Nixon Fork Mine

Plan of Operations & Reclamation Plan

Version 2

Volume I of II

Submitted to the

Anchorage Field Office
Bureau of Land Management
6881 Abbott Loop Road
Anchorage, AK 99507

By

Mystery Creek Resources, Inc.
1200 West 73rd Avenue
Vancouver BC, V6P 6G5

Amended
July 2012

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EXECUTIVE SUMMARY

NIXON FORK MINE
PLAN OF OPERATIONS
and RECLAMATION PLAN

The Nixon Fork Mine is a lode gold mine located 32 miles northeast of McGrath, AK, within Township 26 South, Ranges 21 and 22 East, Kateel River Meridian. It is located on federal unpatented mining claims and state mining claims. Mining has occurred in the vicinity for many years, with two campaigns in the modern era: from 1993 to 1999 under Nevada Goldfields Inc. (NGI) and more recently for five months in 2007 under Mystery Creek Resources Inc. (MCRI). Operations at Nixon Fork have been evaluated in three environmental assessments (1991, 1995 and 2005), all resulting in a finding of no significant impact.

MCRI has held a mining lease on the property, which is owned by the Mespelt & Almasy Mining Company, LLC, since February 4, 2003. The 2005 POO was prepared while MCRI was a wholly owned subsidiary of St. Andrews Goldfields Ltd (SAS). While MCRI is still the operator, it has changed ownership twice since the 2005 POO:

- On February 12, 2009 Pacific North West Capital announced that it had exercised an option to acquire from St. Andrew Goldfields Ltd. all of the outstanding shares of MCRI.

- On August 13, 2009, Fire River Gold Corp. announced that it had exercised an option to purchase a 100% interest in MCRI and the Nixon Fork Project from Pacific North West Capital.

Two Preliminary Economic Assessments have been completed to evaluate the economics for the resumption of operations. The first, completed in September 2010, focussed on the completion of a carbon-in-leach cyanidation circuit and the recovery of residual gold from the existing tailings pond. The second, completed in February 2011 demonstrated the viability of resuming underground mining operations. On the basis of these two studies and internal investigations, the company has made the determination and has returned the property to full operations in the summer of 2011.

The site currently has a rotating staff of 50 workers, including supervision, geology, miners, maintenance workers, and support staff.

The mine has 121,690 tonnes of indicated resources grading 26.9 g/t plus 70,780 tonnes of inferred resources grading 27.8 g/t. Copper and silver values are present, but sufficient geological work has not been completed to estimate a resource for either metal. For the purposes of this document, a mineral inventory of 238,875 tonnes grading 25 g/t is assumed to be mined over the five year period of this POO. This is more than the current resource and assumes the addition of mineable tonnes through exploration. The historic tailings pond has an indicated resource of 92,000 tonnes grading 7.9 g/t and an inferred resource of 48,000 tonnes grading 7.4 g/t. This POO assumes that 85,500 tonnes of these tailings will be mined over the duration of this POO. Neither the mine nor the TSF is assumed to be depleted over the duration of this POO.

Mining operations started in April 2011. The mill was started on gravity and flotation circuits only on July 4 2011. As of November 1, 2011, a total of 15,430 tonnes of ore has been processed at a grade of 15.1 g/t.

The mine is being operated with mobile trackless diesel equipment at 150 tpd in the same fashion as prior operators using underground stoping methods such as shrinkage stoping, mechanized cut and fill, or sublevel stoping.

Processing up to 250 tonnes per day is accomplished using the existing gravity and flotation mill, producing both doré and copper concentrate on site. Fresh **mill** tailings will then be run through a CIL circuit, increasing overall gold recovery to approximately 96%. In the unfrozen months, tailings from the existing pond will be dredged and run through and the CIL circuit.

Both tailings will be filtered and stored at the final tailings disposal site (FTDS) through the course of this production period. After the TSF is emptied and prior to reuse, engineered drawings and plans for the TSF shall be submitted to the ADEC and ADNR for approval.

Power will continue to be supplied by the existing diesel-fired generators.

The FTDS facilities will function with zero water discharge. The TSF will have periodic land application disposals to maintain water levels in the pond, largely based on the level of snowfall. The only anticipated LAD was during the summer to lower the impounded water to provide the necessary 3-foot freeboard and continuing in the summer months until the TSF has been emptied of tailings to dispose of any water remaining in the pond after all tails have been recovered and prior to repairing or replacing the liner.

The site will be reclaimed according to a site plan approved by the Bureau of Land Management (BLM) and the State of Alaska. A bond of approximately $3.6 M exists, which will be adjusted as directed by the BLM and the State of Alaska.

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Tables

Figures

1 Introduction

1.1 Purpose

The purpose of this document is to present a Plan of Operations (POO) and Reclamation Plan for the Nixon Fork Mine project as partial fulfillment of the requirements under 43 CFR 3809. The reclamation plan is a stand-alone document incorporated by reference. The Nixon Fork Mine is an existing facility.

While this document is prepared for regulatory purposes, it should be recognized to contain “forward looking statements”. Other than statements of historic fact, ***it presents a plan that may not prove to be accurate .*** Actual results and future events could differ from those anticipated in this document due to several factors outside of the company’s control, including but not limited to fluctuations of metal prices and market demand, inflation of operating costs, and availability of capital to fund the activities described. Therefore it should be interpreted as the company’s best projection of near term activities at site, prepared in good faith to satisfy the needs of the BLM and State agencies. The POO will be amended when facility changes are required.

1.2 Ownership

MCRI is the current lessee and operator of the Nixon Fork Mine. The lessor and owner of the claims is the Mespelt & Almasy Mining Company LLC (MAMC). The lease is exclusive and unrestricted ten year term renewable upon written notice from the lessee. The primary aspect of the lease is that it provides the lessee with exclusive mining rights in exchange for an NSR payment, which has a minimum amount of $3,000 per month.

The lease specifically excludes portions of the property as “personal property”, which is listed as Exhibit D. This list includes the cabins and stamp mill and surrounding areas. MCRI has respected MAMC’s ownership and maintained strict conformance to the terms of the lease with regard to these areas for the entire duration of the lease. No industrial work of any kind has been performed in this section of the claim by MCRI.

MCRI has changed ownership twice since the last POO:

- On February 12, 2009 Pacific North West Capital announced that it had exercised an option to acquire from St. Andrew Goldfields Ltd. all of the outstanding shares of MCRI.

- On August 13, 2009, Fire River Gold Corp. announced that it had exercised an option to purchase a 100% interest in MCRI and the Nixon Fork Project from Pacific North West Capital.

1.3 Location and Access

The mine site is located approximately 32 miles northeast of McGrath and 8 miles north of Medfra in west central Alaska (see Figure 1). It is not road accessible; access to site is by charter plane flown out of Anchorage, Fairbanks, or McGrath. The property has a 4200 ft long airstrip, which is sole source of access to site for all workers, equipment, and supplies.

An old road exists connecting the mine to Medfra, which is situated on the Kuskokwim River and available to seasonal barging. In the absence of facilities in Medfra and given the state of the trail and limited operating window for river operations, ***MCRI does not consider barging a viable alternative for transportation to site***

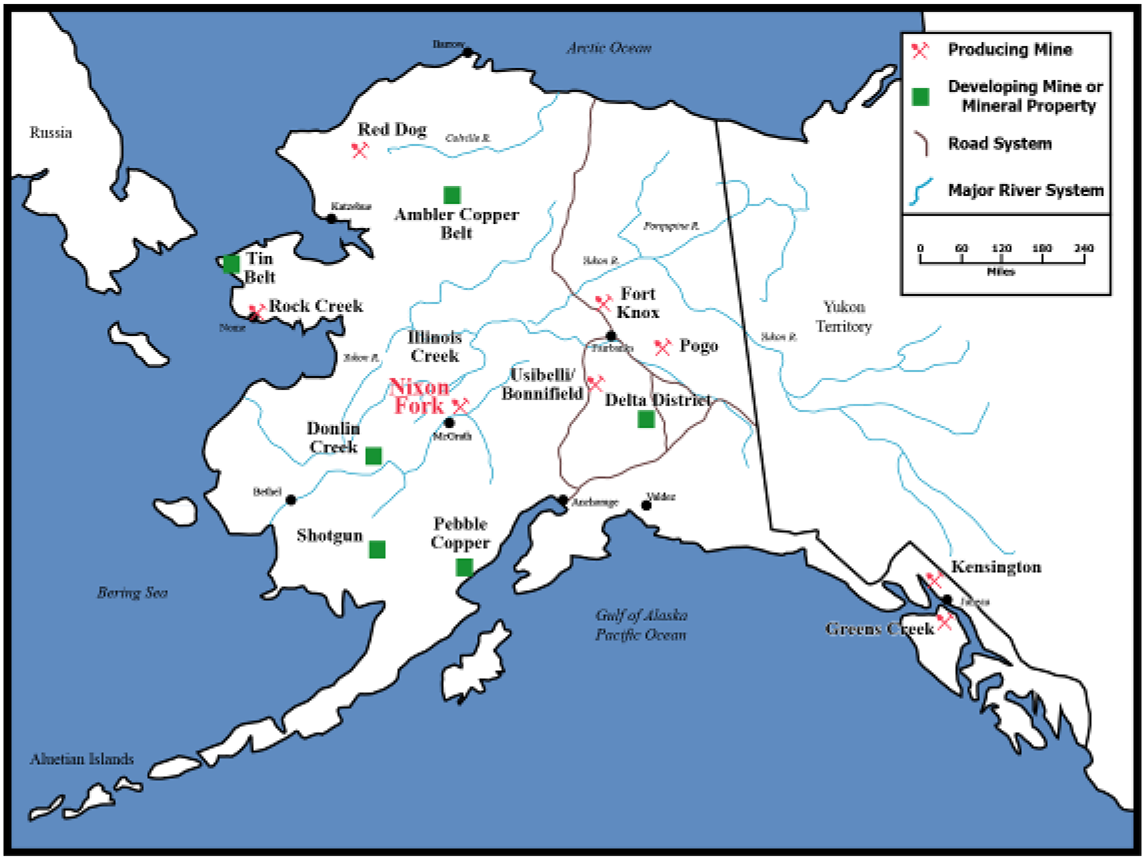

Figure 1: Nixon Fork Mine Project Location

1.4 Claims

The Nixon Fork property consists of 95 unpatented federal lode and 15 placer claims (2,200 acres) and an additional 77 State of Alaska mining claims (8,800 acres) located in Township 26 South, Ranges 21 and 22 East, Kateel River Meridian (Figure 1). List of claims is presented in Exhibit A. The mine is located in the Medfra A4 quadrangle and is centered at 63^{o} 14'N, 154^{o} 46'W, 56 km northeast of McGrath, central Alaska. The claims are registered with the U.S. Bureau of Land Management and the Alaska Division of Mining, Land and Water Management (see Figures 2 through 5).

With two minor exceptions, the mine site and all known mineral resources are on federal mining claims in Range 21 East that are State selected but remain under the jurisdiction of BLM. The exceptions are: 1) a switchback on the Mystery Creek mine road and 2) approximately 1.1 acres of the TSF (12% of its footprint) which are located on State

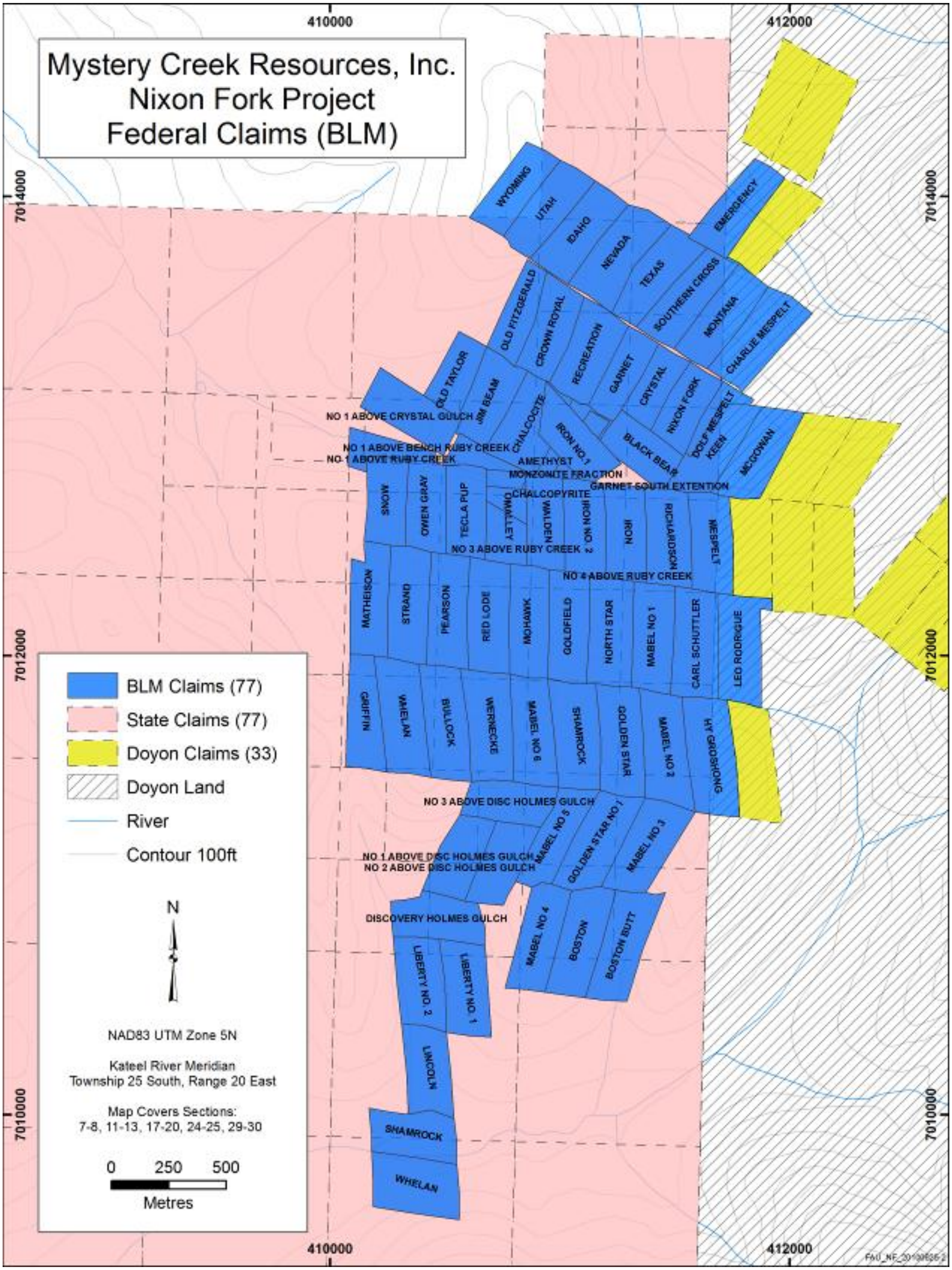

Figure 2: BLM Claims, Nixon Fork Mine

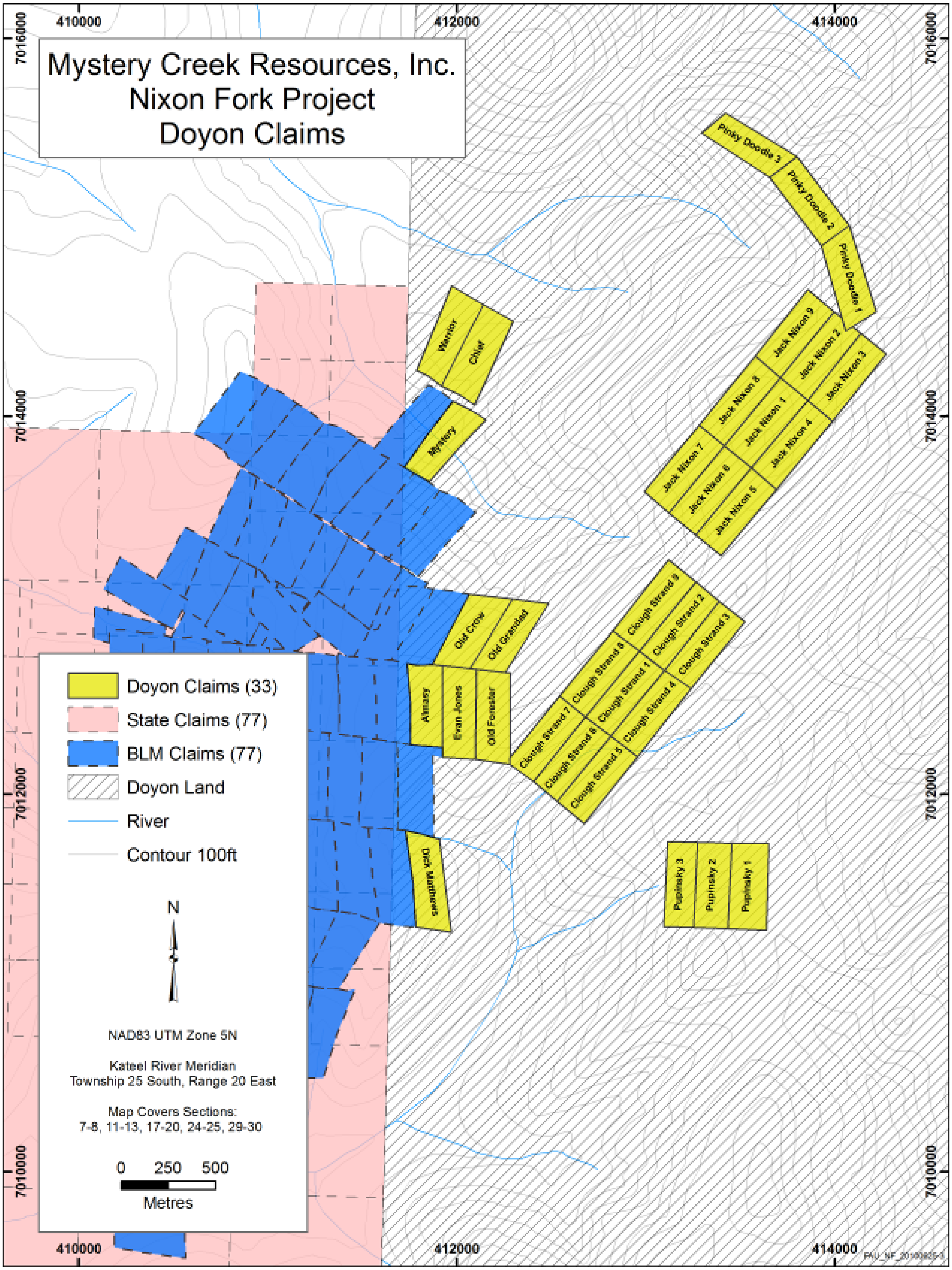

Figure 3: Doyon Claims, Nixon Fork Mine

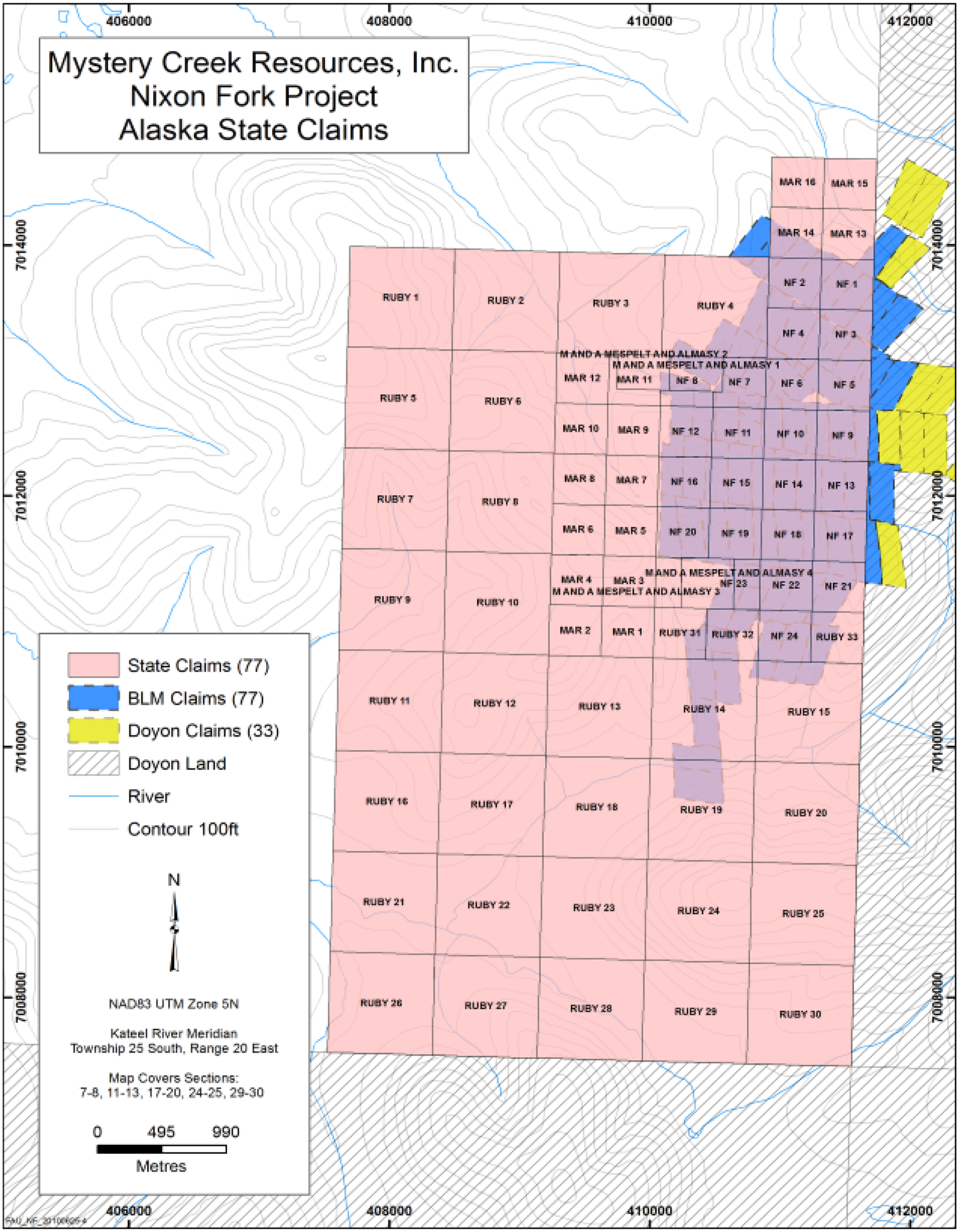

Figure 4: State Claims, Nixon Fork Mine

claims. Potential additional resources exist immediately to the east in Range 22 on federal claims on lands selected by Doyon, Ltd., the native regional corporation for interior Alaska, and on private land owned by Doyon, Ltd. MCRI does not currently have an agreement to explore and/or mine minerals on private Doyon lands.

1.5 History

The site has a long mining history. There are two modern era production phases: (NGI) from 1995 to 1999 and MCRI under St. Andrews Goldfields Ltd. (SAS) in 2007. Both campaigns used gravity and flotation as the mineral recovery methods. Table 1 shows the production from the mine from these two campaigns.

Table 1: Production at the Nixon Fork Mine (1995-2007)

Mining	Tonnes	Grade		Mined		Recovered		Recovered	
Period	Mined	Au (g/t)	Au (opt)	Au (g)	Au (oz)	Au (g)	Au (oz)	Cu (kg)	Cu (lbs)
1995-1999	122,381	42.0	1.22	5,136,118	165,130	4,284,473	137,749	952,544	2,100,000
2007 (6 mos)	18,105	17.1	0.50	309,635	9,955	210,726	6,775	35,672	78,644
Total	140,486	38.8	1.13	5,445,753	175,085	5,445,753	175,085	988,216	2,178,644

This section has been divided into two sections: Pre-August 2005, representing the history prior to the most recent POO, and August 2005 to Feb 2009, representing the period of SAS operations under the existing POO.

1.5.1 <u>Before August 2005</u>

The area surrounding the present day Nixon Fork Mine was first staked in 1917. During the next two years a few small ore bodies were developed. In 1919 the most promising claims were taken over by the Treadwell Yukon Company. In 1920 Treadwell built a ten-stamp mill and operated the claims until 1924. Shortly thereafter seven claims at the head of Ruby Creek, including the stamp mill, passed into the hands of the Mespelt brothers who conducted small-scale operations into the early 1950s. Since then several other small, intermittent operations have occurred. In addition to hard rock mining, placer mining occurred in Ruby and Hidden creeks. Remains of the old stamp mill and several cabins remain on the property as well as the mine tailings from the stamp mill operations.

The Nixon Fork Mine, as it exists today, was placed in operation in 1995 by NGI. A Plan of Operations was submitted to BLM in February 1995 and an EA was completed resulting in a finding of no significant impact (FONSI). All state and federal permits were received by NGI prior to beginning construction in mid-1995.

Production activities at the Nixon Fork Mine began in the fall of 1995 and ceased in May of 1999 when Real Del Monte Mining Corporation (parent company of NGI) and its subsidiaries were voluntarily placed into bankruptcy. A total of approximately 135,000 short tons of ore were produced and processed by the Nixon Fork facility while in operation. After filing for bankruptcy in the U. S. Bankruptcy Court in Delaware, the property went into receivership in mid-1999. The trustee of the U.S. Bankruptcy Court subsequently relinquished rights to the mining leases held by Nixon Fork Mining, Inc., and later legally abandoned ownership of the inventory, equipment, and fixtures at the site. The rights to the site and facilities were returned to the federal mining claimant

MAMC by court action. A caretaker was retained by MAMC in December 1999 to protect the mine and equipment. The “lights at the mine were turned off” to await continuation of mining under a new operator.

MCRI leased the property from MAMC in early 2003. In the spring, MCRI submitted an annual Plan of Operation for 2003/2004 to BLM, ADNR, and ADEC calling for a phased return to full production at the mine. An annual plan of operation for 2004/05 was also submitted to the agencies.

1.5.2 August 2005 to Feb 2009

The last Plan of Operations was submitted in August 2005, at which time MCRI was a wholly owned subsidiary of SAS. From 2006 to 2007, SAS also conducted a thorough facilities upgrade, replacing the power plant and approximately doubling the size of the camp. At this time SAS also designed, procured the equipment for, and partially installed a 250 tpd CIL circuit. This was located in an expansion of the sprung structure that housed the existing gravity and flotation mill.

MCRI put the mine back into production in 2007 and operated it for five months, ceasing operations in July 2007. On October 10, 2007, SAS announced that it had suspended operations at the Nixon Fork Mine pending additional definition drilling and resource modeling. A 9400 m drill program was conducted in 2007 and 2008. Results were never released and the resource estimate was never updated to incorporate this additional drilling. The mine was placed on care and maintenance at the close of the drill program in early 2008.

1.6 Current Status and Short Term Plans

The Nixon Fork Mine is currently being operated under the existing 2011 Plan of Operations (BLM reference numbers AA087162 and AA086337) and the 2012 Waste Management and Temporary Water Use Permits (DEC# 2012-DB0013).

Mining is ongoing at the Crystal Mine at a planned rate of approximately 250 tpd. Gold is being recovered from the mill using gravity, flotation and CIL methods. Tailings from the operation are being disposed of in the existing new FTDS.

The Filtered Tailings Disposal Site (FTDS), which was started by prior operators as a collection system with a percolation pond, was voluntarily converted to a lined facility with a collection pond in the summer of 2011, using 60 mil liner. It is ready for use.

The company intends on continuing operations through the winter. In the spring tailings from the TSF will be added to the mill as supplemental feed for the CIL circuit.

At present the mine employs approximately 110 workers and has an on-site complement of approximately 75 workers.
Figure 5 shows a general site plan establishing the locations of all primary facilities and infrastructure on the property. As the site is quite rugged, two benches were cut into

hillsides to house the property facilities (see Figure 6). The only alteration since this photograph is the addition of a core storage tent west of the offices.

The upper bench contains an 85-person camp. The lower bench is west of the camp bench and much larger. It contains the processing plant building, including the gravity, flotation, and CIL circuits (see photo in Figure 7); an ore stockpile adjacent to the crusher area south of the mill; the power plant, including a heat recovery system, main compressor, and air receiver tank; a refuelling area south of the power plant; a maintenance and warehouse complex; the mine offices, including the assay lab and mine dry; and several shipping containers used for storage. During the course of the geological re-evaluation work from summer 2009 to winter 2010, all existing viable drill core was collected and moved north of the offices on the mill bench. An existing storage shed was relocated to this area and a new core storage tent was also erected to house existing and new core.

Other mine site facilities include the fuel storage (at the north end of the runway), several variously-sized lay down areas, and several small portable buildings housing equipment, parts, and supplies.

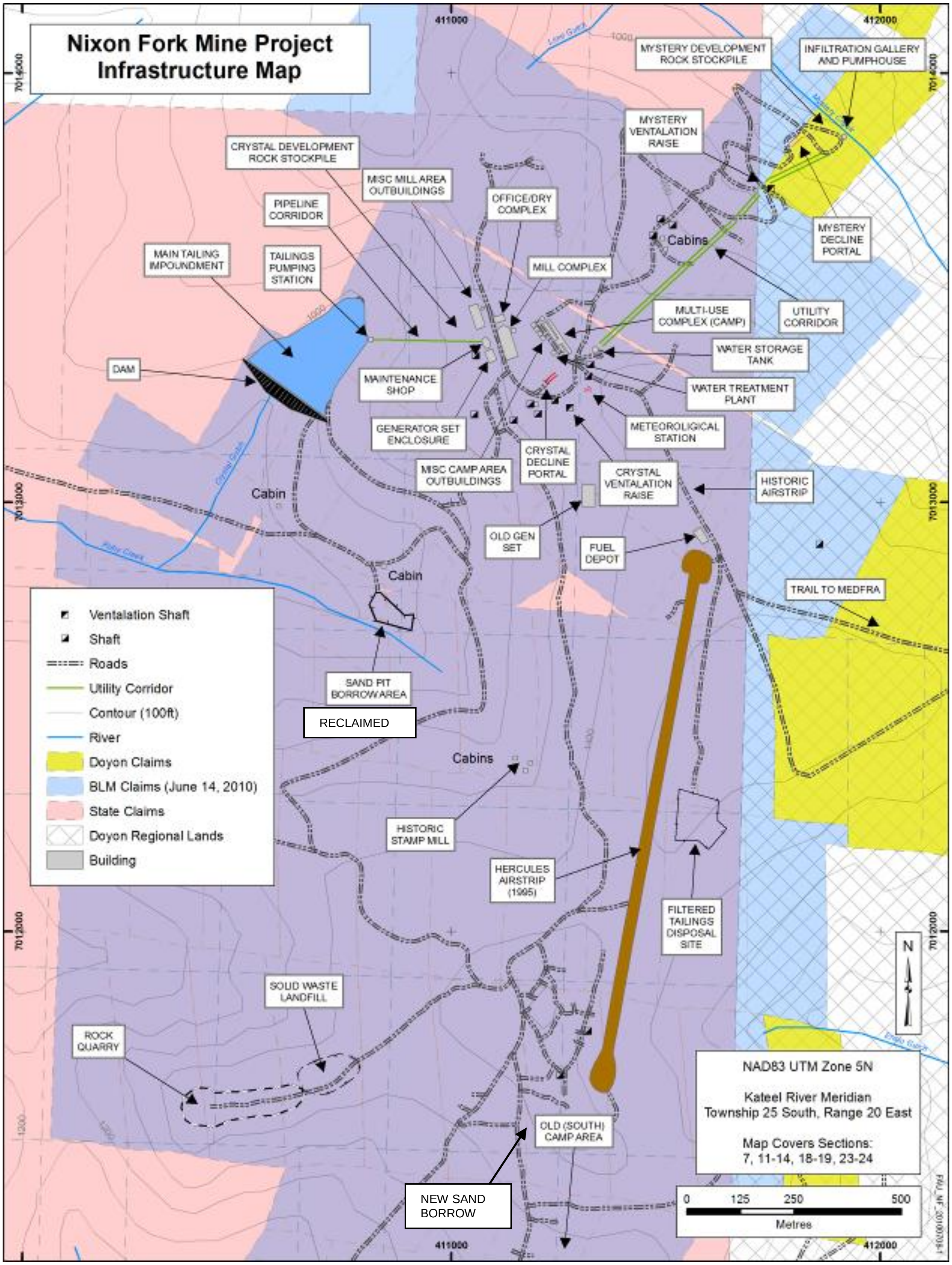

Figure 5: Locations of Primary Facilities, Nixon Fork Mine

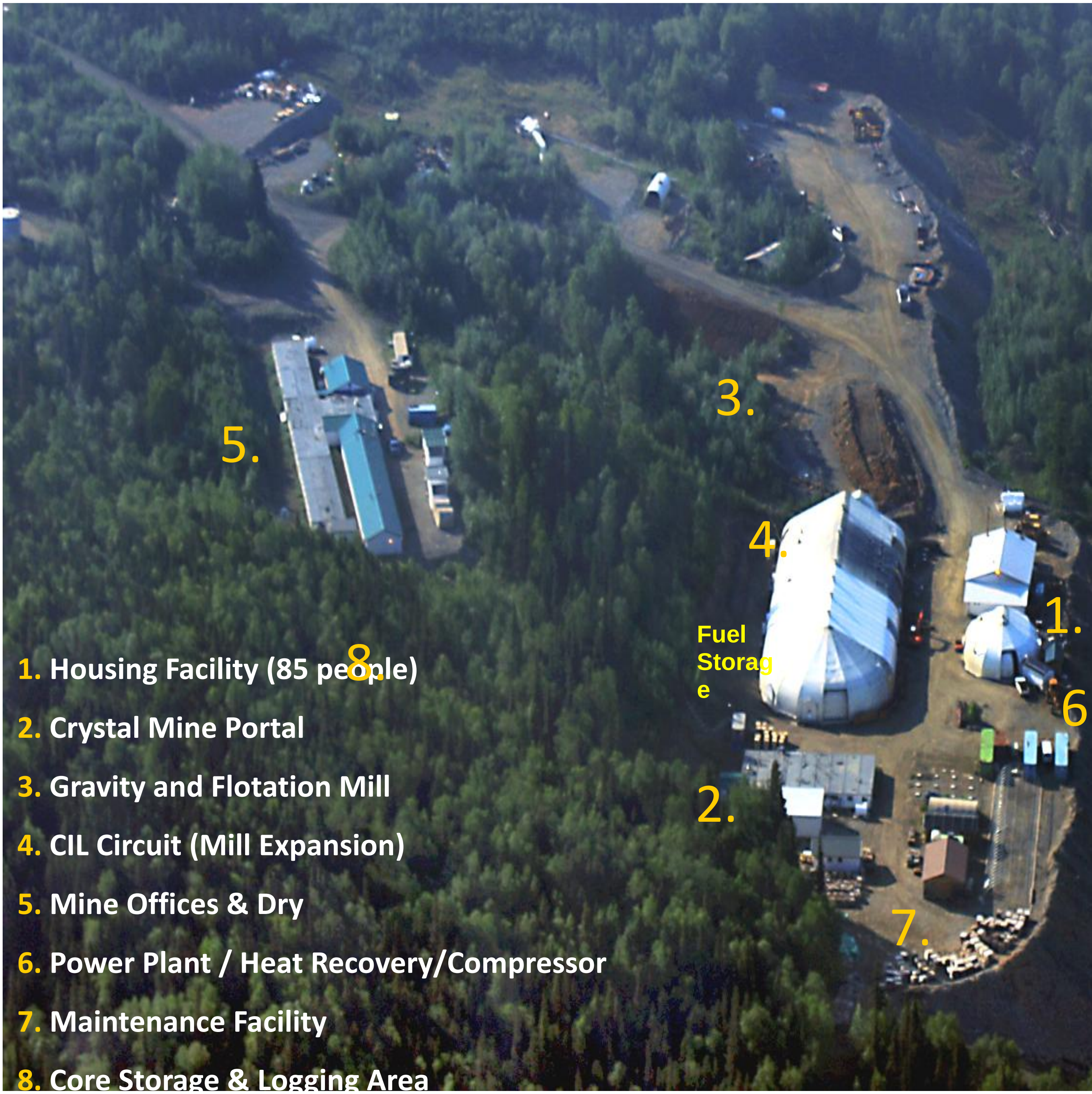

Figure 6: Aerial Photo of the Nixon Fork Mine (Looking South)

Figure 7: Gravity and Flotation Mill (right) and CIL Circuit Area (Left)

2 Applicant Information

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

2.1 Mining Claims

The mining claims associated with the Nixon Fork Mine Project are shown in Figure 2 (BLM), Figure 3 (Doyon), and Figure 4 (State). A complete listing of those claims is contained in Appendix A.

2.2 Corporate Information

Business Name:	Mystery Creek Resources, Inc.
Address:	Suite 1 – 6400 South Air Park Place, Anchorage Alaska
Telephone:	907-243-2220
FAX:	907-243-2225
President:	Blane W. Wilson
Secretary:	J.P. Tangen
Address:	Attorney at Law 1600 A Street, Suite 310 Anchorage, Alaska 99501-5148
Telephone:	907-222-3985

2.3 Corporate Officer Completing Application

Name.	Blane W. Wilson
Title:	President & CEO
Telephone:	604 261 0580

2.4 Designated Facility Contact Person

Name.	Will Beach
Title:	Mine Manager
Telephone:	907 433 2408

2.5 Alaska Registered Agent

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

3 Plan of Operations (POO);

This 2011 Plan of Operations covers five years of operations beginning January 1, 2011 through December 31, 2015. As per the 2005 POO, there are two sources of future production incorporated into this 2011 POO: 1) the resumption of underground mining, and 2) the recovery of gold from tailings using a CIL circuit.

MCRI made a production decision on the mine and brought the mine back into production in July 2011.

The major distinctions between this 2011 POO and the 2005 POO are:

1. The CIL circuit designed, procured, and partially installed by SAS has a production capacity of 250 tpd, not 350 tpd as per the 2005 POO. As this rate does not allow for a timely depletion of the tailings pond in conjunction with ongoing mining operations, an expansion of the CIL circuit to 350 tpd is anticipated in the production schedule (2012).
2. SAS did not install an electrowinning circuit on site, as per the 2005 POO; it will be included in this 2012 POO. Gold recovered from the gravity and cyanidation circuits will be recovered as doré. Copper concentrate will still be made that will also contain gold and silver.

3. Fuel bladders were replaced as the main diesel storage with a fuel farm comprised of eight x 9400 gallon steel tanks in 2007. With the anticipation to expand this facility in the future.

4. The camp was expanded from a capacity of 45 single units to 85.

3.1 Operations Summary

The following is an overview of MCRI's planned mining and milling activities.

Project Life	Ten years plus one year of reclamation, based on a resource of approximately 240,000 tonnes grading 25 g/t in the mines and 140,000 tonnes grading 7 g/t in the existing tailings pond. Note that the mine has no declared reserves, as a feasibility study has not been prepared.
Operating Period	365 days per year mining and milling.
Mining Method	Underground using various stoping methods, including mechanized cut-and-fill, shrinkage, and sub-level open stoping.
Development Rock	An average of approximately 200 tonnes per day (tpd), approximately 50% of which will be stored underground. Approximately 50% will be hauled

	outside the mine and dumped on the existing waste rock dump.
Production Rate	A mining rate of approximately 150 tpd producing approximately 4 to 5 tpd gold/silver/copper concentrate is planned. The tailings will be leached on site to produce loaded carbon pellets, which will be stripped on site to produce doré, which will be comprised of both gold (70%) and silver (30%). The CIL circuit will be operated at 250 tons per day, augmenting fresh tailings with reclaimed tailings from the TSF during the non-frozen months until the TSF is emptied. The TSF will not be emptied over the duration of this POO.
Milling Method	The mined ore will be crushed, ground, its free gold recovered by gravitational methods, and then passed through a flotation circuit. The tailings will then be leached. In the non-frozen months, the tailings will be combined with existing TSF tailings and the combined tails will be cyanide leached. Tails mined from the TSF will be pumped as slurry up the hill to the mill. The combined tails will be leached for 20 hours and the total CIL tailings stream will then be treated in a cyanide destruct system which will then remove the cyanide from the final tailings solids. The tailings will then be filtered and hauled by truck to the FTDS. The filter discharge water will be returned to the process water system. The loaded carbon pellets will then be passed through a carbon stripping circuit so that it too may be reused. Metal recovered from the carbon stripping will be recovered by electrowinning and sent from site to a refinery as a gold/silver doré.
Filtered Tailings Disposal	Mill tailings will be filtered and dry stacked for permanent disposal on the 13.5 acre FTDS east of the airstrip (see Figure 8) that has a permitted capacity of 302,500 tonnes and a maximum daily addition of 350 tonnes per day
Tailings Storage Facility	The tailings pond currently holds approximately 154,000 tonnes of tailings. MCRI will continue to use the tailings pond for storage and process water recycling during the first two months of operations. All water lines to the TSF have been severed and capped so no water can be sent to the TSF from the mill until further notice. On commissioning the drystack and tailings filtration system, all tailings will be sent to and stored at the FTDS. Impounded tailings will then be transported to the mill as a slurry

	or solids for recovery of gold through cyanidation until the pond is emptied. Once emptied and prior to reuse, engineered drawings and plans for the TSF shall be submitted to the ADEC and ADNR for approval
Water Supply	MCRI is permitted by the State to withdraw 54,800 gallons per day (gpd) from Mystery Creek. Actual withdrawal is estimated at 10,000 gpd.
Power Supply	Three 820 kW diesel generators – two in service and one as backup.
Transportation	Personnel, supplies, and fuel will be transported by air using the existing 4200 ft airstrip. Onsite travel is by pickup, four-wheel ATVs and snow machines.
Fuel Storage	Eight 9400-gallon steel fuel storage tanks are located at the north end of the airstrip. A 1000-gallon tank is also located in this main fuel storage at the airstrip, and is used to store gasoline. The main storage tanks are plumbed to feed smaller tanks located near the camp, mill and power plant by gravity flow via buried lines. These smaller tanks include: • a 1,000-gallon diesel day tank located adjacent to the camp on its south end • a 5000-gallon tank located south of and adjacent to the power plant, which is used to store #1 diesel for refuelling mobile equipment, and • a 2000-gallon tank which stores low sulphide diesel.
Work Force	Approximately 75 personnel on site (total payroll of approximately 100).
Housing	Year-round, 85-person single residence camp.
Exploration	The 2012 surface exploration program will have a total impact of approximately 10 acres for trenching plus drill pads and minor spur trails off existing site roads. Five to ten acres of surface exploration may occur in each succeeding year.

3.2 Production Forecast and Mine Life

A Life of Mine (LOM) production forecast is shown in Table 2. The forecast covers a period of nine years from 2011 to the end of 2018. This table incorporates the mining of existing resources that have mining plans associated with them, resources that have not yet been planned, and the “notional” resources that are at present do not have any geological data to prove their existence, but are projected based on the usual ability of mining operations to extend their lives by additional exploration.

3.3 Site Access

Personnel, fuel, supplies and equipment will be transported by air to the site. Mineral concentrate and doré will be transported by air out, usually as a back-haul component of fuel flights. The current airstrip is adequate for C-130 Hercules aircraft. The airstrip is approximately 4,200 ft long with a gravel surfaced runway approximately 85 ft wide. Total cleared length is 4,600 ft. On each side is an additional cleared, obstruction-free zone for a total cleared width of approximately 250 ft. At present aircraft operations are up to two charter/ crew change flights per week and one fuel flight every two weeks. During expanded operations, this is expected to increase to between five and eight aircraft flights per week.

Since active exploration commenced in the mid-1980s, the existing approximately five-mile mine area road network has served as the spine from which access has been developed to the various drill, trench, and excavation areas. Transportation within the mine area is by the existing road network (most of which is shown on Figure 5) using pickups, four wheel ATVs and snow machines.

Table 2: Life of Mine Production Forecast 2011 to 2018

Stope	Invenotry					2011 Schedule				2012 Schedule																		
Name	Tonnes	Grade	Type	%	Tonnes	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2013	2014	2015	2015	2016	2017	2018
G1	8,000	14.6	Dev	11%	900		900																					
		14.6	Prod	89%	7,100			1,500	1,500	1,500	1,500	1,100																
G2	3,560	15.0	Dev		0																							
		15.0	Prod	100%	3,560	1,500						400	1,500	160														
S1	9,975	17.2	Dev	14%	1,425	1,000	425																					
		17.2	Prod	86%	8,550			1,000	1,000	1,000	2,000	1,500	1,500	550														
S2	7,854	12.5	Dev	10%	785		785																					
		12.5	Prod	90%	7,068	1,500	1,215	2,000	1,500	853																		
S3	6,336	20.3	Dev	12%	750		750																					
		20.3	Prod	88%	5,586				1,000	1,600	1,500	1,486																
S4	18,651	14.8	Dev	10%	1,865	500	500	215				650																
		14.8	Prod	90%	16,786								1,000	1,500	1,500	1,100	1,100	1,150	1,000	2,000	2,000	4436						
S5	10,761	21.8	Dev	10%	1,076								500	576														
		21.8	Prod	90%	9,685									750	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1000	935					
S6	11,784	19.5	Dev	10%	1,178								500	678														
		19.5	Prod	90%	10,605									750	1,000	1,000	1,000	1,000	1,250	2,000	1,000	1605						
3000X	2,022	26.7	Dev	30%	606								243	363														
		26.7	Prod	70%	1,415										300	400	400	315										
3000 Deep	40,500	18.7			40,500															500	750	5,000	5,000	10,000	10,000	9,250		
3300 Deep	33,300	24.8			33,300														250	1,000	1,500	15,000	15,000	550				
Mystery Mine	58,160	14.9			58,160																		5,500	7,000	17,000	5,000	20,000	3,660
Tailings	140,000	7.6			140,000										3,000	3,000	3,000	3,000	3,000			18,000	18,000	18,000	18,000	18,000	25,000	10,000
Notional: *3000 Deeper*	*50,000*	*18.7*			*50,000*																			*1,950*	*2,500*	*12,590*	*20,000*	*12,960*
3300 Deeper	*50,000*	*24.8*			*50,000*																			*5,000*	*15,000*	*25,000*	*5,000*	
3550	*150,000*	*25.0*			*150,000*								*500*	*500*	*500*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*1,000*	*45,000*	*45,000*	*45,000*	*7,500*			
3550 Deep	*50,000*	*25.0*			*50,000*																			*2,500*	*20,000*	*20,000*	*7,500*	
Total	650,902	16.6			650,902	4,500	4,575	4,715	5,000	4,953	5,000	5,136	5,743	5,827	7,300	7,500	7,500	7,465	7,500	7,500	7,250	90,041	89,435	90,000	90,000	89,840	77,500	26,620
					tpd	150	153	157	167	165	167	171	191	194	243	250	250	249	250	250	242	250	248	250	250	250	215	74
					grams (x 1000)	66	68	67	78	82	87	88	103	113	107	116	116	115	115	150	147	1,846	1,830	1,790	1,683	1,740	1,173	373
					ounces	2	2	2	3	3	3	3	3	4	3	4	4	4	4	5	5	59	59	58	54	56	38	12
					g/t	14.6	14.9	14.3	15.6	16.6	17.3	17.0	17.9	19.4	14.6	15.5	15.5	15.4	15.3	19.9	20.3	20.5	20.5	19.9	18.7	19.4	15.1	14.0
					opt	0.43	0.43	0.42	0.46	0.48	0.51	0.50	0.52	0.57	0.43	0.45	0.45	0.45	0.45	0.58	0.59	0.60	0.60	0.58	0.55	0.56	0.44	0.41
					Planned Resources	2,115	2,186	2,160	2,509	2,641	2,785	2,815	2,900	3,233	2,301	2,197	2,197	2,147	1,962	2,908	2,281	3,821	656	0	0	0	0	0
					Resource Oz	0	0	0	0	0	0	0	0	0	733	733	733	733	932	1,098	1,648	19,370	21,998	14,199	18,540	12,353	15,667	4,193
					Notional	0	0	0	0	0	0	0	402	402	402	804	804	804	804	804	804	36,170	36,170	43,340	35,571	43,589	22,049	7,798
					% Planned	100%	100%	100%	100%	100%	100%	100%	88%	89%	67%	59%	59%	58%	53%	60%	48%	6%	1%	0%	0%	0%	0%	0%
					% Resource	0%	0%	0%	0%	0%	0%	0%	0%	0%	21%	20%	20%	20%	25%	23%	35%	33%	37%	25%	34%	22%	42%	35%
					% Notional	0%	0%	0%	0%	0%	0%	0%	12%	11%	12%	22%	22%	22%	22%	17%	17%	61%	61%	75%	66%	78%	58%	65%

Figure 8: Aerial Photo of the FTDS, Airstrip, (looking SW)

BLM has authorized the closure of the site to public use due to mining operations, underground blasting and the presence of open, old abandoned mine shafts. The boundary is appropriately posted. Anyone establishing a need to cross the property will be allowed to do so under escort of an MCRI employee. Given the remote location and difficulty of surface transportation, few, if any, crossing requests are expected. The airstrip will be available for emergency and official governmental agency aircraft operations.

3.4 Mining

3.4.1 The Deposits

Mineral resources are currently in several deposits. The southernmost developed deposit (Crystal) consists of both oxide and sulfide ores. The northernmost developed deposit (Mystery) consists mainly of sulfide ore. The Crystal and Mystery deposits have been accessed by separate declines. South of the Crystal and between the Crystal and Mystery deposits, several other mineralized deposits are known to exist. These will be the focus of exploration in the 2012 summer season and beyond.

It is anticipated that through the course of this five year term, ore will be supplied by both existing mines and possibly additional mines as proven by exploration drilling. It is also anticipated that a LOM plan for the mines will contain a connection between the Mystery and Crystal mines early in the schedule to allow for underground haulage of Mystery ore through the Crystal portal, provide adequate drill platforms for the Southern Cross and J5A deposits, provide secondary egress for both mines, combine ventilation systems, and allow for exploitation of any economically viable resources found between the two mines.

3.4.2 Mining Methods

The mining process includes development and stope mining. All ore mined in the stopes will be hauled to the mill.

Generally shrinkage stoping, mechanized cut and fill, or sublevel stoping methods will be used. In the mining process the ore will be drilled and blasted, loaded into 10 to 20-ton trucks with underground loaders, hauled to the surface, and transported to either the mill crusher or placed in an existing ore stockpile located adjacent to the mill.

Mining will be accomplished with small scale diesel trackless equipment, most of which already exists at site, some of which is being actively procured.

3.4.3 Mine Development Rock

The ore in the Crystal Mine occurs in exoskarn material formed in limestone. The quartz monzonite stock to the east of the orebodies served as the “heat source” in the formation of these skarn ore bodies. In some, but not all cases, the quartz monzonite in immediate proximity to the altered limestone is altered and soft. Underground workings, wherever possible, will be developed in the more competent limestone.

The development rock will either be retained as loose waste fill in the mine, or will be transported to the surface and disposed of in existing development rock dumps immediately southwest of the Crystal decline portal. The outlined Mystery development rock dump area shown in Figure 5 provides an adequate area for additional material if it is developed from the Mystery Portal. Approximately 150,000 tons of development rock will be placed on the Crystal surface dump during the five-years of operations. Development rock will cover approximately 6.7 additional acres. No wetlands are involved with the development rock dump. Approximately 20,000 tons of material will be placed on the Mystery Surface Repository, MCRI will submit waste dump development plans to the Agencies for review and approval.

The main rock types mined at Nixon Fork are skarn (which comprises the ore and is milled), limestone, basalt, and quartz monzonite. The limestone does not generally contain sulfides. In rare instances limestone has been found which contains minute sulfide veins or disseminated sulfides never exceeding 2%. The basalt never contains sulfides.

The quartz monzonite may contain sulfides, but this too is rare (as demonstrated by tens of thousands of feet of core). In the areas where the monzonite contains sulfides it is in either veins or minute specks with the total sulfide content in these rocks from 2-5% on the average. Due to generally poor ground conditions for the monzonite near the limestone-monzonite contact, the majority of the development will be located in the limestone. In over 2.5 miles of development at Nixon Fork, less than 4% of it has been in monzonite. Some of these areas have caved, and as such, all efforts will be made to avoid this sort of rock in the future.

SGS Lakefield Research Limited performed meteoric water mobility procedure (MWMP) on the two main types of development rock, limestone and quartz monzonite. Samples were collected at the mine in February 2004 (SGS, 2004). The MWMP influent pH was 5.75 and 5.50, respectively. The extraction pH was 7.46 and 7.12. This confirms the 1993 work by Hazen showing the neutralization potential is high for the rock at Nixon Fork. Hazen reported oxide tailings had an acid generating potential (AP) of <0.1 and a neutralization potential (NP) of 331. While the sulfide tailings result was not as dramatic, the corresponding data was 30.9 and 326. (1995 Environmental Assessment)

Waste rock with higher sulphide content (> 5%) will be retained in the mine for use as loose waste backfill. This determination will be made visually by the mine geologist, and periodically calibrated by assay. A "catalogue" of rocks with varying sulphide content will be assembled to aid in this visual determination and to homogenize practices amongst the geologists and help with the training of new staff. Samples collected from the waste rock as part of the approved monitoring will be reviewed to ensure that the 5 percent sulphide content does not result in an NP/AP ratio less than 3.

The MWMP results presented in Table 3 show that the metal leaching potential of the develop rock is low. The metal concentrations in the MWMP leachate from these samples were detected at concentrations below the strictest potential criterion including the federal maximum contaminant levels (MCL) for drinking water, or were not detected (below detection limit). The exception is that the alkalinity result for the monzonite sample MWMP leachate was below the alkalinity minimum. The Weak Acid Dissociable (WAD) cyanide detection limit is elevated above the aquatic criterion; however, cyanide has reportedly not been used in the mill process at the mine in the past. For additional data see Volume II, Appendix E.

The nitrate level at 9.77 mg/l is close to the drinking water criteria of 10. Blasting will be managed to minimize the amount of unused blasting materials during each blast, reducing the amount of nitrate in the development rock.

The comprehensive monitoring plan will include additional sampling with MWMP and Acid Base Association (ABA) analysis of rock placed in the development rock dump. If the development rock monitoring results indicate the NP/AP ratio is unacceptable, NPR≤3[*] material with NPR≤3 will be considered potentially acid generating, corrective action will be developed and proposed to ADEC and ADNR. Considering the above NP/AP ratios this is not expected to occur.

Groundwater monitoring at the development rock disposal site will be difficult using traditional monitoring wells since the water table is likely at a depth below grade of 770 feet (235 meters) within the underlying bedrock. However, MCRI will monitor storm water runoff and will evaluate the feasibility and effectiveness of installing a monitoring network to capture and sample pore water in the unsaturated zone near the edges of the development rock disposal area. This will be included in the comprehensive monitoring plan.

[*] Guidelines For Metal Leaching and Acid Rock Drainage at Minesites in British Columbia, William A. Price and John C. Errington, Ministry of Energy and Mines, August 1998

Table 3: Meteoric Water Modeling Procedure Results for Development Rock

Parameter	**Units**	**Strictest Potential Regulatory Criterion**		**Limestone**	**Monzonite**
Initial Moisture	%			<0.5	< 0.5
Final Moisture	%			0.9	0.9
Sample weight	g			5000	5000
Influent pH	s.u.			5.75	5.50
Extraction Time	hours			24	24
pH	s.u.	6.5/8.5(acceptable)	Aquatic	7.46	7.12
Alkalinity	mg/L as $CaCO_3$	20 (minimum)	Aquatic	24	**11**
Bicarbonate	mg/L as $CaCO_3$			24	11
Aluminum	mg/L	0.087 [a]	Aquatic	0.02	0.02
Antimony	mg/L	0.006	Drinking	< 0.006	< 0.006
Arsenic	mg/L	0.010	Drinking	< 0.005	< 0.005
Barium	mg/L	2	Drinking	0.002	0.002
Beryllium	mg/L	0.004	Drinking	< 0.004	< 0.004
Bismuth	mg/L			< 0.0003	< 0.0003
Boron	mg/L	0.75	Irrigation	0.07	< 0.01
Cadmium	mg/L	0.00013 [b]	Aquatic	< 0.0001	< 0.0001
Calcium	mg/L			12.8	3.36
Chloride	mg/L	230	Aquatic	9.1	<2
Chromium	mg/L	0.100 [c,b]	Drinking	< 0.001	< 0.001
Cobalt	mg/L	0.05	Irrigation	< 0.0003	< 0.0003
Copper	mg/L	0.0039 [b]	Aquatic	0.0013	0.0010
Cyanide WAD	mg/L			< 0.01	< 0.01
Fluoride	mg/L	1	Irrigation	0.06	0.06
Gallium	mg/L			< 0.02	< 0.02
Iron	mg/L	1	Aquatic	< 0.02	< 0.02
Lead	mg/L	0.00086 [b]	Aquatic	0.0003	0.0005
Lithium	mg/L	2.5	Irrigation	< 0.005	< 0.005
Magnesium	mg/L			6.53	0.72
Manganese	mg/L	0.050	Irrigation	0.002	0.014
Mercury	ppm	0.000050	Aquatic	< 0.0001	< 0.0001
Molybdenum	mg/L	0.01	Irrigation	0.0017	0.0007
Nickel	mg/L	0.022[b]	Aquatic	0.002	0.004
Nitrate	mg/L-N	10	Drinking	9.77	0.66
Nitrate + Nitrite	mg/L-N	10	Drinking	9.77	0.66
Nitrite	mg/L-N	1	Drinking	<0.6	< 0.6
Phosphorous	mg/L			< 0.01	< 0.01
Potassium	mg/L			0.83	0.57
Scandium	mg/L			< 0.01	< 0.01
Selenium	mg/L	0.0046 [d]	Aquatic	< 0.004	< 0.004
Silver	mg/L	0.00064 [b]	Aquatic	< 0.001	< 0.001
Sodium	mg/L			7.73	0.41
Solids (Total Dissolved)	mg/L			100	<30
Strontium	mg/L			0.138	0.021
Sulphate	mg/L	250	Drinking	<5	<5
Thallium	mg/L	0.002	Drinking	< 0.0002	< 0.0002
Tin	mg/L			< 0.001	< 0.001
Titanium	mg/L			< 0.005	< 0.005
Vanadium	mg/L	0.1	Irrigation	< 0.002	< 0.002
Zinc	mg/L	0.0512 [b]	Aquatic	< 0.01	< 0.01

Notes:
[a] Criterion expressed as total recoverable concentration.
[b] Aquatic criterion is hardness dependent. Potential Criteria based on the 15^{th} percentile of the Ruby Creek
[c] Drinking water criterion for total chromium is 0.1 mg/L. Aquatic chronic criteria for Cr(III) and Cr(VI) are 0.042 and 0.011 mg/L,
[d] Selenium criteria is based on the speciation of selenium.
Shaded cells exceed strictest regulatory criterion.

Source: Golder Associates. See Volume II Appendix D.

3.5 Milling

3.5.1 Mill Feed

There will be two sources of mill feed: fresh ore from underground mining, and the tailings currently contained in the TSF. Fresh ore from the underground mines will be mined, crushed, ground, pass through the gravity, flotation and CIL circuits Existing tailings recovered from the TSF will be leached in the CIL circuit. All the leached tailings will then be filtered to remove moisture and placed in the filtered tailings disposal site (FTDS). The existing tailings in the TSF can only be mined when the pond is not frozen, nominally from May to October. Operation of the underground mine will provide fresh ore year-round.

3.5.2 Production Rate

The mill began processing ore at a nominal rate of 150 tpd, in July of 2011. Mining and reprocessing of the existing tailings will commence in 2012 concurrently with underground mining and will continue each spring in six month seasons until the pond is emptied. Summary of Process

Processing will be accomplished with a standard crushing, grinding and flotation circuit with the tailings exiting to the leach circuit. Process water from both sections are comingled, after a cyanide destruct process, for reuse within the entire circuit *as shown in Figure 9*. Brown lines show the movement of ore and tailings, yellow lines indicate the movement of nearly pure gold, and blue lines represent the water flow of the complete mill circuit. The lines feeding the TSF have are currently disconnected and capped.

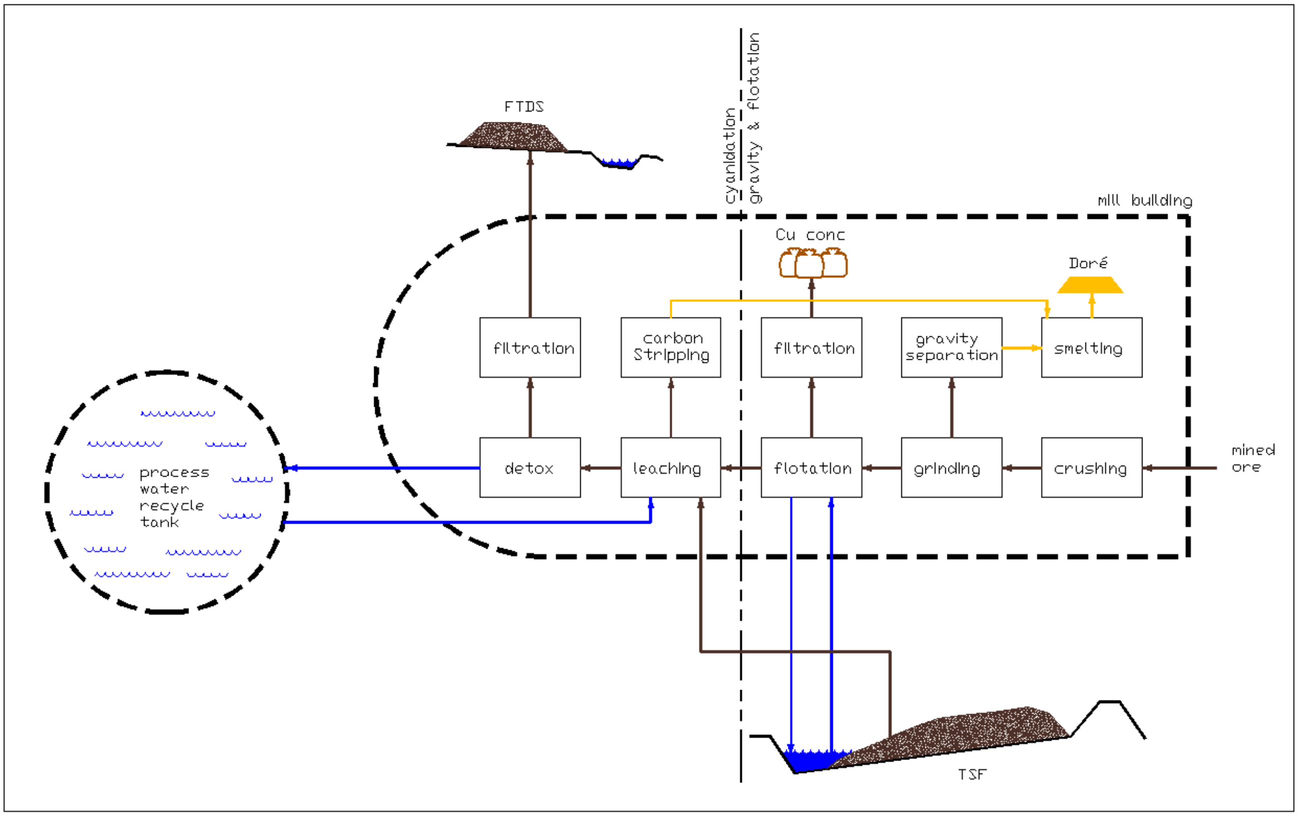

Figure 9: Simplified Process Flowsheet Showing both Process Sections

MCRI will be using a similar mill process used by the prior operators, which recovers the gold using gravitational methods followed by flotation. Most of the same equipment will also be used, although further analysis may identify justifiable upgrades. Similarly, the CIL circuit will be completed largely as designed by the last operator using equipment already purchased and at site with some additional equipment. Both the flotation tails and reclaimed tailings will be treated with cyanide to recover approximately 80% of the contained gold. All solutions and slurries will be treated through the Inco SO_2 process to ensure the WAD cyanide is lowered to or below permit limits.

The process uses a zero discharge tailings pond and the tailings are non-acid producing.

Both circuits will recycle common process water containing residual cyanide below regulatory limits. No residual cyanide water will be placed in the TSF.

The process water recycle tank (PWRT), or a technology or process that would serve the same end, is only required when the existing tailings are being reclaimed from the TSF. In winter months, when the CIL circuit will be running at the mining production rate, a smaller tank inside the mill building will be used to recycle process water for the cyanidation circuit. The process circuitry required for the TSF tailings reprocessing will be appropriately constructed and insulated, but will not be operated in extremely cold temperatures.

As can be seen on Figure 9, the system is self-contained. The only products exiting the mill are gold doré, copper concentrate, and filtered tailings.

A detailed General Arrangement drawing of the mill is shown as Figure 10. A larger scale general arrangement drawing shows the relationship between the mill and the tailings pond on Figure 11.

3.5.3 Testwork

All testwork since the 2005 POO, performed by this and prior operators, has focussed on leaching. Through numerous batches of testwork and operations, the metallurgy associated with the gravity and flotation circuits is well understood and captured in several reports. The last and most vigorous testwork performed on these circuits is described in the 2005 POO as follows:

> *"Three samples of ore expected to represent that to be encountered in future mining were taken in late 2003 and early 2004 for use in metallurgical testing. The criteria used for the selection of the sample sites were mineralogy, alteration, wall rock, and metal (gold) grade. The locations of these holes were selected by the Nixon Fork Exploration Manager. Data from past production, drill records and underground mapping were used to help select the sites.*
>
> *The first two samples were selectively taken by drilling and blasting wall rock or back (roof rock) in the proximity of the selected sample sites. Broken rock was then sampled in an orderly manner to obtain a representative sample of the rock broken. The last sample was taken by channel sampling the entire back (roof rock) in an open ore stope. This third sample was the most representative of the three samples as it was not selective, and included all of the various rock types and grades in the stope on that level. In the case of Sample 1, approximately 550 pounds of sample were taken. Similarly for Sample 2, approximately 550 pounds of sample were taken. In the case of Sample 3, approximately 150 pounds were taken. In each case the samples were bagged and not processed in any manner at the site, and represent the size of the blasted material sampled. All samples were shipped to Phillips Enterprises laboratory in Golden, Colorado for metallurgical testing."*

3.5.4 Gravity and Flotation

Fresh ore from the mine will be crushed in a stationary jaw and secondary cone crusher, and then ground into a slurry in two ball mills. The reduced product will pass through a gravity separation process using a Falcon concentrator and shaker table, where free gold and heavy minerals are removed from the slurry. The gravity concentrate will either become a portion of the doré, doré slag, which will be returned to the grinding circuit for reprocessing, or otherwise combined with a salable product such as flotation concentrate.

The remaining slurry, consisting of **very minor** sulfides, **copper oxides, iron oxides and gangue** containing gold, silver, and copper, will go to a flotation process where a concentrate containing gold/silver/copper will be produced.

The flotation concentrates, consisting generally of chalcopyrite (45%) and pyrite (20-25%) with minor amounts of pyrrhotite (5-13%), magnetite (<5%), clinoamphibole (<5%), marcasite (<3%), quartz (3-10%) and arsenopyrite (<2%) will be reground in the mill. Th**e** solids from the regrind circuit will then be routed to the cleaner flotation circuit, conditioned and refloated to prepare a clean copper concentrate for sale. This concentrate will be filtered and bagged for shipment to smelters.

The residual tailings from the flotation process , primarily consisting of limestone, marble and garnet with very minor amounts of sulfide minerals (pyrite and chalcopyrite), will report to the cyanide leach circuit. Leaching

A 250 tpd cyanide leach circuit will be added to the mill process to facilitate gold recovery from the existing TSF tailings and to allow additional gold recovery from ore from the flotation circuit. A mill expansion to house the CIL circuit was completed in 2007, which involved an 80 ft expansion of the slab floor of the mill and the sprung structure that houses it. MCRI has confirmed that all equipment specified by the existing CIL design was purchased and is available at site.

The only significant alteration to the existing 2005 POO design will be to incorporate electrowinning after carbon stripping rather than fly loaded carbon off-site although that can still be an option. Note that Figure 10 distinguishes between existing and installed equipment (black), equipment that is at site but not installed yet (blue), and new pieces required to complete the circuit (red).

MCRI intends to use the sulfur dioxide and air process for cyanide destruction since the sulfur dioxide can be supplied and transported as a solid in the form of sodium metabisulfite ($Na_2S_2O_5$) or sodium sulfite (Na_2SO_3). This process is utilized in over 40 mines around the world for free and WAD cyanide destruction. The equation for the reaction is:

$$SO_2 + O_2 + H_2O + CN^- = OCN^- + SO4^{-2} + 2H^+$$

In addition to the oxidation of cyanide, metals previously complexed with the cyanide, such as copper, nickel, and zinc are precipitated as metal-hydroxide compounds. Iron cyanide removal is affected through precipitation with copper, nickel or zinc as metal complexes of the general form $M_2Fe(CN)_6$, where M represents the previously mentioned metals.

The filtered tailings will be sampled on a routine basis for WAD cyanide and compliance with regulations. Typical results with the sulfur dioxide process are shown in Table 4 below (Ingles and Scott 1987).

Table 4: Typical Results from Sulfur Dioxide Process

Treatment Results SO_2 Process		
Parameter	Untreated (mg/l)	Treated (mg/l)
Total Cyanide	450	0.1 to 2.0
Copper	35	1 to 10
Iron	1.5	<0.5
Zinc	66	0.5 to 2.0

Tailings, whether from fresh ore or recovered from the TSF will be de-watered in a thickener prior to cyanidation. The dewatered tailings will be mixed with recycled, barren sodium cyanide solution, and agitated in five leach tanks for 20 to 24 hours. The design of the cyanide "tank house" includes an internal concrete containment wall capable of containing 110% of the quantity of slurry held in the largest tank. The tanks will transfer "bottom to top" in a manner to prevent draining of more than one tank at a time in the event leakage were to occur in a tank. In addition, the lower drain of each tank will be valved to permit isolation in case of a leak.

The leached tailings will then be transferred by pump to a two-stage slurry cyanide detox circuit and treated with sulfur dioxide solution to reduce the WAD cyanide remaining in the tailings to the regulatory limits, as follows: 90% of the samples containing less than 10 mg/kg of WAD cyanide and no sample containing more than 25 mg/kg of WAD cyanide. Table 6 shows a predicted Cyanide WAD of 0.019 mg/L. The detoxified slurry then feeds a thickener. The thickener underflow will feed a filter and will produce a filter cake that will be truck hauled to the FTDS. The filter filtrate water then feeds a secondary cyanide destruct circuit and the treated water is pumped to the process water system. The tails will then be filtered again to not more than 17% moisture on a daily basis (with a monthly average of 15% moisture) using a Larox and or the Phoenix filter with the excess solution returned to the cyanide destruction circuit, and the tailings hauled to and deposited in the FTDS.

An 18 m diameter by 3 m high (59 ft diameter x 10 ft high) cylindrical steel tank or other appropriate vessel will be added to the northeastern extent of the mill bench on the upslope side to recycle process water for use as a process water recycle tank (PWRT) for the cyanidation circuit or for the TSF remining possibility. The location is shown in Figure 12 and in the photos included as Figure 14 and Figure 15. The site is currently occupied by a core logging shed and diamond drill core, stored outside in boxes, which will be relocated. This location was selected for the following reasons:

- The PWRT is too large to be fitted into the ideal location – inside the mill building.
- Locating it adjacent to the mill building would be preferred, but would require relocating the office, mine dry, and assay office.
- No additional surface disturbance is required, as it is on a developed bench.
- The eastern upslope edge will be more stable than western edge, as it is the "cut" portion of the cut and fill bench.
- The area is somewhat sheltered from the wind (which blows predominantly from the northwest) due to the trees and slope of embankment.

Water will be sent to this tank from the detoxification (cyanide destruct) tanks and will be recycled for re-use in the leach tanks. This water will contain a residual level of cyanide, estimated to be <1 mg/L.

The PWRT will be partially enclosed with a steel top (See Figure 13 for sectional details). A circular opening will be located at the center, where a vertical misting machine will be located. The tank top will be sloped inward toward this center opening such that any water falling out of the mist will collect and flow back into the tank. A geotextile curtain will encircle the upper rim of the tank to act as a barrier to water flow beyond the tank's footprint, ensuring that the water does not escape the facility except through evaporation. The tank will be lighted for visual monitoring.

There will be two HDPE pipelines connecting the PWRT to the mill: a discharge line from the detox tanks, and a reclaim line to the leach tanks. Pumps will be used to transfer the recycle water between the tank and cyanidation circuit. These lines will not penetrate the catchment berm, but rather climb over it with rub sheets to prevent liner wear.

The PWRT will be located in a lined catchment with a volume that exceeds 110% of the tank volume (840 cu m). This will be constructed in a cut and fill fashion, digging out a depression in the bench for the tank and using the excavated material to construct the perimeter berm, which will toe into the existing bank on the eastern edge. De-watering the catchment will be done using a submersible pump, sending the water to the mill. Dewatering lines will climb over the berm lining in the same fashion as the HDPE pump lines; there will be no penetration through the berm liner.

(

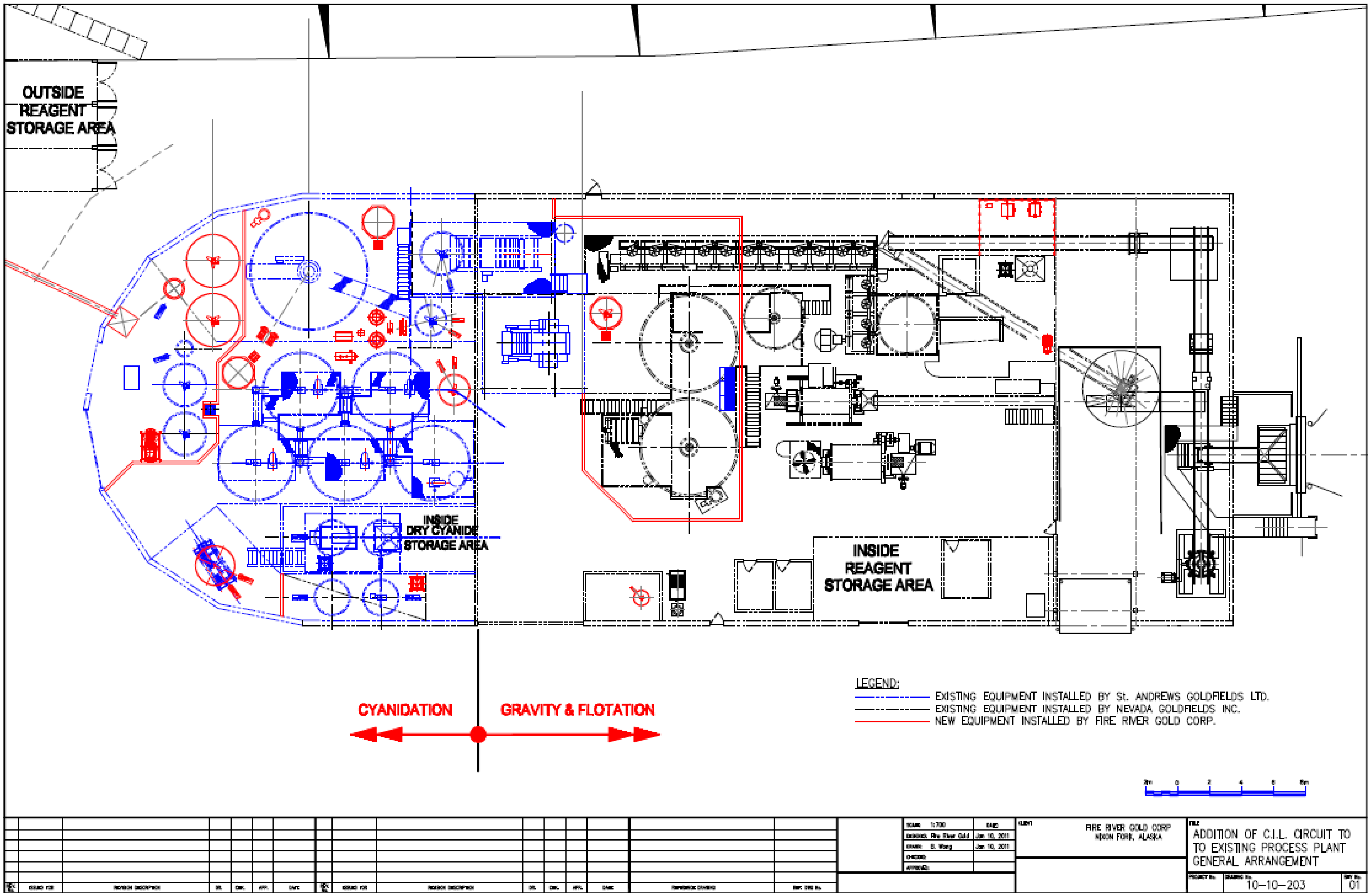

Figure 10: General Arrangement of Completed Process Plant Including CIL Circuit

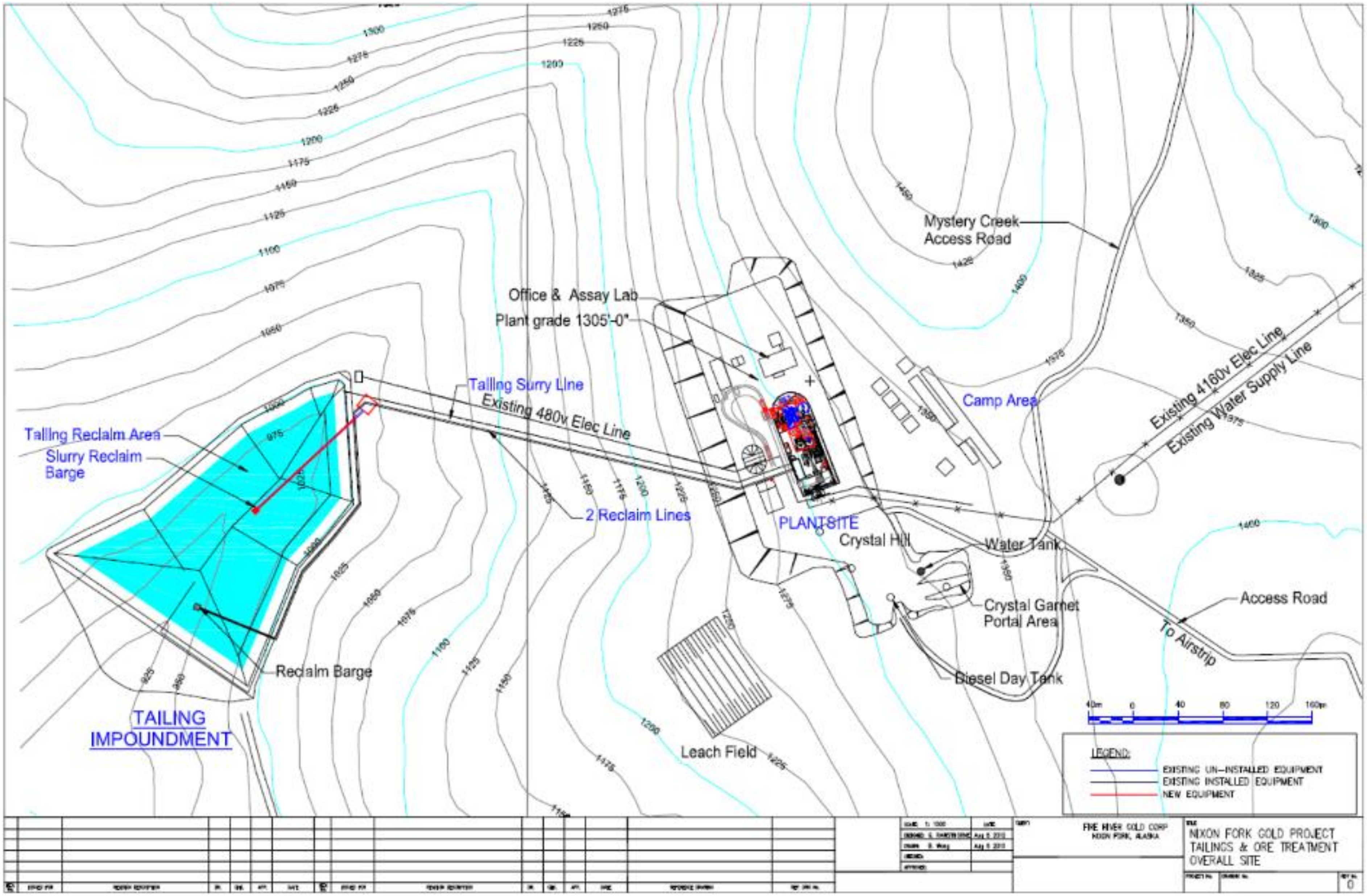

Figure 11: General Site Plan from Tailings Impoundment to Mill and Plantsite

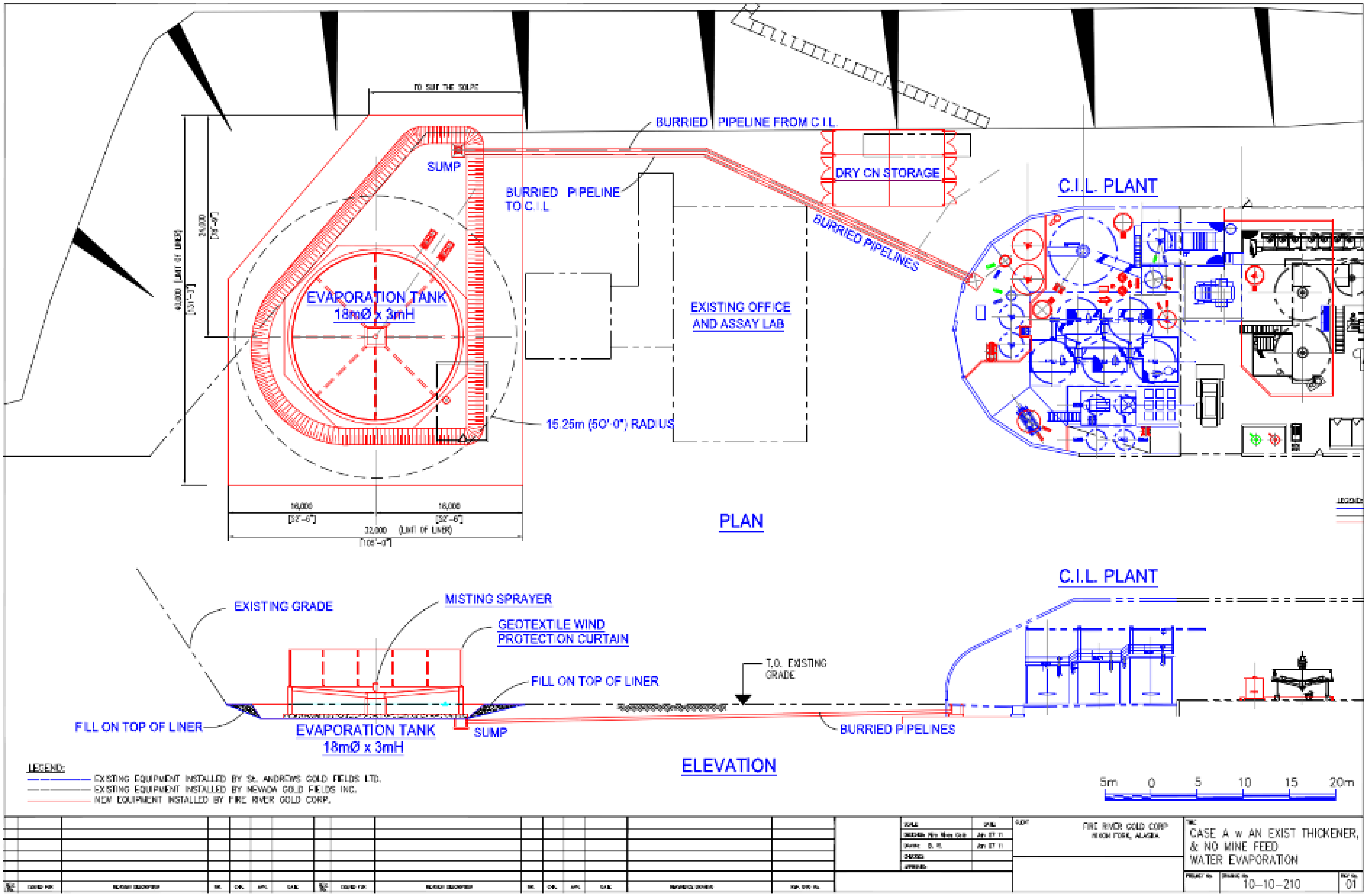

Figure 12: Process Water Recycle Tank Location and General Arrangement

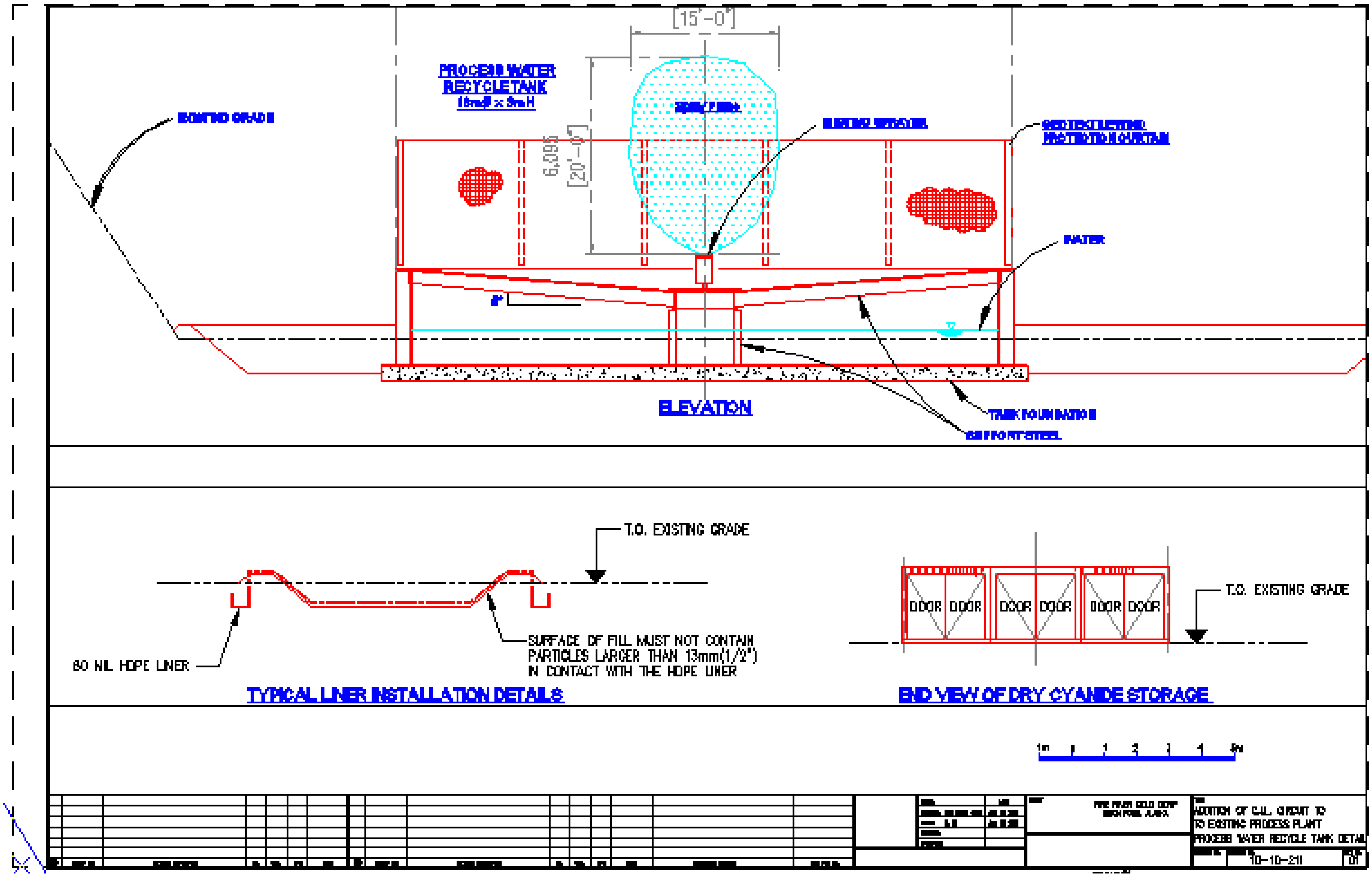

Figure 13: **Sectional Drawing of Process Water Recycle Tank and Liner**

Figure 14: Process Water Recycle Tank Location (Looking Southeast)

Figure 15: Process Water Recycle Tank Location (Looking Northeast)

3.5.5 Reagents

Chemicals and reagents required for project operation will be purchased from vendors in Anchorage or the Lower 48 States and will be flown to site. Hazardous materials will be transported in conformance with U.S. Department of Transportation regulations (46 CFR Subchapter D, 46 CFR Parts 148 and 151, and 49 CFR Parts 173, 176, and 178). These regulations cover package construction, maximum package size, package marking, proper handling, and proper storage.

The following reagents, or their equivalent substitutes with similar chemistry, will be used in the mill process. These chemicals in their original form are considered for the most part to be relatively inert and non-hazardous and biodegrade to non-hazardous inorganic and organic chemical compositions. A HMHP will be developed before the system is placed in operation.

Table 5 shows reagent consumption levels for both summer and winter operating conditions.

Table 5: Projected Reagent Consumption Levels (lbs per day)

Season	Summer 2012			Winter 2011-2015		
Process	CIL	Flotation	Total	CIL	Flotation	Total
Production Rate (tpd)	250	150	250	150	150	150
Potassium Amyl Xanthate		50	50		50	50
Sodium Meta -biSulphide (Na_2S $9H_2O$)	2,452	375	2,827	1,471	375	1,846
Anionic Polyacrylamide (flocculant)	177	15	192	106	15	121
Cationic DADM (flocculant)		15	15		15	15
Cytec AERO 6697		15	15		15	15
Cyquest DP-6 (anionic Polymer)		15	15		15	15
Methyl Isobutyl Carbinol (MIBC)		15	15		15	15
Sodium Cyanide	1,672	480	2,152	1,003	480	1,483
Lime	3,243	1,400	4,643	1,946	1,400	3,346
Copper Sulfate	87	20	107	52	20	72
Total Weight	7,631	2,400	10,031	4,579	2,400	6,979

There are four sites that will be used for process chemical storage, two outside and two inside the mill:

1. An outside reagent storage area is located onsite and comprised of 8 x 20 ft shipping containers Four containers will be dedicated to cyanide storage and two to all other reagents. The containers will have a storage capacity of approximately 24 tons each, providing a total storage capacity of 96 tons of cyanide and 48 tons of other reagents.
2. The middle laydown yard across from the camp bench (outside)
3. An inside dry cyanide storage area, comprised of a concrete pad and containment berm located inside the mill near the cyanide mix tank (as shown on Figure 10)

4. An inside reagent storage area on an elevated concrete pad, located inside the mill between the mill superintendent's office and the electrical room (as shown on Figure 10).

The storage of the various reagents is specified by product as follows:

- **Cyanide** will be received in one tonne bags. They will be segregated from all other reagents at all times. Inside the mill building, they will be stored in the inside dry cyanide storage area. There is sufficient floor space for nine boxes that can be stacked three high for 27 tons total storage. Quantities in excess of that will be stored in the outside reagent storage area in one of the four shipping containers reserved for cyanide only.

- **Lime** will be received in one tonne bulk bags that will be stored in the inside reagent storage area of the mill. Outside storage will be done in the outside reagent storage area in one of the two 20 ft containers of reserved for reagents other than cyanide.

- **Sodium Metabisulfite** will be received in one tonne bulk bags that will be stored in the inside reagent storage area of the mill. Outside storage will be done in the outside reagent storage area in one of the two 20 ft containers of reserved for reagents other than cyanide.
-
- **Xanthate** will be received in 205 L drums that will be stored in the inside reagent storage area of the mill. Outside storage will be done in the middle laydown area without containment.

- **MIBC** will be received in 205 L drums that will be stored in the inside reagent storage area of the mill. Outside storage will be done in the middle laydown area without containment.

- **Flocculants** will be received in 205 L plastic drums and 25 kg bags that will be stored in the inside reagent storage area of the mill. Because of the modest volumes consumed, outside storage will not be necessary.

- **Miscellaneous flotation reagents** will be received in 205 L plastic drums and will be stored in the inside reagent storage area of the mill. Outside storage will be done in the middle laydown area without containment.

- **Caustic Soda (NaOH)** will be received as a 30 % aqueous solution in one cubic meter totes that will be stored in the inside reagent storage area of the mill. Outside storage will be done in the outside reagent storage area in one of the two 20 ft containers of reserved for reagents other than cyanide.

- **Nitric Acid (HNO_3)** will be received as a 60 % aqueous solution in one cubic meter totes that will be stored in the inside reagent storage area of the mill. Outside storage will be done in the outside reagent storage area in one of the two 20 ft containers of reserved for reagents other than cyanide.

- **Copper Sulfate ($CuSO_4.5H_2O$)** will be received in 25 kg bags that will be stored in the inside reagent storage area of the mill. Outside storage will be done in the outside reagent storage area in one of the two 20 ft containers of reserved for reagents other than cyanide.

- **Carbon** will be received in one ton bulk bags. These will be stored on the middle laydown yard without containment.

- **Antiscalant** will be received as a 100 % reagent in one cubic meter totes. This will be stored in the inside reagent storage area of the mill. Because of the modest volumes consumed, outside storage will not be necessary.

3.6 Tailings Disposal

Tailings disposal will occur in the FTDS and the TSF, as discussed below.

3.6.1 <u>Tailings Chemistry</u>

Table 6 presents the MWMP results for the existing pre-processed tailings (Samples 1-1, 1-2, 1-3, 2-1, 2-2, and 2-3), reprocessed tailings (sample T-31) and new mine ore tailings (Sample #3) that will go into the FTDS. T-31 is a composite sample taken from 8 locations and is not a composite of 1-1 through 2-3. Table 7 shows the acid base accounting for these tailings samples. As can be seen, all three sets of tailings samples are non-acid producing.

While some of the results in Table 6 exceed the strictest potential water quality standards, the potential for generating leachate is limited because the low permeability of the placed tailings, estimated at 10^{-6} cm/sec, will reduce the potential for recharge to the tailings. In addition, the neutralization potential ratio (at 29.1) is sufficiently high to limit the acid generation potential which limits the metal leaching potential of moisture that may accumulate in the tailings. As a general rule these criteria would not apply to the tailings pond or to the dry stack, since there would be no discharge to waters of the U.S. Stipulations, if any, will be determined by ADEC in the waste water permit (L. Boles personnel communications). The new mined ore tailings, when deposited in the dry stack, will be on top of, or sandwiched between the combined reprocessed tailings representing warm weather processing of both the newly mined ore and remined TSF tailings, as they have a higher neutralization ratio of 29.1. See Volume II, Appendix E detailed data on the tailings.

Whether disposing to the FTDS or TSF, additional sampling will be done during operations for both MWMP and ABA and is included in the monitoring plan.

Table 6: Meteoric Water Modeling Procedure Results

Parameter	Strictest Potential Regulatory Criteria		Existing Tailings												Re-Processed Tailings (Sample T-31)		New Mined Ore Tailings (Sample #3)	
			Sample 1-1		Sample 1-2		Sample 1-3		Sample 2-1		Sample 2-2		Sample 2-3					
pH	6.5 to 8.5	Aquatic	7.93		7.89		7.92		7.82		7.87		7.86		NA		NA	
Alkalinity	20 (min)	Aquatic	88		83		94		46		81		87		NA		NA	
Bicarbonate			88		83		94		46		81		87		NA		NA	
Aluminum	0.087 [a]	Aquatic	< 0.01		0.01		< 0.01		0.01		< 0		< 0.01		<0.020		<0.020	
Antimony	0.006	Drinking	**0.031**	J	**0.036**	J	**0.033**	J	0.006	J	**0.037**	J	**0.038**	J	**0.071**		**0.12**	
Arsenic	0.05 [e]	Drinking	0.014		0.012		0.009		< 0.01		0.012		0.011		**1.3**		**0.12**	
Barium	2	Drinking	0.028		0.029		0.027		0.043		0.032		0.034		0.018		0.016	
Beryllium	0.004	Drinking	<0.001		< 0		< 0		< 0		< 0		< 0		<0.000093		<0.000093	
Bismuth			< 0.0003		< 0		< 0		< 0		< 0		< 0		<0.00005		NA	
Boron	0.75	Irrigation	0.39		0.40		0.39		0.04		0.36		0.39		0.22		0.20	
Cadmium	0.00045 [b]	Aquatic	< 0.0001		< 0		< 0		< 0		< 0		0.0001	J	**0.0055**	J	**0.0019**	J
Calcium			275		272		252		57.6		336		550		13		4.6	
Chloride	230	Aquatic	15		14		14		14		17		16		14.5		19.6	
Chromium	0.1 [b,c]	Drinking Irrigation	0.004		0.004		0.003	J	< 0		0.003	J	0.004		<0.0056		<0.0056	
Cobalt	0.05	Irrigation	0.0052		0.005		0.0050		7E-04		0.01		0.0194		0.0060		0.0021	J
Copper	0.018 [b]	Aquatic	0.002		0.003		0.003		0.008		0.004		0.008		**0.019**		**0.16**	
Cyanide WAD	0.0052	Aquatic	< 0.005		**0.01**		< 0.01		< 0.01		< 0		< 0.01		**0.019**	J	**0.0053**	J
Fluoride	1	Irrigation	0.46		0.46		0.43		0.20		0.40		0.44		0.53		0.56	
Iron	1	Aquatic	< 0.02		0.02		< 0.02		< 0.02		< 0		< 0.02		0.088		0.15	
Lead	0.0063 [b]	Aquatic	0.0004		0.002		2E-04		3E-04		0.001		< 0		<0.0029		**0.0088**	J
Lithium	2.5	Irrigation	< 0.05		< 0.05		< 0.05		< 0.05		< 0.1		0.067		0.0028		0.0016	J
Magnesium			40.7		40.2		37.4		6.49		46.1		66.5		2.2		0.38	
Manganese	0.2	Irrigation	**0.444**		**0.434**		**0.443**		**0.380**		**0.666**		**1.06**		0.0022	J	0.0081	
Mercury	0.00077	Aquatic	< 0.0001		< 0		< 0		< 0		< 0		< 0		0.00075		0.00035	
Molybdenum	0.01	Irrigation	**0.0349**		**0.034**		**0.029**		**0.018**		**0.035**		**0.0412**		0.0084		0.011	
Nickel	0.107 [b]	Aquatic	0.012		0.012		0.013		< 0		0.015		0.027		NA		0.0021	
Nitrate	10	Drinking	< 0.5		0.7		<0.5		<0.5		<0.5		<0.5		0.303	H	0.111	
Nitrite	1	Drinking	< 0.5		< 0.5		<0.5		<0.5		<0.5		<0.5		<0.023	H	0.137	
Phosphorous			< 0.1		< 0.1		< 0.1		< 0.1		< 0.1		< 0.1		0.064	J	0.027	J
Potassium			32.4		32.7		30.6		11.7		37.8		45.7		5.2		2.2	
Selenium	0.0046 [d]	Aquatic	**0.0071**		0.004	J	0.0040	J	0.0020	J	**0.009**		**0.0122**		**0.026**	J	<0.010	*
Silver	0.015 [b]	Aquatic	< 0.0001		< 0		< 0		< 0		< 0		< 0		0.0049	J	<0.0036	
Sodium			28.8		27.9		26.2		2.95		28.1		31.2		450		85	
Strontium			0.794		0.799		0.755		0.132		0.807		1.15		0.057		0.014	
Sulfate	250 [f]	Drinking	**910**		**870**		**780**		150		**1000**		**1600**		**2,530**		50.4	
Thallium	0.002	Drinking	< 0.0002		< 0		< 0		< 0		< 0		< 0		<0.018	*	<0.018	*
Tin			< 0.001		< 0		< 0		< 0		< 0		< 0		0.021	B	<0.0076	
Titanium			< 0.005		< 0.01		< 0.01		< 0.01		< 0		< 0.01		<0.0023		<0.0023	
Vanadium	0.1	Irrigation	0.002		< 0		< 0		< 0		0.003		0.006		<0.0029		<0.0029	
Zinc	0.269 [b]	Aquatic	< 0.01		< 0.01		< 0.01		< 0.01		< 0		< 0.01		0.035	B	0.023	

Notes:

NA - not applicable

Bolded cells identify exceedance of strictest regulatory criterion.

[a] Criterion expressed as total recoverable concentration.

[b] Aquatic criterion is hardness dependent. A hardness of 235 mg/L as $CaCO_3$ is assumed.

[c] Drinking water criterion for total chromium is 0.1 mg/L. Aquatic chronic criteria for Cr(III) and Cr(VI) are 0.042 and 0.011 mg/L, respectively. Cr(III) criterion is hardness dependant (235 mg/L as $CaCO_3$ assumed).

[d] Selenium criterion is based on the speciation of selenium.

[e] The arsenic maximum contaminant level (MCL) of 0.01 mg/L will become enforceable in January 2006.

[f] National Secondary Drinking Water Standards. Adopted by Alaska as enforceable standards (18 AAC 70.220).

Explanation of Data Qualifiers:

B = Analyze detected in the associated Method Blank, value not subtracted from result.

J = Estimated value (identifies a compound that is detected below the LQL).

** = Reporting limit is higher than strictest regulatory standard.*

H = Sample analyzed outside of holding time.

Whole Ore sample temperature upon arrival at Evergreen Analytical Laboratory = 21 °C.

Re-Processed Tailings sample temperature upon arrival at Evergreen Analytical Laboratory = 13 °C.

Table 7: Acid Base Accounting (ABA) Procedure Results

Parameter	Units	Tailings Type		
		Pre-Processed* (Existing)	Re-Processed Tails (Sample T-31)	Newly Mined Ore (Sample #3)
Paste pH	s.u.	8.59	9.7	8.1
S-total	wt. %	0.52	0.37	5.43
$S^=$	wt. %	0.07	0.34	4.02
SO_4	wt. % S	0.43	0.03	1.41
NP	t $CaCO_3$/1000 t	415	310	294
AP	t $CaCO_3$/1000 t	2.1	10.6	126
NNP	t $CaCO_3$/1000 t	413	299	168
NPR (NP/AP)		213	29.1	2.34

Notes:
NP - Neutralization Potential
AP - Acid Potential (calculated from sulfide sulfur)
NNP - Net Neutralization Potential (NNP) (calculated as NP-AP)
NPR - Neutralization Potential Ratio
[a] Average of 6 samples, tests conducted prior to re-processing.
Source of Tables 3.2 and 3.3; Golder Associates. See Volume II, Appendix. E

3.6.2 Tailings Storage Facility (TSF)

At present the TSF contains about 140,000 tonnes of tailings material from prior mining from 1993 to 2007 (Giroux, 2010). The Certificate of Approval to Operate a Dam (number FY20011-23-AK00213) expires October 2012.

Golder Associates conducted the most recent site inspection in April 2012 and prepared the most current Periodic Inspection Report . The following is extracted from the executive summary of that report:

> *Based on our inspection, the dam generally appeared to be in good condition. The significant conclusions and recommendations resulting from our inspection of the dam and review of design, construction and operations documents are summarized below.*

- *Except for the following observations, the dam and its appurtenances appear in* satisfactory condition:
  - Rub sheets or other protection methods are not being used between the discharge pipelines or the floating walkway ramp where they cross over the liner. Angular rockfill and a boulder were also observed on the lined slope and are apparently left over from melting snow ramps constructed to remove snow from the impoundment. We recommend using a rub sheet or a cushion layer in these areas to protect the liner from potential damage.
  - Liner damage and poor liner repairs were observed that included perforations from animal damage, patches that were not seamed, and

failing liner repairs with poorly bonded and improper welds. We recommend making liner repairs using a certified welding technician, patches made from the same type or equivalent liner materials, and HDPE welding rod. Performing trial seams would help verify that the means and the methods for making the liner repairs are correct.

- The culvert at the eastern diversion ditch outlet is undersized and could potentially lead to overflows into the impoundment during storm events. We recommend adding another of the same size culvert pipe or a minimum 18.5 in. smooth-walled culvert at the same grade.

- The dam slopes generally appeared in good condition with no signs of seepage or scarps. Increased tree and brush growth on the downstream dam face currently inhibits inspection; therefore, we recommend that the foliage be trimmed and cleared so the area can be monitored easily.

- A review of thermistor data indicates that the permafrost below the dam embankment continues to thaw and may have thawed about 5 ft between 2004 and 2006. The depth of thaw appears to have stabilized since 2006.

- A review of the survey data since 2007 indicates that settlement continues to occur in the permafrost area and is likely a result of thaw and consolidation. The 2009 data shows settlement as high as 1.6 in. since 2007, with an accuracy of 0.6 in. The 2008 survey was not collected along the proper alignment.

- The maintenance and inspections outlined in the OM&E manual, which was updated in 2008, are being performed. The maintenance and inspections should continue including the thermistor monitoring, annual surveying of the dam crest between the two survey monuments, and downstream water monitoring.

MCRI's plans with regard to the TSF are to:

- Conduct all repair work specified in the 2009 PSI, including the rub sheets, liner repair, and culvert installation in the spring of 2011.
- Resume use of the dam until the CIL circuit is operational in January 2012
- Upon commissioning of the FTDS (January 2012), begin emptying the TSF of all material, pumping the slurry to the mill for recovery of the residual gold through cyanidation and placing the final filtered material on the FTDS. Continue recovery of these tailings in this fashion on a seasonal basis (six months per year) until the pond is emptied[*]
- Once emptied, the tailings will be re-lined using at least 60-mil LLDPE with leak detection system

[*] The TSF is not expected to be emptied during the period covered by this POO (before 31 July 2015).

- Again update the *Operations, Maintenance and Emergency Action Manual for the Nixon Fork Tailings Dam* and apply for a new *Certificate of Approval to Operate a Dam*
- Resume storing the mine tailings in the TSF

Repairs will be performed by a certified welding technician using patches made from 40-mil VLDPE or equivalent liner material and HDPE extrusion welded seams, including using trial seams for quality control and assurance and testing the repairs using an air lance or vacuum box and soapy water. The slump in dam will continue to be monitored for signs of stress and any necessary repairs. Freeboard will continue to be measured from the low point.

The total tailings have been estimated at 140,000 tonnes (154,000 tons) grading 7.73 g/t (0.23 opt) by Giroux (2010)*. Rather than bury a valuable resource, MCRI intends to reprocess the tailings that are in the existing tailings pond to recover gold and silver contained in that material. The reprocessing is expected to begin in spring of 2012.

Tailings will be recovered from the pond using a shallow draft self-propelled hydraulic dredging machine, which will be remotely operated from the edge of the TSF. The dredging head will be equipped with a liner protection system to prevent damage to the liner (see Figure 16). The liner is protected by wheels that make contact with the liner, keeping the dredge away from it. Tailings will be drawn from the "edge of the beach" by the dredger and progress uphill to the north. Water sprays will be used for the final cleanup, pushing the sand downhill toward the dam. Water for the sprays will be collected from the pond when necessary to maintain the 3-foot freeboard; however, make-up water from the creek will likely be required due to the negative water balance at the TSF (see Section 3.9)..

Figure 16: Crisafulli "Flump" Dredge with Liner Protection System

Tailings will be pumped from the dredge to a pumping station located on land on a concrete pad at the edge of the pond nearest to the mill, where the current pipelines are located. The

* Actual resources are 92,000 tonnes of indicated resources grading 7.9 g/t Au plus 48,000 tonnes of inferred resources grading 7.4 g/t Au. They have been combined in this report for simplicity, but this is not a correct practice for resource reporting as per Canadian National Instrument 43-101.

pad will be designed to drain back into the pond. Tailings or water potentially spilled in this area during pump repairs will be hosed back into the pond. The pumping station will consist of two main lift pumps installed in series that will push the tailings uphill to the mill as a 25% solids slurry. At the mill this slurry will be dewatered to 85% solids and the excess water returned to the pond. A small amount of suspended fines will be returned to the pond in the decant water.

Figure 17: Tailings Storage Facility (Looking North)

A new surface high density polyethylene (HDPE) pipeline will be installed extending from the stationary high-pressure pumps to the mill building. The pipe will be installed adjacent to the existing pipelines in the existing 20-ft wide corridor that was cut through the trees when the existing pipes were installed. The new pipe will be anchored to the ground with cables and rebar. Spillage from a possible rupture of the line carrying tailings from the pond to the mill house would flow downhill to the area of the tailings pond. The line will be valved for emergency drainage into the pond in the event of power loss or line rupture.

During tailings dredging, a culvert of the same cross-sectional area as the tailings pond diversion ditch will be placed in the diversion ditch where the tailings pipe crosses the ditch. The culvert will extend 25 feet to each side of the tailings pipe. The culvert will be buried, and the surface above the culvert will be sloped towards the tailings pond. A berm will be constructed perpendicular to the ditch near each end of the culvert to divert any potential tailings spill back into the tailings pond. Upon completion of tailings dredging, the culvert will be removed and the ditch restored to its original condition.

Upon completion of the tailings reprocessing (which occurs beyond the duration of this POO), the remaining water in the tailings pond will be sampled, treated if and as necessary, and land applied through a sprinkler system after securing the proper permit from ADEC. Excess pond water has been successfully land applied using a sprinkler system on two prior occasions after approval by ADEC. No additional treatment of the pond water was necessary.

The old liner will be replaced with a new low-density polyethylene liner. A Certificate to Repair will be obtained for this work. Tailings will move by gravity through an insulated, heat-traced, 3-in surface pipe from the mill to the zero-discharge tailings impoundment. Water displaced by the settled solids will form a pond covering the tailings. Water will be recycled by pump to the mill on a year-round basis.

The dam has thermistors installed at the base of the dam.

3.6.3 Filtered Tailings Disposal Site (FTDS)

The FTDS is located on a gentle slope east of the airstrip (see Figure 8 and Figure 18). This location was selected because it is accessible, minimizes haulage time, and, is for the most part, previously disturbed ground. The area is a topographic high reducing potential run on from precipitation. The site is 2,100 feet from the nearest limestone contact, 1,800 ft from the headwaters of Ruby Creek, and 2,500 ft from the headwaters of Mystery Creek. In addition the area is underlain by shallow, massive, and relatively impermeable bedrock (quartz monzonite) that extends to the regional water table that is greater than 800 ft below the dry stack elevation.

The FTDS was originally designed (by Golder Associates Ltd) to include a collection system to a percolation pond located in the southeast corner. Construction was started based on this design, with the percolation pond excavated, some collection pipes installed and the first cell roughed in. MCRI agreed to line the facility and convert the percolation pond to a containment pond. A complete re-design was done, also by Golder and the work was completed in October 2011. Exhibit B contains the complete Golder design for the lined facility, including all drawings, liner specifications and earthwork specifications.

The FTDS capacity is 302,500 tonnes. Based on a bulk density of 115 pounds per cubic ft, this represents a volume of 132,100 m^3. The maximum height of the FTDS will be 30 ft, with 4H:1V side slopes (horizontal to vertical).

The outside berms were designed at 3 m wide to provide room for construction equipment. These were graded at 1.5H:1V for both cut and fill slopes on the inside slope and 2H:1V on the outside slope.

The collection pond has a volume of 9,940 m^3, sufficient to contain a precipitation of 9.5 inches over its final lined footprint. This includes 6 inches of annual water balance of precipitation and evaporation and 3.5 inches for a 24-hour 100-year storm event, while maintaining a 1 ft freeboard.

The FTDS was constructed by stripping the top four feet of unconsolidated sediments (overburden) and stockpiling it in a berm around the perimeter of the tailings repository, thus creating a large ditch around the perimeter of the repository. It was lined with 60 mil LDPE liner to prevent any discharge. The percolation pond was converted to a collection pond by enlarging it and lining it with 60 mil HDPE liner. A non-woven geotextile and a sand layer were used to protect the liner. Installation of the liner, including welding and QA/QC certification was done by Northwest Linings and Geotextile Products Inc. of Kent, Washington. A picture of the lined facility is included as Figure 20.

Tailings will be transported to the FTDS using 15 yd³ articulated dump trucks. These will be loaded at the mill using a front end loader. The haulage distance to the FTDS is approximately 1 km and the length of the complete FTDS will be 600 m, making the average haulage distance 1.3 km. The estimated total cycle time is 17 minutes, suggesting that one truck operating on one shift will be sufficient for production needs at 250 tpd. One truck operating 24 hours per day will be required after the CIL expansion in 2012.

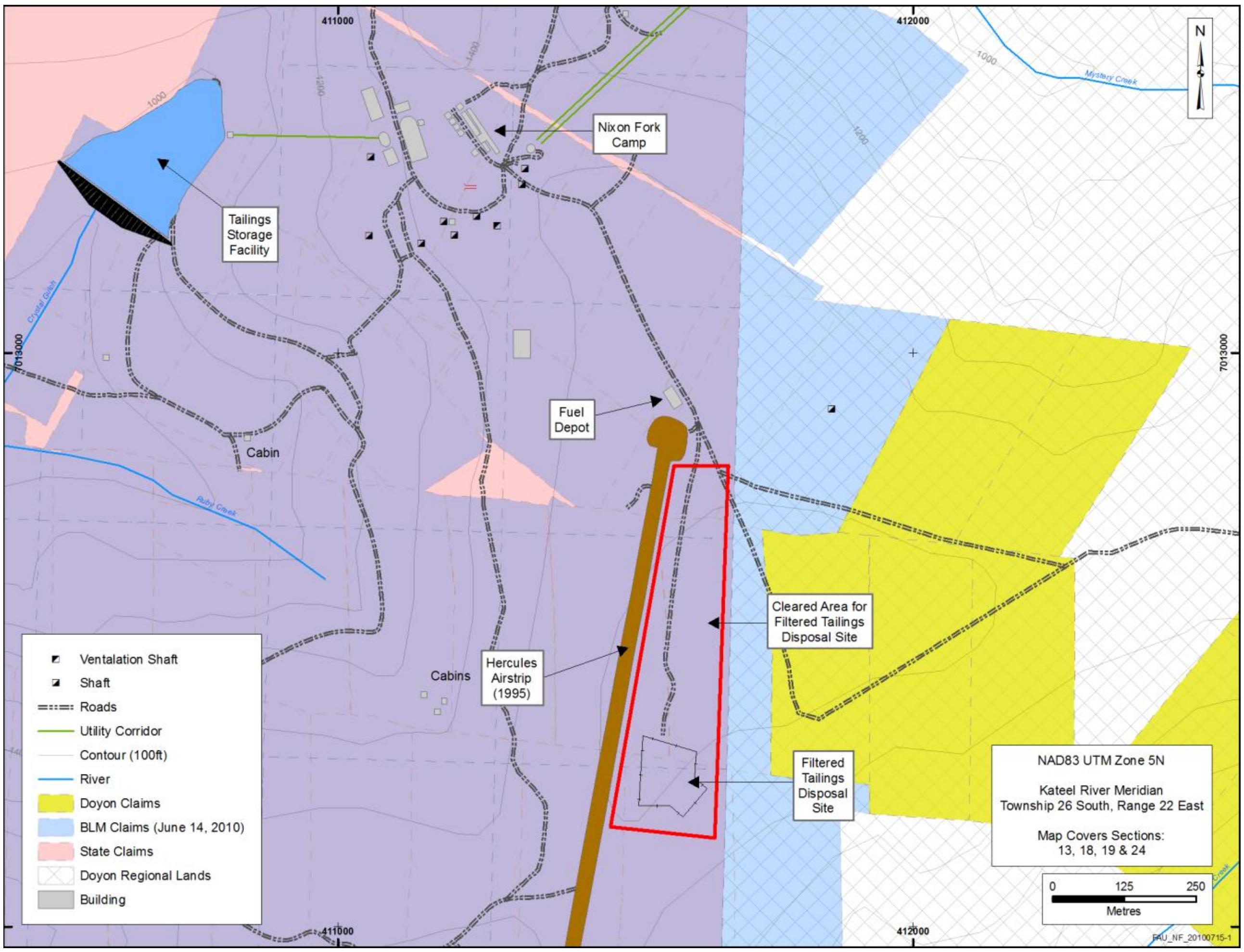

Figure 18: Filtered Tailings Disposal Site Plan

Figure 19: Panorama of Original FTDS from Southwest Corner, March 2010

Figure 20: Liner Placement on the FTDS

3.6.4 Precipitation and Pore Water

The tailings permeability after placement is estimated to be in the range of 10^{-6} cm/sec (Golder letter dated September 7, 2004, Volume II, Appendix E. Precipitation will runoff the in place tailings, into the perimeter ditch, and be directed to the Storm Water Retention Pond, which will be lined and referred to as a Retention Pond. Concurrent reclamation using the overburden excavated from the site and natural revegetation will further control runoff and erosion.

“Field capacity" is a soils property that specifies the maximum amount of water a soil can retain in its pores. It is dependent on compaction and particle size. The field capacity of Nixon Fork tailings is estimated to be 17.4% moisture content (Golder letter dated December 1, 2004, Volume ll, Appendix E). The tailings will be filtered to less than 15% moisture content (17% daily maximum- 15 % monthly average). Thus the tailings would not bleed pore water unless precipitation is allowed to percolate through the tailings. Maintaining a sloping surface would ensure that precipitation does not pond on, or percolate through the tailings pile.

Potential seepage water quality due to precipitation or pore water from the compacted tailings can be characterized by the Nixon Fork Tailings MWMP results (Table 6). While some of the results exceed the strictest potential water quality standards, the potential for generating leachate is limited because the low permeability of the placed tailings, estimated at 10^{-6} cm/sec, will reduce the potential for recharge to the tailings, and, in addition, the neutralization potential ratio (29.1) is sufficiently high to limit the acid generation potential, which also limits the metal leaching potential of moisture that may accumulate in the tailings (Golder letter dated October 15, 2004 in Volume II Appendix E).

Precipitation runoff or seepage that collects in the retention pond will be monitored in accordance with the Storm Water Pollution Prevention Plan.

3.7 Water Supply

The ground water around the mine, and the surface waters in Mystery and Ruby creeks, in their natural condition, are generally of drinking water quality and, largely meet other various water quality standards. In the surface waters, arsenic content slightly exceeds the current standard of 0.010 mg/L (see Table 9).

Water used underground will be supplied from underground sumps. Water for domestic purposes will be supplied from the Mystery Creek infiltration gallery only. The domestic water is treated before distribution to meet the State’s requirements.

The water from the infiltration gallery will be pumped from Mystery Creek through a buried, insulated, 3-in HDPE pipe to a 20,000-gal insulated, heated storage tank located just east of the Crystal Portal and the camp. From the storage tank water will flow by gravity feed directly to the camp and the mill. The mine is permitted by the State of Alaska to withdraw up to 54,800 gpd from Mystery Creek. Domestic water use will be some 10,000 gpd (50 person x 200 gpd) most of which will go to the septic system. See Section 3.9 for the water balance.

Table 8 details the surface water quality data for both Mystery and Ruby creeks. Table 9 presents similar data for the ground water around the mine. This data is present purely as baseline or background information as there are no discharges to either surface or ground water. Detailed data may be found in Volume II F.

3.8 Wastewater Disposal

Four types of wastewater will be generated: 1) mine water, 2) mill process wastewater, 3) shop and laboratory wastewater, and 4) domestic sewage and gray water from the camp and mill site.

The site will be operated as a zero-discharge facility.

To maintain operational efficiencies in the operation of the tailings pond, it will be necessary to make a land application disposal (LAD) of water stored within the tailings pond. Additional LAD applications may be necessary, largely depending on the variability of snowfall and rainfall each year. This application will be conducted under permit with the ADEC and occur at the rate of 108,000 gallons per day.

MCRI will investigate the possibility of obviating the need for periodic LADs by mechanically accelerating evaporation from the pond using misting machines.

3.8.1 Mine Water

The underground sumps will provide water to be used underground by the rock drills, to suppress dust, and for washing rock faces after blasting. Water from these activities will seep into the ground. Excess water will flow down the workings to a sump.

A 200,000 gallon reservoir was installed in the mine at the 190 m elevation in a dormant drift. Sumps throughout the mine will pump to this reservoir, which will in turn be used as the source of supply for drill water in the mine. This reservoir is schedule to be removed late 2012.

No mill process water will be used undergroundOre sent to the mill for processing will have an inherent moisture content of approximately 8%, comprised of drill water, natural drainage and mine water used to water the muck pile.

3.8.2 Mill Process Water

All process water leaving the mill will be (1) transported to the dry stack as treated pore water in the filtered tailings, (2) shipped off-site as pore water in the flotation concentrate filter cake, or (3) returned from the mill to the tailings pond for storage and reuse (if it has not been used for cyanide) or, in the case of WAD cyanide water, sent to evaporation using a misting sprayer.

The tailings will be ground to approximately 80 to 100% 200 mesh (74 micron) or smaller, thus removing all treated pore water is not feasible prior to disposal in the FTDS. Process water not trapped in the FTDS tailings will be recycled to the mill.

Table 8: Surface Water Chemistry Summary

Sample Location / Sample Date	Units		Potential Water Quality Standard	Mystery Creek						Ruby Creek					
				Dissolved			Total Recoverable			Dissolved			Total Recoverable		
				Min	Max	Average(1)	Min	Max	Average(1)	Min	Max	Average(1)	Min	Max	Average(1)
Metals by EPA 200.7, 200.8, and 6020															
Aluminum	mg/L	0.087	Aquatic	0.0207	0.0297	0.02302	0.064	**0.248**	**0.118**	0.012	0.0503	0.03044	ND (0.012)	0.0682	0.04222
Antimony	mg/L	0.006	Drinking	0.00055	0.00067	0.000622	0.00048	0.00087	0.000646	0.00086	0.00321	0.002322	0.0009	0.0032	0.002278
Arsenic	mg/L	0.050	Drinking	**0.0562**	**0.0613**	**0.05878**	**0.0601**	**0.0693**	**0.06334**	**0.00945**	**0.0269**	**0.01511**	0.0113	0.0318	0.0168
Barium	mg/L	2	Drinking	0.0063	0.007	0.00658	0.0067	0.009	0.00774	0.014	0.03	0.0226	0.014	0.031	0.0234
Beryllium	mg/L	0.004	Drinking	ND (0.00022)	ND (0.00022)	0.00011	0.00022	0.00022	0.00011	ND (0.00022)	ND (0.00022)	0.00011	ND (0.00022)	ND (0.00022)	0.00011
Bismuth	mg/L			ND (0.000005)	0.00002	0.000006	0.000005	0.00002	0.000015	0.00012	0.00026	0.000101	0.00023	0.00059	0.000356
Boron	mg/L	0.75	Irrigation	0.0014	0.024	0.00672	0.0013	0.027	0.00792	0.0045	0.01	0.00758	0.0051	0.013	0.0094
Cadmium	mg/L	0.0045	Aquatic	ND (0.000073)	0.0001	0.0000492	ND (0.000073)	ND (0.000073)	0.0000365	ND (0.000073)	ND (0.000073)	0.0000365	ND (0.000073)	0.00015	0.0000592
Calcium	mg/L			8.99	10.3	9.43	8.55	10.5	9.51	16.5	22	18.32	16.2	21.2	18.42
Chromium	mg/L	0.1	Drinking	ND (0.00072)	0.00094	0.000584	ND (0.00072)	0.00163	0.00073	ND (0.00072)	0.00132	0.0008	ND (0.00072)	0.00135	0.00100
Copper	mg/L	0.018	Aquatic	ND (0.000788)	0.00092	0.0004992	ND (0.000788)	0.00108	0.00074	**0.0942**	**0.18**	**0.08982**	0.107	**0.196**	0.1289
Iron	mg/L	1	Aquatic	0.019	0.0942	0.04	0.09	0.447	0.194	0.74	**1.76**	**1.13**	**1.13**	**2.16**	**1.418**
Lead	mg/L	0.0063	Aquatic	ND (0.000224)	0.000224	0.000112	ND (0.000224)	0.00027	0.0001436	ND (0.000224)	0.00028	0.0001456	ND (0.000224)	0.00035	0.00019
Magnesium	mg/L			2.03	3.4	2.39	1.1	3.8	2.23	3.3	4.4	3.87	1.7	4.4	3.50
Manganese	mg/L	0.2	Irrigation	0.0028	0.0096	0.00494	0.0052	0.017	0.00874	0.089	0.19	0.1378	0.092	**0.26**	0.1504
Mercury (EPA 245.1)	mg/L	0.00077	Aquatic	ND (0.000063)	ND (0.000103)	0.0000475	ND (0.000103)	ND (0.000103)	ND (0.0000515)	ND (0.000063)	ND (0.000103)	0.0000475	ND (0.000063)	ND (0.000103)	ND (0.0000475)
Molybdenum	mg/L	0.01	Irrigation	0.001	0.0023	0.00142	0.00076	0.0025	0.001392	ND (0.00013)	0.00062	0.000408	ND (0.00013)	0.00056	0.000289
Nickel	mg/L	0.107	Aquatic	0.00051	0.0011	0.000838	ND (0.002772)	0.00083	0.0004792	0.00153	0.00248	0.001904	0.00071	0.00179	0.001265
Potassium	mg/L			0.59	0.75	0.68				0.38	0.74	0.54			
Selenium	mg/L	0.0046	Aquatic	ND (0.000876)	ND (0.000876)	0.000438	0.006978	0.00258	0.0011328	ND (0.000876)	ND (0.000876)	0.000438	ND (0.000876)	ND (0.000876)	0.000688
Silicon	mg/L			3.3	5.6	4.38	3	6.4	4.5	2	4	3.14	2	4.1	3.12
Silver	mg/L	0.015	Aquatic	ND (0.0000566)	ND (0.0000566)	0.0000283	ND (0.0000566)	ND (0.0000566)	0.0000283	ND (0.0000566)	0.00028	0.00008	0.0001	0.00039	0.000105
Sodium	mg/L			1.9	2.2	2.02	0.98	2.2	1.836	1.5	2.4	2.02	0.96	2.5	1.792
Thallium	mg/L	0.002	Drinking	ND (0.000066)	0.00016	0.0001	ND (0.000066)	ND (0.00014)	0.0000832	ND (0.000066)	0.00013	0.000046	ND (0.000066)	0.00013	0.0000524
Tin	mg/L			ND (0.00096)	ND (0.0063)	0.0016	ND (0.00096)	0.0095	0.002284	ND (0.00096)	ND (0.0019)	0.0008	ND (0.00096)	0.0016	0.000704
Titanium	mg/L			0.0011	0.002	0.0015	0.004	0.023	0.00994	0.00046	0.0018	0.0013	0.0012	0.0026	0.00174
Uranium	mg/L			0.00049	0.0007	0.0006	0.00063	0.00095	0.000806	0.00014	0.00028	0.000216	0.00018	0.00032	0.000236
Vanadium	mg/L	0.1	Irrigation	ND (0.00035)	ND (0.00035)	0.000175	ND (0.00035)	0.00081	0.000523	ND (0.00035)	0.00039	0.000218	ND (0.00035)	0.00047	0.000291
Zinc	mg/L	0.269	Aquatic	ND (0.0015)	0.00164	0.00156	ND (0.0015)	0.00354	0.001308	0.00365	0.00717	0.00506	0.00353	0.261	0.05574

Note:
Arithmetic average calculated using half the reported Method Detection Limit.
A hardness of 235 mg/L as $CaCO_3$ is assumed for criterion that are hardness dependent.
The arsenic maximum contaminant level (MCL) of 0.01 mg/L will become enforceable in January 2006.
Bolded cells identify concentrations that are higher than the potential regulatory criterion.
Source: Golder

Table 8: Surface Water Chemistry Summary, continued…

Sample Location / Sample Date	Units		Potential Water Quality Standard	Mystery Creek Dissolved Min	Mystery Creek Dissolved Max	Mystery Creek Dissolved Average(1)	Mystery Creek Total Recoverable Min	Mystery Creek Total Recoverable Max	Mystery Creek Total Recoverable Average(1)	Ruby Creek Dissolved Min	Ruby Creek Dissolved Max	Ruby Creek Dissolved Average(1)	Ruby Creek Total Recoverable Min	Ruby Creek Total Recoverable Max	Ruby Creek Total Recoverable Average(1)
Metals by EPA 200.7, 200.8, and 6020															
Anions, Nutrients, Field Parameters and Other Species															
Bicarbonate Alkalinity	mg/L as CaCO3						32.2	34.9	33				39.6	71.5	52
Carbonate Alkalinity	mg/L as CaCO3						0.208	0.428	0.373				0.208	0.428	0.373
Hydroxide Alkalinity	mg/L as CaCO3						0.208	0.428	0.373				0.208	0.428	0.373
Total Alkalinity	mg/L as CaCO3						30.5	34.4	33				37.9	71.4	52
Chloride	mg/L	230	Aquatic				0.18	0.29	0.24				0.38	0.91	0.57
Fluoride	mg/L	1	Irrigation				0.048	0.08	0.06				0.048	0.048	0.05
Sulfate	mg/L	250					3.43	3.62	3.5				3.34	19.3	10.0
Sulfide	mg/L						0.015	0.015	0.015				0.015	0.015	0.015
Hardness	mg/L			31	35	33	29	36	32	56	71	66	55	71	61
Cyanide WAD	mg/L	0.0052	Aquatic				0.0013	0.0044	0.0021				0.0013	0.0015	0.0014
TDS	mg/L						53	60	57				96	126	112
TSS	mg/L						2	20	9				1	5	2
Settleable Solids	mL/L/hr														
Turbidity	NTU						0.3	4.0	1.5				1.7	2.7	2.3
Ammonia-Nitrogen	mg/L						0.008	0.075	0.025				0.058	0.126	0.088
Nitrate/Nitrite-N	mg/L	10	Drinking				0.27	0.33	0.31				0.01	0.18	0.10
Nitrate-N	mg/L	10	Drinking				0.28	0.31	0.30				0.06	0.19	0.11
Nitrite-N	mg/L	1	Drinking				0.01	0.03	0.02				0.01	0.01	0.01
TKN	mg/L						0.332	0.332	0.332				0.435	0.520	0.488
Orthophosphate-P	mg/L						0.00141	0.00847	0.00527				0.00141	0.00506	0.00297
Phosphorus	mg/L						0.0052	0.0322	0.0145				0.0047	0.0070	0.0055
pH	pH units						7.14	7.30	7.23				7.02	7.45	7.16
Temperature	°C						4.5	20.1	14.1				20.0	21.7	21.0
Conductivity	mS/cm						58	192	146				105	255	171
Cation Anion															

Note:
Arithmetic average calculated using half the reported Method Detection Limit.
A hardness of 235 mg/L as CaCO3 is assumed for criterion that are hardness dependent.
The arsenic maximum contaminant level (MCL) of 0.01 mg/L will become enforceable in January 2006.
Bolded cells identify concentrations that are higher than the potential regulatory criterion.
Source: Golder Associates

Table 9: Groundwater Water Chemistry Summary, Crystal Mine Pump Test

Analyte	Units	Potential Water Quality Standard		Groundwater - Crystal Mine Pump Test							
				Dissolved				Total Recoverable			
				Minimum	Maximum	No.	Average(1)	Minimum	Maximum	No.	Average(1)
Metals by EPA 200.7, 200.8, and 6020											
Aluminum	mg/L	0.087	Aquatic	ND (0.012)	0.0449	22	0.0119	0.0365	**0.222**	22	**0.0900**
Antimony	mg/L	0.006	Drinking	0.00333	0.00423	22	0.00358	0.00303	0.00428	22	0.00352
Arsenic	mg/L	0.050	Drinking	0.0195	0.0237	22	0.0226	0.0198	0.025	22	0.0234
Barium	mg/L	2	Drinking	0.028	0.035	22	0.031	0.03	0.037	22	0.034
Beryllium	mg/L	0.004	Drinking	ND (0.00022)	ND (0.00022)	22	0.00011	ND (0.00022)	ND (0.00022)	22	0.00022
Bismuth	mg/L			ND (0.000005)	0.00001	22	0.00001	0.00001	0.0001	22	0.00004
Boron	mg/L	0.75	Irrigation	0.013	0.018	22	0.016	0.012	0.032	22	0.017
Cadmium	mg/L	0.0045	Aquatic	ND (0.000073)	0.00029	22	0.000089	ND (0.000073)	0.00023	22	0.000076
Calcium	mg/L			69.7	79.9	22	75.45	61.1	85	22	73.89
Chromium	mg/L	0.1	Drinking	ND (0.00072)	0.00111	22	0.001	ND (0.00072)	0.00142	22	0.001
Copper	mg/L	0.018	Aquatic	0.00311	0.0055	22	0.00394	0.00465	0.0135	22	0.00628
Iron	mg/L	1	Aquatic	0.0124	0.034	22	0.0233	0.0494	0.265	22	0.0964
Lead	mg/L	0.0063	Aquatic	0.000224	0.00106	22	0.00033	0.00062	0.00248	22	0.00105
Magnesium	mg/L			13	15	22	14	7.1	16	22	13
Manganese	mg/L	0.2	Irrigation	0.0089	0.014	22	0.01083	0.0082	0.014	22	0.01026
Mercury (EPA 245.1)	mg/L	0.00077	Aquatic	ND (0.000103)	ND (0.000103)	22	0.000052	ND (0.000103)	ND (0.000103)	22	0.000103
Molybdenum	mg/L	0.01	Irrigation	0.0017	0.0036	22	0.00237	0.002	0.0044	22	0.00255
Nickel	mg/L	0.107	Aquatic	0.00151	0.00482	22	0.00327	0.00184	0.00417	22	0.00307
Potassium	mg/L			1.2	1.5	22	1.31	0.63	1.6	22	1.28
Selenium	mg/L	0.0046	Aquatic	ND (0.000876)	ND (0.000876)	22	0.00044	ND (0.000876)	0.00206	22	0.00072
Silicon	mg/L			2.7	4.2	22	3.45	2.9	5.3	22	4.17
Silver	mg/L	0.015	Aquatic	ND (0.0000566)	ND (0.0000566)	22	0.00003	ND (0.0000566)	0.00023	22	0.00008
Sodium	mg/L			2.3	3	22	2.58	1.2	3.2	22	2.48
Thallium	mg/L	0.002	Drinking	ND (0.000066)	0.00014	22	0.00005	ND (0.000066)	0.00016	22	0.00008
Tin	mg/L			ND (0.00096)	ND (0.00096)	22	0.00048	ND (0.00096)	ND (0.00096)	22	0.000960
Titanium	mg/L			0.00095	0.0025	22	0.0014	0.0021	0.0089	22	0.0039
Uranium	mg/L			0.0033	0.0053	22	0.0039	0.0036	0.0058	22	0.0042
Vanadium	mg/L	0.1	Irrigation	0.00035	0.00051	22	0.00022	0.00035	0.00085	22	0.00041
Zinc	mg/L	0.269	Aquatic	0.0248	0.0366	22	0.0298	0.0246	0.035	22	0.0302

Notes: Table continues with notes on following page

Table 9: Groundwater Water Chemistry Summary, Crystal Mine Pump Test, continued…

Analyte	Units	Potential Water Quality Standard		Groundwater - Crystal Mine Pump Test							
				Dissolved				Total Recoverable			
				Minimum	Maximum	No.	Average(1)	Minimum	Maximum	No.	Average(1)
Anions, Nutrients, Field Parameters and Other Species											
Bicarbonate Alkalinity	mg/L as CaCO3							192	218	22	207.6
Carbonate Alkalinity	mg/L as CaCO3							ND (0.208)	ND (0.428)	22	0.3880
Hydroxide Alkalinity	mg/L as CaCO3							ND (0.208)	ND (0.428)	22	0.3880
Total Alkalinity	mg/L as CaCO3							193	218	22	205.1
Chloride	mg/L	230	Aquatic					0.87	1.3	22	1.00
Fluoride	mg/L	1	Irrigation					0.06	0.11	22	0.08
Sulfate	mg/L	250						13	21.6	22	14.86
Sulfide	mg/L							ND (0.015)	ND (0.015)	6	0.008
Hardness	mg/L							203	259	22	245.5
Cyanide WAD	mg/L	0.0052	Aquatic					ND (0.0013)	0.0027	22	0.0009
TDS	mg/L							272	296	22	281.8
TSS	mg/L										
Settleable Solids	mL/L/hr							ND (0.068)	ND (0.14)	13	0.000
Turbidity	NTU							1.11	11.6	22	3.30
Ammonia-Nitrogen	mg/L							ND (0.0138)	0.102	22	0.038
Nitrate/Nitrite-N	mg/L	10	Drinking					4.1	7.18	22	5.30
Nitrate-N	mg/L	10	Drinking					4.17	6.97	22	4.95
Nitrite-N	mg/L	1	Drinking					0.02	0.07	22	0.05
TKN	mg/L							ND (0.332)	0.799	22	0.239
Orthophosphate-P	mg/L							ND (0.00141)	0.00567	22	0.00172
Phosphorus	mg/L							ND (0.00474)	0.0139	22	0.00781
pH	pH units							6.51	7.56	21	7.12
Temperature	°C							6.7	10.4	22	7.43
Conductivity	mS/cm							492	1482	22	751.7

Notes:

Arithmetic average calculate using using half the reported Method Detection Limit.
A hardness of 235 mg/L as CaCO3 is assumed for criterion that are hardness dependent.
Drinking water criterion for total chromium is 0.1 mg/L. Aquatic chronic criteria for Cr(III) and Cr(VI) are 0.042 and 0.011 mg/L, respectively.

The arsenic maximum contaminant level (MCL) of 0.01 mg/L will become enforceable in January 2006.
Bolded cells identify concentrations that are higher than the potential regulatory criterion.
Source: Golder Associates. See Appendix

3.8.3 Shop and Laboratory Wastewater

Shop wastewater will result from washing and servicing mobile equipment. It will be processed through an oil/water separator with the water then sent to the tailings impoundment. Oil residue from the separator will be collected and burned in the incinerator.

The analytical and metallurgical laboratory processes will use sodium fluoride, and hydrochloric, sulfuric, and nitric acid. Less than twenty five gallons of each will be used annually. Disposal into a lined zero discharge tailings pond would be appropriate according to ADEC (Boles, per communication, May 2004). ADEC will require that the acids and bases be neutralized prior to disposal into the no-discharge facility and that the pH of the solution being disposed of to be between 6 and 9 (email May 7, 2005 from ADNR's Steve McGroarty).

The laboratory wastewater will be characterized for Resource Conservation and Recovery Act (RCRA) purposes prior to disposal. Depending on the results of the characterization, the resulting wastewater will be combined with the mill process wastewater and tailings for disposal in the tailings impoundment, or otherwise disposal of as required by regulation.

3.8.4 Domestic Sewage

Domestic sewage from the camp and mill site will be sent through insulated, heat-traced, gravity piping to septic tanks that drain through similar piping to an existing septic absorption field approved by ADEC. Underground workers will use honey buckets or chemical toilets that will be trucked to the surface and processed through the mill site septic system.

3.9 Water Balance

Water is consumed at Nixon Fork in several areas: underground mining, milling, reprocessing existing tailings, domestic usage, and miscellaneous usage such as dust control. The sources of water used are the Mystery Creek Infiltration Gallery, water currently in the existing tailings pond, and mine water.

The water usage at site is divided into two separate streams: domestic (potable) and industrial. There is no connection between systems.

It is estimated underground mining will require approximately 12,000 gallons per day when mining operations are underway. It is anticipated that all of this water can be obtained underground and returned to underground sumps in the mine. Milling of run-of-mine ore and existing tailings will require the majority of water consumed. Man-camp usage is estimated at 10,000 gallons per day when the camp is fully occupied. This water will come from the Mystery Creek Infiltration Gallery. Miscellaneous usage is estimated to vary from a few hundred to 2000 gallons per day during the summer months and will come from the infiltration gallery or tailings pond.

Water balances for seasonal operating conditions (summer and winter) are summarized in Table 10, which shows the seasonal water balance on a monthly basis. Precipitation that is collected at each particular facility during the winter is assumed to show up into the system during the spring freshet in May. Therefore, the May precipitation shown is an accumulation of the precipitation from October through May, and also accounts for any estimated evaporation occurring in April.

Summer operations (May through September) will include up to 250 tonnes per day (tpd) of tailings reclaimed from the TSF and/or ore that will be mined from underground, crushed, milled, and passed through gravity and flotation circuits.
During the winter operations (October through April), 250 *tpd* of ore will also be mined from underground and processed in the same way as during the summer operations, except they will be processing through the cyanidation plant . All final tailings processed through a CIL circuit will be filtered hauled and disposed at the FTDS.

After emptying the TSF, the liner will be inspected and repaired or replaced as necessary, and use of the TSF will then resume.

Additional LADs may be required over the course of the LOM, largely depending on the level of snowfall or rainfall year by year, operation performance, *and the return from the gravity and flotation process* MCRI is investigating the usage of misting machines to accelerate evaporation from the pond. The machines spray the water in a fine mist above the pond, engineering the droplet size and time airborne to maximize evaporation. The liquid that does not evaporate returns to the pond. Based on the spraying mister literature, their equipment operates up to 80 gallons per minute at an evaporation rate of 25 to 70 percent. Therefore, assuming an evaporation rate of 25 percent, each misting sprayer can evaporate approximately 14,400 gallons in a 12-hour day. Adding this device may ensure that additional LADs are avoided.

The water level in the FTDS run-off containment pond will also be maintained in the summer months using spraying misters. These spraying misters will project the misted water laterally across the lined FTDS so that any run-off created from the spray is returned to the lined facility from which it came rather than released to the environment. There will be no need to operate the mister in the winter months when the run-off water and the collection pond water are both frozen. However, if “snow” were generated in spring or fall months, it will remain in the lined facility until melted.

A spraying mister will also be used at the TSF, if necessary, and will be located on the western side of the pond near the dam. It will collect water from the “pond” portion of the facility and project it east over the “beach”. In this fashion, any run-off water or “snow” will be contained in the lined facility.

A smaller vertical mister will be installed atop the PWRT, as describe in Section 0. This will only be operated during summer months when the tailings are being re-processed. During the winter months, when the tailings are not being reclaimed, this tank will be drained and decommissioned. The CIL circuit will still be operated in the winter, but at 150 tpd from fresh feed only using a smaller process water recycle tank, located inside the mill.

Operating criteria will be developed for the spraying mister, including such considerations as maximum wind speed under which it will be operated, to ensure that no residue escapes the tank. This is not anticipated to pose a significant problem, as the location is sheltered by the heavily treed upslope bank. Baseline and periodic monitoring will be set up in the area surrounding the tank to monitor against cyanide contamination.

Table 10: Seasonal Water Balance

TAILINGS STORAGE FACILITY (TSF)

		INPUT		OUTPUT		
		Precipitation (gallons/day)	From G&F (gallons/day)	Evaporation[3] (gallons/day)	To GF&C (gallons/day)	H20 Balance[4] (gallons/day)
Winter Operations	Oct	see note 2	0	0	4,894	-4,894
	Nov	see note 2	0	0	4,894	-4,894
	Dec	see note 2	0	0	4,894	-4,894
	Jan	see note 2	0	0	4,894	-4,894
	Feb	see note 2	0	0	4,894	-4,894
	Mar	see note 2	0	0	4,894	-4,894
	Apr	see note 2	0	548	4,894	-4,894
Summer Operations	May	54,033	56,489	2,862	79,281	28,380
	Jun	8,761	56,489	5,750	79,281	-19,780
	Jul	14,308	56,489	6,518	79,281	-15,002
	Aug	14,837	56,489	5,246	79,281	-13,200
	Sep	14,784	56,489	2,136	79,281	-10,143
			Total annual water balance at TSF (gallons) =			-1,929,779

GRAVITY, FLOATATION & CYANIDATION (GF&C)

		INPUT			OUTPUT			
		From TSF (gallons/day)	Mined Ore (gallons/day)	From PWRT (gallons/day)	Concentrate (gallons/day)	To TSF (gallons/day)	To PWRT (gallons/day)	To FTDS (gallons/day)
Winter Operations	Oct	4,894	1,016	0	130	0	0	5,781
	Nov	4,894	1,016	0	130	0	0	5,781
	Dec	4,894	1,016	0	130	0	0	5,781
	Jan	4,894	1,016	0	130	0	0	5,781
	Feb	4,894	1,016	0	130	0	0	5,781
	Mar	4,894	1,016	0	130	0	0	5,781
	Apr	4,894	1,016	0	130	0	0	5,781
Summer Operations	May	79,281	1,016	43,747	130	56,489	57,695	9,730
	Jun	79,281	1,016	43,747	130	56,489	57,695	9,730
	Jul	79,281	1,016	43,747	130	56,489	57,695	9,730
	Aug	79,281	1,016	43,747	130	56,489	57,695	9,730
	Sep	79,281	1,016	43,747	130	56,489	57,695	9,730

PROCESS WATER RECYCLE TANK (PWRT)

		INPUT		OUTPUT		
		From Cyanidation (gallons/day)	Precipitation (gallons/day)	Evaporation[3] (gallons/day)	Spraying Mister[5] (gallons/day)	To Cyanidation (gallons/day)
Winter Operations	Oct	0	see note 2	0	0	0
	Nov	0	see note 2	0	0	0
	Dec	0	see note 2	0	0	0
	Jan	0	see note 2	0	0	0
	Feb	0	see note 2	0	0	0
	Mar	0	see note 2	0	0	0
	Apr	0	see note 2	46	0	0
Summer Operations	May	57,695	4,582	809	17,722	43,747
	Jun	57,695	743	1,625	13,066	43,747
	Jul	57,695	1,213	1,843	13,319	43,747
	Aug	57,695	1,258	1,483	13,724	43,747
	Sep	57,695	1,254	604	14,598	43,747

FILTERED TAILINGS DRY STACK (FTDS)

		INPUT		OUTPUT		
		From Cyanidation (gallons/day)	Precipitation (gallons/day)	Evaporation[3] (gallons/day)	Pore Water (gallons/day)	Spraying Mister[5] (gallons/day)
Winter Operations	Oct	5,781	see note 3	0	5,781	0
	Nov	5,781	see note 3	0	5,781	0
	Dec	5,781	see note 3	0	5,781	0
	Jan	5,781	see note 3	0	5,781	0
	Feb	5,781	see note 3	0	5,781	0
	Mar	5,781	see note 3	0	5,781	0
	Apr	5,781	see note 3	313	5,781	0
Summer Operations	May	9,730	30,919	1,218	9,730	29,701
	Jun	9,730	5,013	2,447	9,730	2,567
	Jul	9,730	8,187	2,773	9,730	5,414
	Aug	9,730	8,490	2,232	9,730	6,258
	Sep	9,730	8,460	909	9,730	7,551

Notes: 1. Assumed solid values include 150 tonnes/day of mined ore and 3.6 tonnes/day of concenetrate produced year-round, 100 tonnes/day of reprocessed tailings from TDS during the summer, 246.4 tonnes/day filtered tails to FTDS in the summer, and 146.4 tonnes/day filtered tails to FTDS in the winter.
2. Precipitation that occurs during the winter (October to April) does not enter system until it thaws in May.
3. Evaporation in the summer (May to September) at the TSD and FTDS generally occurs over inundated areas with standing water. Evaporation that occurs in April is taken into account in the May precipitation value.
4. Based on the negative water balance at the TSF, make-up water may be required during every month except May.
5. The spraying mister operates up to 80 gallons per minute at an evaporation rate of 25 to 70 percent. Assuming an evaporation rate of 25 percent and a 12-hour day, each mister/sprayer can evaporate at least 14,400 gallons per day.

3.10 Power Supply

Three existing 870 kW diesel-electric generators will produce power required by all project facilities. Two operating generators will meet power needs. The third 870 kW generator will be maintained as a spare.

The power plant is located on the Crystal development rock dump area across from the crushing area of the mill (see Figure 6). It is located in a building with the compressor station and air receiver. The generators are fed by a common 1,000-gallon day tank, which in turn is fed by a double wall buried fuel line (1½ inch pipe within a 3 pipe) from the fuel storage tanks at the airstrip. Power is transmitted via a buried cable to the Crystal Mine, Mystery Mine and the mill
A glycol waste heat collection system was installed with the new power plant at the south end of the building. In the winter the exhaust or waste heat from each generator will be transferred via heated glycol in a buried double walled pipe to the Crystal raise, mill, and shop buildings to provide heat for those facilities. During the summer the waste heat will be dissipated at the power plant site with fan cooled radiators.

Based on the emission source inventory, the mine project will be classified as a PSD (prevention of significant deterioration) major stationary source under 18 AAC 50.300(c)(1) if permitted to operate with no restrictions on air emissions. The major source of emissions will be these generators. However, as allowed under 18 AAC, MCRI requested a limit on fuel used (Owner Requested Limits or ORL) to avoid classification as a major source.

Specifically, MCRI requested an ORL of 1,075,000 gallons of fuel per 12-month period for the generators. This will limit the potential for air emission to less than 250 tons per year for each applicable criteria pollutant. The Air Quality Control Construction Permit (AQ837CPT01 – Project X-226) has been issued by ADEC.

3.11 Fuel Supply

Fuel is flown into the site by DC-4, DC-6 or C130 Hercules aircraft with freight tanks of between 3,000 and 6,400 gallons. The fuel is pumped out of the aircraft and transferred by gravity through a four-inch hose to a fuel storage site comprised of eight x 9,400 gallons fuel tanks (see Figure 21). These tanks are located inside a secondary containment berm that meets the specifications of 40 CFR 112. The berm was designed with the room and storage capacity for two more similarly sized fuel tanks.

Fuel is transferred by gravity flow from the tanks approximately 2,200 ft via a 1-inch pipe within a 4-inch HDPE pipe to the main camp, which was upgraded in 2006 (after the 2005 POO) to one of three double lined tanks, sized at 1,000, 2,000 and 5,000 gallons. The 1,000-gallon tank is located beside the camp on its south side and is used as a day tank that feeds the main generators. The two larger tanks are located south of the generator building and are used as a refuelling station for underground and surface mobile equipment.

Figure 21: Fuel Storage Site

3.12 Borrow Source

The primary borrow source will be the mine development rock from stock piles located either at the Mystery Portal or the Crystal Portal. (Figure 5).

Sand will be required for maintenance of the road network. The old borrow source, approximately ¾ of a mile south of the tailings pond.

3.13 Explosives

The explosives used for underground blasting will be ammonium nitrate/fuel oil (ANFO) and ammonia based emmulsion explosives. Separate magazines will be used for storage of explosives, and for storage of detonators, and will comply with the requirements of the Mine Safety and Health Administration (MSHA).

3.14 Solid Waste Disposal

Non-tailings solid wastes, such as inorganic, non-burnable solid wastes, will be disposed of in the existing solid waste disposal site permitted by ADEC. The site is located west of the south end of the airstrip (Figure 5). The ADEC permit (# SWG0302000) allows up to 50 cubic yards per year of burnable organics and a like volume of non-burnable inorganic material. This site has the capacity to hold approximately 1000 yd^3, or approximately a ten-year life.

Kitchen and other spoilable waste will be stored inside the dining hall building or in bear-proof containers prior to disposal. All combustible and spoilable wastes will be incinerated (daily, weather permitting) and reduced to ash residue before disposal in the solid waste site. The incinerator will comply with state air quality control regulations at 18 AAC 50. With only ash and non-combustibles in the landfill it is highly unlikely that wildlife would be attracted to the landfill. As an added precaution, the ADEC permit requires that "If necessary, erect and maintain a fence or other devices to keep bears and other scavenging animals out of the refuse."

No hazardous or other prohibited wastes (e.g., batteries, used oil) will be placed in the solid waste site.

3.15 Hazardous Materials

Existing used oil, grease, and hazardous materials left at the site by NGI or other operators are not the responsibility of MCRI. The xanthates were removed in the summer of 2004 by the owner of the claims (Almasy) under an agreement with BLM. Used oil, which could be burned, was used as heating fuel by MCRI in the winter of 2004-5. Other used petroleum products and any remaining hazardous materials left by NGI were removed by BLM in the summer of 2005 or used by MCRI.

3.15.1 New Materials

All new materials containing oil and/or hazardous substance will be transported, stored, used, and disposed of by MCRI or its agents in strict compliance with federal and state regulations. MCRI has prepared and will maintain a Spill Preventions Control and Countermeasures Plan (SPCCP) (July, 2010). All hazardous wastes generated on site, including solid wastes such as batteries, will be temporarily stored in accordance with a hazardous materials handling plan (HMHP) that complies with 40 CFR 260-273, and is approved by BLM. These materials will be disposed of in accord with federal and state requirements, including being transported offsite to a permitted hazardous waste treatment and disposal facility. Used oil from heavy equipment, generators, etc., will be used to produce heat for the shop or burned as fuel in the solid waste incinerator. Approximately 3,000 gallons of used oil will be needed to heat the shop during the winter (six months). The facility will create approximately 2,300 gallons per year. Approximately 1,150 gallons (21 barrel equivalent) of used oil will be accumulated during the summer (six months) for winter heating. No more than 6 months accumulation of used oil will be on site at any one time. No more than two month's accumulation of used grease will be on site at any one time.

3.15.2 Hazardous Chemicals

All materials brought on-site by MCRI that contain oil or hazardous substances will be transported, stored, and used by MCRI or its agents in strict compliance with federal and state regulations.

3.15.3 Oil and CERCLA Hazardous Substances Containing Solid Wastes

All solid waste generated on site by MCRI or its agents which contains regulated quantities of oil and/or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances will be temporarily accumulated using demonstrated best management practices such as; by providing spill containment, fire prevention, etc. Any solid waste that is listed as, or exhibits the characteristics of, a hazardous waste will be managed in accordance with 40 CFR 260-279. MCRI will minimize hazardous waste generation to **the** extent possible by conducting on-site energy recovery of used-oil and off-site recycling of other wastes such as lead-acid batteries. All remaining oil and/or CERCLA hazardous substance containing wastes will be properly disposed of off-site. Regulated solid waste will be removed from the site on a regular basis in accord with the HMHP.

3.15.4 Program Management

MCRI will have an employee on-site at all times that is trained in the handling of hazardous materials. MCRI is responsible to ensure that all aspects of management of oil and hazardous substance containing materials and wastes, and emergency spill response, are properly functioning in accord with the HMHP.

3.16 Wildlife Protection

Employees transported to the mine site, or individuals otherwise on site, will not be permitted to have personal firearms, and will not be permitted to hunt, trap, or fish in the area surrounding the mine. Company firearms will be available only for defence of life and property (DLP). Hunting will not be permitted by anyone in the immediate vicinity of the project facilities for public safety reasons. Feeding of animals by workers will be strictly prohibited. Storage of all food items will be in bear-proof containers or facilities at all times. Employees will receive education about the personal dangers involved in such feeding, and the fact that the animals often end up being shot when they lose their fear of people and become dangerous. Problem bears will be brought to the attention of ADFG for potential disposal unless DLP situations are involved.

Wildlife observations of brown bear, black bear, moose, caribou, wolves and any other species of interest will be recorded by date, species, number, and specific location on the site, and submitted to BLM annually. This will also include any animal destroyed for DLP or incidentally destroyed by mine facilities/activities. A wildlife monitoring plan for the tailings pond will be developed. Wildlife mortalities associated with the tailings facility or dry stack will be reported to ADNR and ADF&G-Habitat Division. Semi-annual reports will be required detailing observation counts and carcasses found, with preservation and lab analysis of a representative number of specimens. Should monitoring identify continuing wildlife impacts, fencing, and/or netting of the tailings pond or other action might have to be taken.

3.17 Surface Disturbance

Table 11 lists the acreage of existing (89.2 acres) and proposed (70.2 acres) surface disturbance for each project component and related facilities. Fifty acres of the estimated 70.2.2 acres to be disturbed is based on an estimate of 10 acres of surface exploration per year that may or may not occur. Surface exploration is concurrently reclaimed. The proposed additional 20.2 acres of disturbance will be caused by the deposition of development rock, excavation of borrow materials for the tailings dam and road maintenance, and construction of the dry stack. Less than one-quarter acre would be re-disturbed for borrow materials for roads under this 2011 POO.

The contiguous federal claims around the mine total approximately 1670 acres. The total mine disturbance, existing and proposed, attributed to the mine is approximately 175 acres. With concurrent reclamation, including exploration sites and the dry stack, approximately 116 acres will require reclamation at the end of mine life.

All disturbed areas are, or will be stabilized to prevent erosion and reclaimed. Reclamation for all areas to be disturbed, as shown in Table 11, will be bonded as approved by ADNR and BLM. BLM will administer the bond in cooperation with the State of Alaska.

3.18 Clearing and Stockpiling

Areas to be covered by development rock or fill material, whenever possible, will be cleared and the growth material stockpiled for closure reclamation. For re-disturbed borrow sources, all trees, brush, and other vegetation removed will be put into windrows at the edge of the cleared areas. Topsoil and overburden then will be removed and stockpiled at an immediately adjacent site for use during reclamation. Because revegetation in the project area usually occurs naturally and relatively fast, stabilization of stockpiles likely will occur quickly. It is anticipated that approximately 88.2 acres will require clearing during the five-year permit period. Fifty acres of the new disturbance will occur with surface exploration that will be reclaimed the following year. At closure approximately 58.7 acres of the new disturbance will have been reclaimed.

Table 11: Existing and Proposed Surface Disturbance by Area-Component

Area	Description	Disturbance in Acres			
		Existing[a]	Proposed	Reclaim Preclose	Total At Close
A	Mystery Portal Development Rock Dump	2.9	0	0	2.9
B	Water Infiltration Gallery	0.1	0	0	0.1
C	Mystery Vent Raise/Boiler Area	0.5	0	0	0.5
D	Utility Corridor-Naturally Reclaimed	N/A	N/A	N/A	N/A
E	Main Camp Site	1.9	0	0	1.9
F	Mill Site	2.1	0	0	2.1
G	Tailings Impoundment & Dam	10.2		0	10.2
H	Tailings and Water Reclaim Line-	0[b]	0.4	0	0.4
I	Crystal Portal Development Rock Dump[c]	5.3	6.7	0	12.0
J	Crystal Vent Raise/Boiler Area	0.5	0	0	0.5
K	Explosive Magazine	0.5	0	0	0.5
L	Old Airstrip (1990)	6.7	0	0	6.7
M	Fuel Depot	0.6	0	0	0.6
N	Power Plant Site[d]	0	0	0	0
O	Filtered Tailings Disposal Site	4.1[e]	9.4[f]	13.5	0
P	Historic Placer Site-Not MCRI Disturbance	N/A	N/A	N/A	N/A
Q	Borrow Area - Sand Pit	0.9	0.2	0	1.1
R	Borrow Area	0	0	0	0
S	Historic Stamp Mill Not MCRI Disturbed	N/A	N/A	N/A	N/A
T	Hercules Airstrip (1995)	26.9	0	0	26.9
U	Quarry	4.6	0	0	4.6
V	Landfill	0.3	0	0.2	0.1
W	Old Camp Site (Exploration)	0.8	0	0.8	0
X	Site Roads	13.3	0	0	13.3
Y	Exploration[i]	7.0	50.0[j]	47.0[j]	10.0
	Totals	**89.2**	**70.21.7**	**61.5**	**109.4**

[a] Summer 2005

[b] Existing reclaimed area to be re-disturbed by installation of the reprocessed tailings low-pressure line.

[c] Includes power plant site on south end of area, road, and utility corridor for power and coolant to mill.

[d] Power plant site area included in I.

[e] Existing grease barrel storage site.

[f] Includes percolation pond and overburden stockpiles less existing disturbance of 4.1 acres.

[h] Site roads are shown on the area map but not labeled.

[i] Exploration sites are not shown on the area map.

[j] Up to 10 acres per year with concurrent reclamation.

3.19 Employment

When the project is at full production it will employ approximately 80 people full time, with 75 being on site at any given time. Working 365 days per year, mining and milling will occur continuously. Workers will live in the existing 85-bed singles camp located just north of the Crystal Portal and east of the mill site.

3.20 Exploration

Exploration activities will consist of surface exploration drilling, trenching, soil sampling, and underground definition drilling. Annually, MCRI will develop a surface exploration map and submit it to BLM and ADNR. Up to 10 acres of surface disturbance may be anticipated from surface exploration in any given year. The disturbance will include access roads, drill pads and trails, and trenches. The estimated surface disturbance is calculated as follows:

- Roads are assumed to be 14-15 ft wide with an additional 6-7 ft for spoil.
- Trenches are assumed to be as much as 13-14 ft wide with an additional 8-9 ft spoil.
- New drill sites are assumed to be 50 ft by 50 ft square to accommodate a diamond drill rig.
- Trails (used to access to drill sites) are assumed to be 13-14 ft wide.

Existing roads will be used insofar as possible. If new roads are needed for access to the drill sites, surplus overburden will be stockpiled along the road so it will be available for reclamation. Trails to drill sites, and the drill sites, where possible, will be constructed by clearing the trees and leaving the vegetative mat and soil in place to minimize erosion.

All trenches, drill pads and trails will be reclaimed in the same year as created or in the following spring. Drill polymers will be used that are environmentally safe. Sorbent pads and/or drip pans will be used beneath the drill engine to catch any oil, hydraulic fluid or fuel drips. All sorbent pads and waste products will be disposed using Best Management Practices.

At drill pads, bore holes will be plugged when drilling is complete, and all drilling equipment and supplies will be removed. All drill holes will be plugged with a bentonite hole plug, a benseal mud, or equivalent slurry, for a minimum of 10 feet within the top 20 feet of the drill hole in competent material. The remainder of the hole will be backfilled to the surface with drill cuttings. If water is encountered in any drill hole, a minimum of 7 feet of bentonite holeplug, a benseal mud, or equivalent slurry shall be placed immediately above the static water level in the drill hole. If artesian conditions are encountered, the operator will contact the Division of Mining, Land & Water (Steve McGroarty – 907-451-2795) or the Department of Environmental Conservation (Timothy Pilon – 907-451-2136) to indicate how the hole was plugged. Trenches (drill pads and trails as applicable) will be regraded to original ground, scarified as needed and capped with the overburden stockpiled during construction. The entire area will be fertilized as recommended by ADNR’s Plant Materials Center.

No surface disturbance will occur from underground exploratory drilling.

4 Alternatives Considered

MCRI is considering a number of alternatives that would affect this POO, as discussed below.

4.1 Elimination of the TSF

Once emptied, MCRI may elect to permanently decommission the TSF and dispose of all future tailings in the FTDS. This may require an expansion of the FTDS profile and will require the reclamation of the TSF by breaching the dam permanently, recontouring the ground to a natural slope, covering the surface with soil, and re-seeding. This decision will not be required during the period covered by this POO.

4.2 Mine Backfill

The list of viable mining methods is somewhat hindered by a lack of liquid backfill at site.
Electrowinning

Currently electrowinning and floatation are the two processes for recovery of precious metals onsite..

4.3 Bulk Water Discharge from the Mine

The Crystal Mine decline extends to a depth of approximately 245 m vertically from the surface adit to an ultimate depth of 145 m ASL. The water table varies from 140 to 168 m ASL.

Mineral resources occur below the water table it may be necessary to dispose of the water to make mining viable below the water table. This would require securing a permit. For disposing of the water through underground injection, a Underground Injection Control (UIC) permit would be secured from the Environmental Protection Agency (EPA). Surface disposal would require an Alaska Pollution Elimination System (APDES) from ADEC with an accompanying Environmental Impact Statement (EIS).

5 Reclamation Plan and Cost Estimate

Responsibility for reclamation at Nixon Fork is somewhat complicated due to: 1) the long history of mining on the property; 2) whether certain disturbance occurred before or after 1981 when BLM received authority to enforce reclamation; and 3) the nature of current activities which include concurrent exploration, mine development, and reclamation programs.

The Nixon Fork Mine area has been explored and mined sporadically since the early 1900s. Because of this there are several sites disturbed prior to 1981 that are not a part of the proposed project and are not the responsibility of MCRI. MCRI has used some of these old sites during exploration activities and is committed to the reclamation of any disturbance which has been caused by their activity at the Nixon Fork Mine site."

MCRI retained the services of Travis/Peterson Environmental Consulting, Inc. to prepare the reclamation plan for the Nixon Fork Mine site. Travis/Peterson Environmental Consulting, Inc. is an independent mining and environmental engineering consultant.

The Reclamation Plan and Cost Estimate is based on this Plan of Operations and has been developed to identify and assess all closure, reclamation, and post-closure requirements, and to identify and determine the associated closure, reclamation, and post-closure costs for bonding purposes.

The Reclamation Plan and Cost Estimate has been developed under the assumption that BLM and/or the Alaska Department of Natural Resources, as the administering agency, would contract with an independent contractor to supply all manpower, equipment, and materials necessary to perform all aspects of site closure, reclamation, and post-closure activities. Therefore, the plan analysis incorporates verifiable price quotes from vendors located in the Anchorage area that are representative of what would be required to mobilize and transport all equipment, men, and materials to the site for full execution of plan requirements, followed by demobilization and return transport to Anchorage. In addition, the plan analysis incorporates a provision for a 30-year post-closure monitoring period.

A complete discussion of reclamation activities and cost is contained in Volume II of II of this plan of operations.

Travis/Peterson Environmental Consulting, Inc. believes the Reclamation Plan and Cost Estimate to be representative of what would be required to close and reclaim the site, as described, in general accordance with those requirements put forth in 43 CFR 3809 and associated guidance.

6 Reclamation Monitoring

MCRI retained the services of Travis/Peterson Environmental Consulting, Inc. to prepare a comprehensive monitoring plan for the Nixon Fork Mine site. Travis/Peterson Environmental Consulting, Inc. is an independent third party environmental services consultant.

MCRI, BLM, ADNR and ADEC will monitor the success of reclamation actions following the monitoring plan. Post-reclamation monitoring will begin as soon as reclamation activities occur.

Monitoring of concurrent reclamation associated with the ongoing exploration program and dry stack will occur annually by MCRI personnel and agency representatives during their annual field inspections.

Following final reclamation activities for major components, e.g., mill site, tailings impoundment, MCRI will schedule an annual visit contemporaneously with BLM, ADEC, and ADNR representatives to jointly examine the sites. Post closure monitoring will be performed annually in years 1, 2, 5, 10, 15, 20, and 30.

The document, *Mystery Creek Resources Inc., Nixon Fork Mine Monitoring Plan* dated 2011, prepared by Travis/Peterson Environmental Consulting, Inc. is incorporated by reference in this Plan of Operations.

7 Applicant Acceptance of Responsibility

Mystery Creek Resources, Inc. assumes all responsibility for completing the reclamation work described in the *Reclamation Plan and Cost Estimate*, for meeting the requirements of this plan, and for returning the site to a safe and stable condition consistent with approved post-mining land use. In the event a new operator assumes control of the Nixon Fork project, the new operator will agree to assume responsibility for the reclamation and maintenance of any affected land and structures that are the subject of this plan or existing permits.

8 Glossary, Abbreviations, and Acronyms

Glossary

Acid base accounting—A method to determine if a material has the potential to generate acidic leachate. Both the acid-producing potential and the ability of the material to neutralize acid are determined and compared. If the acid-producing potential of the material is greater than its natural neutralizing capacity, the material is considered a potential acid-producing material.

Acid generation potential (or net acid generation potential)—A measure of the sulfide minerals in mine dumps and mill tailing and their capability, under oxidizing conditions, to form acid.

Ball mill—A large rotating cylinder partially filled with steel balls. The cascading balls grind the ore into fine particles.

CIL (Carbon in Leach) – A leaching process using cyanide to recover metal by simultaneous dissolution and adsorption onto fine carbon.

Crusher—A machine that reduces (or crushes) material by compression. The machine consists of a movable head moving against a fixed head. Material is crushed between the movable and fixed head. The material is fed by gravity through the crusher. Crushers reduce rock from the size of a small vehicle to 2 inches. Shorthead cone crushers, or roll crushers reduce rock from 2 inches to 3/8 inch.

Cyclone (hydrocyclone)—A particle-sizing device that uses circular motion to generate centrifugal forces greater than the force of gravity. The high forces are used to separate particles by size and specific gravity.

Concentrates – Material produced by the gravity or flotation process which contains gold, silver and other metals in free gold or sulfide forms. This is the normal product of the mill containing the economic product of the process.

Development rock—Rock that is non-economic, or has no mineral value, that must be removed to allow access to the ore. Development rock can be used as fill in construction of roads, dams, and other mine facilities.

Doré—A metal alloy composed of gold and other precious metals. Typically the final product from a precious metals mine.

Gram – Metric unit of weight for precious metals (gold, silver, platinum) – one gram equals 0.032151 troy ounces.

Gravity circuit - A circuit with any of several devices that use the differences in specific gravity of materials to separate gold it from other material.

Mill—A facility in which ore is treated to recover valuable metals such as gold.

Milling—The process of separating the valuable constituents (gold) from the non-economic constituents, which after milling are called tailings. Milling typically consists of crushing and grinding to liberate or free the gold, which then is recovered through a gravity, flotation or leach circuit.

Mining—The process of removing ore from the ground and transporting it to the mill. This will include drilling, blasting, loading into trucks, and hauling to a primary crusher from underground stopes.

Overburden—Non-mineralized material that overlies the ore body.

Sub-aerial deposition—Discharge of tailings slurry onto land, as opposed to underwater. A beach-like deposit is formed, which allows water to drain from the tailings, and the tailings to densify more than when it is deposited sub-aqueous. Water is collected in a pool and recycled to the mill. Typically the method is used during summer.

Sub-aqueous deposition—Discharge of tailings underwater in the tailings impoundment. Solids in the tailings slurry settle to the bottom and the water is recycled to the mill. Typically the method is used during winter to minimize ice formation.

Tailings—The non-economic constituents that are discharged from the mill after the gold or other minerals have been extracted.

Toe—The bottom of a fill, such as a road embankment or dam.

Tonne – Metric unit of weight – one metric tonne equals 2204.6 pounds

Underflow—That portion of a slurry that exits a hydrocyclone through the bottom and contains the larger, denser particles in the slurry.

Weak Acid Dissociable - analytical method to determine free cyanide, simple cyanides and weak-acid dissociable metallocyanides

Zero discharge—The standard of performance for protecting surface waters that requires containing all process fluids with no discharge outside the process circuit.

Abbreviations and Acronyms

AAC	*Alaska Administrative Code*
ABA	Acid Base accounting
ac	Acre
ADFG	Alaska Department of Fish & Game
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
asl	Above sea level
amsl	Above mean sea level
ANFO	Ammonium nitrate/fuel oil
AP	Acid generating potential
APDES	Alaska Pollutant Discharge Elimination System
ASL	Above Sea Level
ATV	All terrain vehicle
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*U.S. Code of Federal Regulations*
CGP	Construction General Permit
CIL	Carbon in leach
DLP	Defense of Life and Property
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FONSI	Finding of No Significant Impact
ft	Feet/foot
ft^2	Square feet
FTDS	Filtered tailings disposal site (dry stack)
g	Grams (32.151 grams per troy ounce)
g/t	Grams per tonne (1 troy ounce per ton equals 34.29 grams per/tonne)
gal	Gallons
gpd	Gallons per day
gpm	Gallons per minute
HDPE	High density polyethylene (pipe)
HMHP	Hazardous Materials Handling Plan
in	Inch
kW	Kilowatts
LAD	Land Application Disposal
LOM	Life of Mine
MAMC	Mespelt & Almasy Mining Company LLC
MCL	Maximum Contaminant Levels
MCRI	Mystery Creek Resources, Inc.
mg/L	Milligrams per liter

mi	Mile
MSHA	Mining Safety and Health Administration
MWMP	Meteoric Water Modeling Procedure
NAAQS	National Ambient Air Quality Standards
NGI	Nevada Goldfields, Inc.
NP	Neutralization potential
NPDES	National Pollution Discharge Elimination System
O & M	Operation and Maintenance
ORL	Owner Requested Limits
oz	Ounce (for gold use troy ounces – 12 troy ounces per pound)
PEA	Preliminary economic assessment
POO	Plan of Operations
RCRA	Resource Conservation and Recovery Act
SAS	St. Andrews Goldfields Ltd.
SPCCP	Spill Prevention Control and Countermeasures Plan
SWPPP	Storm Water Pollution Prevention Plan
t	Tonne (metric ton – 2204.622 pounds)
tds	Total dissolved solids
tpd	Tonnes per day
TPECI	Travis/Peterson Environmental Consulting
tpy	Tonnes per year
TSF	Tailings storage facility (tailings pond)
UIC	Underground Injection Control
WAD	Weak acid dissociable
yd^3	Cubic yard

9 References

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EXHIBIT A

LIST OF CLAIMS

Alaska State Federal Claims (BLM):

Count:	Claim Number:	Claim Name:	Mining District:	MTRS:	Area (ha):
1	AKAA 033686	OLD TAYLOR LODE CLAIM	McGrath	K 26S 21E 13	6.582
2	AKAA 033685	JIM BEAM LODE CLAIM	McGrath	K 26S 21E 13	7.382
3	AKAA 033717	NO 1 ABOVE CRYSTAL GULCH	McGrath	K 26S 21E 13	7.676
4	AKAA 033715	NO 1 ABOVE RUBY CREEK	McGrath	K 26S 21E 13	6.645
5	AKAA 033676	SNOW LODE CLAIM	McGrath	K 26S 21E 13	6.585
6	AKAA 033675	OWEN GRAY LODE CLAIM	McGrath	K 26S 21E 13	6.678
7	AKAA 033672	MATHEISON LODE CLAIM	McGrath	K 26S 21E 24	7.753
8	AKAA 033674	STRAND LODE CLAIM	McGrath	K 26S 21E 24	8.676
9	AKAA 033673	PEARSON LODE CLAIM	McGrath	K 26S 21E 24	8.400
10	AKAA 033671	BULLOCK LODE CLAIM	McGrath	K 26S 21E 24	9.033
11	AKAA 033714	WYOMING LODE CLAIM	McGrath	K 26S 21E 13	6.830
12	AKAA 033728	AMETHYST LODE MINING CLAIM	McGrath	K 26S 21E 13	6.960
13	AKAA 033682	MONZONITE FRACTION LODE CLAIM	McGrath	K 26S 21E 13	3.672
14	AKAA 033683	PORPHYRY FRACTION LODE CLAIM	McGrath	K 26S 21E 13	1.672
15	AKAA 033677	OMALLEY LODE CLAIM	McGrath	K 26S 21E 13	7.137
16	AKAA 033726	NO 3 ABOVE DISC HOLMES GULCH	McGrath	K 26S 21E 24	6.485
17	AKAA 033720	NO 1 ABOVE DISC HOLMES GULCH	McGrath	K 26S 21E 24	6.699
18	AKAA 033719	NO 2 ABOVE DISC HOLMES GULCH	McGrath	K 26S 21E 24	6.614
19	AKAA 033721	DISCOVERY HOLMES GULCH	McGrath	K 26S 21E 24	7.224
20	AKAA 033722	LIBERTY NO. 2	McGrath	K 26S 21E 25	7.881
21	AKAA 033723	LIBERTY NO. 1	McGrath	K 26S 21E 25	7.741
22	AKAA 033724	LINCOLN PLACER MINING CLAIM	McGrath	K 26S 21E 25	7.304
23	AKAA 033725	SHAMROCK PLACER MINING CLAIM	McGrath	K 26S 21E 25	7.275
24	AKAA 033727	WHELAN PLACER CLAIM	McGrath	K 26S 21E 25	9.079
25	AKAA 033729	GARNET SOUTH EXTENTION	McGrath	K 26S 21E 13	3.784
26	AKAA 033731	RECREATION LODE	McGrath	K 26S 21E 13	8.330
27	AKAA 033718	NO 1 ABOVE BENCH RUBY CREEK	McGrath	K 26S 21E 13	2.746
28	AKAA 033716	NO 2 ABOVE RUBY CREEK	McGrath	K 26S 21E 13	1.648
29	AKAA 033730	GARNET LODE MINING CLAIM	McGrath	K 26S 21E 13	5.762
30	AKAA 033732	CRYSTAL LODE	McGrath	K 26S 21E 13	5.018
31	AKAA 033735	NO 3 ABOVE RUBY CREEK	McGrath	K 26S 21E 13	3.614
32	AKAA 033736	NO 4 ABOVE RUBY CREEK	McGrath	K 26S 21E 24	5.780
33	AKAA 033733	NIXON FORK LODE	McGrath	K 26S 21E 13	6.100
34	AKAA 033734	BLACK BEAR LODE	McGrath	K 26S 21E 13	8.205
35	AKAA 033649	TEXAS LODE CLAIM	McGrath	K 26S 21E 13	7.825
36	AKAA 033648	SOUTHERN CROSS	McGrath	K 26S 22E 18	8.087
37	AKAA 033647	CHALCOCITE	McGrath	K 26S 21E 13	9.142
38	AKAA 033646	CHALCOPYRITE	McGrath	K 26S 21E 13	2.896
39	AKAA 033650	EMERGENCY	McGrath	K 26S 22E 7	7.647
40	AKAA 033667	MONTANA LODE CLAIM	McGrath	K 26S 22E 18	7.922
41	AKAA 033661	CHARLIE MESPELT LODE CLAIM	McGrath	K 26S 22E 18	8.927
42	AKAA 033660	DOLF MESPELT LODE CLAIM	McGrath	K 26S 22E 18	5.123

Alaska State Federal Claims (BLM) Cont...

Count:	**Claim Number:**	**Claim Name:**	**Mining District:**	**MTRS:**	**Area (ha):**
43	AKAA 033629	SHAMROCK	McGrath	K 26S 21E 24	9.209
44	AKAA 033627	GOLDEN STAR	McGrath	K 26S 21E 24	8.968
45	AKAA 033631	MABEL NO 2	McGrath	K 26S 21E 24	9.228
46	AKAA 033628	GOLDEN STAR NO I	McGrath	K 26S 21E 24	9.000
47	AKAA 033632	MABEL NO 3	McGrath	K 26S 21E 24	8.696
48	AKAA 033633	MABEL NO 4	McGrath	K 26S 21E 25	8.040
49	AKAA 033630	MABEL NO 1	McGrath	K 26S 21E 24	8.260
50	AKAA 033643	IRON NO.1	McGrath	K 26S 21E 13	7.124
51	AKAA 033636	MABEL NO 6	McGrath	K 26S 21E 24	8.424
52	AKAA 033634	MABEL NO 5	McGrath	K 26S 21E 24	6.921
53	AKAA 033641	RED LODE	McGrath	K 26S 21E 24	8.837
54	AKAA 033637	MOHAWK	McGrath	K 26S 21E 24	8.261
55	AKAA 033635	BOSTON	McGrath	K 26S 21E 25	8.814
56	AKAA 033638	TECLA PUP	McGrath	K 26S 21E 13	6.869
57	AKAA 033640	GOLDFIELD	McGrath	K 26S 21E 24	8.307
58	AKAA 033639	NORTH STAR	McGrath	K 26S 21E 24	8.942
59	AKAA 033642	WALDEN	McGrath	K 26S 21E 13	6.559
60	AKAA 033644	IRON NO. 2	McGrath	K 26S 21E 24	7.392
61	AKAA 033645	IRON	McGrath	K 26S 21E 24	7.308
62	AKAA 033668	WERNECKE LODE CLAIM	McGrath	K 26S 21E 24	9.288
63	AKAA 033665	HY GROSHONG LODE CLAIM	McGrath	K 26S 22E 19	10.269
64	AKAA 033656	KEEN	McGrath	K 26S 22E 18	7.310
65	AKAA 033655	MCGOWAN	McGrath	K 26S 22E 18	8.130
66	AKAA 033659	MESPELT	McGrath	K 26S 22E 19	7.721
67	AKAA 033663	CARL SCHUTTLER LODE CLAIM	McGrath	K 26S 22E 19	9.187
68	AKAA 033664	LEO RODRIGUE LODE CLAIM	McGrath	K 26S 22E 19	8.974
69	AKAA 033669	GRIFFIN LODE CLAIM	McGrath	K 26S 21E 24	7.121
70	AKAA 033670	WHELAN LODE CLAIM	McGrath	K 26S 21E 24	9.383
71	AKAA 033654	BOSTON BUTT	McGrath	K 26S 21E 25	9.089
72	AKAA 033658	RICHARDSON	McGrath	K 26S 21E 24	8.151
73	AKAA 033713	UTAH LODE CLAIM	McGrath	K 26S 21E 13	7.286
74	AKAA 033712	IDAHO LODE CLAIM	McGrath	K 26S 21E 13	8.018
75	AKAA 033681	NEVADA LODE CLAIM	McGrath	K 26S 21E 13	9.143
76	AKAA 033684	OLD FITZGERALD LODE CLAIM	McGrath	K 26S 21E 13	5.645
77	AKAA 033690	CROWN ROYAL LODE CLAIM	McGrath	K 26S 21E 13	7.315

Doyon, Limited Claims:

Count:	**Claim Name:**	**Area (ha):**
1	Warrior	8.362
2	Chief	9.192
3	Old Crow	8.376
4	Old Grandad	7.372
5	Almasy	7.465
6	Old Forester	8.652
7	Evan Jones	8.481
8	Clough Strand 7	7.796
9	Clough Strand 8	7.930
10	Clough Strand 9	8.665
11	Clough Strand 6	7.327
12	Clough Strand 1	7.541
13	Clough Strand 2	7.643
14	Clough Strand 3	7.969
15	Clough Strand 4	7.912
16	Clough Strand 5	8.205
17	Pupinsky 3	7.105
18	Pupinsky 2	8.183
19	Pupinsky 1	9.138
20	Jack Nixon 7	7.941
21	Jack Nixon 5	8.034
22	Jack Nixon 8	8.186
23	Jack Nixon 6	8.478
24	Jack Nixon 1	8.648
25	Jack Nixon 4	8.110
26	Jack Nixon 9	8.110
27	Jack Nixon 2	8.298
28	Jack Nixon 3	7.856
29	Pinky Doodle 1	8.473
30	Pinky Doodle 2	8.319
31	Pinky Doodle 3	7.202
32	Dick Matthews	8.765
33	Mystery	7.678

State of Alaska Mining Claims:

Count:	Claim Number:	Claim Name:	Mining District:	MTRS:	Area (ha):
1	ADL 532180	NF 22	McGrath	K026S021E24	6.582
2	ADL 532181	NF 23	McGrath	K026S021E24	7.382
3	ADL 312761	M AND A MESPELT AND ALMASY 3	McGrath	K026S021E24	7.676
4	ADL 312762	M AND A MESPELT AND ALMASY 4	McGrath	K026S021E23,K026S021E34	6.645
5	ADL 508868	MAR 3	McGrath	K026S021E23	6.585
6	ADL 508869	MAR 4	McGrath	K026S021E23	6.678
7	ADL 532175	NF 17	McGrath	K026S021E24	7.753
8	ADL 532176	NF 18	McGrath	K026S021E24	8.676
9	ADL 532177	NF 19	McGrath	K026S021E24	8.400
10	ADL 532178	NF 20	McGrath	K026S021E24	9.033
11	ADL 508870	MAR 5	McGrath	K026S021E23	6.830
12	ADL 508871	MAR 6	McGrath	K026S021E23	6.960
13	ADL 661078	RUBY 8	McGrath	K026S021E23	3.672
14	ADL 661077	RUBY 7	McGrath	K026S021E22	1.672
15	ADL 532171	NF 13	McGrath	K026S021E24	7.137
16	ADL 532172	NF 14	McGrath	K026S021E24	6.485
17	ADL 532173	NF 15	McGrath	K026S021E24	6.699
18	ADL 532174	NF 16	McGrath	K026S021E24	6.614
19	ADL 508872	MAR 7	McGrath	K026S021E23	7.224
20	ADL 508873	MAR 8	McGrath	K026S021E23	7.881
21	ADL 532167	NF 9	McGrath	K026S021E13	7.741
22	ADL 532168	NF 10	McGrath	K026S021E13	7.304
23	ADL 532169	NF 11	McGrath	K026S021E13	7.275
24	ADL 532170	NF 12	McGrath	K026S021E13	9.079
25	ADL 508874	MAR 9	McGrath	K026S021E14	3.784
26	ADL 508875	MAR 10	McGrath	K026S021E14	8.330
27	ADL 661076	RUBY 6	McGrath	K026S021E14	2.746
28	ADL 661075	RUBY 5	McGrath	K026S021E15	1.648
29	ADL 532163	NF 5	McGrath	K026S021E13	5.762
30	ADL 532164	NF 6	McGrath	K026S021E13	5.018
31	ADL 532165	NF 7	McGrath	K026S021E13	3.614
32	ADL 661096	RUBY 26	McGrath	K026S021E34	5.780
33	ADL 661091	RUBY 21	McGrath	K026S021E34	6.100
34	ADL 661086	RUBY 16	McGrath	K026S021E27	8.205
35	ADL 661081	RUBY 11	McGrath	K026S021E27	7.825
36	ADL 661079	RUBY 9	McGrath	K026S021E22	8.087
37	ADL 661097	RUBY 27	McGrath	K026S021E35	9.142
38	ADL 661092	RUBY 22	McGrath	K026S021E35	2.896
39	ADL 661087	RUBY 17	McGrath	K026S021E26	7.647
40	ADL 661082	RUBY 12	McGrath	K026S021E26	7.922
41	ADL 661080	RUBY 10	McGrath	K026S021E23	8.927
42	ADL 661098	RUBY 28	McGrath	K026S021E35	5.123
43	ADL 661093	RUBY 23	McGrath	K026S021E35	9.209
44	ADL 661088	RUBY 18	McGrath	K026S021E26	8.968

State of Alaska Mining Claims Cont ...

Count:	**Claim Number:**	**Claim Name:**	**Mining District:**	**MTRS:**	**Area (ha):**
45	ADL 661083	RUBY 13	McGrath	K026S021E26	9.228
46	ADL 508867	MAR 2	McGrath	K026S021E23	9.000
47	ADL 508866	MAR 1	McGrath	K026S021E23	8.696
48	ADL 661099	RUBY 29	McGrath	K026S021E36	8.040
49	ADL 661094	RUBY 24	McGrath	K026S021E36	8.260
50	ADL 661089	RUBY 19	McGrath	K026S021E25	7.124
51	ADL 661084	RUBY 14	McGrath	K026S021E25	8.424
52	ADL 661101	RUBY 31	McGrath	K026S021E24	6.921
53	ADL 661102	RUBY 32	McGrath	K026S021E24	8.837
54	ADL 661100	RUBY 30	McGrath	K026S021E36	8.261
55	ADL 661095	RUBY 25	McGrath	K026S021E36	8.814
56	ADL 661090	RUBY 20	McGrath	K026S021E25	6.869
57	ADL 661085	RUBY 15	McGrath	K026S021E25	8.307
58	ADL 532182	NF 24	McGrath	K026S021E24	8.942
59	ADL 532179	NF 21	McGrath	K026S021E24	6.559
60	ADL 532166	NF 8	McGrath	K026S021E13	7.392
61	ADL 508876	MAR 11	McGrath	K026S021E14	7.308
62	ADL 508877	MAR 12	McGrath	K026S021E14	9.288
63	ADL 312759	M AND A MESPELT AND ALMASY 1	McGrath	K026S021E13	10.269
64	ADL 312760	M AND A MESPELT AND ALMASY 2	McGrath	K026S021E13, K026S021E14	7.310
65	ADL 532161	NF 3	McGrath	K026S021E13	8.130
66	ADL 532162	NF 4	McGrath	K026S021E13	7.721
67	ADL 661074	RUBY 4	McGrath	K026S021E13	9.187
68	ADL 661073	RUBY 3	McGrath	K026S021E14	8.974
69	ADL 661072	RUBY 2	McGrath	K026S021E14	7.121
70	ADL 661071	RUBY 1	McGrath	K026S021E15	9.383
71	ADL 532159	NF 1	McGrath	K026S021E13	9.089
72	ADL 532160	NF 2	McGrath	K026S021E13	8.151
73	ADL 508878	MAR 13	McGrath	K026S021E12	7.286
74	ADL 508879	MAR 14	McGrath	K026S021E12	8.018
75	ADL 508880	MAR 15	McGrath	K026S021E12	9.143
76	ADL 508881	MAR 16	McGrath	K026S021E12	5.645
77	ADL 661103	RUBY 33	McGrath	K026S021E24	7.315

EXHIBIT B

FTDS DESIGN INFORMATION