See Table 3-5 for Parameter List)

(2) NDEP = Nevada Department of Protection test procedure or other acceptable by ADEC.

(3) 12-week Humidity Cell Testing. American Society for Testing and Materials (1996), ASTM Designation: D5744-96 Standard Test Method for Accelerated Weathering of Solid Materials Using a Modified Humidity Cell, ASTM, West Conshohocken, PA, 13p.

TABLE 3-5
MWMP TEST PARAMETER LIST

Parameter	Method Detection Limit (MDL)	Method
pH unit	0.01	EPA 150.1
Alkalinity	1 mg/L	SM 2320
Bicarbonate	1 mg/L	SM 2320
TDS	10 mg/L	EPA 160.1
CN(WAD)	0.01 mg/L	SM4500- CN I
Cl	0.5 mg/L	EPA 300
F	1 mg/L	EPA 300
NO ₃ as N	0.5 mg/L	EPA 300
NO ₂ as N	0.5 mg/L	EPA 300
Total Nitrates as N	0.5 mg/L	EPA 300
SO ₄	1 mg/L	EPA 300
Hg	0.0005 mg/L	CVAAS
Ag	0.003 mg/L	ICP-OES
Al	0.02 mg/L	ICP-OES
As	0.01 mg/L	ICP-MS
B	0.01 mg/L	ICP-MS
Ba	0.002 mg/L	ICP-MS
Be	0.001 mg/L	ICP-MS
Ca	0.5 mg/L	ICP-OES
Cd	0.002 mg/L	ICP-MS
Cr	0.004 mg/L	ICP-MS
Cu	0.003 mg/L	ICP-MS
Fe	0.03 mg/L	ICP-OES
K	1 mg/L	ICP-OES
Mg	0.5 mg/L	ICP-OES
Mn	0.01 mg/L	ICP-OES
Na	0.5 mg/L	ICP-OES
Ni	0.01 mg/L	ICP-OES
Pb	0.02 mg/L	ICP-MS
Sb	0.02 mg/L	ICP-OES
Se	0.02 mg/L	ICP-MS
Tl	0.03 mg/L	ICP-MS
Zn	0.04 mg/L	ICP-OES

3.4.1.2 Reprocessed and New Ore Tailings – Pore Water Chemistry

Since the geotechnical data shows that there is limited risk that the tailings will generate drainage water in the FTDS, MCRI has no plans at this time to perform pore water (interstitial water) chemistry testing in the filtered tailings. The monitoring presented in this plan is a contingency sampling plan that would be implemented if any one of two conditions is found during other monitoring activities at the FTDS as follows:

1. Pore water chemistry monitoring would start if seeps are observed coming from the filtered tailings at any time during or after placement: and/or
2. If the monitoring of storm water collecting in the percolation pond has detections that exceed applicable state water quality criteria or standards.

If either of these two above conditions are detected, MCRI will notify ADEC and implement the sampling plan as outlined in Table 3-6, Filtered Tailings Pore Water Chemistry. The frequency of sampling will be twice per week for 4 weeks, then monthly and repeat cycle when, or if, there is a feed stock change. If the results after the one month of sampling are lower than the applicable water quality criteria, then a reduced sampling schedule will be discussed with ADEC and/or the sampling schedule will continue on a monthly basis.

TABLE 3-6
FILTERED TAILINGS PORE WATER CHEMISTRY

Parameter	Method	Units	Method Detection Limit (MDL)	Practical Quantitation Limit (PQL)	Potential Regulatory Criteria^(1&2)
Major Ion Chemistry					
Total Dissolved Solids	EPA 160.1	mg/L	3.1	10.0	
Iron ³	EPA 200.7	mg/L	0.0124	0.04	1
Minor Ion Chemistry					
Manganese ²	EPA 200.8	ug/L	0.31	1	.05
Chloride	EPA 300.0	mg/L	0.031	0.1	230
Nitrate-Nitrogen	EPA 300.0	mg/L	0.0031	0.01	10
Sulfate	EPA 300.0	mg/L	0.031	0.1	250
Nitrate/Nitrite-Nitrogen	EPA 300.0	mg/L	0.0031	0.01	1
Cyanide (total)	SM 4500-CN C,E	mg/L	0.0025	0.005	
Cyanide (WAD) Dissolved	SM 4500CN-I	mg/L	0.0025	0.005	.0052
Nitrogen, Ammonia-	SM 4500NH3-F	mg/L	0.0258	0.0500	
Trace Ion Chemistry					
Aluminum	EPA 200.8	ug/L	6.20	20	87
Antimony	EPA 200.8	ug/L	0.31	1	6
Arsenic ⁽⁴⁾	EPA 200.8	ug/L	1.5	5	50 ⁽⁴⁾
Barium	EPA 200.8	ug/L	0.94	3	2000
Bismuth	EPA 200.8	ug/L	0.31	1	
Cadmium	EPA 200.8	ug/L	0.05	0.5	0.20/(0.18)
Chromium (total)	EPA 200.8	ug/L	0.31	1	60.56/(52.08)
Copper	EPA 200.8	ug/L	0.31	1	6.46/(6.20)
Lead	EPA 200.8	ug/L	0.062	0.2	1.84/(1.57)
Manganese	EPA 200.8	ug/L	0.31	1	50
Nickel	EPA 200.8	ug/L	0.62	2	36.23/(36.12)
Selenium	EPA 200.8	ug/L	1.5	5	5/(4.6)
Silver	EPA 200.8	ug/L	0.31	1	1.93/(1.64)
Zinc	EPA 200.8	ug/L	1.5	5	83.18/(81.35)
Mercury	EPA 1631A	ng/L		1	50

Note: (1) Potential Criteria based on the Ruby Creek average hardness of 65 mg/L.

(2) Criteria (i.e. 0.20/(0.18)) show the total recoverable with dissolved criteria when a conversion factor is established in 18 AAC 70.

Arsenic maximum contaminant level (MCL) to change to 10 ug/L in Jan. 2

3.4.2 Tailings Impoundment

New ore tailings will be placed in the tailings impoundment as a slurry after the pond is emptied, liner inspected and repaired, and the impoundment is put back in to service. The reprocessed tailings (solids) will be analyzed for acid generating potential, trace metals, WAD CN, and leaching potential and compared to the previous results to evaluate trends in tailings composition. The solids will be analyzed using the ABA procedure and the trace metals per the methods and frequency presented in Table 3-7. The leaching potential will be evaluated per the MWMP, and the list of parameters presented in Table 3-5, as long as the NP is 3 or greater based on the ABA results. If the NP is less than 3, then kinetic testing (12-week Humidity Cell Testing) will be performed to further evaluate the material.

3.4.2 Development Rock - Solids

Development rock will be placed in the area down slope of the mill and will mostly consist of limestone with lesser quantities of quartz monzonite. The purpose of characterization of the development rock is to evaluate the potential for dissolution and mobility of certain chemical parameters. The rock will be analyzed for acid generating potential, trace metals, and leaching potential and compared to the previous results to evaluate trends in development rock composition per the methods and frequency presented in Table 3-7. The leaching potential will be evaluated per the MWMP as long as the NP is 3 or greater based on the ABA results. If the NP is less than 3, then kinetic testing (12-week Humidity Cell Testing) will be performed to further evaluate the material.

TABLE 3-7

DEVELOPMENT ROCK GEOCHEMICAL TESTING – SOLIDS

Parameter	Units	Method	Sample Type and Frequency
Acid Base Accounting (ABA)			
Paste pH	Standard Units	Standard	Once per month for 4 months, then annually there after.
Sulfur-total (S)	wt. %	EPA 9-20-3	
Sulfide (S ⁻²)	wt. %	EPA 9-20-3	
Sulfate(SO ₄)	wt. % SO ₄	EPA 9-20-3	
Total Inorganic Carbon (TIC)	wt. %	EPA 9-20-3	
Carbonate (CO ₃)	wt. %	EPA 9-20-3	
Neutralization Potential (NP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Acid Generating Potential (AP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Net Neutralization Potential (NNP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Neutralization Potential Ratio (NP/AP)	T CaCO ₃ /1000 t	EPA 9-20-3	
Long-term Leaching Potential			
MWMP ⁽¹⁾	mg/L	NDEP ⁽²⁾	Twice per week for 4 weeks, then monthly and repeat cycle when there is feed stock change
Kinetic	mg/L	See note (3)	Applicable if NP/AP ratio becomes < 3
Other Testing			

Notes: t = U.S. ton

(1) Meteoric Water Mobility Procedure

(2) NDEP = Nevada Department of Protection test procedure or other acceptable by ADEC.

(3) 12-week Humidity Cell Testing or other method acceptable to ADEC.

The monthly samples will consist of a composite of representative samples collected weekly of that month. The annual samples will consist of a composite of representative samples collected quarterly throughout the year. A detailed explanation of the sample collection and analysis is located in Appendix B.

3.5 Tailings Impoundment Water

Water in the tailings pond will be sampled on a quarterly basis when the pond is in use and not frozen over during the winter months, which should result in approximately 3 samples per year. For

example, when the existing tailings are reprocessed, the tailings pond will need to be emptied of water for inspection and repair prior to receiving slurried new ore tailings. Water will also have to be discharged at closure. The parameters to be analyzed for each sampling event are presented in Tables 3-8 and 3-9.

TABLE 3-8
TAILINGS IMPOUNDMENT WATER SAMPLES
MAJOR IONS
PARAMETER METHODS AND DETECTION LIMITS

Parameter	Method	Units	Method Detection Limit (MDL)	Practical Quantitation Limit (PQL)	Potential Regulatory Criteria ⁽¹⁾
Major Ion Chemistry					
pH (field & Lab)	EPA 150.1	Standard	n/a	n/a	6.5 to 8.5
Temperature (field)	Elect. probe	Degrees C	n/a	n/a	
Conductivity (field & lab)	SM2510B	umhos/cm	0.477	1	
Settleable Solids (field)	Cone	mL/L/hr	n/a	n/a	
Total Dissolved Solids	EPA 160.1	mg/L	3.1	10.0	
Total Suspended Solids	EPA 160.1	mg/L	0.15	0.5	
Turbidity (lab)	EPA 180.1	NTU	0.05	0.1	
Alkalinity, Total	SM 2320B	mg/L as CaCO ₃	3.1	10.0	Min. of 20
Alkalinity, Bicarbonate	SM 2320B	mg/L as CaCO ₃	3.1	10.0	
Alkalinity, Carbonate	SM 2320B	mg/L as CaCO ₃	3.1	10.0	
Alkalinity, Hydroxide	SM 2320B	mg/L as CaCO ₃	3.1	10.0	
Calcium	EPA 200.7	mg/L	0.062	0.2	
Iron	EPA 200.7	mg/L	0.0124	0.04	1
Magnesium	EPA 200.7	mg/L	0.062	0.2	1
Potassium	EPA 200.8	ug/L	150	500	
Silicon	EPA 200.8	ug/L	62	200	
Sodium	EPA 200.8	ug/L	150	500	

Note: Analysis will be for dissolved parameters unless noted

(1) Potential Criteria based on the Ruby Creek average hardness of 65 mg/L.

TABLE 3-9
TAILINGS IMPOUNDMENT WATER SAMPLES
MINOR & TRACE IONS
PARAMETER METHODS AND DETECTION LIMITS

Parameter	Method	Units	Method Detection Limit (MDL)	Practical Quantitation Limit (PQL)	Potential Regulatory Criteria ^(1&2)
Minor Ion Chemistry					
Phosphorus, Total	EPA 200.8	ug/L	62	200	
Manganese	EPA 200.8	ug/L	0.31	1	.05
Chloride	EPA 300.0	mg/L	0.031	0.1	230
Fluoride	EPA 300.0	mg/L	0.031	0.1	1
Nitrate-Nitrogen	EPA 300.0	mg/L	0.0031	0.01	10
Sulfate	EPA 300.0	mg/L	0.031	0.1	250
Nitrate/Nitrite-Nitrogen	EPA 300.0	mg/L	0.0031	0.01	1
Cyanide (total dissolved)	SM 4500-CN C,E	mg/L	0.0025	0.005	
Cyanide (WAD) Dissolved	SM 4500CN-I	mg/L	0.0025	0.005	.0052
Nitrogen, Ammonia-	SM 4500NH3-F	mg/L	0.0258	0.0500	
Trace Ion Chemistry					
Aluminum	EPA 200.8	ug/L	6.20	20	87
Antimony	EPA 200.8	ug/L	0.31	1	6
Arsenic ⁽⁴⁾	EPA 200.8	ug/L	1.5	5	50 ⁽⁴⁾
Barium	EPA 200.8	ug/L	0.94	3	2000
Bismuth	EPA 200.8	ug/L	0.31	1	
Cadmium	EPA 200.8	ug/L	0.05	0.5	0.20/(0.18)
Chromium (total)	EPA 200.8	ug/L	0.31	1	60.56/(52.08)
Copper	EPA 200.8	ug/L	0.31	1	6.46/(6.20)
Lead	EPA 200.8	ug/L	0.062	0.2	1.84/(1.57)
Manganese	EPA 200.8	ug/L	0.31	1	50
Nickel	EPA 200.8	ug/L	0.62	2	36.23/(36.12)
Selenium	EPA 200.8	ug/L	1.5	5	5/(4.6)
Silver	EPA 200.8	ug/L	0.31	1	1.93/(1.64)
Zinc	EPA 200.8	ug/L	1.5	5	83.18/(81.35)
Mercury	EPA 1631A	Ng/L		1	50

Note: Analysis will be for dissolved parameters unless noted

(1) Potential Criteria based on the Ruby Creek average hardness of 65 mg/L.

(2) Criteria (i.e. 0.20/(0.18)) show the total recoverable with dissolved criteria when a conversion factor is established in 18 AAC 70.

Arsenic maximum contaminant level (MCL) to change to 10 ug/L in Jan. 2006

3.6 Seeps and Groundwater Monitoring

The regional groundwater table is deep and located within the bedrock at the Nixon Fork Mine site. The general stratigraphy in the mine area includes relatively thin unconsolidated sediments overlying bedrock. The unconsolidated sediments locally may be saturated, or permafrost, but are not characterized as an aquifer nor a continuous hydrogeologic unit. Water quality monitoring of the bedrock groundwater table from surface wells is not considered practical due to the depth (500+ ft below ground surface), relative hydrologic isolation from the surface facilities (long travel time), and the availability of surface monitoring locations (seeps and springs). These conditions prevent monitoring deep groundwater using standard monitoring well designs impractical at any of the facilities including the FTDS, Tailings Impoundment, and Development Rock Dump. As a result, other groundwater monitoring options have been developed for each of the facilities as discussed below.

3.6.1 FTDS

No direct groundwater sampling is planned for the FTDS using traditional monitoring wells at this time. If the percolation pond monitoring described in Section 3.7.1 indicates that the quality of this water exceeds the criteria over two consecutive sampling events, then operational mitigation plan will be developed and submitted to ADEC for review and comment. If appropriate, shallow monitoring wells will be installed down slope of the percolation pond and the wells will be sampled on a quarterly basis for the same parameters noted in Section 2.0, Tables 2-1 and 2-2, to further characterize the potential for shallow groundwater migration. The well location and construction will be approved by ADEC prior to installation. Seeps will not likely develop or be observed near the FTDS because of its location. The FTDS will be inspected for seeps on a monthly basis. If detected, seeps will be sampled and analysed following the parameter list developed for the baseline surface water samples discussed in Section 2.0, Tables 2-1 and 2-2.

3.6.2 Tailings Impoundment

Two groundwater monitoring wells are located near the toe of the tailings impoundment dam. The completion intervals of these wells extend a short distance into the bedrock. Groundwater sampling is typically unsuccessful using these wells because they are either dry or have insufficient water to allow sample collection. This is likely due to the transient and seasonal nature of the shallow groundwater flow system at the site. These wells will continue to be monitored for the presence of

water on a quarterly schedule; if any water is present, samples will be collected. In addition, the toe area of the tailings impoundment dam will be monitored for seeps on a quarterly basis. The seep with the most flow will be setup so that a water sample can be collected for laboratory analysis. The parameter list for these samples will be the same as the list used for the baseline surface water samples discussed in Section 2.0, Tables 2-1 and 2-2.

3.6.3 Development Rock Dump

No direct groundwater sampling is planned at this time for the development rock dump using traditional monitoring wells. However, the hillside below the development rock dump will be inspected on a monthly basis for seeps. If seeps are located, up to three separate seeps will be setup for sample collection. Samples will then be collected from the seeps on a quarterly basis. The parameter list for the seep samples will be the same as the list used for the baseline surface water samples discussed in Section 2.0, Tables 2-1 and 2-2.

3.7 Storm Water Monitoring

3.7.1 FTDS Percolation Pond

Water will collect in the percolation pond at the FTDS during rain-storm and snowmelt events. A pond will be constructed on the north side of the tailings area that will collect this runoff. This water should percolate out the sides of the pond and flow along the bedrock surface as transient groundwater. The nearest discharge point for this perched groundwater is the headwaters of Mystery Creek located approximately 900 ft (275 m) to the north. The quality of this pond water will be monitored periodically to evaluate whether filtered tailings are impacting the stormwater runoff that reaches the pond.

Monitoring of the percolation pond water will be performed on a quarterly basis during the periods that the facility is operational. Grab samples will be collected quarterly from the pond during day light hours and within 30 minutes of when the runoff or snowmelt begins collecting or reaches the pond. Grab samples will also be collected from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch) storm event.

The storm water samples for benchmark monitoring will be collected in laboratory prepared sample bottles and by laboratory prepared protocols that have been approved under 40 CFR Part 136. The samples will be sent for analyses to a state-certified laboratory. The laboratory will analyze the sample for total recoverable aluminum, total recoverable iron, total recoverable lead, and total recoverable zinc content.

Benchmark monitoring water quality results will be documented using forms in the Storm Water Pollution Prevention (SWPP) Plan. In addition, a Discharge Monitoring Report (DMR) will be filled out and sent to the ADEC, Major Facilities & Water Permits Section. These completed forms will be maintained with the SWPP for at least three years from the date the facility's coverage under the Multi-Sector General Permit expires or is terminated.

3.7.2 Development Rock Dump

Monitoring of storm water management for the development rock dump will consist of weekly visual monitoring to identify potential areas of erosion, scour, ponding, general stability. Observations will be documented in monthly reports with recommendations for general improvements in storm water management. Temporary use of silt fencing and other erosion control methods will be employed as needed.

3.7.3 Infrastructure

Infrastructure at the Site include the airport, ore processing area, access roads, mine areas, vent shafts, and utility corridors. Monitoring of storm water management for each of the pertinent structures will consist of monthly visual monitoring to identify potential areas of erosion, scour, ponding, and general stability. Observations will be documented in monthly reports with recommendations for general improvements in storm water management. Temporary use of silt fencing and other erosion control methods will be employed as needed.

3.8 Closure and Reclamation Monitoring

Operational monitoring of surface water and storm water, as discussed previously, will continue at the Site on a quarterly basis until closure and reclamation activities are completed. Closure and reclamation activities are anticipated to require approximately one to two years after mining and ore processing is complete. After the completion of reclamation, storm water and surface water quality

monitoring will then be reduced to once per year for a period of five years, at which time an alternate monitoring frequency negotiated with ADEC. Annual vegetation monitoring of reclaimed areas and revegetation work (if required) will be completed until the 70% vegetation cover requirement is met.

4.0 MONITORING RECORDS AND REPORTING

4.1 Field Measurements and Records

All field activities pursuant to this monitoring plan will be recorded on field forms that will included the following information:

- Location, date, time of inspection, observations, measurements;
- The person(s) performing the inspection or monitoring activity;
- The laboratory performing the analysis;
- Chain-of-Custody records;
- Laboratory reports; and
- Consultant or engineering report.

4.2 Retention of Records

During the period of operation, closure, and reclamation, all records associated with the monitoring activities will be retained by MCRI or an MCRI representative for a period of 3 years.

4.3 Monitoring Reports and Submission Schedules

Monitoring reports will be submitted quarterly to ADEC. All quarterly reports will be submitted on or before the 15th day of the month following the end of the quarter. In addition, an annual report will be prepared for each year, through December 31, and will be submitted to ADEC and the BLM on or before February 15 of the subsequent year. The annual reports will include laboratory reports and will summarize all visual geotechnical and water monitoring that has taken place during that year.

5.0 OTHER MONITORING AND REPORTING

5.1 Revegetation Monitoring Program

Revegetation criteria for reclaimed areas are 70 percent vegetation cover achieved prior to requesting bond release. MCRI will monitor the revegetation process every spring and fall the mine is in operation and if 30 % vegetative cover is not achieved within 3 years, MCRI will determine the cause and develop a solution with BLM to improve the vegetation cover. Vegetation cover will be determined by field transects.

5.2 Impacts to Avian and Terrestrial Wildlife

All MCRI employees will be instructed to report unusual circumstances involving wildlife encounters and mortalities to the security officer on duty or to the mine manager. Wildlife mortalities occurring in the Nixon Fork Mine leased lands will be reported to the Alaska Fish and Wildlife Service (USF&WS), the ADF&G and ADEC. Specific areas that will be monitored on a regular basis will include the tailing impoundment because of the open water and potential for soft unconsolidated tailings, although operation standards require that tailings discharge to both areas be non-toxic to avian and terrestrial wildlife.

Wildlife mortalities discovered in operational areas of the mine will require special collection and sampling procedures. After reporting the mortalities to the security officer or mine manager, the species and a standing solution (e.g., water or liquid associated with soft tailings) sample will be collected. The standing solution sample will be collected as close to the site of the carcass as possible. The solution sample will be preserved immediately with sodium hydroxide to attain a pH>10 and submitted to an outside laboratory for WAD cyanide analysis. The collected wildlife species will be immediately preserved by freezing (size dependant) and temporarily stored in a facility under the control of mine security.

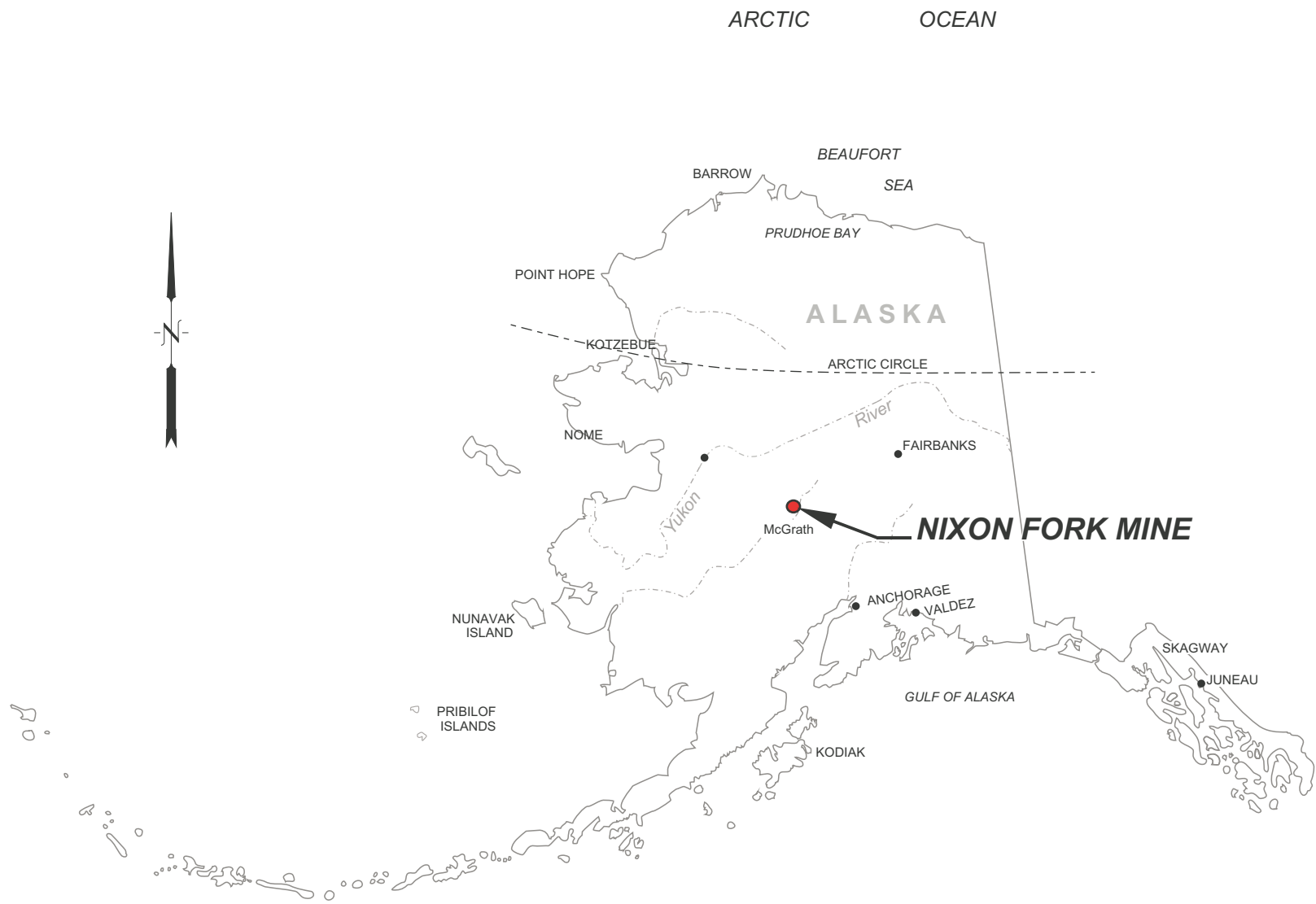
USF&WS, the ADF&G, and ADEC will be contacted to report mortalities within 24 hours or during the next scheduled workday. A written follow-up report will be submitted to USF&WS and ADF&G with the date the mortality was discovered, identification of species, and WAD cyanide level of the solution sample. The follow-up report will be submitted within 7 days of the initial verbal notification to allow verification of analytical results. A semi-annual summary will be prepared by MCRI and will review mortality occurrences during the ice-free period (generally April through


September) and during the ice cover (October through March). The semi-annual report will be submitted within 30 days of the end of the reporting period if mortalities have occurred.

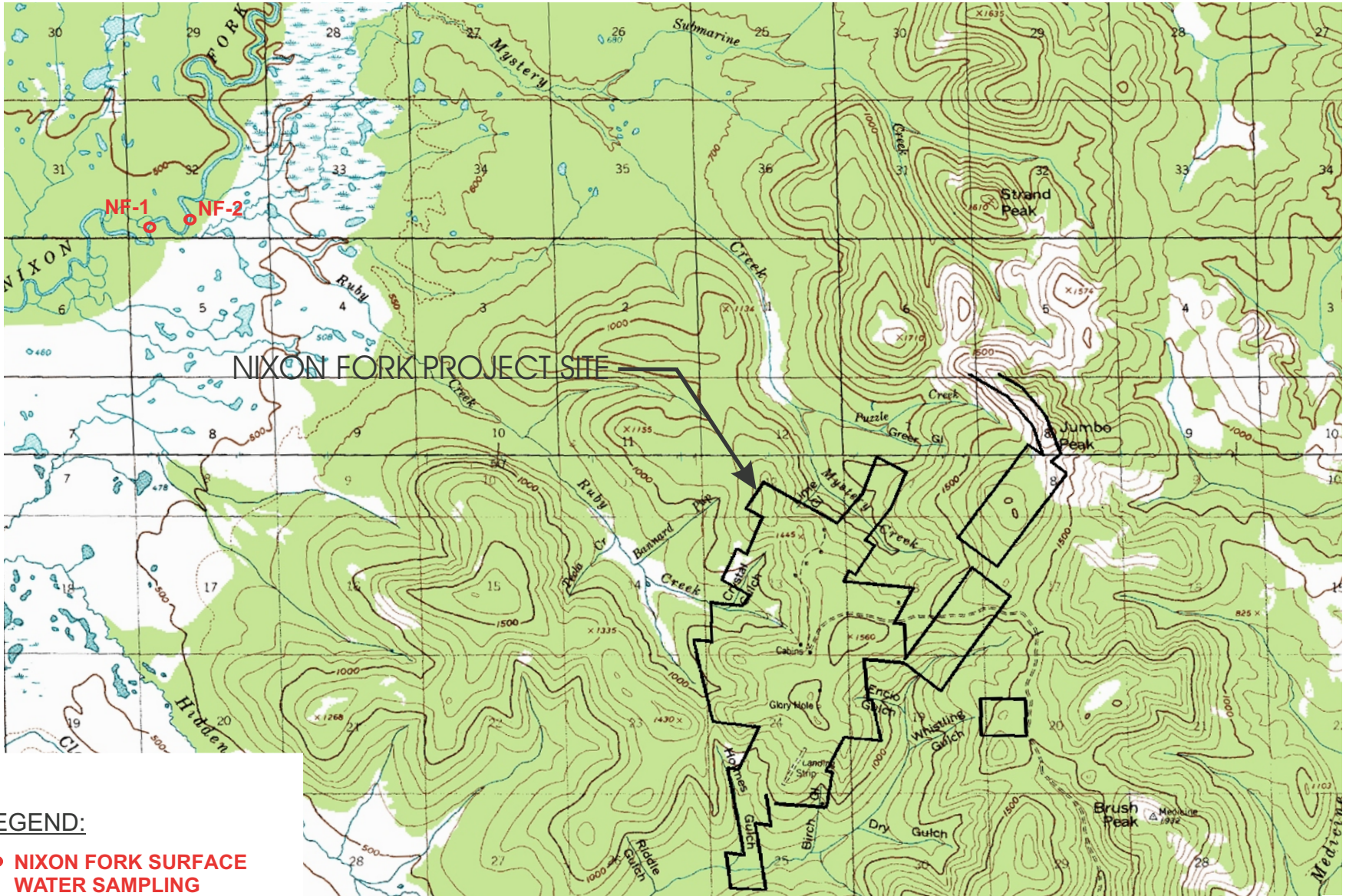
All carcasses will be available for final collection by USF&WS or ADF&G, depending on species (i.e., migratory bird or game species). Laboratory results of analysis for WAD cyanide concentration from solution samples will determine final disposal procedure for all carcasses collected. WAD cyanide levels ≥ 25 parts per million (pap) will trigger a necropsy to determine cause of death. WAD cyanide levels < 25 pap will not require further analytical analysis. Final deposition of all carcasses will be determined by the appropriate agency.

Terrestrial animals mired in unconsolidated tailings material will be extracted and moved or herded to a safe area. All attempts to extract mired animals will be based on evaluation as to the health and safety of employees and that of the animal.

FIGURES



 <p>Golder Associates Anchorage, Alaska</p>	SCALE	1 IN. = 300 MI.	<p>VICINITY MAP NIXON FORK MINE NEAR MCGRATH, ALASKA</p>
	CADD	CAV	
	DATE	06/28/05	
	CHECK	JFD	
FILE No.	0335632A003	DATE	06/28/05
PROJECT No.	033-5632x002.004	REV.	0
MYSTERY CRK / MONITORING PLAN / AK			FIGURE 1



LEGEND:

- NIXON FORK SURFACE WATER SAMPLING POINTS



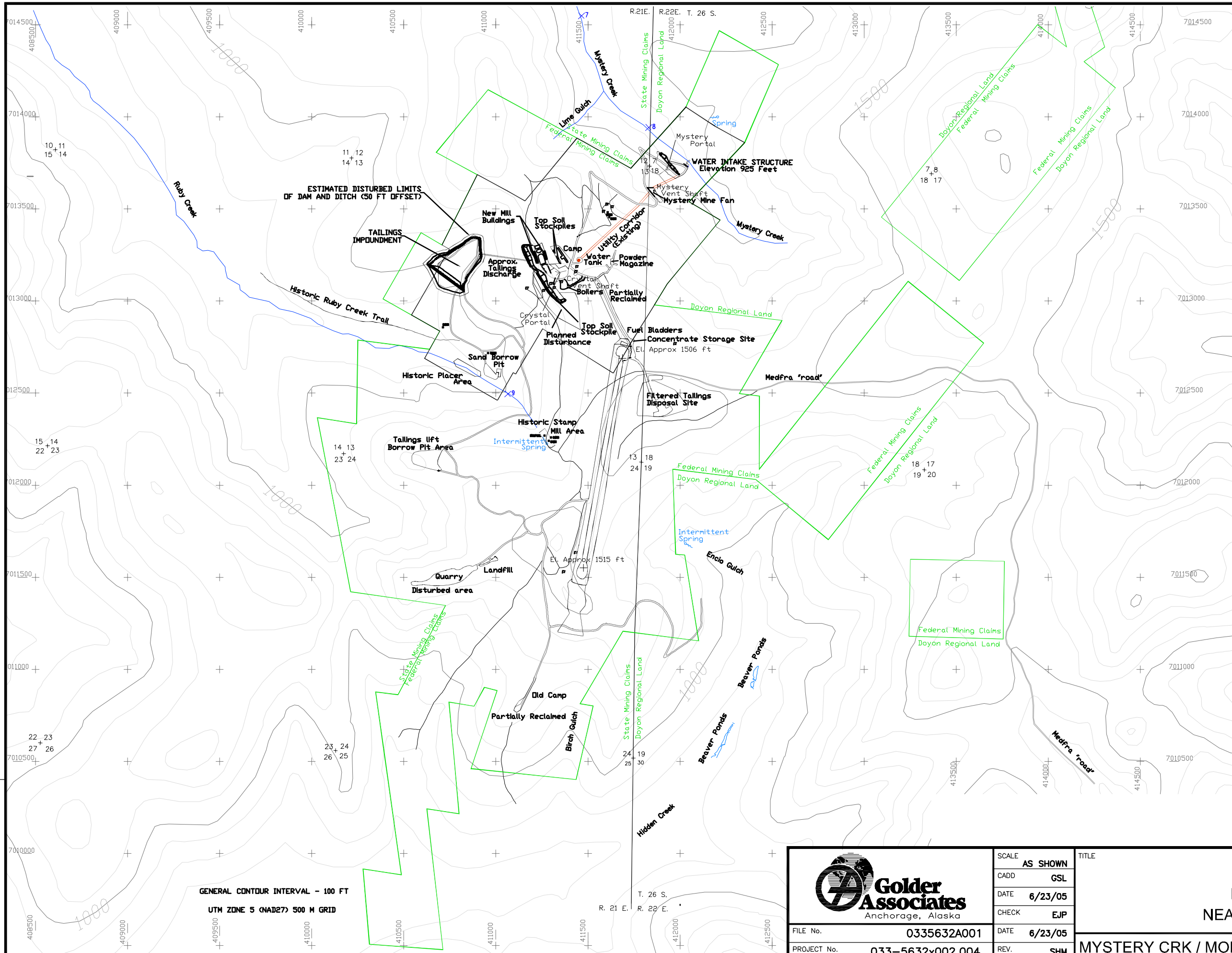
REFERENCES: USGS QUADRANGLE MAPS
MEDFRA A(4) & B(4)

Golder Associates
Anchorage, Alaska

FILE No.	0335632A004	DATE	6/28/05
PROJECT No.	033-5632x002.004	REV.	0

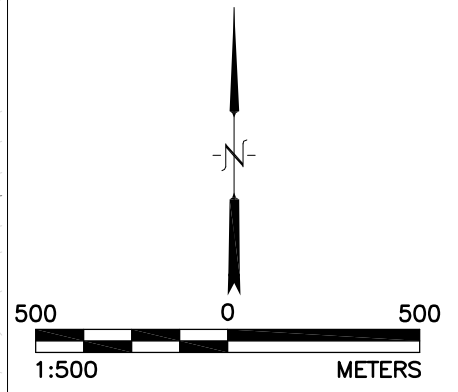
SCALE	AS SHOWN
CADD	CAV
DATE	3/30/05
CHECK	JFD

TITLE	PROJECT LOCATION NIXON FORK MINE NEAR MCGRATH, ALASKA
FIGURE	



GENERAL CONTOUR INTERVAL - 100 FT
 UTM ZONE 5 (NAD27) 500 M GRID

- ### LEGEND
- Former stream gauge approximate location and number from 1990 project
 - Approximate location of spring
 - Active Mine Portal
 - Active Ventilation Shaft
 - Existing Shaft
 - Existing Building
 - Existing Disturbance
 - Planned Disturbance
 - Federal Claims Surveyed
 - Federal Claims Unsurveyed



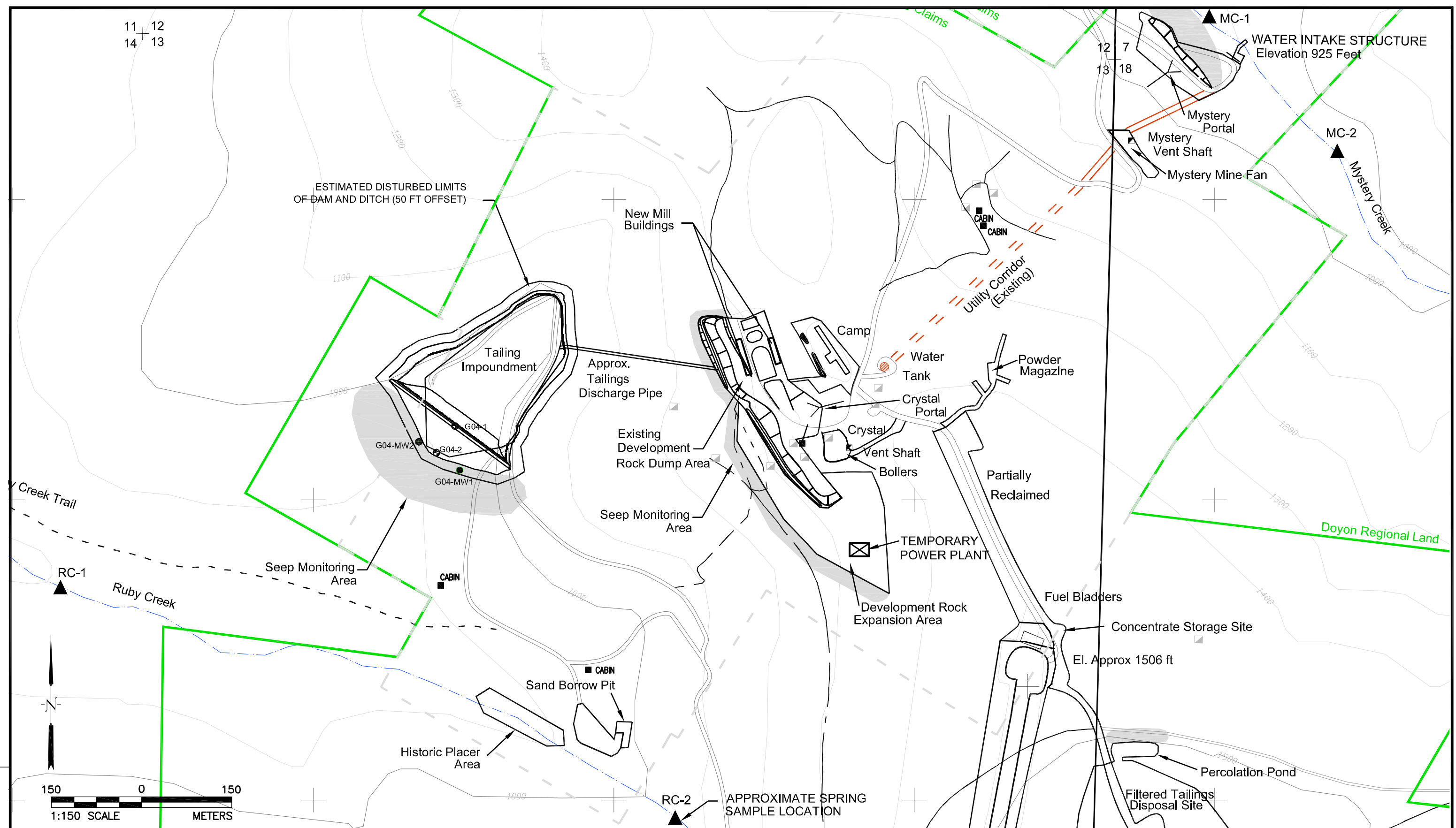
REFERENCES

1.) FIGURE PROVIDED BY MYSTERY CREEK RESOURCES INC.

	SCALE	AS SHOWN	
	CADD	GSL	
FILE No.	0335632A001	DATE	6/23/05
PROJECT No.	033-5632x002.004	CHECK	EJP
		DATE	6/23/05
		REV.	SHM

TITLE	
<h2>SITE PLAN</h2> <h3>NIXON FORK MINE</h3> <h3>NEAR MCGRATH, ALASKA</h3>	
FIGURE	3

11 12
14 13



LEGEND

G04-1	BOREHOLES WITH THERMISTERS	-1100-	GROUND SURFACE CONTOURS IN FEET
G04-MW2	MONITORING WELLS	☒	TEMPORARY POWER PLANT LOCATION
☐	SHAFT	●	SEEP MONITORING AREA
▲	SURFACE WATER SAMPLE LOCATION		

NOTES

1. LOCATION OF 2004 BOREHOLES AND WELLS ARE BASED ON MEASUREMENTS FROM KNOWN FEATURES AND SHOULD BE CONSIDERED APPROXIMATE.

REFERENCES

1. BASEMAP PROVIDED BY MYSTERY CREEK RESOURCES INC.

Golder Associates
Anchorage, Alaska

FILE No.	0335632A002	SCALE	AS SHOWN
PROJECT No.	033-5632x002.004	CADD	ACM
		DATE	06/20/05
		CHECK	EJP
		DATE	6/23/05
		REV.	SHM

TITLE

WATER MONITORING LOCATIONS
NIXON FORK MINE
NEAR MCGRATH, ALASKA

MYSTERY CRK/ MONITORING PLAN/ AK

FIGURE **4**

APPENDIX A

NIXON FORK MINE PROJECT

QUALITY ASSURANCE/QUALITY CONTROL
AND
FIELD PROCEDURES MANUAL

JUNE 2005

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Objectives	1
1.2	Quality Assurance/Quality Control Program.....	1
1.3	Data Uses and Data Quality Objectives.....	2
1.4	Data Quality Parameters	2
1.4.1	Precision	2
1.4.2	Accuracy.....	3
1.4.3	Representativeness	3
1.4.4	Comparability.....	4
1.4.5	Completeness	4
2.0	FIELD QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES.....	5
2.1	Purpose	5
2.2	Quality Control Samples.....	5
2.3	Sample Collection, Labeling, and Handling Procedures	6
2.3.1	Surface Water and Seep Water Grab Sampling	6
2.3.2	Surface Water Grab Sampling Through Ice	7
2.3.3	Groundwater Sampling.....	8
2.3.4	Solids Sampling Procedure – Development Rock/Mill Tailings.....	8
2.3.5	Sample Labeling.....	9
2.3.6	Packaging	10
2.3.7	Chain-of-Custody	11
2.3.8	Shipping	12
2.3.9	Field Documentation	12
2.3.10	Corrections to Documentation.....	12
2.3.11	Field Equipment Calibration	13
2.3.12	Decontamination Procedures.....	13
2.3.13	Dissolved Metal Field Filtration Method	14
2.3.14	Field Corrective Action.....	15
3.0	LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PROGRAM.....	16
4.0	DATA QUALITY ASSURANCE/QUALITY/QUALITY CONTROL PROGRAM..	17

ATTACHMENTS

Attachment A Nixon Fork Mine Project Instrument Calibration, Operation, and Maintenance Procedures

1.0 INTRODUCTION

1.1 Objectives

This Water Monitoring Quality Assurance / Quality Control (QA/QC) and Field Procedures Manual are for the use of Mystery Creek Resources, Inc. (MCRI) operating personnel at the Nixon Fork Mine Project. This manual is closely modeled after an example¹ provided by the Alaska Department of Environmental Conservation (ADEC) Water Quality Division (WQD). Much of the text in this manual is verbatim from this publicly available document, although no effort is made to identify the verbatim text.

This manual will be used to maintain the quality of field activities, sample collection, sample handling, laboratory and data analysis, and to document the quality of data at each processing level. The QA/QC program identifies major aspects of the project requiring specific quality control and demonstrates that quality control is a major focus for this project. Additionally, this manual will be used for training employees in approved field monitoring procedures (i.e. instrument calibrations, measurements, maintenance).

1.2 Quality Assurance/Quality Control Program

The QA/QC program consists of the following three components.

- **Field QA/QC** identifies the procedures to be used in the field to verify that water samples and field monitoring data are collected according to the requirements of the project. The objective of field QA/QC is to assure that both field measurements and samples collected for laboratory analyses can be demonstrated to be representative of the environment sampled and are of known and acceptable quality.
- **Laboratory QA/QC** identifies the protocols to be used by the laboratories to demonstrate that project data are analyzed according to U.S. Environmental Protection Agency (EPA) acceptable methodologies, and that reported values are accurate. The objective of the laboratory QA/QC program is to produce data that will meet state and federal analytical requirements.

¹ Water Monitoring QA/QC and Field Procedures Manual, True North Project, Fairbanks Gold Mining, Inc., Document date unknown

- **Data QA/QC** identifies the protocols to be used to verify that laboratory and field data have been reported accurately. The objective of the data QA/QC program is to demonstrate that the data reported meet the specified requirements, including comparability, with data from previous years.

1.3 Data Uses and Data Quality Objectives

Quality assurance (QA) requirements are established in this QA/QC program to achieve the project objectives for the data uses. Applicable quality control (QC) procedures, quantitative target limits, and level of effort for assessing the data quality are dictated by the intended use of the data and the nature of the required field and analytical methods. The project objectives are to collect data of known and sufficient quality for MCRI to comply with the analytical permit requirements during operation and ultimately closure of the Nixon Fork Mine Project. The analyses to be conducted on the various sample types have been presented in the Nixon Fork Mine Project Monitoring Plan. Protocols and appropriate detection limits are included in the laboratory's QA/QC plan available to all MCRI environmental personnel.

Federal and state levels of concern (i.e., ambient water quality criteria or maximum contaminant levels) exist for many of the parameters being analyzed in the water monitoring program. To the extent possible, analytical methods have been specified that will allow detection of chemical constituents at or below levels of concern.

1.4 Data Quality Parameters

The quality of laboratory data is measured by the precision, accuracy, representativeness, comparability, and completeness of the data. These parameters and the applicable quality control procedures and levels of effort are described below.

1.4.1 Precision

Precision is a qualitative measure of the reproducibility of a measurement under a given set of conditions. For duplicate measurements, analytical precision can be expressed as the relative percent difference. A quantitative definition of the relative percent difference is represented by the following equation.

$$RPD = (S_1 - S_2 / m) * 100$$

where:

- RPD = Relative percent difference (precision)
- S₁ = Results of sample 1
- S₂ = Results of sample 2
- m = (S₁ + S₂) / 2

The level of effort for precision measurement will be at a minimum frequency of one in 20 (5 percent), or one per batch, whichever is more frequent.

1.4.2 Accuracy

For samples processed by the analytical laboratory, accuracy will be evaluated through the use of matrix spikes and standard reference materials (SRMs) to establish the percent recovery. A quantitative definition of percent recovery is represented by the following equation.

$$\text{Percent R} = [(A_x - B_x) / S_x] * 100$$

where:

- Percent R = Percent recovery (accuracy)
- A_x = Concentration of analyte determined
- B_x = Background concentration of analyte
- S_x = Concentration of analyte added into sample or blank

The level of effort for precision measurement will be at a minimum frequency of one in 20 (5 percent), or one per batch, whichever is more frequent.

1.4.3 Representativeness

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the soil and water sampled. Sampling plan design, sampling techniques, and sample handling protocols (e.g. storage, preservation, and transportation) have been developed and are discussed in other sections of this document. Proposed documentation will establish that protocols have been followed and sample identification and integrity assured. Field blanks and field duplicates obtained at a minimum frequency of 5 percent or one per sampling event will be used to assess field and transport contamination and method variation. Laboratory sample retrieval, storage, and handling procedures have also been developed and are discussed in other

sections of this document. Laboratory method blanks will be run at the minimum frequency of 5 percent or one per set to assess laboratory contamination.

1.4.4 Comparability

Comparability is the level of confidence with which one data set can be compared with another. Comparability of the data will be maintained by using EPA-defined procedures, where available and appropriate. Comparability will also be maintained by the use of consistent units.

1.4.5 Completeness

Completeness is a measure of the amount of valid data obtained from the measurement system. The target completeness objectives are approximately 90 percent for each analytical parameter; the actual completeness can vary with the intrinsic nature of the samples. The completeness of the data will be assessed during the data review.

2.0 FIELD QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

2.1 Purpose

Producing data of known quality that are considered representative of the sampling environment at an appropriate level of detail is achieved by establishing a QA/QC program with specified data gathering protocols overseen by a field QA/QC leader. The main components of the proposed QA/QC program include the following:

- Verification of use of proper sample containers and preservatives;
- Collection and analysis of blank and duplicate samples;
- Specific procedures for handling, labeling, and shipping samples;
- Field equipment calibration;
- Equipment decontamination;
- Field documentation; and
- Field corrective action.

Each task sampler is responsible for implementing these components in the field. However, the field QA/QC leader will oversee each aspect of field operations to verify that these components are accomplished within the strict requirements of the project.

2.2 Quality Control Samples

To aid in evaluating the accuracy of the analytical data, a field filter and rinse blank and duplicate samples are collected and subjected to the same analyses as identified in task samples. One field filter and rinse blank is collected for every 20 unknown samples, or one per sampling event (quarterly), whichever is greater. In addition, a minimum of one duplicate sample is collected for every 20-task samples, or one per sampling event (quarterly) whichever is greater.

Equipment blanks for surface water sampling are taken by pouring laboratory provided distilled water into a decontaminated sample collection bucket, then sample bottles are filled from the sample collection bucket with a decontaminated one-liter plastic pitcher. Blanks will be analyzed along with the unknown samples. Equipment blanks will not be necessary if site conditions allow direct fill into the sample bottles without using a non-disposable transfer vessel. In addition, an equipment blank will not be necessary if the transfer vessel used to initially collect a sample is previously unused and disposable, and is not used for any other sample locations.

2.3 Sample Collection, Labeling, and Handling Procedures

Sample collection, labeling, and handling procedures are periodically checked by the QA/QC leader to verify that the following conditions are met.

- Collection: Samples are collected according to approved sampling methods.
- Labeling: Samples are uniquely labeled using a code that prohibits unauthorized personnel from knowing the sampling locations.
- Packaging: Samples are correctly packaged to prevent leakage or cross-contamination, sample containers with proper preservatives are used; and sample custody can be adequately documented.
- Shipping: Samples are hand delivered to the laboratory or proper shipping procedures are used, including maintenance of proper temperatures and specified holding times.

Each task leader is responsible for implementing the proper sample collection, labeling, and handling procedures. The field QA/QC leader will oversee these activities.

2.3.1 Surface Water and Seep Water Grab Sampling

Surface/seep water samples are collected in the following order:

1. Total and dissolved metals;
2. Settable solids;

3. Total suspended solids;
4. Ammonia nitrogen; and
5. Remaining parameters (i.e. fluoride, phosphorous, etc.).

The surface/seep water grab sampling procedures and sampling sites are listed below.

1. Decontaminate compositing container and any other containers used to transfer the sample to the laboratory bottles. Decontamination procedures are described in Section 2.3.12.
2. Locate sampling site at a point in the stream exhibiting greatest flow and/or highest velocity, if possible.
3. Surface/seep water sample sites at the Nixon Fork Mine Project require filling the plastic-bucket by direct submergence. When submersion is required: submerge plastic-bucket at sampling point such that mouth of container is under water surface at least 2 to 3 inches, if possible. Allow container to fill partially, rinse container by shaking, and then discharge this water. Repeat this procedure three times. Collect sample in plastic bucket and then transfer water from bucket into the laboratory sample bottle. Dissolved metals samples are field filtered with a 0.45 μ m filter as they are transferred to the laboratory sample bottles. Water field filtering procedures are described in Section 2.3.13.
4. Fill out appropriate field data form(s). Field documentation procedures are described in Section 2.3.9.

2.3.2 Surface Water Grab Sampling Through Ice

During winter months when ice cover is present, sample water is accessed with use of a manual handheld ice auger. Sampling procedures for winter sampling through ice are described below.

1. Clear snow off ice in an area large enough to drill a hole for sample collection and to set sampling equipment.
2. Drill sample hole in ice with auger periodically cleaning hole of ice chips.
3. After breaking through ice, cut a square area with an ax around the ice hole large enough (3-4 inches deep) to dip the sample collection container in.

4. Purge three volumes from the ice hole prior to sampling, trying to remove all ice chips within the hole. This volume can be approximated from the hole dimensions in the ice.
5. Follow surface/seep water grab sample procedures steps 3 through 4 described in Section 2.3.1, Surface Water and Seep Water Grab Sampling, above.

2.3.3 Groundwater Sampling

The groundwater monitoring wells are sampled with disposable bailers. A description of the sampling procedure is given below.

1. Measure and record the static water level in the well then determine the well casing volume to be purged:
 - (0.37 gal/ft for 2" well)
 - (0.65 gal/ft for 4" well)
 - (1.47 gal/ft for 6" well)
2. Purge at least three well casing volumes using a disposable bailer and line/rope prior to sampling. Measure field parameters (pH, conductivity, and temperature) after purging each casing volume. After finishing purging and if field parameters were stable (within 10% between readings or ± 0.2 pH units, fill sample bottles directly from the bailer. If field parameters were unstable during well purging, continue purging well until stable field parameters are achieved. Fill out appropriate field data form(s) documenting sample location, time, and other pertinent information (as described in Section 2.3.9, below) before leaving sampling site.

2.3.4 Solids Sampling Procedure – Development Rock/Mill Tailings

2.3.4.1 Development Rock

Development rock samples will be collected at the surface by MCRI personnel. No consideration for rock type will be made during the collection of approximately 20 lbs of sample in a cloth sack. The sample will be stored out of the weather until it is time to composite all the samples collected over the period for the laboratory. All the samples, normally four, will be mixed by the geologic technician and then split into 4 approximately equal portions. One of these sample portions will be randomly selected and submitted to the laboratory for analysis, with one of the remaining portions stored on

site, in a cloth sack, for additional analysis at a future date, if needed. The remaining sample will be discarded in the development rock dump.

The cloth sample sack containing the saved sample portion will be labeled with a code to uniquely identify the sample. Following receipt of the analytical results, appropriate QA/QC of the data will be performed as described in Section 4.0, below. If the analytical results vary significantly from previous sampling events, the saved sample portion will be shipped to the laboratory for confirmation analysis. Otherwise, if the analytical results are consistent with previous results, the remaining sample will be discarded on the development rock dump.

2.3.4.2 Mill Tailings

Filtered and slurried tailings at the mine will be collected for laboratory analysis at an off-site analytical laboratory.

A composite filtered tailings sample will be collected from the temporary pile that will accumulate at the end of the filtration belt. Each composite sample will consist of 5 discrete samples collected from “fresh” tailings coming off the tailings belt over a 10 minute period. All the samples, normally 5, will be mixed by the MCRI personnel and then split into 4 approximately equal portions. Each split portion will be labeled with a code for unique identification. One of these sample portions will be randomly selected and shipped to the off-site laboratory for analysis, with one of the remaining portions submitted to the on-site laboratory for additional analysis. The remaining sample portions will be stored for up to 12 weeks for future analysis, if needed. Following receipt of the analytical results, appropriate QA/QC of the data will be performed as described in Section 4.0, below. If the analytical results vary significantly from previous sampling events, the saved sample portion will be shipped to the appropriate laboratory for confirmation analysis. Otherwise, if the analytical results are consistent with previous results, the remaining sample will be discarded on the development rock dump.

2.3.5 Sample Labeling

Each sample container will have a waterproof label large enough to contain the information needed to easily identify each sample. The information to be included on each label includes:

- the project name;
- date and time of collection;
- preservative (if added); and
- sampling code.

The sample code will be formatted to indicate sample number and date. In the field record book, the sampler will identify each sampling location. Each sample will be identified with a 12-digit number separated into three series, which includes the date (series 1), sampler (series 2), and identification number of the sample (series 3). An example of sample identification is as follows:

Sample ID: 050707/022/013

where:

050707 = Date (2005, July 07)

022 = Employee's identification number

013 = Sequential sample number recorded in log book for that date.

All blanks and duplicates will be noted in the field notebook. The following designation will be noted for the sample identification series (series 3): natural samples will be identified as 100 series; blanks as 200 series; and duplicates as 300 series.

2.3.6 Packaging

Each water sample bottle will be packed in an iced cooler immediately following collection to keep the samples cooled to 4°C and to prevent breakage during delivery/shipment to the laboratory. For hand delivered and shipped samples, one copy of the chain-of-custody seal will be attached to the outside of the cooler such that the seal(s) must be broken if the cooler is opened. Before sealing coolers, the field QA/QC leader will inspect the sample packaging.

2.3.7 Chain-of-Custody

Chain-of-custody forms will be used for all samples shipped off site. Once collected, the samples will remain within the custody of the sampler or will be locked up until the samples are prepared for shipment. Each time the sample bottle or sample changes hands, both the sender and receiver will sign and date the chain-of-custody form and specify what samples have changed hands. One carbon copy or photocopy of the chain-of-custody form will be retained by MCRI and the original and one carbon copy is sent to the laboratory. The laboratory will forward the original to MCRI with the laboratory report. Samples analyzed by the on-site laboratory will be tracked in the laboratory log book.

The following information is to be included on the chain-of-custody form and on-site laboratory log book:

- Sample identification code;
- Signature of sampler;
- Date and time of collection;
- Project name;
- Type of sample;
- Number and type of containers;
- Sample analysis requested (e.g., Profile I, II, III, Acid/Base Accounting, etc.);
- Inclusive dates of possession; and
- Signature of receiver.

Other chain-of-custody components will include sample labels, sample seals, field notebook, sample shipment receipts, and the laboratory logbook noting the requested analysis in the Monitoring Plan.

2.3.8 Shipping

MCRI personnel will have the samples delivered to the designated laboratory as soon as feasible after collection and in compliance with the specified method holding times for the required analysis. The remote location of the mine will require that samples be shipped by air using the available services. The shipping containers will be sealed, which will be opened in transit only by airline personnel as part of airport security, if required, and then at the receiving laboratory. Samples may also be hand delivered by MCRI personnel as the opportunity is available. A copy of the chain-of-custody, signed by the laboratory at the time of delivery, will be sent with the laboratory report to MCRI.

2.3.9 Field Documentation

Field observations, field equipment calibration information, field measurements, and sample documentation (including sample identification, sample duplicates, and date and time the sample was collected) will be the responsibility of the entire sampling team. Field logbooks will have waterproof paper.

Proper documentation for sample custody includes keeping records of all materials and procedures involved in sampling. Project notebooks and data sheets will be used to record field data. The field crews will record information regarding the sampling station, including the station position, and respective samples and replicates collected at each. The field crew leader will review all data before leaving the sampling station. Completed field logs will be kept on file for any QA/QC checks. Additionally, the field QA/QC leaders will regularly inspect all field documentation, notebooks, and data sheets.

2.3.10 Corrections to Documentation

All original data will be recorded using waterproof ink unless prevented by weather conditions. No accountable documents will be destroyed or thrown away even if they are illegible or contain inaccuracies that require a replacement document. If an error is made on an accountable document assigned to one person, that person must make corrections by drawing a single line through the error, initialing and dating the lined-out item, and entering the correct information. The erroneous information is not to be obliterated but is to remain legible. The person who made the entry will

correct any subsequent error discovered on an accountable document. All such subsequent corrections will be initialed and dated.

2.3.11 Field Equipment Calibration

Field equipment used for collection, measurement, and testing is subject to a strict program of control, calibration, adjustment, and maintenance as discussed in Attachment A. Portable water quality instruments will be used for the in situ measurement of pH, temperature, dissolved oxygen, and conductivity. Recorded measurements will not be taken until an agreement of replicate measurements is obtained. This value will then be recorded. Calibrations will be performed daily prior to beginning any sample tasks. The standards of calibration are in accordance with applicable criteria such as the National Institute of Standards Technology (NIST), ASTM standards, or other accepted procedures outlined in the manufacturer's handbook of specifications. All calibration activities will be documented in each task notebook, as well as on appropriated field calibration forms.

The field crew leader will review data measured in the field, and final validation will be by senior personnel. Data validation will be completed by checking procedures used in the field and comparing the data with previous results. Data that cannot be validated will be so documented; corrective action may be required, as discussed in Section 2.3.14, below.

2.3.12 Decontamination Procedures

All sample processing tools, such as pumps, buckets, and hoses, which come into contact with a sample will be decontaminated by means of the following procedure.

1. Rinse in tap water to remove visible particles/material from equipment.
2. Wash in Alconox, (or equivalent)/tap water solution.
3. Double rinse in deionized or distilled water, and air dry if not to be used right away.
4. Place in plastic bag immediately after air-drying for storage and/or transport to next sampling location.

The purpose of the Alconox (or equivalent)/water solution washes is to remove all visible particulate matter. This is followed by a deionized or distilled water rinse to remove the detergent. It is not anticipated that high concentrations of organics will be encountered. If organics are detected in the field, a solvent rinse will be added followed by a deionized or distilled water rinse.

2.3.13 Dissolved Metal Field Filtration Method

Water sample filtration for selected samples will be performed either at the sampling station whenever possible, or at the mine office, if necessary, when sampling locations are remote and difficult to transport filtration equipment to. Filtration will be performed using an electronically operated peristaltic pump to transfer the sample through the filter and into the sample bottles except for groundwater wells sampled with downhole pumps. Separate descriptions for surface water sample and groundwater sample (collected with downhole pumps) filtration are presented below.

Surface Water:

1. Use a new, disposable, high capacity, pre-cleaned, vacuum-type, 0.45-micron filter for each sample.
2. Use a new length of clean, flexible poly tubing for each sample.
3. Visually inspect filter, and tubing for damage. Replace parts or repair equipment as necessary.
4. Attach length of poly tubing to drive head of peristaltic pump. Attach one end of poly tubing to inlet of the filter. Place other end of poly tubing in container containing collected sample for filtration. Purge approximately 3 filter and tubing volumes through system using peristaltic pump.
5. If sample water is extremely turbid, use the same procedure but pre-filter the water (usually with a 3-micron filter) and then use 0.45-micron filter.
6. Immediately after purging, fill sample container to appropriate level with filtered sample.
7. Repeat step 6 until all required sample bottles are filled.

Groundwater sampled with downhole pump:

1. Place disposable, high capacity, pre-cleaned, vacuum-type, 0.45-micron filter in two-way hose fitting/reducer fitting after restricting flow to one outlet.
2. After inserting filter firmly into the two-way hose fitting adjust valves so as to divert flow through the filter.
3. Let at least three filter volumes run through the filter before filling sample bottles.

2.3.14 Field Corrective Action

Field sampling corrective actions includes procedures to follow when field data results are not within the acceptable error tolerance range. These procedures include the following:

1. Comparing data readings being measured with readings previously recorded;
2. Recalibration of equipment (i.e., pH meters);
3. Replacing or repairing faulty equipment; and
4. Resampling when feasible.

The field team leader is responsible for ordering appropriate field corrective actions when deemed necessary. All field corrective actions will be recorded in the field book.

3.0 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

The laboratory QA/QC program is available to all MCRI personnel and a copy is also located in the Nixon Fork mine office.

4.0 DATA QUALITY ASSURANCE/QUALITY/QUALITY CONTROL PROGRAM

The data QA/QC program serves four major functions:

- Maintenance of a duplicate record of all field data;
- Sample tracking through laboratory analysis;
- Data validation; and
- Oversight of data management.

During field operations, the field QA leader will receive copies of all field data and will file these in a project notebook. These duplicates will serve as a backup file and will be checked against the field data entered into the database management system.

The second major component of the data QA/QC program is sample tracking throughout the laboratory analytical process. The data QA/QC leader will maintain close communication with all analytical laboratories to verify sample receipt, proper sample management, and strict adherence to sample holding times. The laboratories will immediately inform the field QA leader of sample breakages, inadequate sample media to meet QA objectives, and other sample problems. The field QA leader will then notify the task leader and project manager so that corrective action can be implemented as deemed necessary.

Following receipt of the analytical data package from the laboratory, the QA leader will verify that all sample parameter data have been received and will compare detection limits and preliminary results with previous results. Should major discrepancies be found, the field QA leader will communicate these to either or both the task leader and project manager. Possible corrective measures will then be evaluated as deemed necessary.

A data review or validation process will also be performed on 20 percent of all analytical data received from the laboratories. Chemical data will be reviewed with regard to the following:

- Analytical methodology;
- Detection limits;
- Cross-contamination as indicated by blank data;
- Accuracy and precision; and
- Adherence to holding times.

Where data do not meet the requirements specified in the QA/QC program, the data will be flagged with qualifiers. These reviews of data will be summarized and included in the report of sampling data.

ATTACHMENT A

**NIXON FORK MINE PROJECT
INSTRUMENT CALIBRATION, OPERATION, AND
MAINTENANCE PROCEDURES**

ATTACHMENT A
INSTRUMENT CALIBRATION, OPERATION, AND MAINTENANCE PROCEDURES
A-1

ATTACHMENT A
INSTRUMENT CALIBRATION, OPERATION, AND
MAINTENANCE PROCEDURES

The following sections discuss field sampling procedures and instrument calibration, maintenance, and measurements.

ATTACHMENT A
INSTRUMENT CALIBRATION, OPERATION, AND MAINTENANCE PROCEDURES
A-2

ELECTRICAL CONDUCTANCE

Instrument Calibration

At the beginning of each day of sampling, check instrument linearity.

1. Rinse probe with deionized water.
2. Measure conductivity of two potassium chloride (KCl) solution standards, which bracket expected sample values.
3. Measure temperature of both KCl solution standards.
4. Calculate cell constant for each standard to determine if instrument linearity is reasonable. The cell constant is the ratio of the computed conductivity to the measured conductivity of the standard KCl solution.

Maintenance

1. Store meter in its case during transport.
2. Check batteries before taking meter into the field. Carry spare batteries in the field (9 volt).
3. Inspect conductivity probe for cracks or other damage.

Field Measurement Procedures

1. Turn instrument on.
2. Rinse plastic beaker with approximately 50 milliliters of sample water three times.
3. Place water sample in plastic beaker (fill to at least 50 millimeters).
4. Rinse probe with deionized.
5. Immerse conductivity probe in sample so that vent hole is submerged. Move probe around in sample to displace any air bubbles. Turn instrument on to appropriate scale to measure conductivity. Record conductivity reading after a stable reading is obtained.
6. Remove probe from sample and turn off instrument.

ATTACHMENT A
INSTRUMENT CALIBRATION, OPERATION, AND MAINTENANCE PROCEDURES
A-3

FIELD PH

Instrument Calibration

1. Calibrate pH meter at the beginning of each day of fieldwork when pH will be measured, and whenever the standard check is out of acceptable bounds.
2. Rinse pH electrode probe with deionized water.
3. Immerse electrode and temperature probe from solution, and then rinse with deionized water.
4. Remove electrode and temperature probe from solution, and then rinse with deionized water.
5. Immerse electrode and temperature probe from solution, and rinse with deionized water.
6. Remove electrode and temperature probe from solution, and rinse with deionized water.
7. Measure pH of a third fresh calibration solution at pH 7.0. If measured value differs from expected value by more than 0.1 units, obtain fresh calibration solutions and recalibrate. If discrepancy persists, begin trouble-shooting procedures following meter operating instructions: check batteries, connections, probe, etc.

Maintenance

1. Store meter in its case with electrode immersed in a pH 7 buffer solution.
2. Inspect electrode prior to use.
3. Filler hole plug should be firmly seated when meter is stored for a week or more.
4. Check glass electrode for cracks or scratches.
5. Check batteries each time meter is used. Carry a spare battery pack into the field in the pH meter case.

Field Measurement Procedures

1. Rinse decontaminated glass beaker or sample bottle with approximately 50 milliliters of sample water three times.
2. Rinse pH electrode with deionized water.

ATTACHMENT A
INSTRUMENT CALIBRATION, OPERATION, AND MAINTENANCE PROCEDURES
A-4

3. Rinse pH electrode with deionized water.
4. If measurement is read ex situ, fill beaker with sample water.
5. Immerse electrode and temperature probe in sample while swirling the sample to provide thorough mixing. Turn on meter. Read pH to nearest 0.1 until the reading has stabilized (when beaker icon stops flashing).
6. Record sample pH. Note any problems such as erratic readings.
7. Rinse probe with deionized water and store according to manufacturer's directions.

WATER TEMPERATURE

1. Linearity and Field Measurement Procedures.
2. Use either a National Institute of Standards and Technology (NIST)-calibrated thermometer or a digital temperature probe calibrated against a NIST-calibrated thermometer to measure temperature.
3. Check thermometers for cracks or gaps in the mercury. Do not use thermometers if either cracks or gaps are visible.
4. When possible, measure temperature of surface water at midstream by submersing the thermometer or electronic temperature probe for approximately 1 minute or until temperature stabilizes.
5. When in situ temperature measurements are not possible, draw sample of at least 200 ml into a decontaminated beaker or sample bottle as soon after sampling as possible.
6. Place thermometer or electronic temperature probe in sample and allow temperature to stabilize.
7. Record temperature to nearest 0.5°C in field logbook or on field data sheet.
8. Rinse thermometer or electronic temperature probe with deionized water.
9. Check field thermometers or digital temperature probes against a NIST-certified laboratory thermometer, on a quarterly basis. Agreement should be within 0.5°C.

ATTACHMENT A
INSTRUMENT CALIBRATION, OPERATION, AND MAINTENANCE PROCEDURES
A-5

DISSOLVED OXYGEN

Instrument Calibration

Calibrate probe and dissolved oxygen meter in accordance with manufacturers instrument operating procedures, as follows:

1. Switch instruments to OFF and adjust meter to mechanical zero.
2. Switch to red line and adjust.
3. Prepare probe for operation (keep in moist paper towel taking care that paper towel doesn't touch membrane) plug into instrument, turn ON and wait 15 minutes for probe to stabilize (temperature).
4. Switch to ZERO and adjust.
5. Adjust salinity knob to FRESH.
6. Switch to TEMP and read.
7. Use probe and true local atmospheric pressure (feet above MSL) to determine correct calibration values from Table I and II (see instrument back panel) for example calculation.
8. Switch to desired dissolved oxygen range 0-5, 0-10, 0-20 and with calibrate control adjust meter to correct calibration value determined in step 7.
9. It is important that the instrument not be turned off between measurements, as it will then need to be recalibrated if turned off.

The probe membrane must be replaced prior to sampling. There should be no cracks, tears, or wrinkles in the membranes as well as no air bubbles in the KCL solution filled probe tip. Also any extra membrane should be cut to avoid covering the stainless steel temperature sensor. Store the probe in a saturated piece of cloth or paper towel.

When possible, place probe directly into the stream or water to be measured. If this is not possible, place probe into Teflon sample container filled with sample. Manually raise and lower probe through sample about 1 foot per second. Allow sufficient time for probe to stabilize to sample temperature and dissolved oxygen concentration.

ATTACHMENT A
INSTRUMENT CALIBRATION, OPERATION, AND MAINTENANCE PROCEDURES
A-6

1. Read dissolved oxygen value.
2. Record appropriate data on field forms.

APPENDIX B
DEVELOPMENT ROCK MONITORING PROCEDURES

APPENDIX B
DEVELOPMENT ROCK MONITORING PROCEDURES

1.0 INTRODUCTION

Appendix A describes the procedures that will be utilized to sample, analyze, and track development rock characteristics placed in the dump during the production phase of the mine. The majority of the development rock brought to the surface and placed in the dump below the mill is expected to be limestone with a high neutralization capacity. Quartz monzonite is generally avoided during mining development because of its geotechnical qualities, and as a result, a much smaller percent of the development rock brought to the surface will be this material. In addition, Mystery Creek Resources, Inc. (MCRI) will use the quartz monzonite development rock underground as backfill material in the mine as much as possible. There will be no effort to segregate the two general types once brought to the surface and placed in the rock dump.

2.0 DEVELOPMENT ROCK SAMPLING

Development rock samples will be collected at the surface by a MCRI geologic technician in the area most actively being used at the time. No consideration for rock type will be made during the collection of approximately 20 lbs of sample in a sack. The sample will be stored out of the weather until it is time to composite all the samples collected over the period for the laboratory. All the samples, normally four, will be mixed by the geologic technician and then split in to 4 samples. One of these samples will be randomly selected and submitted to the laboratory for analysis, with two of the remaining samples stored on site for additional analysis, if needed.

3.0 GEOCHEMICAL ANALYSIS

Each sample will be analyzed the Acid-Base Accounting (ABA) procedure, the Meteoric Water Mobility Procedure (MWMP). If the neutralization potential (NP) of any samples is less than 3 the second sample will be submitted to the laboratory for the same testing. If the NP is again less than 3, then kinetic testing (12-week Humidity Cell Testing) will be performed to further evaluate the material.