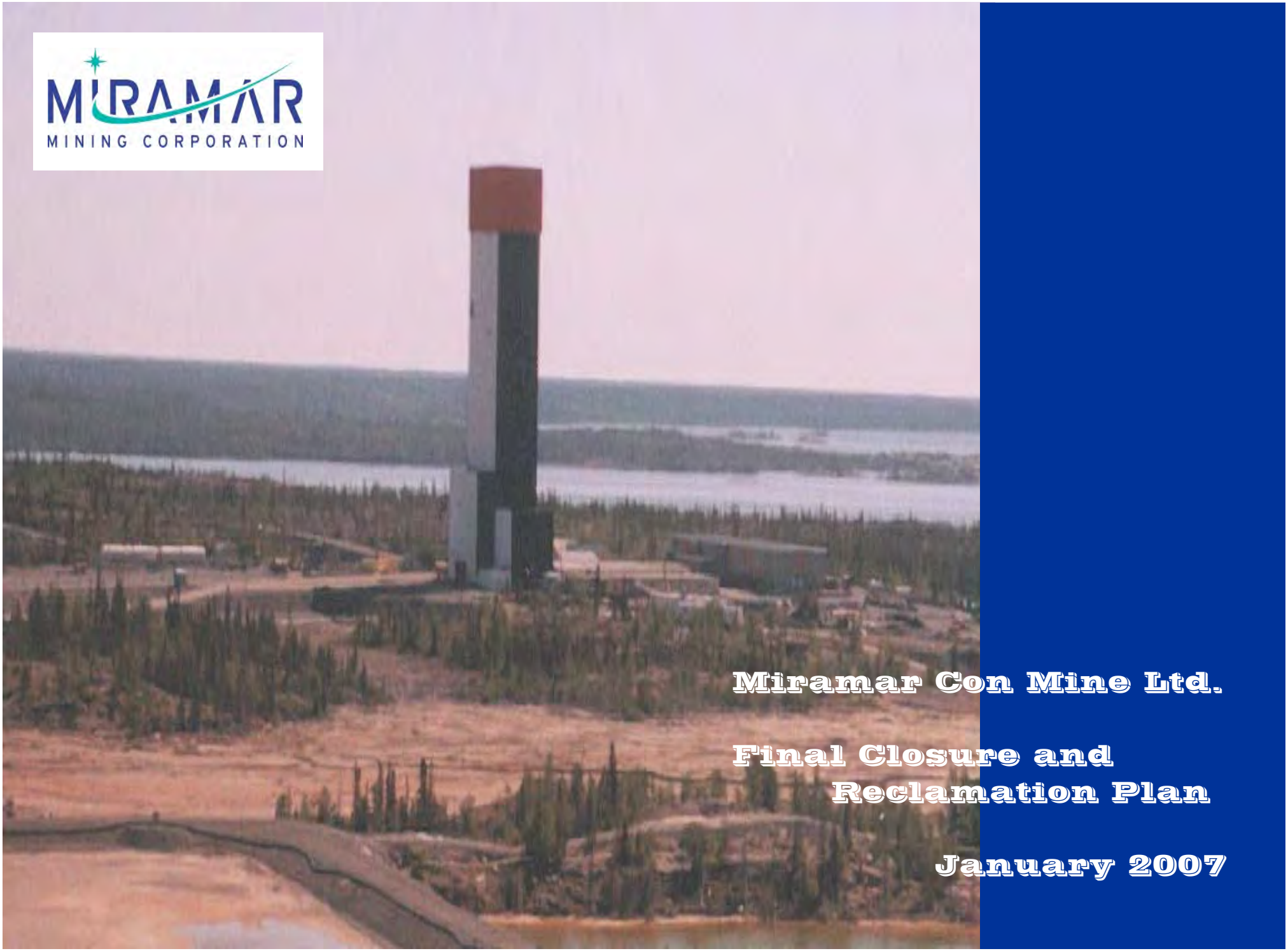


Miramar Con Mine Ltd.

Final Closure and Reclamation Plan

January 2007



MIRAMAR CON MINE, LTD.
FINAL CLOSURE
AND
RECLAMATION PLAN

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January 31, 2007

EXECUTIVE SUMMARY

Miramar Con Mine, Ltd. (MCML) is pleased to submit the Final Closure and Reclamation Plan (C&R Plan) for the Con Mine in Yellowknife, Northwest Territories. Since 1995, the Con minesite leases have been the subject of a number of investigative studies directed at locating, identifying and characterizing all areas of contamination that need to be remediated during the reclamation process. Theses studies were undertaken with the knowledge that active operations at the Con Mine were drawing to a close, thus all impacted areas would need to be identified, located, and defined in extent and nature to allow appropriate remediation measures to be designed. These studies have been submitted under separate cover to the Mackenzie Valley Land and Water Board (MVLWB) to form part of the public registry for the Con Mine Closure and Reclamation Plan. The information collected from these studies has been brought together and addressed through the proposed reclamation measures outlined in this C&R Plan.

In addition to the mining and milling operations associated with the Con Mine, the C&R Plan encompasses all lease areas associated with the minesite. It identifies the specific issues that must be addressed during the two phases of closure, the initial phase, which includes decommissioning, demolition, site cleanup, and revegetation of the site; and the post closure phase, which is the long term monitoring and maintenance of the site. The initial phase of closure is scheduled to take place between 2007 and 2010. Long term monitoring and maintenance of the site will continue until it is deemed by MVLWB to be no longer necessary (The C&R Plan assumes this would be for a minimum period of 50 years). The Plan outlines the measures to be taken to remediate specific areas and provides a schedule for execution of the remediation and reclamation projects. In support of this C&R Plan, a human health risk assessment for arsenic-impacted soil has been prepared and submitted under a separate cover. Cost estimates for the work are set out in Section 10 of the report.

The objectives of the Final Closure and Reclamation Plan are to:

(a) Present a characterization of the minesite, including the natural setting, history, a description of the site facilities, and identification of environmentally impacted areas, both recent and historical;
(b) Describe the environmentally disturbed areas;
(c) Present reclamation measures to address the disturbed areas;
(d) Provide a schedule of the activities required for reclamation of the site;
(e) Provide a schedule of post closure monitoring activities; and,
(f) Provide a budget of the estimated costs for reclamation of the property.

During both the initial closure reclamation, and the long term monitoring and maintenance phase, the Con Mine site will continue to be governed by federal and territorial regulations, and be subject to inspection by the various regulatory agencies, including Indian and Northern Affairs Canada (INAC), Environment Canada (EC), and the Department of Fisheries and Oceans (DFO). Statutes that will continue to apply include:

(i) Water License N1L2-0040 under the Mackenzie Valley Land & Water Act, which establishes limits for contaminant release, frequency of monitoring, and guidelines for inspection and maintenance of the site; and,
(ii) The federal Metal Mining Effluent Regulation (MMER) and Environmental Effects Monitoring (EEM), which also establishes limits for contaminant release as well as limitations on biological effects that may be caused by effluent from the site.

Con Mine was opened in 1938 by Consolidated Mining and Smelting Limited (Cominco). Nerco Minerals Limited purchased the operation in 1986, and owned and operated the mine until 1993, at which time Kennecott Limited purchased Nerco and sold the Con Mine to Miramar Mining Corporation. Miramar Con Mine Limited (MCML) has owned and operated the mine since October 1993. The mine ceased production in September 2003 and the pumps were turned off in the mine in November 2003. The mill will be utilized to process the remaining arsenic sludges on site. This work is scheduled for completion in 2007.

The five minesite surface leases encompass a total area of 340 hectares, of which some 80 hectares are covered by tailing. With the exception of the main mine lease and the Con Dock Lease, the leases are scheduled to expire in 2011, at which time or sooner it is anticipated that they will be returned to the Commissioner of Lands. The main mine lease and the Con Dock/Camp lease are scheduled to expire in 2021. It is expected that the Con Dock Lease may be in a condition to be returned to the Commissioner of Lands, circa 2011. Miramar expects that it will continue to hold the main mine lease, or a portion thereof, until Post Closure monitoring and maintenance are no longer required.

At the Con Mine, gold ore was classified as one of two types: “refractory” or “free milling”. Tailing is the by product of both processes and consists of a slurried mixture of finely ground rock, water, and chemical residues that remain after the extraction of the valuable minerals. Early in the mine’s history, prior to the development of the pressure oxidation (autoclave) technology, high-temperature roasting was used to oxidize refractory ore, producing residual by-products known as arsenic sludges and calcines. Processing of all calcines remaining on site was completed in July 2006. Some calcines were stockpiled for use as feed to the autoclave during treatment of the remaining arsenic sludge. This work will be completed in 2007. Following treatment to render them environmentally stable, these by-products will be disposed of in the mine Tailing Containment Areas (TCA’s).

The primary reclamation issues, identified by mine component, are listed below, along with a description of the applicable work required to remediate each area.

Underground Mining Operations

Mining ceased in September 2003 and the underground workings were closed in November 2003. All hazardous materials were removed; large equipment was cleaned of fuels and hydrocarbons, and the batteries were sent to recyclers. Equipment with no salvage value was cleaned and then left underground. All hazardous materials from this cleaning were removed to surface for off-site disposal through licensed disposal facilities. The mine has been allowed to flood since November 2003. Based on two minewater sampling events (URS Canada in June 2004, and MCML in September 2006), it is now calculated that it will take ~11 years for the minewater to reach surface (expected in late 2014). Water quality testing of the minewater during these sampling events indicates that the only substance that currently exceeds Water License discharge limits is Zinc. All openings to surface will be closed by 2009; however sampling and pumping ports will be constructed in the concrete caps over the Robertson Shaft, C-1 Shaft, and the 204Q Stope to allow monitoring of the minewater depth and quality, and pumping to Middle Pud should the water quality not meet the Water License discharge limits.

Arsenic-Contaminated Soils

The minesite has been divided into sectors, according to the degree of arsenic contamination. The sectors are as follows:

- Mill and autoclave site;
- Crank Lake and area to the south;
- Con Pond area;
- Blend Plant and Negus Pond;
- Robertson complex;
- Con Dock, Tin Can Hill, and area north of Negus Mill complex;
- Upper and Middle Pud tailing areas;
- Lower Pud and Negus tailing areas and Neil Lake; and,
- Undisturbed or background areas.

In these areas, approximately 150,000 to 175,000 m^3 of arsenic-impacted soil will be excavated and disposed of in the hazardous waste disposal site that has been developed at the former calcine storage area south of the mill. Most of the impacted soil will be excavated from the Mill and Autoclave sites. The areas at the Blend Plant, Negus Pond, and Con Pond will be closed as hazardous waste sites, with no new material to be placed in these areas. Clean construction debris will be placed in the non hazardous waste landfill, which will remain at the site of the present on-site landfill operation.

Tailing Containment Areas (TCA's)

There are six tailing containment areas on the mine property. Of these, four areas contain historic tailing and have not been used for tailing deposition for the last 20 years. These historic tailing areas have generally consolidated (settled). These are: Crank Lake, Lower Pud Lake, Negus, and Neil Lake. Reclamation of these areas will consist of the establishment of a self-sustaining vegetative cover to prevent wind and water erosion. This remediation work is underway, and is expected to be complete in 2009. The two tailing containment areas that were most recently active are Upper Pud Lake and Middle Pud Lake. Upper Pud Lake neared full tailing capacity in 2004. Reclamation is scheduled to begin in 2008 once the pore water drains and the tailing is allowed to consolidate to a sufficient degree for equipment to work on the tailing surface. Reclamation of these recently active areas will be carried out by constructing a cap over top of the tailing. This cap will consist of a minimum layer of 50 to 60 cm of waste rock mixed with some overburden, which will then be fertilized and seeded to encourage establishment of a self-sustaining vegetative cover. A test pad was constructed in 2005 to demonstrate this type of cap and to evaluate the stability of the Upper Pud tailing in relation to bearing capacity for placement of the proposed rock cap and to confirm the feasibility of establishing a vegetative cover as proposed. Since that time no significant settling of the test pad has occurred and vegetation is established on ~50% of the cover. Middle Pud TCA will be taken out of service in 2008. It is anticipated that the majority of the reclamation of this TCA will be complete by 2010. For the historic areas, the TCA's will be drained, contoured, and revegetated to achieve a self-sustaining vegetative cover that will be dominated by native plant types within several years.

Surface Waters

The surface water catchment areas will be graded so that they drain by gravity to the Middle Pud TCA. The area north of the Upper Pud at Taylor Road will be modified and a storm sewer system built to divert the surface water to Kam Lake. MCML has proposed that the City of Yellowknife ultimately take possession of this system and has opened discussion on this proposal with City engineering staff to ensure that construction meets City specifications for such drainage structures.

The central portion of the property defined by Crank Lake, Upper Pud and Middle Pud will continue to be managed for some time. Engineered drainage collection channels will be installed to direct runoff from these areas to Middle Pud, where it will subsequently be collected and treated at the Water Treatment Plant. Current data indicates that it will be necessary to treat water from this source for at least 10 to 15 years.

The Lower Pud, Negus, and Neil Lake TCA's will be recontoured so that surface water is directed to Lower Pud, where the water quality will be tested. If the water is within

Water License discharge limits, it will be discharged to Meg Lake; if it is not within Water License discharge limits, it will be pumped to Middle Pud pond for treatment before it is released.

Groundwater

It is expected that once the mine is flooded, the regional groundwater pattern will return approximately to the pre-mine pattern. The final C&R Plan allows for installation of water quality monitoring and pumping openings in the concrete caps on the Robertson Shaft, C-1 Shaft, and 204Q Stope. Minewater quality will be routinely monitored prior to the water level reaching equilibrium at surface. The C&R Plan provides for contingent pumping and treatment of this water if the water quality does not meet Water License discharge standards. If the minewater meets Water License discharge standards, it will be directed into Rat Lake from a spill point constructed in the 204Q stope cap. This assumes that there will be a positive outflow of groundwater from the flooded mine workings to surface in the future, as compared to the current net inflow. This assumption will be validated through ongoing monitoring as the flooding level within the mine approaches surface (expected in 2014).

Surface Structures

With the exception of the Water Treatment Plant and the ALS Environmental Laboratory, all surface structures will be demolished and the clean debris placed in the on-site non hazardous waste landfill that is located within the Middle Pud Tailing Containment Area. Material of this nature that is determined to still be hazardous after cleaning and testing will be placed in the hazardous waste disposal area. Sites of former buildings and roads will be scarified, contoured, and revegetated as required.

Water Treatment

The Water Treatment Plant will continue to treat surface water runoff from impacted areas on the minesite until such time as Water License discharge limits are achieved without the need for treatment (predicted to be in 10 to 15 years as the rate of contaminant release from the tailing porewater diminishes).

Costs

Costs for carrying out the Final C&R Plan have been estimated using the DIAND Reclaim spreadsheet model. The revised estimate for the reclamation, post closure water treatment, monitoring and maintenance is $12.5 million, which excludes all progressive reclamation completed as of the end of 2006. A cost breakdown summary appears in Section 10 of the C&R Plan.

Monitoring

Post-closure monitoring and maintenance of the site will continue until it is deemed no longer necessary, a decision that will be made by the MVLWB in consultation with the other regulatory agencies and stakeholders. It is proposed that, for purposes of post-closure environmental monitoring and maintenance, the existing Surveillance Network Program be extended for at least twenty five years, as a minimum, after closure.

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Confidential – provided to MVLWB under separate cover

LIST OF STAND ALONE SUPPORT DOCUMENTS TO THE C&R PLAN SUBMITTED UNDER SEPARATE COVER TO THE MVLWB

These documents are available for viewing or printing from the MVLWB www.mvlwb.com website under Miramar Con Mine Water Licence N1L2-0040 MVLWB/

Miramar Con Mine – Engineering Risk Assessment and Risk Management Plan for the Flooding of the Underground Workings, URS Consultants, January 6, 2005.

Summary Soil Sampling Plan 1997, Miramar Con Mine, Yellowknife, NT Technical Memorandum, Golder Associates Ltd., February 1, 2006.

Soil Contamination Study Con Mine Final Closure and Reclamation Plan, Miramar Con Mine, Yellowknife, NWT, Golder Associates Ltd., February 2, 2006.

Non-hazardous Landfill Inventory June 2004, Memorandum from MCML to MVLWB, January 31, 2005.

2005 Groundwater Monitoring at Con Mine, Technical Memorandum, Golder Associates Ltd., February 1, 2006.

Letter to Miramar Con Mines Ltd. from CE Jones & Associates, February 16, 2006.

Phase 2 – 204Q Crown Pillar Evaluation Miramar Con Mine, Yellowknife, NT, Golder Associates Ltd., April 28, 2005.

Interim Summary of Results, Kinetic Testing on Tailings, Closure Plan, Miramar Con Mine, NT, Golder Associates Ltd., August 16, 2006.

Soil Contamination Study, Con Mine Final Closure and Reclamation Plan, Miramar Con Mine, Yellowknife, Northwest Territories, Golder Associates Ltd., February 2, 2006.

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1.0 INTRODUCTION

1.1 Scope

Since 1995, the Con minesite leases have been the subject of a number of investigative studies directed at locating, identifying and characterizing all areas of contamination that need to be remediated during the reclamation process. Theses studies were undertaken with the knowledge that active operations at the Con Mine were drawing to a close, thus all impacted areas would need to be identified, located, and defined in extent and nature to allow appropriate remediation measures to be designed. These studies have been submitted under separate cover to the Mackenzie Valley Land and Water Board to form part of the public registry for the Con Mine Closure and Reclamation Plan (C&R Plan). A chronological list of those studies is presented with the Table of Contents. These studies are key supporting elements of the C&R Plan and should be referenced by readers of this Plan to gain a full understanding of the nature of the contaminated sites to be addressed through the reclamation at the Con minesite. The information collected from these studies has been brought together and addressed through the proposed reclamation measures outlined in this C&R Plan.

The C&R Plan provides a description of the activities and reclamation measures that are being taken by Miramar Con Mining Limited (MCML) to remediate, close, and monitor the Con minesite following completion of the proposed reclamation activities. It identifies measures to be taken to remediate specific areas and provides a schedule for completion of these reclamation projects. The Plan details ongoing water treatment commitments and outlines environmental monitoring and maintenance activities that will continue after the physical site reclamation is complete (scheduled for 2010). Cost estimates for the planned work have been prepared using the DIAND RECLAIM reclamation costing model and are summarized in Section 10 of this Plan. However, distribution of the detailed reclamation cost estimate is limited (to the MVLWB and INAC) so as not to interfere with Tenders that may be requested to carry out the various projects.

The objective for this document is to provide an overarching plan of what activities are being proposed for reclamation of the Con minesite leases. This Plan was prepared in accordance with the terms and conditions of the Con Mine Water License (Appendix I) and is subject to review and approval by the Mackenzie Valley Land and Water Board (MVLWB).

Specific reclamation activities are subject to INAC inspections and subsequent orders issued under the Water License. Job-specific plans will be prepared prior to the start of each reclamation project and developed for tendering and contracting purposes following final approval of the C&R Plan by the MVLWB. It must be clearly understood that this document is a Plan, and as such it is subject to revision to deal with any change in actual conditions as they arise throughout the course of the work.

1.2 Con Mine

Con Mine is located in the City of Yellowknife and is adjacent to the southern residential neighbourhoods of the city. The mine is located on the west side of Yellowknife Bay on Great Slave Lake, in the south-central Northwest Territories as shown in Figure 1.1. The minesite is at Longitude 114 degrees, 20 minutes and Latitude 62 degrees, 28 minutes, immediately south of Yellowknife (Figure 1.2).

The minesite surface leases encompass a total area of 340 hectares (Figure 1.3). An aerial photograph of the site is presented in Figure 1.4. The five surface leases covering the minesite are listed in Table 1.1 and shown on Figure 1.5. There are presently three gated accesses to the property: Taylor Road Gate, Con Road West Gate, and the Con Road Southeast Gate, which is the main entrance to the minesite.

TABLE 1.1: Con Mine Leases

Lease Number	Lease Name or Property Area	Area		Commencement Date	Expiration Date
		Hectares	Acres		
L-8658 T	Minesite	261.19	645.40	1 August 1991	31 July 2021
L8659 T	Mosher Island	4.68	11.60	1 August 2001	1 August 2011
L-8660T	Con Camp	44.25	109.30	1 August 1991	1 August 2021
L-8661 T	Tin Can Hill Area	11.93	29.50	1 August 2001	1 August 2011
L-8662 T	Rat Lake Area	17.20	42.50	1 August 2001	1 August 2011

1.2.1 Site History and Operations

Mineral claim staking in the Yellowknife area began in 1934 as a result of the discovery of gold by a mapping party of the Geologic Survey of Canada, and by the end of 1935 the entire Yellowknife greenstone belt had been staked. Through acquisition and joint ventures, two companies, Consolidated Mining and Smelting Limited (Cominco) and Falconbridge, gained control of the Yellowknife Volcanic Belt and developed the Con and Giant mines. Nerco Minerals Limited purchased Con Mine in 1986 and owned and operated the mine until 1993, at which time Kennecott Limited purchased Nerco and sold Con Mine to Miramar Mining Corporation. Miramar Con Mine, Ltd. (MCML) has owned and operated the mine since October 1993. The mining operation closed in September 2003, but the mill will operate until the last of the arsenic sludges and calcines are processed. This is expected to be completed in 2007.

Con Mine went into production in 1938 and has since produced 5.5 million ounces of gold. Early work concentrated on developing and mining ore from narrow veins in the hanging wall of the Con Shear and from the Rycon-Negus veins. The Campbell Shear was discovered in 1947; the Robertson Shaft sunk in 1974, and deepened to its final depth of 1,902 m in 1984. The Robertson Shaft was used to hoist the entire mine's ore production in the last years of the operation. Both refractory ore and free milling ore have been mined and processed since the start of operations. To pre-treat the refractory ores, a roaster was operated at the mine between 1938 and 1970. Between 1970 and 1991, roasting was discontinued and only free-milling ore was mined. In 1991, Nerco Minerals Limited determined that a pressure oxidation process using an autoclave to treat refractory ores was preferable from an environmental and economical perspective, allowing for increased gold recovery from the refractory ore. The autoclave was constructed and commissioned in late 1991.

The main access and hoisting shafts at Con Mine were the C-1 Shaft, located adjacent to the existing mill, and the Robertson Shaft, south of the mill. Other openings to surface include the Negus and Rycon shafts and a number of ventilation and manway raises, as shown on the map of Con Mine openings to surface (Figure 1.6).

As illustrated in section on Figure 1.7, underground workings extend to a depth of over 1,900 m at the Robertson Shaft and to over 750 m at the C-1 Shaft. The primary mining methods were cut and fill, shrinkage, and longhole stoping. Ore was gravity fed to the loading pocket via the main ore pass, then hoisted to surface. Most mine waste rock was left underground as structurally supporting backfill in previously mined areas. Mine waste rock was hoisted to surface if an excessive quantity was being produced, such as during development of new mining areas. Mill tailing was also utilized underground for backfill in the stopes. Upon cessation of underground mining operations, pumping for the mine dewatering system ceased and the mine was allowed to flood. Details of the mine-flooding plan are presented in later sections of this report.

1.2.2 Geology

Major gold production in the Yellowknife area has come from the Con and Giant mines, which are hosted by volcanic rocks of the Archean-aged Yellowknife Greenstone Belt. The Yellowknife Greenstone Belt is located in the southeast corner of the Slave Province and extends north from Great Slave Lake for more than 50 km. The greenstone belt is bounded to the west by younger granitic rocks of the Western Plutonic Complex (Figure 1.8) and to the east by siliciclastic sedimentary rocks of the Burwash Formation. The belt consists of a homoclinal, steep easterly to vertically dipping succession of mafic to intermediate volcanic rocks with minor volcaniclastic and sedimentary rocks striking to the northeast.

The rocks underlying Con Mine (Figure 1.9) strike north-easterly and dip 70 to 80 degrees to the southeast, forming a homoclinal succession with little evidence of secondary folding. In the vicinity of the mine, a series of granitic plugs and dykes and related bodies of breccia extend east from the Western Granodiorite to the West Bay Fault. Graded bedding in sedimentary intervals suggests stratigraphic tops face to the southeast. South of the West Bay Fault are a series of north-trending, sub-parallel planar shears dipping 50 to 60 degrees to the west (Figure 1.10). The Campbell and Con shears are the largest gold-bearing shears and they host the majority of the gold mineralization mined at Con Mine.

In the mine area, the Campbell Shear strikes 5 degrees east of north and dips 50 degrees west near surface, steepening to about 70 degrees west below a structural flexure at the 5100 level. The shear consists of strongly foliated chlorite-carbonate and sericite-chlorite-carbonate schist zones. Ore zones comprise intense quartz veining in which gold occurs in quartz-ankerite-sericite veins that are enveloped by sericite-ankerite alteration.

The Con Shear is a 35-m-wide series of anastomosing shears that strike 30 degrees east of north and dip 45 to 65 degrees northwest. The Con Shear, like the Campbell Shear, is a zone of strongly foliated chlorite-carbonate and sericite-chlorite-carbonate schist, with ore zones composed of gold-bearing quartz-sericite veins.

The discontinuous Rycon and Negus shear zones cross over between the Con and Campbell shears, striking north-northwest and dipping between 55 and 65 degrees to the west. Ore zones consist of quartz lenses occurring at shear flexures and junctions and are composed of a number of narrow, quartz and quartz-carbonate filled breccia zones. Gold occurs as ore shoots within the quartz and quartz-carbonate veins.

1.2.3 Topography and Geomorphology

As shown on the site map (Figures 1.3 and 1.11), elevations range from 161 m ASL to just over 197 m, for a total vertical relief of just over 35 m. The ice-scoured planar topography is typical of ice-cap erosion, characterized by striated, grooved, and polished rock surfaces, and rounded rock knobs interspersed with shallow basins of glacial till overlain with silts and clays.

The Yellowknife region has been subjected to numerous periods of glaciation. The most recent glacial event in the Yellowknife area terminated during the Quaternary Period, in the late Holocene Epoch, between 11,000 and 9,000 Before Present, as the melting Laurentide Ice Sheet retreated to the northeast. As the ice sheet retreated, the glacial Lake McConnell was formed in the basins now occupied by Great Bear, Great Slave, and Athabaska lakes. Lake McConnell flooded the Yellowknife area, depositing lacustrine silts and clays over glacial till in topographic lows.

1.2.4 Climate

Total annual precipitation ranges from 200 to 500 mm. Based on 30-year averages (1971 to 2000), normal annual precipitation at Yellowknife is 281 mm, of which 116 mm occurs as snowfall and 165 mm as rainfall. Average annual evaporation is in the order of 470 mm.

The minesite is located in a zone of discontinuous permafrost, with a mean annual air temperature of 4.6 degrees Centigrade below zero. During the winter, wind direction is generally from the north and during the summer, from the south. Table 1.2 is a presentation of 30-year (1971 to 2000) averages of monthly precipitation, temperature and wind data from Environment Canada (http://www.msc-smc.ec.gc.ca/climate/climate_normals/).

TABLE 1.2: Yellowknife Climate Normals, 1971 to 2000

Precipitation	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Rainfall (mm)	0	0	0.2	2.2	14.5	26.9	35	40.9	29.5	14.7	0.2	0.2	164.3
Snowfall (cm)	18.8	17.6	17.3	10.5	4.5	0	0	0.1	3.1	23	34.4	23	152.2
Total Precipitation, Water (mm)	14.1	12.8	13.4	10.9	19.1	26.9	35	40.9	32.9	35	23.5	16.3	280.7
Temperature:													
Daily Mean (^{o}C)	-26.8	-23.4	-17.3	-5.3	5.6	13.5	16.8	14.2	7.1	-1.7	-13.8	-23.7	-4.6
Daily Maximum (^{o}C)	-22.7	-18.6	-11.2	0.4	10.6	18.2	21.1	18.2	10.3	1	-9.9	-19.7	-0.2
Daily Minimum (^{o}C)	-30.9	-28.1	-23.3	-11	0.5	8.7	12.4	10.3	3.8	-4.4	-17.7	-27.7	-9
Daily Events / Days With:													
Blowing Dust	0	0	0	0	0	0	0	0	0	0.04	0	0	0.04
Wind Speed > = 52 km/hr	0.23	0.12	0.12	0.15	0.08	0.08	0.04	0.04	0.31	0.35	0	0.08	1.6
Wind Speed > = 63 km/hr	0.04	0.08	0	0	0	0	0	0.04	0.04	0.04	0	0	0.24
Maximum Temperature > 10 (^{o}C)	0	0	0	2.1	17.2	28.1	31	29.8	15.7	0.7	0	0	124.6

1.2.5 Hydrology

Surface Hydrology

The two watersheds on the minesite are:

The Pud Lake, watershed or western drainage system that includes the original Pud Lake, drains to Kam Lake. The portion of the watershed that has been used for tailing disposal now drains by pipeline to Meg Lake. The drainage basin has several sub-basins, which are the Taylor Road area, Upper Pud Lake, Middle Pud Lake, Lower Pud Lake, Neil Lake, and Negus tailing area.

The second watershed is the Crank Lake watershed or eastern drainage basin. It includes Crank Lake and drains to Rat Lake to the north and to Yellowknife Bay to the east.

These watersheds are shown on Figure 1.12.

Surface water flows are controlled by the topography of the area, the geomorphology, and the bedrock surface. Almost 70% of the surface landmass on the mine property is rock outcrop.

Prior to construction of the Upper and Middle Pud Tailing Containment Area, surface drainage from the northwest of the property (Taylor Road area) flowed south into Pud Lake and then west to Kam Lake. Near-surface groundwater was inferred to move in the same direction. Since construction of the Tailing Containment Area, surface water collected north of, or below, Taylor Road Dam is tested to verify that no contaminants are present, then pumped to Kam Lake each summer. This has also impacted the shallow groundwater flows in the area.

Surface water flows to Upper and Middle Pud tailing areas are now directed to Middle Pud Basin and then to the Water Treatment Plant prior to release to Meg Lake. West of Upper, Middle, and Lower Pud Basins, the surface flow pattern is toward Kam Lake.

At the south end of the property, surface water historically flowed from the Negus, Neil Lake, and Lower Pud tailing areas to the Lower Pud basin and toward Kam Lake. In the mid-1960s, a man-made channel was created to direct surface water and runoff from these areas towards Meg Lake. In 1987, a pipe was installed to move the treated water from Middle Pud across the Lower Pud basin to the south end of the tailing area.

Surface runoff flows in the Negus and Neil Lake tailing areas are generally minor due to the small catchbasins. The limited amount of water that does run off flows to the Lower Pud basin and is pumped into the Middle Pud for treatment in the Water Treatment Plant prior to release to the environment. As part of the reclamation plan, engineered drainage channels will be constructed to direct runoff and ponded water from Negus and Neil Lake to Lower Pud Basin at a point near the Water Treatment Plant.

Crank Lake basin was the first area to receive tailing in the 1940s. Crank Lake includes part of what was originally the southern end of the Rat Lake watershed. The basin was used for historic tailing deposition, from the time of the mine's commissioning in 1938 until the mid or late 1950s. Snowmelt and runoff from Crank Lake accumulates as surface ponding at the east side of the original lake basin. The ponded water is pumped to the Middle Pud TCA.

On the northeast margin of the property, snowmelt and surface runoff flows toward Rat Lake. Over the operating life of the mine there has been some seepage from Crank Lake towards Rat Lake, but there does not appear to have been any placement of tailing into Rat Lake. Beginning in 1953 and continuing until just after 1961, a jetty was constructed at the south end of Rat Lake. At the same time a portion of the south end of the lake was filled with waste rock. During the same period, the lake level was lowered with the installation of an excavated drainage system at the lake's north end. It appears that this work was undertaken to prevent water from entering underground mine workings immediately below the lake. The lake level is now controlled by the inlet level of a storm sewer maintained by the City of Yellowknife.

Subsurface Hydrogeology

At depth, the bedrock is generally hydraulically tight except near major fault or shear zones, which have a major influence on the patterns of groundwater flow. These fractured and faulted zones reduce or prevent development of large-scale regional groundwater flow systems and focus groundwater flows to these permeable structural features. A regional groundwater study for the property, "Hydrogeological and Hydrogeochemical Study of the Miramar Con Mine – Yellowknife, NWT" by INTERA Consultants, Ottawa, March 31, 1997, indicated that there are several types of subsurface water, each with distinct isotopic and geochemical characteristics in the mine at depth. These are shield brine, glacial melt water, old meteoric water, and recently recharged meteoric water.

Shield brine is typical of deep crystalline environments and is recognized by its high salinity due to calcium and sodium chlorides. Water pumped from the deeper parts of the mine was typically of the shield brine type. Glacial melt water and old meteoric water, derived from the retreat of glaciation from the Great Slave area 9,000 to 10,000 years ago

is characterized by brackishness and its depleted oxygen 18 isotope signature. It is identified in the mine at intermediate depths (the 2300 level, or some 2,300 feet below surface) and towards the south end of the mine. Recently recharged meteoric water is characterized by its stable water isotopes and the detectable presence of tritium.

As discussed in INTERA's report, the irregular spatial distribution of water types and the change in distribution over time (since measurements began in 1980) is related to the varying hydraulic conductivities within faults and the disturbance of the natural groundwater system during mining activities. The existence of glacial melt water in the mine is attributed to shallow hydraulic gradients that existed in the area prior to mining. At the close of mining, it is anticipated these low gradients will resume and little interaction should occur between shallow groundwater and deeper, flooded mine workings. A separate study carried out by URS Consultants for MCML details this interaction.

1.3 Milling History

Ore processing at Con Mine consisted of up to seven individual processes. As shown in the Mill Circuit schematic (Figure 1.13), the processes include comminution, crushing, grinding, flotation, pressure oxidation, cyanidation, and refining. In this section, each processing procedure is described, along with a qualitative accounting of the respective operating inputs and outputs.

Gold ore at Con Mine was classified as either "refractory" or "free milling". Refractory ore is gold-bearing ore in which the gold is trapped within the structure of other minerals and cannot be recovered by direct leaching with cyanide solution. It must be pre-treated (to destroy the confining minerals), by roasting or pressure oxidation (autoclave processing) to release the gold for extraction by cyanide leaching. Free milling gold ores are amenable to cyanide leaching without pre-treatment. The flow sheets for the two processes are shown on Figures 1.14 and 1.15.

1.3.1 Comminution

Comminution is that step in mineral processing in which there is a reduction in the physical size of the individual particles of the material being processed. At Con Mine, ore was reduced in size by two stages of crushing followed by one stage of grinding.

1.3.2 Crushing

Ore from the mine ranged in size from fine granular particles to individual pieces over 45 cm (18 inches) across. Ore passed through a two-stage crushing process, first through a Telsmith, 64- by 92-cm (25- by 36-inch) jaw crusher then a through a Symons, 1.7-m diameter (5.5-foot) short head cone crusher. The jaw crusher processed ore directly from the mine and reduced the maximum size of individual ore pieces to less than 16 cm (6 inches), which fed to the cone crusher. The cone crusher reduced the material size to less than 1.6 cm (5/8 of an inch), which fed to one of two ball mills for grinding. Crushing was undertaken without water or additives and no wastes or by-products were produced.

1.3.3 Grinding

There were two ball mill grinding circuits at Con Mine, one for refractory ore, and one for free milling ore.

Refractory ore was ground in a single-stage process. It passed through a 2.4- by 3.7-m (8- by 12-foot) ball mill, which reduced the ore to particle sizes of less than 80 microns. Recycled solution from the flotation process was added to the ball mill to facilitate the grinding process and to initiate mineral-specific preparation of the ore particles for flotation. The recycled solution consisted of water with lime and flotation reagents. The refractory ore ball mill circuit produced a pulp solution of 35% to 40% solids and was pumped in its entirety to the flotation circuit.

Free milling ore was also ground in a single-stage process through a 3- by 4.5-m (10- by 15-foot) ball mill, which reduced the ore to a silt-like material with individual particle sizes of less than 80 microns. Recycled solution from the cyanidation process was added to facilitate the grinding process and to initiate gold liberation from the ore particles. The recycled solution consisted of water with lime and a low concentration of cyanide. The ball mill discharge was a pulp solution of 60% to 70% solids and was pumped in its entirety to the cyanidation process.

The majority of the reagents and chemical inputs used in the milling / grinding process have been removed from the property. As part of the decommissioning of the process facilities, these reagents have been taken out of service and sold, recycled, or disposed of according to best management practices for each substance. The rest will be removed once all further milling of arsenic sludge is complete. A list of the major reagents and their former uses appears in Table 1.3 below.

TABLE 1.3: Reagents Formerly Used in Ore Processing at Miramar Con Mine

Reagent Type	Former Use
Acetylene	General Maintenance Property-Wide
Antiscalant	Autoclave
Argon	Autoclave
Borax	Refinery
Calcium Hydroxide	Grinding
Calcium Lignosulfonate	Autoclave
Calcium Oxide (Lime)	Autoclave, Blend Plant
Carbon	Leaching, Dewatering
Cement	Backfilling
Copper Sulphate	Flotation
Diatomaceous Earth	Merrill Crowe System
Diesel Fuel	Refinery, Vehicles, and Equipment Property-Wide
Dow Froth 250-C	Flotation
Flocculants	Autoclave, Blend Plant
Flotation Frothers	Flotation
Gasoline	General Usage, Vehicles, and Equipment Property-Wide
Grease	Crushing, Grinding, Vehicles, and Equipment Property-Wide
Hydraulic Fluid	Crushing, Grinding, Property-Wide
Hydrogen	Autoclave
Lead Acetate	Leaching
Lead Nitrate	Merrill Crowe System
Lubricants	Crushing, Grinding, Property-Wide
Nitrogen	Autoclave
Oxygen	Autoclave
Potassium Armyl Xanthate	Flotation
Potassium Iodide	Leaching
Propane	Autoclave, General Heating
Salt	Autoclave
Silica	Refinery
Silver Nitrate	Leaching
Sodium Carbonate	Refinery
Sodium Cyanide	Grinding, Leaching
Sodium Isopropyl Xanthate	Flotation
Sodium Nitrate	Refinery
Stannous Chloride	Leaching
Zinc	Merrill Crowe System

1.3.4 Flotation

Flotation is a complex physiochemical process taking place in ore pulped with water. The surfaces of one or more minerals in the finely ground pulp are made both water-repellent and responsive to attachment with air bubbles. Selected minerals are caused either to float or sink by the use of flotation chemicals or reagents that become attached to mineral surfaces through physical or chemical sorption. Beneficiation is accomplished as the mineral laden bubbles rise to the surface, leaving behind other minerals that have not responded to the treatment. Success is dependent on the ability to selectively differentiate between those minerals for which flotation is desired and those minerals that are to remain in the tailing.

At Con Mine, gold-bearing sulphide minerals were concentrated by flotation of the sulphide mineral fraction of the pulp. From grinding, the mineralized pulp was routed to conditioners where reagents were added to modify both the surface properties of the different minerals (promoting or suppressing water repellence, or adherence to bubbles) and the nature of the fluid medium (density, pH, surface tension, froth promotion).

After conditioning, separation of the pulp took place in the flotation phase where air bubbles were introduced into the suspended pulp from the bottom of the containment cells. On the surface of the pulp, the sulphide-bearing froth was collected, thickened, and forwarded to the autoclave for pressure oxidation. The excess solution from the gold-bearing sulphide pulp was recycled and used again in the flotation process as well as in the grinding circuit.

In addition to the ore pulp and some water, four primary reagents were used in the flotation process: copper sulphate, flotation frothers, potassium amyl xanthate, and flocculants.

The non-floating portion of the pulp fraction from the process, over 90% of the original solids, was recycled to the neutralization circuit where it was used to partially neutralize the acid generated in the autoclave. Lime was added to the overflow portion to raise its pH to 7.5 prior to thickening. After thickening, the liquid fraction was recycled back into the flotation circuit and the solids were pumped to permanent disposal in the TCAs or underground as backfill in mined out areas.

1.3.5 Autoclave Pressure Oxidation

Over the past 20 years, autoclave pressure oxidation ore processing has been developed into a cost-effective and widely applied technology for the treatment of gold ores and concentrates that are refractory due to the association of gold with sulphide minerals. Compared with roasting, the previously dominant technology for refractory sulphide gold ores, autoclave technology is environmentally superior in that there is a concurrent stabilization of arsenic and no atmospheric emissions of sulphur dioxide or volatile metal oxides.

In 1989 Nerco Minerals initiated research on ore pre-treatment technology, and constructed and commissioned an autoclave at the mine in 1992. The autoclave provides a means for processing refractory ore, and an environmentally efficient method of treating the calcines and arsenic sludge by-products of the pre-1970 roaster operation. These products are from mining and processing activities that predate Miramar's presence and were stored in the Con and Negus ponds.

Feed to the Con Mine autoclave was a mixture of flotation concentrates from mine production and arsenic-rich sludge and calcines. It was blended to meet the process heat requirements (oxidation of the sulphides is an exothermic process) and to maintain an iron to arsenic molar ratio of greater than 1.2 to 1, to maintain a stable, insoluble ferric arsenate product. In these proportions, the process has a daily capacity to treat 30 metric tonnes of sludge, resulting in the stabilization of almost 15 metric tonnes of arsenic trioxide per day.

There were seven products fed into the autoclave: ore concentrates, calcines, arsenic sludge, recycled acid, steam, oxygen, and water. Flotation concentrate slurry feed was pre-treated with recycled acid from the autoclave to neutralize carbonates and then blended with mixed calcine and arsenic sludge slurry. The mixture was diluted with water and additional recycled autoclave acid solution, then pumped into the autoclave. Steam was injected at start-up to heat the feed product to a point at which the exothermic sulphide oxidation reactions are fast enough to meet the bulk heating demand at a temperature of 210ºC (410ºF). Water was added as needed to moderate the heat of reaction and oxygen was supplied throughout the process. The reagent and chemical inputs to the pressure oxidation process are listed in Table 1.3.

The three autoclave discharge products were a solid residue of gold-bearing iron oxides (hematite, Fe_2O_3 and scorodite, $FeAsO_4.H_2O$), a fluid fraction of sulphuric acid (H_2SO_4), and gaseous emissions captured in the scrubber. The solid residue reported to cyanidation for extraction of gold. Part of the acidic fluid was re-circulated to neutralize alkaline material in the ore prior to pressure oxidation in the autoclave, and the excess was treated with lime-rich flotation tailing and lime and then reported to the tailing containment area. The captured scrubber emissions solution was neutralized and also reported to the tailing containment area.

As no process residues are retained within the body of the autoclave, at mine closure it will be thoroughly washed down and dismantled. Reusable equipment will be salvaged and any unusable material will be disposed of in the landfill. Solutions from the wash down will be directed to the tailing containment area, and ultimately treated at the WTP. The Autoclave will not be taken out of service until all remaining arsenic sludges and calcines are processed (expected to be completed in 2007).

1.3.6 Roasting

In 1942, Cominco installed a roaster at the mine to pre-treat refractory concentrates. It operated until 1970. The roaster was a diesel-fired Edwards Roaster and was situated in what is now the autoclave's present location.

The roasting pre-treatment process liberated gold from its physical encapsulation or binding by sulphides, and it consisted of a two-part heating process: heating the ore to a temperature of about 500ºC in a slightly reducing environment to drive off arsenic (by volatilizing arsenopyrite) as a gaseous arsenic trioxide, followed by heating at a higher temperature (550ºC), under more oxidizing conditions, to oxidize pyrite to hematite or magnetite.

The economic product of the roasting process was calcine, a mixture of gold-rich iron oxides and sulphides, amenable to cyanide leaching. Between 1942 and 1948, the roaster off gases were vented directly to the atmosphere. In 1948, a baghouse and scrubber system were installed to capture the gases' arsenical and sulphurous emissions. The sludges from the baghouse and scrubber were stored in the Con and Negus ponds. The roaster was decommissioned in 1970.

1.3.7 Cyanidation

The cyanide process has been utilized by the mining industry since the late 1800s and is used extensively as a collecting medium for gold and silver. At Con Mine, slurries of gold-bearing pulp from the autoclave and the free milling ore grinding circuit were fed into a cyanide-bearing agitation circuit, where the gold was dissolved by the cyanide solution. The solution was then separated from the pulp, clarified, and its oxygen content reduced. Powdered zinc metal was added to the solution to precipitate the precious metals and the precipitate was separated from the solution in a filter press. This gold-bearing filter cake reported to refining.

The leach circuit consisted of a series of tanks equipped with propeller-like rotating blades to agitate and suspend the pulp in a very dilute cyanide solution, generally less than one-tenth of 1% cyanide. Agitation of the medium promoted the dissolution of the gold by keeping the solids in suspension with the cyanide and facilitated the introduction of oxygen. As the pulp moved from tank to tank, the concentration of gold in the solution (referred to as the "pregnant" solution) increased as more gold was dissolved. The solution was continuously separated from the pulp using thickeners and several stages of filtration.

The filtered solution was clarified (the residue from clarification was recycled to the leach circuit), and then de-aerated; the dissolved oxygen gas in the solution was reduced to less than one part per million to enable the gold precipitation process. Immediately after de-aeration, an emulsion slurry of powdered zinc metal was added to the solution, which precipitated a predominantly gold and zinc residue. The solution was filtered and the gold-bearing precipitate reported to refining.

In addition to the gold-bearing slurry, there are five inputs to the cyanide leaching process: cyanide, lime, lead acetate, diatomaceous earth, and zinc metal. The reagent and chemical inputs to the cyanidation process are listed in Table 1.3.

In addition to the gold-bearing precipitate, products from the cyanidation process include solids and solution from the leach or agitation circuit, residue from the filtration of the pregnant solution, and solution from the filtration of the gold-bearing precipitate. Solids from the leach circuit were rinsed with fresh water and pumped to disposal in the TCAs or underground as backfill. Rinse water was processed as gold-bearing pregnant solution. The solution from the pressure filtration of the gold-bearing precipitate, referred to as the "barren" solution, was recycled to the leach circuit and to the free milling ball mill and the excess reported to the Middle Pud TCA. From there it was treated at the WTP.

1.3.8 Refining

Refining is the process of removing base metals and other impurities from high-grade press filter cake to produce bullion containing over 75% precious metal. Gold is separated by heating the material in the presence of slag-forming fluxes at temperatures in excess of the melting point of all the components of the charge, typically between 1000º C and 1400º C. Slag is the fused and vitrified material separated out during the reduction of a metal from its impurities.

Prior to refining, four fluxes were added to the precipitate: silica, sodium borate, sodium nitrate, and sodium carbonate. They serve to produce the slag and to react with the base metals and impurities, freeing them from the precious metals and incorporating them into the slag. The material was then heated to 1100ºC for about 90 minutes, during which time the precious metal segregated and sank to the bottom of the crucible and the lighter slag moves to the top. The resulting precious metal bullion was then poured into bars and shipped off the property to a gold refinery such as the Royal Canadian Mint.

The fluxes and other reagents and chemical inputs to the refining process are listed in Table 1.3.

Including the bullion, there were three outputs from the refining process: the slag, which was re-refined or recycled to the grinding circuit, and the flue emission gases, which were scrubbed by water, captured and reported to tailing. Liquid effluents were then directed to Middle Pud and ultimately treated at the WTP.

1.3.9 Backfilling Operations

Backfilling is the practice of using waste material to fill underground voids in order to safely retain the structural integrity of a specific underground area. The use of tailing for backfill at Con Mine began in 1957, and the quantity placed underground has ranged from approximately 15% to as high as 40% of the total tailing produced each year.

The preparation of tailing for backfill usage was a three-stage process: dewatering the tailing, washing it with fresh water, and removing the finest sized material and reducing the water content. By filtration, process water was removed from the tailing and the tailing was washed with fresh water. This slurry of fresh water and tailing was then processed through a two-stage cyclone system, which removed the smallest size fraction of the solids (generally particles less than 37 microns, referred to as “slimes”) and reduced the water content to produce a slurry of about 60% solids. Recovered water and the finer material reported to the TCAs.

After being pumped underground to its final destination, the backfill was allowed to settle and the decanted fluid was returned to the surface and reported to the tailing containment area. Backfilling stopped with the cessation of mining operations.

1.3.10 Assay Laboratory

Assaying is a process of analysis by which specific constituents of interest in a rock are identified and precisely measured. Methods of analysis used at Con Mine included fire assaying, wet assaying, and instrumental analysis, or a combination of these methods. With fire assaying, the sample is melted at high temperature and the unwanted elements are chemically removed. Using wet assaying, the sample is dissolved in acid and the metals of interest are recovered chemically using various reagents. With instrumental analysis, an element is identified and quantified by its atomic properties, such as response to x-rays.

Samples taken in the mine generally represented specific mineralized areas or potential zones of ore. These were crushed, ground, pulverized, and chemically pre-treated before being submitted to a particular analytical process. From preparation through analysis to conclusion and cleanup, the analytical process used small quantities of a number of chemicals and reagents. These chemicals and reagents are too numerous to list within the context of this document, and they are covered by the small quantity exemption under the

Workplace Hazardous Materials Information System (WHMIS) and were dealt with accordingly as they were phased out of service. Any laboratory chemicals and reagents that could not be sold, returned to the manufacturer, or given to another analytical facility were transferred to the environmental laboratory which is now operated by ALS Laboratory Services as an independent commercial laboratory. The mineral, rock, and chemical residues from these analytical processes reported to the tailing containment areas and were ultimately treated at the WTP.

1.3.11 Environmental Laboratory

As stated above, the environmental laboratory is now operated by ALS Environmental Laboratory Services as an independent laboratory. The Environmental Laboratory was originally constructed to enable rapid analyses of treated effluents from the Water Treatment Plant at Con Mine and the Effluent Treatment Plant at Giant Mine in order to determine that they meet all Water License discharge limits before discharge to the environment. In addition, it was used for determination of input water quality to the treatment plants, as well as analyses of samples for the Surveillance Network Programs at both operations. This entailed numerous types of analysis, including total and trace metals, cyanide, ammonia, pH, total suspended solids, and a host of support measurements.

Methods of analysis used at the Environmental Laboratory include Atomic Absorption, Colorimetric Spectroscopy, distillation, hydride generation, various wet chemical digestions, instrumental analysis, or a combination of these methods. From sample preservation through analysis to conclusion and cleanup, the analytical process uses small quantities of a large number of chemicals and reagents. These chemicals and reagents are too numerous to list within the context of this document, and they are covered by the small quantity exemption under the Workplace Hazardous Materials Information System (WHMIS) and ALS Environmental Services will deal with them accordingly if and when they are phased out of service. Chemical solutions or residues from these analytical processes are either neutralized within the laboratory or deposited into the Middle Pud TCA and ultimately treated at the WTP.

It is anticipated that the Water Treatment Plant at Con Mine will continue to operate for the next 15 to 25 years. As such, it is anticipated that ALS Environmental Services will continue to operate the environmental laboratory at Con Mine as a commercial laboratory and in support of the Water Treatment Plant until such time as the plant is no longer required, or another source of rapid chemical analyses is located within the City of Yellowknife. In the event that ALS determines that it is no longer feasible to operate a commercial laboratory in the City of Yellowknife; the laboratory will be phased out at that time and any laboratory chemicals, reagents, and equipment that cannot be sold, returned to the manufacturer, or given to another analytical facility, will be disposed of

by a hazardous waste management company that specializes in the handling of such materials. The estimated cost for the final phase out of the Environmental Laboratory and the Water Treatment Plant is included in the cost estimate summarized in Section 10.

1.4 Closure and Reclamation Objectives and Issues

The general objective of the closure and reclamation plan is to confirm that the site and its facilities will be closed and reclaimed in compliance with the property's Water License and surface lease agreements in a manner that enhances the natural recovery of the site.

The specific objectives of the Closure and Reclamation Plan are:

- To present a site characterization of the minesite, including the natural setting, history, a description of the site's facilities, and identification of environmentally impacted areas, both recent and historical;
- To describe the environmentally disturbed areas resulting from the historic mining activity carried out at this site over the past ~75 years;
- To present reclamation measures to remediate these disturbed areas to a chemically and physically stable condition where no significant environmental problems will occur in the future ;
- To provide a schedule of the activities required for reclamation of the site;
- To provide a schedule of post closure water treatment, environmental monitoring and maintenance activities to be continued after physical reclamation is complete; and,
- To provide a summary cost estimate for the reclamation of the property.

The minesite is located in a suburban setting on the south side of Yellowknife. Historically, the site has always been used for industrial purposes, specifically mining and milling. MCML proposes to reclaim the site to a condition where much of it can continue to be used in the future for industrial purposes. The Tailing Containment Areas (TCA's) will be reclaimed to a condition where they can be used as open space suitable for light recreation such as walking trails. There will be three capped sites, specifically the cleaned out Con and Negus Pond sites and the hazardous waste disposal site on the east side of the Upper Pud TCA. These areas will need to be excluded from any future development and retained as closed out hazardous sites.

Implementation of the C&R Plan will remove the present structures and foundations so future users can develop the site for other industrial purposes.

In developing the final Closure and Reclamation Plan, the following site-specific issues were considered and where appropriate addressed:

- The mine was initially located several kilometres from the original settlement area which became the town of Yellowknife (now a city). The mine was incorporated within the municipal boundaries for tax purposes in the 1950's. As the city continued to grow, it ultimately placed the minesite within an urban setting.

- Surface areas that were used for mining and milling operations (mill site and Robertson Shaft) will be reclaimed to a physically and chemically stable condition to enable potential future industrial land uses.

- To limit or prevent access to the site during reclamation activities, the perimeter fences, barriers, gates, and signage will be maintained. It is anticipated that these structures will need to remain in place for a considerable length of time (15 to 25 years), which will allow ample time for the site vegetation to be re-established. This however does not preclude specific areas being removed to facilitate other land use as determined by the lease owner (in consultation with the City of Yellowknife).

- The original Tailing Containment Areas (Crank Lake, Neil Lake, Negus and Lower Pud areas) will be drained, contoured, and vegetated. These areas will be fertilized, seeded with a mix of agronomic species and available local plant seed to develop a self-sustaining vegetative cover. There are approximately 35 hectares (87 acres) of land that fall into this category.

- Newer Tailing Containment Areas (those with high salinity such as Middle and Upper Pud) will be capped with a layer of waste rock at least 50 to 60 cm thick to prevent release of salts into the ecosystem. The rock cap will be fertilized and seeded with a mix of agronomic and available local plant seed to develop a self-sustaining vegetative cover. MCML has committed to create islands of overburden on top of the rock cap to encourage quick establishment of vegetation on these islands and to enhance natural progression of vegetation from the islands onto the surrounding areas where overburden has not been placed. MCML will seed the entire tailing surface but there is insufficient overburden to cover the full surface area. There are approximately 50 hectares (124 acres) of land that fall into this category. Where practical, these areas will be developed as open areas accessible for light recreational use. Vehicular traffic of any type will be discouraged. The establishment of self-sustaining vegetation growth on the tailing areas will require several growing seasons.

- It is anticipated that some areas, such as the three former arsenic sludge pits, even after excavation and cleaning, will not achieve industrial site standards. Although these are only small areas (20 m diameter), they will be permanently designated as hazardous waste sites and closed with low permeable geosynthetic clay liners, then covered with waste rock to deter future use of these areas. The perimeter of these areas will be marked with a cordon of large rocks spaced at one meter intervals to prevent vehicular access and designated as such by appropriate signs.

- A hazardous waste disposal site has been developed in the Middle Pud TCA on the site of the former calcine stockpile that was removed in 2006. This area will also be capped with an engineered cover system similar to that described above.

- The remainder of the site is to be returned to an open space state compatible with the historical site setting and consistent with the surrounding non impacted areas of wild grasses, low brush, and Black Spruce trees. Areas that have not been impacted by historic activity will be left in their original state. The reclaimed areas will support local vegetation and would be accessible for light recreational activities such as day hiking.

- The minesite is not a remote site, therefore it is anticipated that long term maintenance and monitoring activities will be required. These will take the form of geotechnical inspections in combination with a water sampling program. However, the long-term goal is to reduce maintenance activities, such as water treatment, to as "low" a level as possible, and ultimately eliminate the maintenance requirement.

- Arsenic is present in the impacted near surface soils, in both soluble and insoluble forms. Those soils above a level defined by a risk-based approach will be moved to a tailing containment area or hazardous waste storage area and covered as described above. (soils with arsenic above 340 mg/kg as per the GNWT Industrial Remediation guidelines).



LEGEND

- Major City
- Major Road
- Site Location
- Provincial/Territorial Boundary

0 50 100 200
Kilometers
Scale - 1:10,000,000

REFERENCE

Basedata from ESRI
Spheroid: GCS 1983 Projection: Lambert Conformal Conic

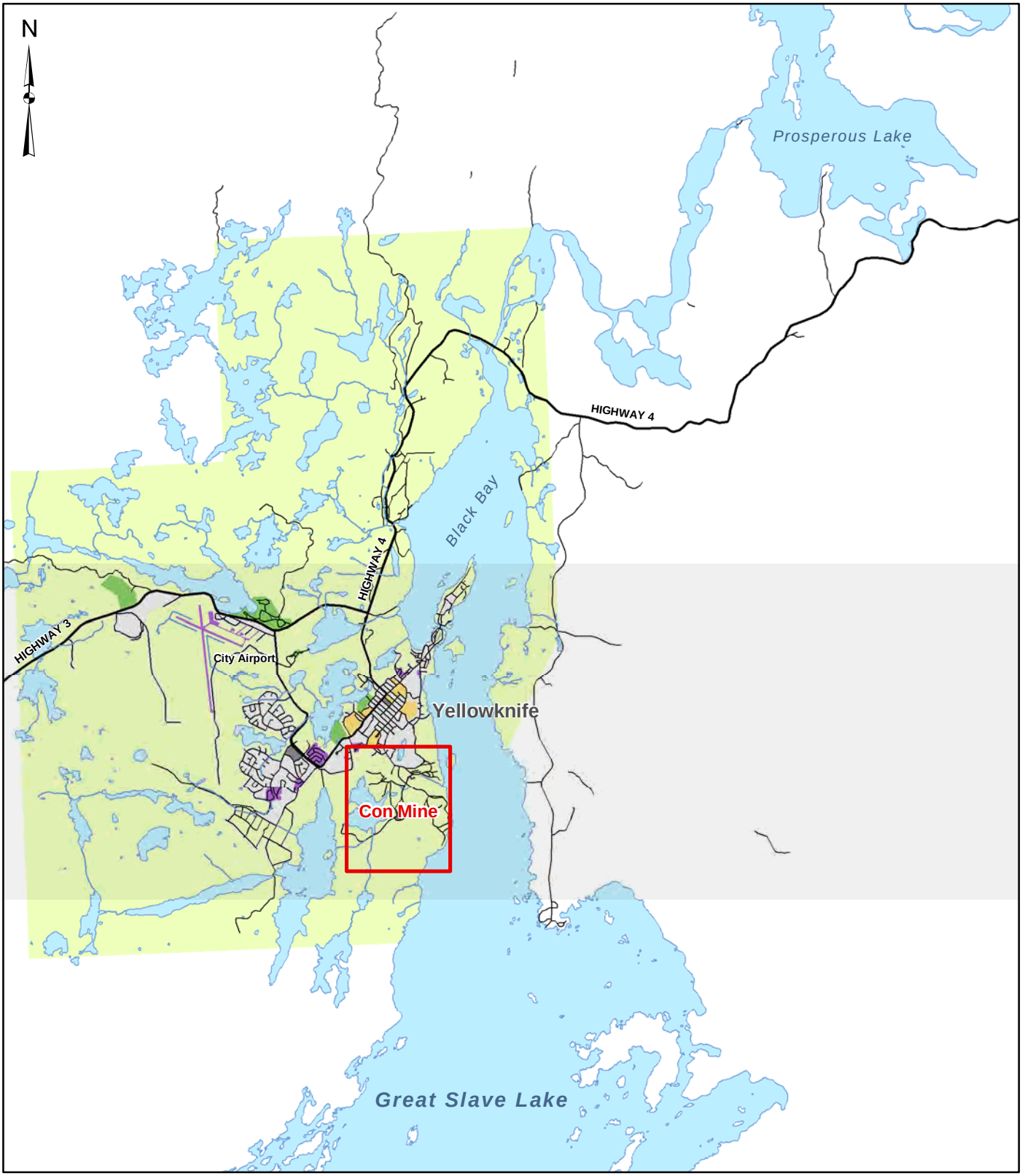
PROJECT

MIRAMAR CON MINE LTD.

TITLE

REGIONAL MAP OF THE NORTHWEST TERRITORIES

PROJECT No.			SCALE AS SHOWN	REV. 0
DESIGN	AS	30 Dec. 2004	FIGURE 1.1	
GIS	GGC	30 Dec. 2004		
CHECK				
REVIEW				



0 0.5 1 2 3 Kilometers

Scale 1:110,000

LEGEND

- Site Locations
- Watercourse
- Road
- Waterbody

Land Use

- Government and Institutional
- Open Area
- Parks and Recreational
- Residential
- Resource and Industrial
- Transporation Related Areas

REFERENCE

Basedata from DMTI
Projection: NAD 83, UTM Zone 11N

PROJECT

MIRAMAR CON MINE LTD.

TITLE

YELLOWKNIFE AREA MAP

PROJECT No.			SCALE AS SHOWN	REV. 0
DESIGN	AS	10 Dec. 2004	FIGURE 1.2	
GIS	GGC	28 Dec. 2004		
CHECK	DC	28 Dec. 2004		
REVIEW				

YELLOWKNIFE BAY

MOSHER ISLAND

RAT LAKE

940 LEASE BOUNDARY

LEASED FROM CITY OF YELLOWKNIFE

TAYLOR ROAD

PUMP TO KAM LAKE

TAYLOR RD. GATE

CON ROAD

CON RD. GATE

CON TRAILER PARK

MILLING COMPLEX

WATER LINE

LAKEVIEW ROAD

MAIN GATE

CRANK LAKE

UPPER PUD TAILING POND

CALCINE STORAGE

CON POND

NEGUS POND

IMPERIAL OIL

MIDDLE PUD TAILING POND

NEGUS TAILING

ROBERTSON SHAFT

BLEND PLANT

WAREHOUSE

940 LEASE BOUNDARY

NEIL LAKE

WATER TREATMENT PLANT

LOWER PUD TAILING

MEG LAKE

LEGEND

- LEASE BOUNDARY
- BUILDINGS ON MINE LEASE
- HISTORICAL TAILINGS
- SWAMPS
- 172.9 SPOT ELEVATIONS
- CONTOUR INTERVAL = 2 METRES

SCALE (METRES)

0 300

REFERENCES

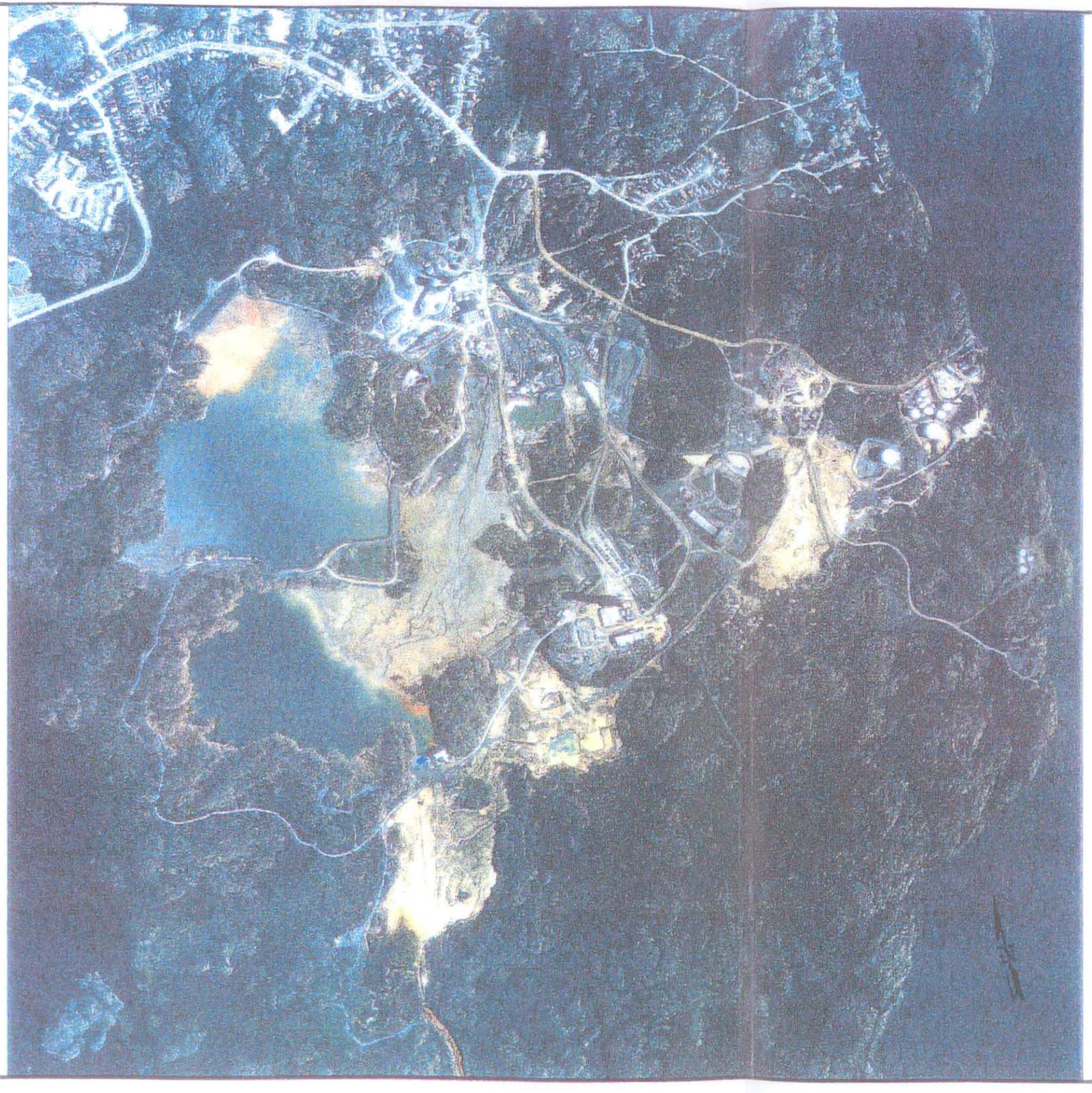
1) Miramar Con Mine. Dated: Jan 2001/Jan 2004

Checked by:
Revised By: Date:

Con Minesite Map

Date: 16DEC02 | Scale As Shown | Figure: 1.3 | Rev. No.

REVISION DATE: 04/12/15 9:54am By: sreddy CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\P041413026-01.dwg



LEGEND

SCALE (METRES)

0 300

SCALE (FEET)

0 500

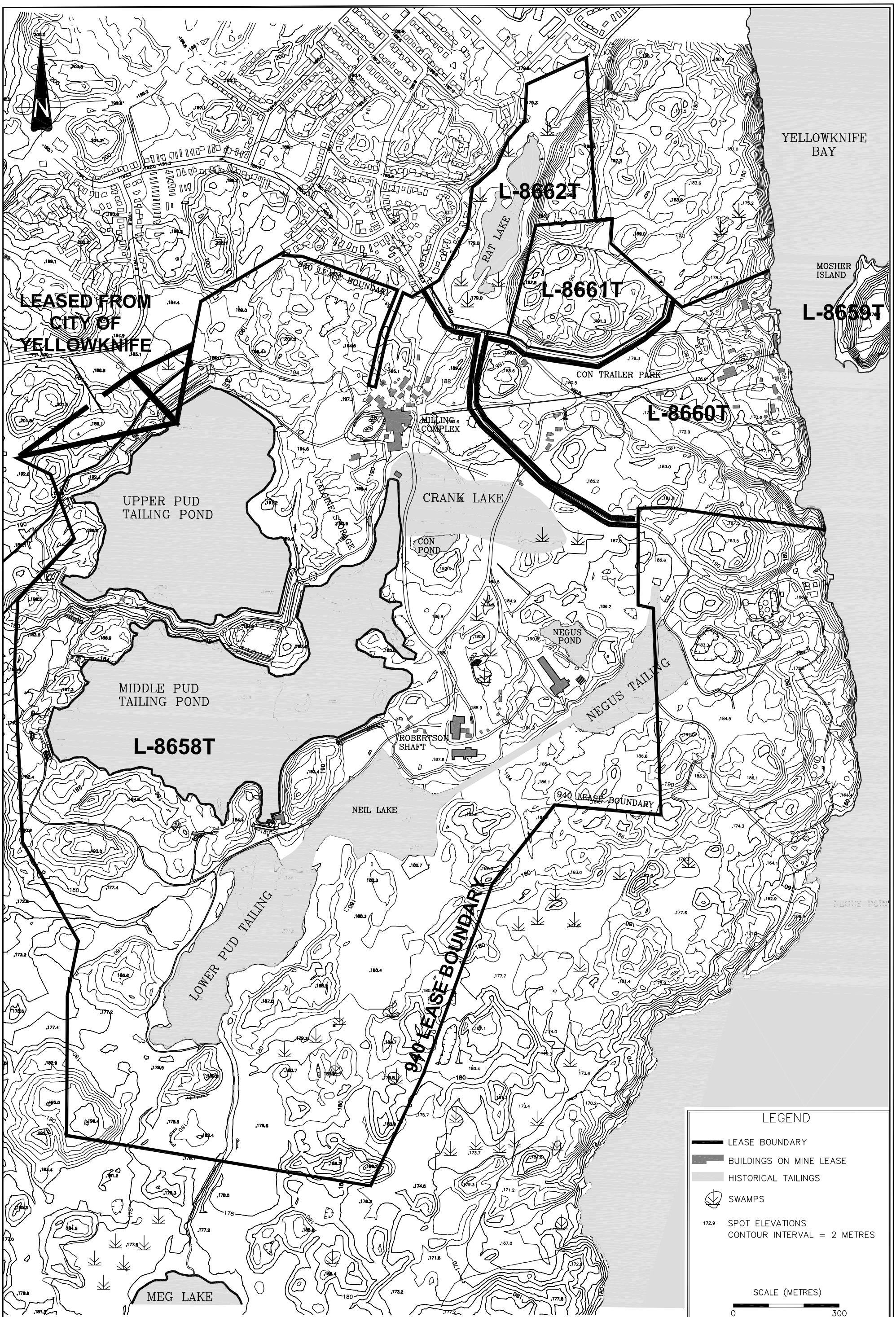
Drawn by:	Mine Staff
Checked by:	
Revised By:	Date
D. Hadley	05/14/02
D. Hadley	11/12/02

Miramar Con Mine, Ltd.

Aerial Photograph of the Con Minesite

Figure 1.4

Date: May 2002	Scale: As Shown	Dwg: Figure 2-5b.dwg	Rev. No.



REFERENCES

1) Miramar Con Mine. Dated: Jan 2001/Jan 2004

Checked by:			
Revised By:	Date:	Con Minesite Claims and Leases	
		Date: 16DEC02 Scale As Shown Figure: 1.5	Rev. No.

REVISION DATE: 04/12/15 10:35am By: sreddy CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\P041413026-06.dwg

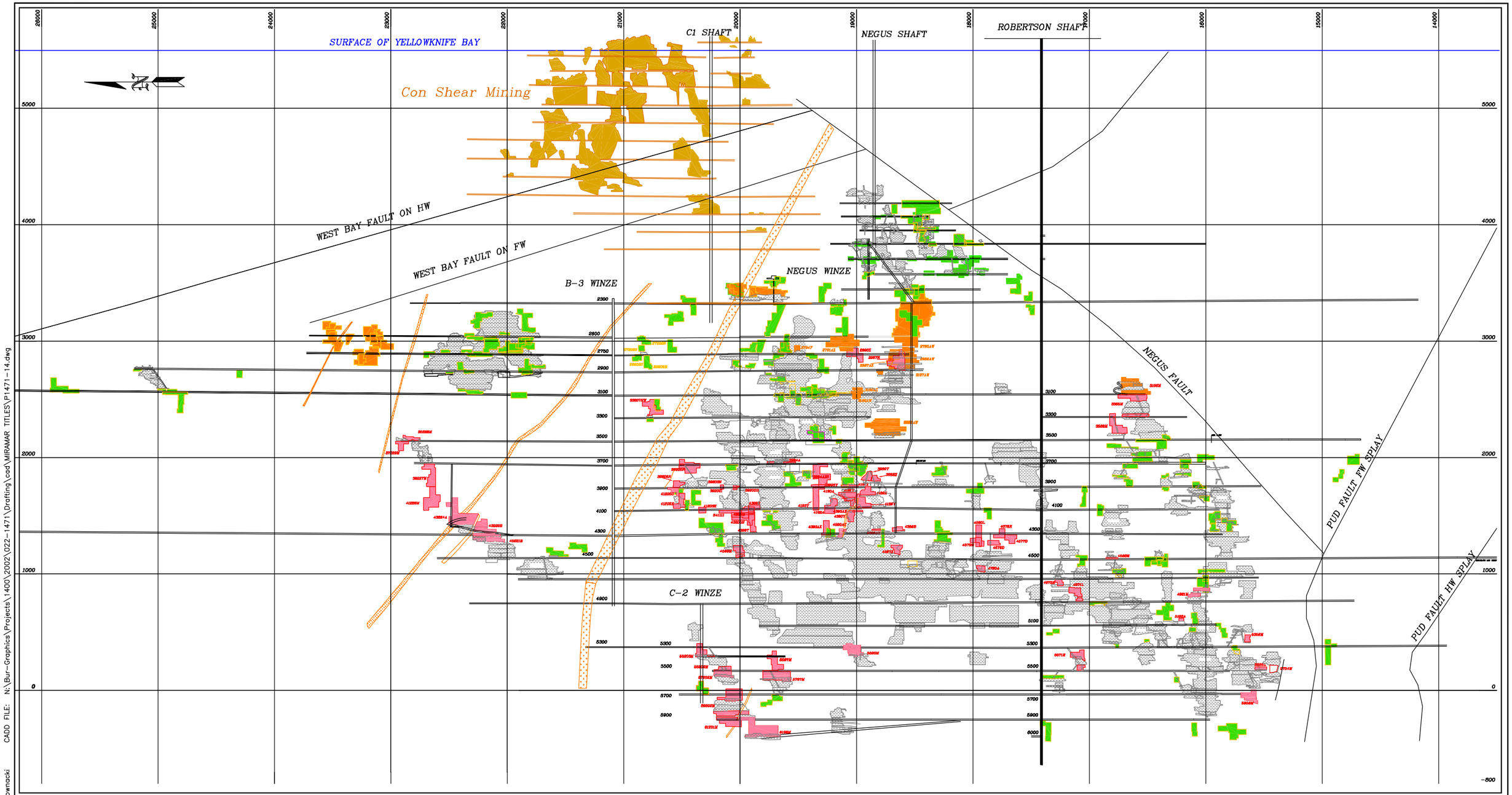


REFERENCES

1) Miramar Con Mine. Dated: Jan 2001/Jan 2004

Checked by		Miramar Con Mine, Ltd.			
Revised By	Date	Con Mine Surface Openings			
		Date: 16DEC02	Scale As Shown	Figure: 1.6	Rev. No.

REVISION DATE: 04/10/28 4:11pm By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\P041413026-05.dwg



REFRACTORY RESERVES
FREEMILLING RESERVES
RESOURCE
MINED OUT
DIABASE DYKES

Feet
0 500

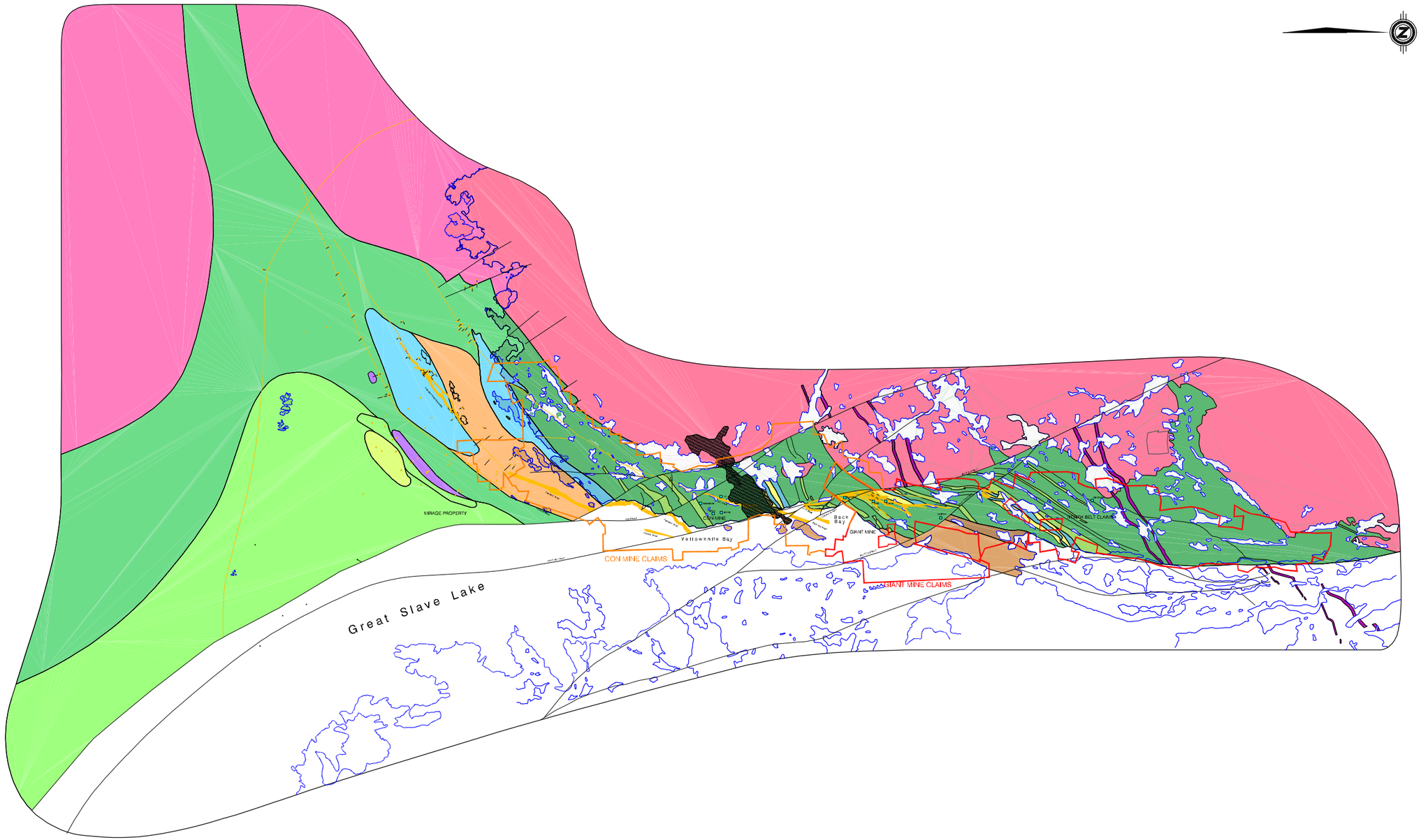
Metres
0 300

Miramar Con Mine, Ltd.

Longitudinal Section of the Con Mine Subsurface Workings

Checked by:				
Revised By:	Date			
Date: 16DEC02	Scale As Shown	Figure: 1.7	Rev. No.	

REVISION DATE: 04/10/28 8:50am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-14.dwg



Fault
Diabase
Shear Zone
Jackson Lake Fm.
Banting Group

Granodiorite
Rhyolite
Intermediate Rock
Ultramafic Rock

Gabbro
Townsite Fm.
Sediment/Tuff
Variolitic Flow
Mafic Flow

Yellowknife Greenstone Belt
Geological Compilation

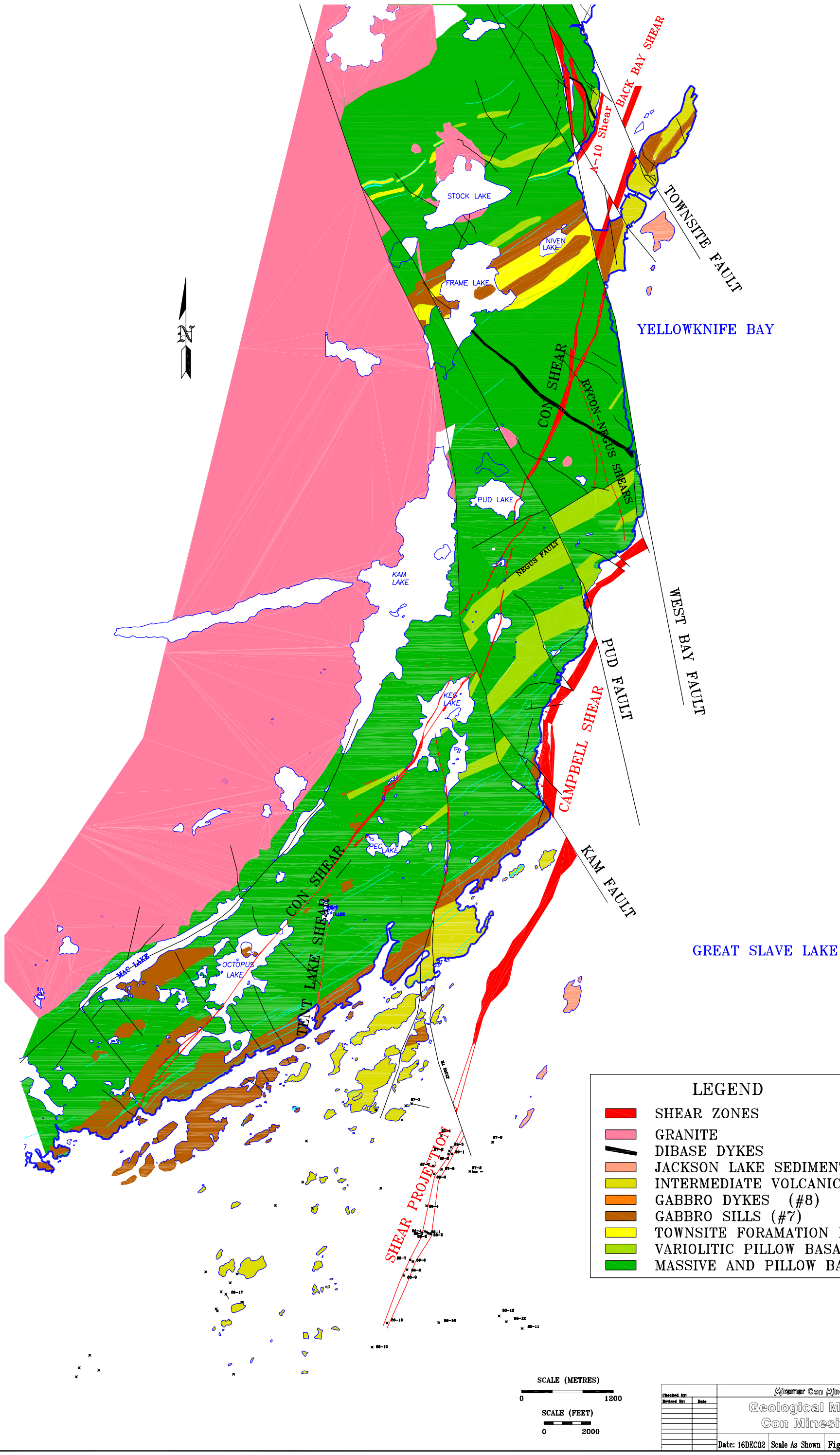
Scale
5000 0 5000 10000 15000
feet
1 0 1 2 3 4 5
kilometres

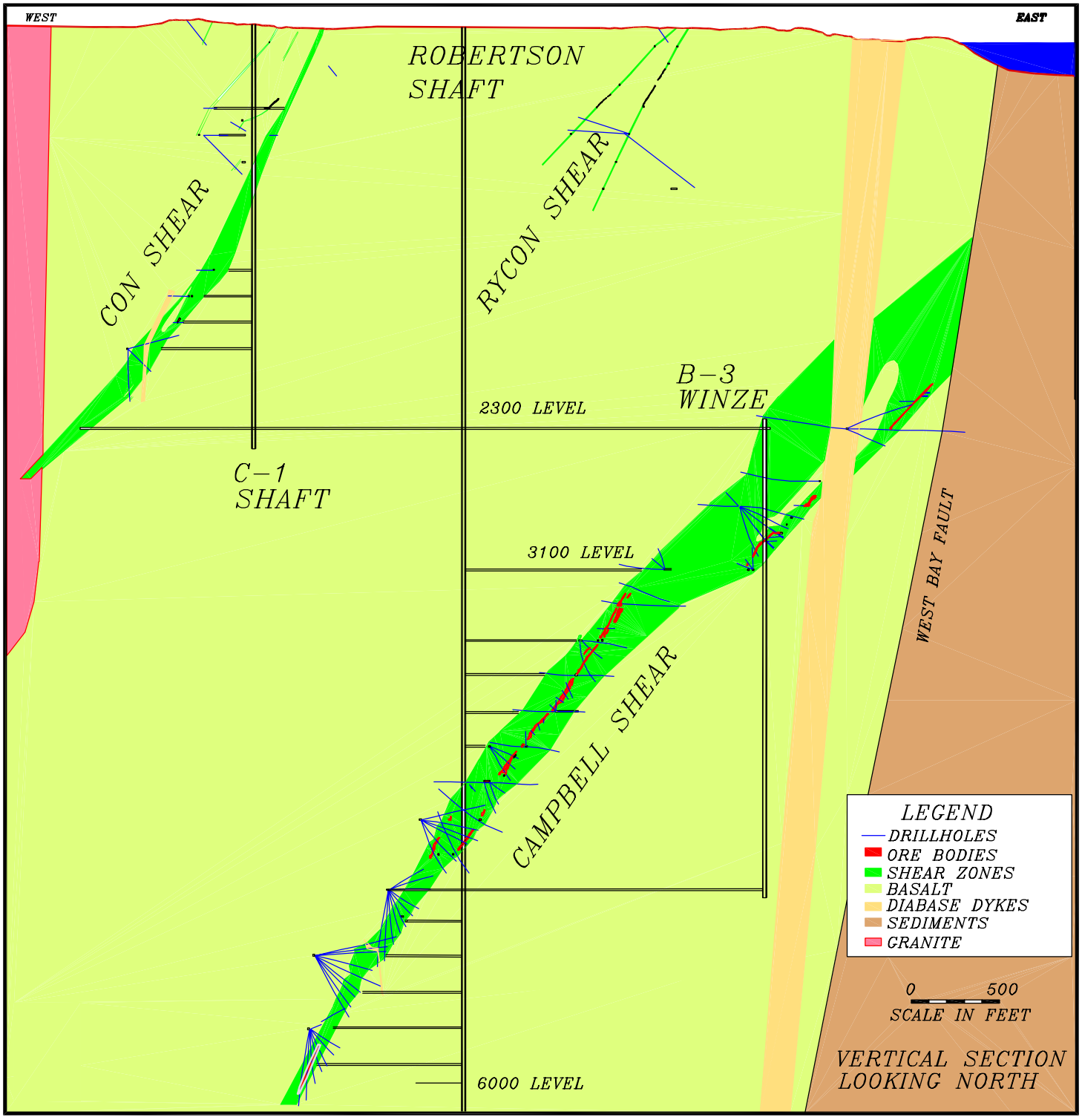
Miramar Con Mine, Ltd.

Geology of the
Yellowknife Area

Date: 16DEC02 | Scale: As Shown | Figure: 1.8 | Rev. No.

REVISION DATE: 04/10/28 8:52am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-15.dwg


A-10 Shear
BACK BAY SHEAR
TOWNSITE FAULT
YELLOWKNIFE BAY
STOCK LAKE
NIVEN LAKE
FRAME LAKE
CON SHEAR
RYCON-NEGUS SHEARS
PUD LAKE
NEGUS FAULT
WEST BAY FAULT
KAM LAKE
KEG LAKE
PUD FAULT
CAMPBELL SHEAR
KAM FAULT
PEG LAKE
MAC LAKE
OCTOPUS LAKE
CENT LAKE SHEAR
GREAT SLAVE LAKE
SHEAR PROJECTION
LEGEND
SHEAR ZONES
GRANITE
DIBASE DYKES
JACKSON LAKE SEDIMENTS
INTERMEDIATE VOLCANICS
GABBRO DYKES (#8)
GABBRO SILLS (#7)
TOWNSITE FORAMATION DACITE
VARIOLITIC PILLOW BASALT
MASSIVE AND PILLOW BASALT
SCALE (METRES)
0
1200
SCALE (FEET)
0
2000
Miramar Con Mine, Ltd.
Geological Map of the
Con Minesite Area
Date: 16DEC02
Scale As Shown
Figure: 1.9
Rev. No.
Checked by:
Revised By:
Date
REVISION DATE: 04/10/28 8:55am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-16.dwg



REVISION DATE: 04/10/28 8:59am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-17.dwg

Checked by:		Miramar Con Mine, Ltd.			
Reviewed By:	Date	Cross Section of the Con Mine Subsurface Workings			
		Date: 16DEC02	Scale As Shown	Figure: 1.10	Rev. No.

YELLOWKNIFE BAY

MOSHER ISLAND

RAT LAKE

940 LEASE BOUNDARY

LEASED FROM CITY OF YELLOWKNIFE

TAYLOR ROAD

PUMP TO KAM LAKE

TAYLOR RD. GATE

CON ROAD

CON RD. GATE

CON TRAILER PARK

MILLING COMPLEX

WATER LINE

LAKEVIEW ROAD

MAIN GATE

CRANK LAKE

UPPER PUD TAILING POND

CALCINE STORAGE

CON POND

NEGUS POND

IMPERIAL OIL

MIDDLE PUD TAILING POND

NEGUS TAILING

ROBERTSON SHAFT

BLEND PLANT

WAREHOUSE

940 LEASE BOUNDARY

NEIL LAKE

WATER TREATMENT PLANT

LOWER PUD TAILING

MEG LAKE

LEGEND

- LEASE BOUNDARY
- BUILDINGS ON MINE LEASE
- HISTORICAL TAILINGS
- SWAMPS
- 172.9 SPOT ELEVATIONS
  CONTOUR INTERVAL = 2 METRES

SCALE (METRES)

0 300

REFERENCES

1) Miramar Con Mine. Dated: Jan 2001/Jan 2004

Checked by:		
Revised By:	Date:	

Con Minesite Topography

Date: 16DEC02 | Scale As Shown | Figure: 1.11 | Rev. No.

REVISION DATE: 04/10/28 3:27pm By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\P041413026-04.dwg

N

YELLOWKNIFE BAY

MOSHER ISLAND

RAT LAKE

CON ROAD

940 LEASE BOUNDARY

LEASED FROM CITY OF YELLOWKNIFE

TAYLOR ROAD

PUMP TO KAM LAKE

TAYLOR RD. GATE

CON RD. GATE

CRANK LAKE WATER SHED

CON TRAILER PARK

MILLING COMPLEX

WATER LINE

LAKEVIEW ROAD

MAIN GATE

CRANK LAKE SUMP

CRANK LAKE

CALCINE STORAGE

UPPER PUD TAILING POND

TO KAN LARE

CON POND

NEGUS POND

IMPERIAL OIL

MIDDLE PUD TAILING POND

NEGUS TAILING

ROBERTSON SHAFT

BLEND PLANT

WAREHOUSE

PUD LAKE WATER SHED

NEIL LAKE

940 LEASE BOUNDARY

LOWER PUD SUMP

WATER TREATMENT PLANT

LOWER PUD TAILING

MEG LAKE

LEGEND

- LEASE BOUNDARY
- BUILDINGS ON MINE LEASE
- HISTORICAL TAILINGS
- SWAMPS
- SURFACE WATER FLOW PATTERNS
- WATERSHED BOUNDARY

SCALE (METRES)

0 300

REFERENCES

1) Miramar Con Mine. Dated: Jan 2001/Jan 2004

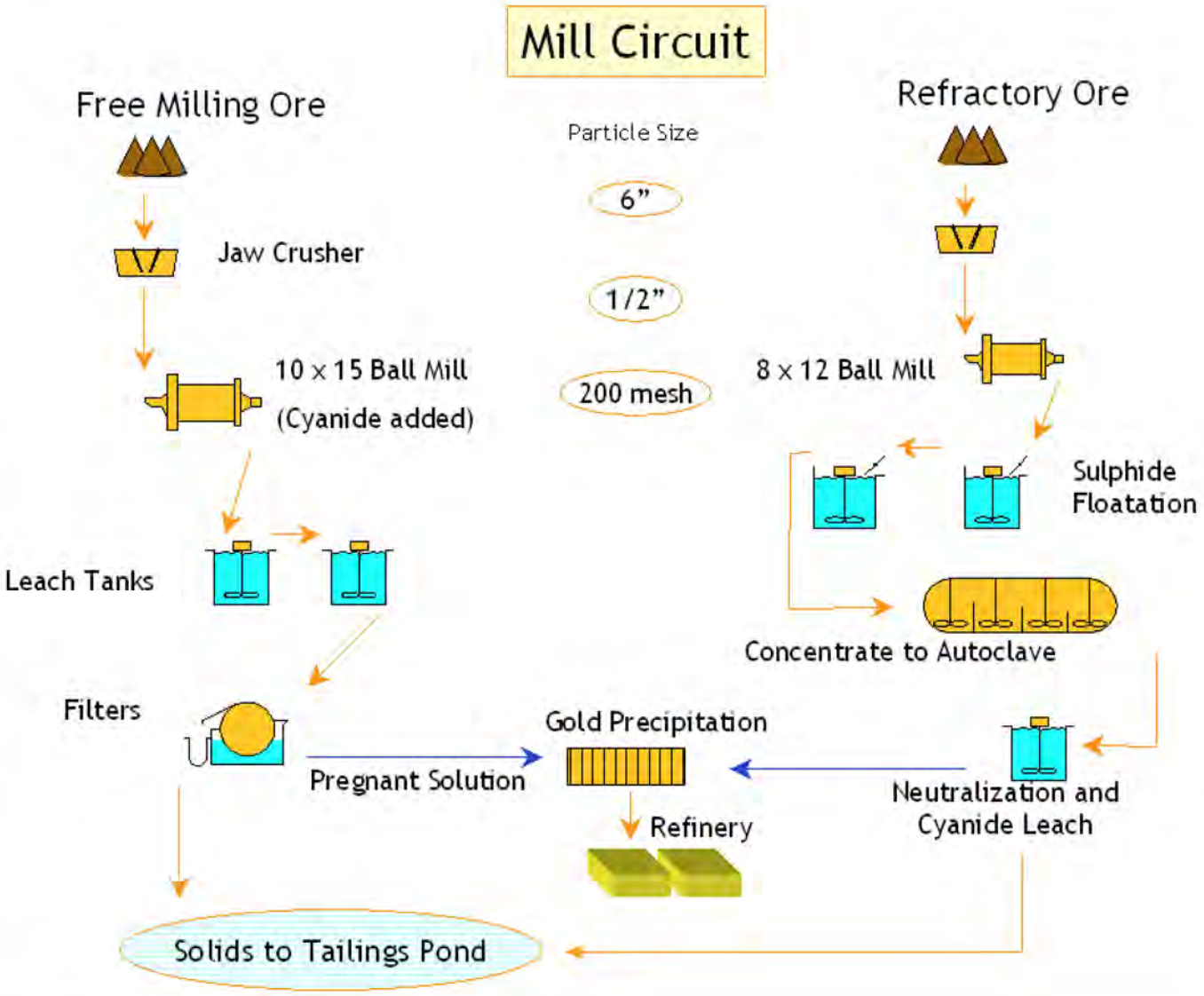
Checked by:
Revised By: Date:

Con Minesite Watersheds

Date: 16DEC02 | Scale As Shown | Figure: 1.12 | Rev. No.

REVISION DATE: 04/12/15 10:01am By: sreddy CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\P041413026-03.dwg

Mill Circuit



REVISION DATE: 03/01/3 11:24am By: NVeloso CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-08.dwg

Checked by		Miramar Con Mine, Ltd.
Revised By	Date	Con Mine Mill Circuit
		Date: 16DEC02 | Scale As Shown | Figure: 1.13 | Rev. No.

CON MINE REFRACTORY ORE PROCESSING FLOWSHEET

CRUSHING

Coarse ore directly from the mine passes through a jaw crusher that reduces the maximum size of the individual ore pieces to less than 13 centimeters (4.5 inches).

CRUSHING

Minus13-centimeter ore from the jaw crusher passes through a 1.7-meter cone crusher, which reduces the maximum size of individual ore pieces to less than 1.6 centimeters (5/8 inch).

GRINDING

Minus 1.6-centimeter ore from the cone crusher passes through a 3 by 4.5 meter ball mill, which reduces the ore to a sand-like pulp material with individual particle sizes of less than 80 microns.

FLOTATION

Using reagents that react with the surface properties of specific minerals, the gold-bearing sulphide minerals are concentrated by selective flotation of this sulphide fraction of the ore pulp reporting from the grinding circuit.

AUTOCLAVE PRESSURE OXIDATION

The gold-bearing sulfide mineral fraction from flotation is blended with historic, roaster-produced arsenic-rich sludge and calcines and pressure oxidized in the autoclave to stabilize the arsenic and avail the gold to cyanide extraction.

CYANIDATION

Gold-bearing pulp from the autoclave is agitated in a cyanide-bearing solution that dissolves the gold. The solution is filtered, deaerated and the gold is precipitated with the addition of zinc dust. The precipitate reports to refining.

REFINING

Fluxes are added to the gold-bearing precipitate and the blend is heated to over 1000 ℃ and the precious metals are separated from base metals and impurities.

REVISION DATE: 04/10/28 9:05am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-07.dwg

Checked by:		Miramar Con Mine, Ltd.			
Revised By:	Date:	Con Mine Refractory Ore Processing Flowsheet			
		Date: 16DEC02	Scale As Shown	Figure: 1.14	Rev. No.

CON MINE FREE MILLING ORE PROCESSING FLOWSHEET

CRUSHING

Coarse ore directly from the mine passes through a jaw crusher that reduces the maximum size of the individual ore pieces to less than 13 centimeters (4.5 inches).

CRUSHING

Minus 13-centimeter ore from the jaw crusher passes through a 1.7-meter cone crusher, which reduces the maximum size of individual ore pieces to less than 1.6 centimeters (5/8 inch).

GRINDING

Minus 1.6-centimeter ore from the cone crusher passes through a 3 by 4.5-meter ball mill, which reduces the ore to a silt-like material with individual particle sizes of less than 80 microns.

CYANIDATION

Gold-bearing pulp from the grinding circuit is agitated in a cyanide-bearing solution that dissolves the gold. The solution is filtered, deaerated and the gold is precipitated with the addition of zinc dust. The precipitate reports to refining.

REFINING

Fluxes are added to the gold-bearing precipitate and the blend is heated to over 1000°C and the precious metals are separated from base metals and impurities.

REVISION DATE: 04/10/28 9:18am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-07.dwg

Checked by		Miramar Con Mine, Ltd.			
Revised By	Date	Con Mine Free Milling Ore Processing Flowsheet			
		Date: 16DEC02	Scale As Shown	Figure: 1.15	Rev. No.

2.0 SITE INFRASTRUCTURE AND FACILITIES

2.1 Introduction

During operations, ore was hoisted up the Robertson Shaft and trucked to the mill at the north end of the property. The mill and associated buildings supported the production of gold bullion and the milling stages of the mining operation. Buildings in the mill complex include shops and warehouses and other infrastructure such as power and water distribution systems, and roads. As part of this plan, the buildings will be removed and the area reclaimed to allow for the future use of the property by other industrial users (subject to the agreement of the land owner – GNWT and the City of Yellowknife.

The following groups in Yellowknife have shown an interest in various buildings and land on the Con Mine property:

- The Yellowknife Masonic Lodge 162 has expressed interest in obtaining the land under their building on the Con dock lease (Lease L-8660T). The Masonic Lodge purchased the building from the Consolidated Mining and Smelting Company of Canada on May 03, 1949.

- Liesabeth van Blairikom and Steve Robertson have expressed interest in obtaining the land under their home on the waterfront on the Con dock lease (Lease L-8660T).

- Yellowknife Funeral Services Ltd has expressed an interest in obtaining the former Con Mine Recreation Hall and the land on which it sits foe use as a Funeral Home. The site is on the Con Mine dock lease (Lease L-8660T).

  Written requests have been received from these parties. Copies of these documents can be found in Appendix III. These groups have been advised by MCML to either relocate the structures or negotiate formal title with the Land Commissioner and the City of Yellowknife. Failing this, MCML will remove the structures and the sites will be reclaimed as per this closure plan.

The various buildings and infrastructure are discussed in the following sections.

2.2 Robertson Shaft Complex

The Robertson Shaft headframe was the main access to the mine operation and the underground mine operation. The large steel frame structure dominates the south end of the minesite. The main mine office complex was associated with the headframe and the adjacent mine dry, however the majority of these buildings were removed as part of the progressive reclamation effort in 2005. The complex was a group of trailers that had

been assembled into a large office. Adjacent to the old office are several small shops, a service area and warehouses. These structures are steel framed and metal clad and the warehouse complex now serves as the mine office.

The mine storage yard is to the west of the office/warehouse complex. The ALS environmental laboratory, which is also a trailer complex, is in the area of the office/warehouse complex.

2.3 Mill Complex

Ore processing took place in the mill complex, which is the group of buildings at the north end of the site at the old mine access gate. The mill building housed the crushing and grinding circuits, the tanks required to process the ore, the autoclave, and the other parts of the milling circuit. The structure is a combination of buildings, but generally is comprised of structural steel buildings with metal cladding. The complex/building was constructed in stages and exhibits various types of construction and small additions.

The C-1 Shaft headframe is located immediately adjacent to the mill building. This was the original access to the mine. The headframe is a steel structure located on the north side of the mill building. The associated structures for the headframe (cable hoist room and power units) are located to the west of the headframe.

Other buildings associated with the mill complex are the shops, warehouses, and offices needed to operate the mill. These are typically wood frame structures and housed the electrical, wood working and metal shops, various offices, laboratories, and small warehouses. Construction of the buildings varies as the structures were developed at different times over the mine life.

The mine oxygen plant is located in the mill complex area to the southwest of the main mill structure. The plant is a steel frame structure with several large tanks on the south side of the plant. The plant provides the supply of oxygen needed to operate the autoclave.

The majority of the bulk fuel storage facilities on the minesite were removed during the progressive reclamation effort and the sites of these structures have been reclaimed. The remaining fuel storage on the property includes the underground fuel storage tanks at the warehouse complex, several small on-site satellite fuel tanks, and propane tanks. Most of the tanks were near the mill complex, but some were located at other key points on the property. The former locations of all surface and subsurface tanks are described in Table 2.1.

TABLE 2.1: Inventory of Surface and Subsurface Storage Tanks

Area Location	Id Number	Surface Or Subsurface	Location & Use	Volume (Litres)	Contents
Robertson (Rob) Shaft, Office, Warehouse & Shops	12	U/G	Engineering Boiler	18,200	Diesel
	14	Surface	Rob Shaft Generator	26,800	Diesel
	15	Surface	Rob Shaft Yard – General Use	4,500	Diesel
	16-1	Surface	Rob Shaft Yard – General Use	2,200	Diesel
	16-2	Surface	Rob Shaft Yard – General Use	1,300	Diesel
	18	U/G	Warehouse – General Use	4,550	Gasoline
	21	U/G	Warehouse – General Use	4,500	Diesel
	12871A	Surface	Warehouse Yard – General Use	3,785	Propane
	A10608	Surface	Mine Air Heaters*	68,130	Propane
	A10609	Surface	Mine Air Heaters*	68,130	Propane
	A10610	Surface	Mine Air Heaters*	68,130	Propane
	B149381	Surface	Rob Shaft Compressor	4,550	Diesel
	DD1248	Surface	Central Shops Igloo	3,785	Propane
	H3381	Surface	Central Shops	4,542	Propane
	NN4920	Surface	Rob Shaft Loadout Area	3,785	Propane
	X2314	Surface	Rob Shaft Generator	3,785	Propane
	XX4858	Surface	Warehouse Yard – General Use	3,785	Propane
	Z1230	Surface	Mine Air Heaters*	68,130	Propane
	59-2187	Surface	Environmental Laboratory	3,785	Propane
	A-1896	Surface	Environmental Laboratory	3,785	Propane
Blend Plant	22A	Surface	Blend Plant	68,100	Diesel
C-1 Shaft & Mill Complex	11	Surface	Powerhouse Generator	47,700	Diesel
	25	Surface	C-1 Change Room	1,300	Diesel
	27	Surface	C-1 Compressors	1,600	Diesel
	114386	Surface	Autoclave	113,550	Propane
	2C (75-102-10-96)	Surface	Mill Boiler house	75,000	Diesel
	221C	Surface	Refinery	2,500	Diesel
	H565	Surface	Loader Parking Shed	3,785	Propane

Area Location	Id Number	Surface Or Subsurface	Location & Use	Volume (Litres)	Contents
Oxygen Plant	n/a	Surface	Oxygen Plant	450,000	Oxygen
Con Dock	114388	Surface	Boiler house	113,550	Propane
	1C (75-103-10-96)	Surface	Boiler house	75,000	Diesel
Water Treatment Plant	B-2536	Surface	Water Treatment Plant	1,893	Propane
	T361	Surface	Water Treatment Plant	7,570	Propane
Upper Pud TCA	H1592	Surface	CIC Shed	3,785	Propane
	XX2387	Surface	CIC Shed	4,542	Propane
Security Gatehouse	NN2050	Surface	Security Gatehouse	3,785	Propane
	X5183	Surface	Security Gatehouse	3,785	Propane

NOTE: * - Indicates that the tanks have been removed from site.

2.4 Blend Plant Facilities and Operations (Reclamation Plant)

The Blend Plant was initially built to re-process arsenic sludge for recycling. Cominco commissioned the plant with the intention of upgrading the arsenic trioxide sludges from the Con and Negus ponds to produce a high-grade arsenic trioxide for sale to the wood preservative industry. The facility was operated from 1983 until 1989, when the operation was suspended because it was uneconomic.

The plant was converted to a reclamation facility in 1992 for collecting and blending the historical roaster calcine stockpiles and the arsenic-contaminated sludges deposited in the Con and Negus containment ponds from the 1950s to 1970. The building complex continues to be used by Miramar Con Mine Ltd. for the environmental cleanup of these calcines and arsenical sludges.

Excavation of arsenic sludges from Con Pond was completed in 2006 and it is anticipated that final clean up will be completed in 2007. The excavation of Negus Pond was started in 2004 and is to be completed in 2007. Plans call for the pond area to be closed in 2008. Sludge from the ponds is transported to the Blend Plant and stored in pits in preparation for processing. The sludges were blended with calcines and flotation concentrates and processed in the autoclave, converting the soluble arsenic trioxides to environmentally stable iron arsenates (Scorodite) for deposition in the tailing containment areas. As there is no longer any flotation concentrate, the calcine and arsenic sludge mixture is fed directly to the autoclave. Processing of the remaining sludges is scheduled for completion in 2007.

2.5 Water Treatment Plant and Operations

The Water Treatment Plant (WTP) is designed to remove cyanide and soluble metals from site wastewater to produce a discharge that meets Water License discharge limits. The use of cyanide permanently ceased at Con Mine when milling was stopped in July 2004. The WTP treats the water using reagents that cause the contaminants to either chemically break down, as with cyanide, or to precipitate out gravimetrically. The reagents used in the water treatment process are shown in Table 2.2.

TABLE 2.2: Reagents Used in the Con Mine Water Treatment Plant

Calcium Hydroxide (Lime)
Copper Sulphate
Ferric Sulphate
Flocculant
Sulphuric Acid
Hydrogen Peroxide

Water is pumped from Middle Pud Tailing Containment Area (TCA) into the first of two mixing tanks, where the initial reagent addition takes place. After the addition and mixing of copper sulphate, ferric sulphate, and hydrogen peroxide in the first tank, the water flows to the second tank for continued mixing. From the second mixing tank, the water is pumped into a series of four reactor tanks that provide continued mixing, additional retention time, and allow for the addition of another reagent, lime, and a flocculant. From the reactor tanks, the solution flows through one of two lamella gravity settlers where the flocculated soluble metals precipitate gravimetrically for the return to the TCA, leaving clear supernatant for the addition of sulphuric acid, which lowers the pH to ~7 in preparation for discharge to the environment. The water treatment plant flow diagram is shown in Figure 2.1.

The quality and volume of treated water discharged from the WTP is dictated by Con Mine's Water License NIL2-0040 (Appendix I) and the federal *Metal Mining Effluent Regulations* (Appendix II). The water quality requirements are presented in Table 2.3. Treated effluent from the plant is continuously sampled using an autosampler, and grab samples are taken several times per day during treatment and discharge periods. The treatment and discharge period is during the summer, typically June through August.

The quality of the treated effluent is monitored at three points following discharge. Twenty-four hour composite sampling at SNP Station number 40-1, using an auto sampler located at the WTP, monitors the water quality prior to discharge to the environment. At SNP Station number 40-10, the treated effluent quality is sampled at the entrance to Meg Lake, 1,300 m south of the WTP. Sampling at SNP Station number 40-5, 6,500 m to the south, monitors the effluent at the point of the Meg-Keg-Peg Lakes system discharge into Great Slave Lake.

TABLE 2.3: Water Treatment Plant Discharge Quality Requirements

Parameter	Maximum Average Concentration mg/L	Maximum Concentration of any Grab Sample mg/L
Total Arsenic	0.50	1.00
Total Copper	0.30	0.60
Total Cyanide	0.80	1.60
Total Lead	0.20	0.40
Total Nickel	0.50	1.00
Total Zinc	0.20	0.40
Total Suspended Solids	15.00	30.00
Oil and Grease	5.00	5.00
Radium 226	0.37 (Bq/l)	0.37 (Bq/L)
pH	6.0 – 9.5	6.0 – 9.5

Post-closure water treatment will continue until the Water Licence discharge limits can be met without the need for treatment. The plan for long term water management is presented in the Water Management Section – Section 8.

2.6 On-Site Housing

There are presently three housing areas on the lease, all located in the east-northeast area of the property as shown in Figure 1.3. Two of the areas are trailer courts and are referred to as the Con Trailer Court and Rycon Trailer Court. The third area is referred to as Con Camp and consists of three housing units and two apartment units.

Up until October 2004, the three housing areas were connected to the Con Mine water system. Potable water was supplied by Con Mine and the sewage flowed to the Middle Pud TCA and was treated at the water treatment plant. As of October 2004, these housing areas were placed on stand alone "pump-in/pump-out" water and sewage systems. Solid waste from the trailer courts and the Con Camp housing and apartment units is collected by Kavanaugh Brothers and transported to the city landfill. Solid waste from mining operations is disposed of in the mine's on-site non-hazardous landfill in the Middle Pud TCA.

2.7 Loading Dock Facilities – Yellowknife Bay

Historically, during the summer shipping season, the mine received supplies by barge at what is commonly referred to as the Con Dock. Although there is no actual dock structure at this location, there is an undeveloped boat launch. Materials were received by placing a loading ramp from the barge to the shore, then the material was moved to the mill and warehouses on the property. With the availability of air service and a nearly year-round open road, the volume of freight transported to the dock decreased. It has now been out of service for over 20 years.

Although it is on private property, the dock area is used year-round by the local population for recreational purposes including boat-launching, winter snow machine access to Great Slave Lake, hiking, fishing and swimming in season. As such, MCML has perceived that it is in the interest of the public to leave this area intact. Therefore, the shore near the dock area and the shallow water near shore will be inspected for debris. Any safety hazards or debris that is identified will be removed.

Historically the mine obtained the majority of its process and potable water from Great Slave Lake. A pumping station is located in the Pump House / Boiler, near the loading dock area on the shore of Great Slave Lake. A pipeline transported fresh water from the pumping station to the mill and the Robertson Shaft. Water was chlorinated prior to domestic use. Although dormant for a number of years, a supply of potable water is also available from the City of Yellowknife at the Boiler via a connection to the City's intake line in Yellowknife Bay. A connection to the City of Yellowknife distribution system at Con Road provides a backup water supply for fire protection

With the exception of this Pump House / Boiler facility, structural removal and surface restoration in the Con Dock area was included as part of the progressive reclamation program. Reclamation to date in this area included dismantling and removal of two above-ground bulk fuel tanks, removal of asbestos from three structures, and demolition of all structures. Demolition of the Pump House / Boiler facilities is scheduled for 2009.

Following demolition of the Pump House / Boiler facility, the Con Dock area will be reclaimed. The existing concrete wall and timber crib in the area of the pump house will be removed. The guidelines as set out by the Department of Fisheries and Oceans will be utilized during this process, as follows:

(a) Identify and remove any contaminated fill and/or debris that may have been deposited into the lake, including treated lumber that may have been used for dock construction.

(b) Confirm that the lake bed and shoreline are contoured to match adjacent areas.

(c) To prevent the entry of sediment-laden runoff into any fish bearing water body, a comprehensive sediment and erosion control plan will be developed. This plan would be implemented prior to, during and after all remediation activities, and include a monitoring program that:

- monitors the physical stability of the bed and banks of the lake;
- monitors the effectiveness of all sediment and erosion control measures; and,
- identifies the corrective measures that will be taken should monitoring identify any problems.

The following mitigation measures will be incorporated into the site specific plan to prevent the deposition of deleterious substances and possible habitat disturbance or loss:

All excavated material will be disposed on land in the TCA.

- All activities including maintenance procedures and vehicular refuelling will be controlled to prevent the entry of petroleum products, debris, slash, rubble, sediment or other deleterious substances into the water.

- In the event of a spill of oil, fuel, or other deleterious material, it will be reported immediately to the 24-Hour Spill Line at (867) 920-8130.

MCML will provide these plans to DFO for review and approval prior to implementation.

2.8 Closure and Reclamation Plan

For reclamation and closure planning purposes, surface structures have been grouped into three areas based on geographical proximity and function. These are:

Dock Area

- Houses and two apartment units;
- Trailers (Con and Rycon Courts); and,
- Boiler house and pump house.

Mill Complex

- Mill and autoclave;
- C-1 Headframe and shaft;
- Warehouses, shops and offices; and,
- Oxygen plant.

Robertson Shaft and Office Complex

- Robertson Shaft / Headframe, dry, and office complex;
- Warehouse and shops;
- Blend plant;
- Water treatment plant; and,
- Environmental laboratory (ALS Environmental Laboratory).

Con Mine's progressive reclamation strategy included the removal of those structures no longer in service; however, the majority of the minesite structures remained in use while mining and milling operations continued. Dismantling and demolition of the structures commenced in 2004 when the mine ceased operation. Upon completion of the Closure and Reclamation Plan, the majority of the property's structures will be either dismantled and removed or demolished and disposed of in the on-site non-hazardous waste or construction demolition landfill.

The structures have been grouped into five "Structure Types" based on the work required to remove the structures. The structure types are listed below and include:

Type 1 – Wood frame includes shops at mill and numerous warehouses;
Type 2 – Steel frame, steel clad, includes warehouses and shops;
Type 3 – Multi-storey steel frame, includes mill complex, blend plant, oxygen plant;
Type 4 – Headframe - Robertson and C-1; and,
Type 5 – Houses, small warehouses, and trailers.

The scopes of work required for removal of the different types of structures are set out below. Building-specific plans will be prepared, based on the types of structure as set out below. All demolition efforts will be subject to regular inspection and approval by representatives from INAC and other regulatory agencies as deemed necessary.

TYPE 1 – WOOD FRAME

Structure Type

Wood frame – single-or two-storey - warehouses and shops.

Construction

Wood frame building, concrete foundation, and asphalt or metal roof

Work Plan

- Inspect each unit and note hazardous materials to be removed or other items that must be addressed before structure is removed;
- Locate and de-energize utilities attached to the structure;
- Remove items deemed salvageable and transport to designated area on mine property;
- Remove hazardous materials to designated area;
- Identify and remove stored hydrocarbons or chemicals, properly contain, and ship off site;
- Check manufacturers' dates and labels on ballast of fluorescent lights for suspect PCBs. If any PCB containing ballasts are identified, they will be removed and placed in proper containers in preparation for shipment to a treatment facility;
- Demolish building using mechanical means and dispose of material in designated hazardous and non-hazardous waste disposal areas;
- Demolish concrete foundations and dispose of material in designated hazardous and non-hazardous waste disposal areas; and,
- Clean up, grade site to establish drainage, and leave in an orderly manner.

Special Items

- Items of special concern will be noted during the initial inspection of each building and dealt with before removal of the building takes place. These include:
  - PCBs
  - Type 1 Asbestos
  - Hydrocarbons
  - Electrical equipment

Health and Safety Issues

- All workers will wear Class "D" Personal Protective Equipment (PPE) as minimum protection. Additional PPE will be worn as required.

TYPE 2 – STEEL FRAME

Structure Type

Steel frame – warehouses and shops

Construction

Steel structure, steel frame, steel roof and steel siding, dry wall interior, insulated, foundation of concrete supported on concrete footings or steel pilings, and electrical equipment

Work Plan

- Inspect each unit and note hazardous materials to be removed or other items that must be addressed before structure is removed;
- Locate and de-energize utilities attached to the building;
- Remove items deemed salvageable and transport to designated area on mine property;
- Remove hazardous materials to designated area;
- Identify and remove stored hydrocarbons or chemicals, properly contain, and ship off site;
- Check manufacturers' dates and labels on ballast of fluorescent lights and any capacitors in electrical equipment for possible PCBs. If identified, they will be removed and placed in proper containers in preparation for shipment to a treatment facility;
- Remove electrical equipment from building if not already done so by owner;
- Dismantle steel roof and dispose of material in designated non-hazardous or hazardous waste disposal area;
- Remove roofing insulation, package, and dispose of in designated non-hazardous or hazardous waste disposal area;
- Remove paneling, and dispose of in designated non-hazardous or hazardous waste disposal area;
- Demolish building using mechanical means and dispose of material in designated non-hazardous or hazardous waste disposal area;
- Remove heavy equipment and machinery as demolition provides safe access and dispose of as directed;

- Demolish concrete foundations and dispose of material in designated non-hazardous or hazardous waste disposal area; and,
- Clean up, grade site, and leave in an orderly manner.

Special Items

- Items of special concern will be noted during the initial inspection of each building and dealt with before removal of the building takes place. These include:

  - PCBs
  - Type 1 Asbestos
  - Hydrocarbons
  - Electrical equipment

Health and Safety Issues

- All workers will wear Class "D" Personal Protective Equipment (PPE) as minimum protection. Additional PPE will be worn as required.

- Safe work practices for demolition-type projects will be enforced.

TYPE 3 – MULTI-STOREY STEEL FRAME

Structure Type

Mill complex, blend plant, oxygen plant

Construction

Multiple-level steel and/or wood structure, pitch felt roof, concrete floor and foundations, concrete pedestals, electrical rooms, compressor room, hydro sub-station, transformers, chemical tanks and apparatus, heavy equipment and machinery, machine shop, mezzanines, crawl spaces under parts of structure, and propane tanks

Work Plan

- Propane tanks to be removed by qualified contractor;
- Inspect each unit and note hazardous materials to be removed or other items that must be addressed before structure is removed. It is noted that at present there are no known PCB contaminated transformers on site as they have all been removed;
- Locate and de-energize utilities attached to the building;
- Remove items deemed salvageable and transport to designated area on mine property

- Remove hazardous materials to designated area;
- Owner has the first right to reclaim any building material, dust, equipment, or ore residue that the owner suspects might contain gold elements;
- Locate and identify chemicals within building by labels or sampling results from laboratories;
- Handle chemicals in the standard regulatory manner;
- Check manufacturers' dates and labels on ballast of fluorescent lights for suspect PCBs. If PCB containing ballasts are identified, they will be removed and placed in proper containers in preparation for shipment to a treatment facility;
- Check electrical equipment for possible mercury switches and, if located, remove, properly contain, and ship off site;
- Drain transformers completely, store hydrocarbons properly, and ship off site as per test results;
- Drain compressors, fuel tanks, and other equipment of hydrocarbons, properly store, and ship to recyclers;
- Remove Asbestos Type 1 paneling, place in proper containers, and dispose of in designated non-hazardous or hazardous waste disposal area;
- Demolish building using mechanical means and dispose of material in designated non-hazardous or hazardous waste disposal area;
- Remove heavy equipment and machinery as demolition provides safe access and dispose of as directed;
- Demolish concrete floors, foundations, and pedestals and dispose of material in designated non-hazardous or hazardous waste disposal area;
- Backfill pits and excavations created by demolition activities with approved backfill material. The three pits in the blend plant will be closed as hazardous waste sites / pits as outlined in the Negus Pond closure (Section 5); and,
- Clean up, grade site, and leave in an orderly manner.

Special Items

- Items of special concern will be noted during the initial inspection of the building and dealt with before removal of the building takes place. These include:

  - PCBs
  - Type 1 Asbestos
  - Radioisotopes –density gauges
  - Hydrocarbons
  - Electrical Equipment
  - Elevated levels of dust
  - Materials impregnated with arsenic
  - Known and unknown chemicals on site, including cyanide
  - Mercury

Health and Safety Issues

- Do not allow crews to work in potential confined space areas.
- All workers to wear Class “C” PPE, complete with dust particle respirators as minimum protection.
- When dealing with chemical residues, all workers to wear Class “C” PPE, complete with chemical vapour respirators as minimum protection.
- Enforce safe hygiene practices by workers.
- Enforce safe handling practices for asbestos, hydrocarbons, mercury, PCBs, and chemicals.
- Requirement for confined space entry permits.
- Requirement for burning permits.

TYPE 4 – HEADFRAME - STEEL FRAME – ROBERTSON AND C-1

Structure Type

Headframe

Construction

Steel structure, pitch felt roof, some steel siding and steel roof, steel superstructure, concrete foundation, railway tracks in concrete floor, compartment shafts complete with hoist, ore bin and conveyor system, and machinery.

Work Plan

- Inspect each unit and note hazardous materials to be removed or other items that must be addressed before structure is removed;
- Locate and de-energize utilities attached to the structure;
- Remove items or equipment deemed salvageable and transport to designated area within mine property;
- Owner has the right to reclaim materials, dust, equipment, or ore residue that the owner suspects might contain gold elements. This work must be done in a timely fashion so as not to impede demolition;

- If not removed, the owner/contractor is to dismantle and remove hoist system from building and place in designated area as directed;
- Place temporary cover over shaft opening and secure site;
- Check manufacturers' date and labels on ballast of fluorescent lights and capacitators for suspect PCBs. If any are identified, they will be removed and placed in proper containers in preparation for shipment to a treatment facility;
- Check building for stored hydrocarbons; if unknown quality, then samples must be taken and sent to a lab for identification;
- Remove the hydrocarbons, store properly, and ship off site as determined by sample results;
- Remove machinery and equipment;
- Remove steel roofing;
- Remove steel siding;
- Demolish lower structures using mechanical means and dispose of material in designated non-hazardous or hazardous waste disposal area;
- Demolish superstructure using mechanical means and dispose of material in designated non-hazardous or hazardous waste disposal area;
- Demolish concrete floor and foundation and remove railway tracks, disposing of material in designated landfill;
- Construct of permanent concrete shaft cap, as per regulatory standards, over shaft opening; and,
- Clean up, grade site, and leave in an orderly manner.

Special Items

- Items of special concern will be noted during the initial inspection of the building and dealt with before removal of the building takes place. These include:

  - PCBs
  - Type 1 Asbestos
  - Hydrocarbons
  - Electrical Equipment
  - Elevated arsenic dust levels
  - Gold residue
  - Open shaft
  - Mercury

Health and Safety Issues

- All workers to wear Class "C" PPE, complete with dust particle respirators as minimum protection.
- Enforce safe handling and storage practices for PCBs, mercury, and hydrocarbons.
- Enforce safe work practices for working around open shafts.
- Enforce good hygiene practices for workers handling demolition materials.
- Enforce safe work practices for demolition, type projects.
- Requirement for confined space entry permits.
- Requirement for burning permits.

TYPE 5 – HOUSE OR SMALL WOOD STRUCTURE

Structure Type

House, garage, small warehouse, or pump house etc.

Construction

All wood frame construction on concrete foundations

Work Plan

- Inspect each unit and note hazardous materials to be removed or other items that must be addressed before structure is removed;
- Locate and de-energize utilities attached to the structure;
- Demolish structures;
- Demolish concrete foundations and footings, and dispose of materials resulting from demolition in designated non-hazardous or hazardous waste disposal area;
- Backfill pits and excavations resulting from demolition with approved material; and
- Clean up, grade site, and leave in an orderly manner.

Special Items

- Items of special concern will be noted during the initial inspection of the building and dealt with before removal of the building takes place. These include:

    - Asbestos/Asphalt siding

Health and Safety Issues

- Workers to wear Class "D" as minimum protection.

As noted above, the plan is to demolish individual surface structures in a series of steps:

- removal of hazardous materials (including asbestos) as required;
- dismantling or demolishing the structure;
- removal of the dismantled components or demolition debris;
- removal and disposal of foundation material;
- sampling and analytical testing of the concrete slab and adjacent soils; and, depending upon analytical results;
- demolition and removal of, or capping with soil, of the concrete slab. Concrete footings will be excavated, broken up and removed. If analytical tests indicate contamination based on the guidelines set out in this document, the footings will be placed in the site hazardous waste disposal site. The concrete that is not contaminated will be placed in the non-hazardous or construction debris landfill. Large non-contaminated concrete footings will be left in place and covered provided there is no contaminant release or interference to surface drainage;
- After removal of the structure, the soils underlying the concrete slab site will be sampled, tested, and excavated, if necessary. The reclaimed site will then be scarified, contoured, fertilized, and seeded; and,
- All demolition efforts will be subject to regular inspection and approval by representatives from INAC and other regulatory agencies as deemed necessary.

Where concrete has been in contact with contaminants and tailing, MCML will collect a 500 gm sample of concrete using proper protective gloves, suits, protective glasses and as appropriate safety hats. Concrete samples will be obtained by coring to a depth of 5 cm with a core 10 to 15 cm in diameter. The samples will be sent to a certified commercial laboratory, where the concrete sample crushed and tested for arsenic. The standard proposed to determine if the concrete is contaminated would be 340 mg/kg arsenic. If considered hazardous, the material would be placed in the hazardous waste storage site.

The mill will require special attention, as once all the calcines and sludges are treated the mill will be taken out of service. The autoclave will be removed from the mill building and either stored in a designated area before shipment off site or dismantled and sent to

the site hazardous waste disposal area. The mill will then be washed down to remove tailing or residual material from the mill structure, tanks, etc. Wash water will be directed to the east arm of Middle Pud and then to the water treatment plant for treatment to remove contaminants before discharge. The mill will then be demolished as noted under Building Type 3. The demolition debris will be placed in the non-hazardous waste disposal site or in the hazardous waste disposal area at the east end of Dam A of the Middle Pud TCA.

If the steel and equipment for the Robertson or C-1 headframe were to be sold to another mine, the headframe will be taken down in reverse order to the construction. If the structure is not sold, it will be taken down as noted under Building Type 4 or by blasting out the lower floors of the structure so that standard backhoes can cut the steel up once it has been "dropped" to the ground. The steel would then be placed in the on-site construction debris landfill in the Middle Pud TCA. Both C-1 and Robertson shafts will be closed and capped. The entire surface area will then be scarified, contoured, fertilized, and seeded.

The above plan will remove or demolish approximately 9,000 m^2 of wood buildings and 8,200 m^2 of steel/concrete buildings. Disassembled or demolished buildings not removed from the site will be disposed of in either the on-site non-hazardous waste disposal or hazardous waste disposal site in the Middle Pud TCA.

Demolition of surface structures will include the closure and disassembly of storage bins or tanks that are no longer needed. All remaining surface and underground/buried hydrocarbon storage tanks will be drained and cleaned, and their contents and the rinseate removed by a contractor that is licensed to handle materials of this nature and disposed of in an approved off-site facility in accordance with current regulations.

Disassembly and removal/disposal of the Blend or Reclamation Plant will begin when the last of the sludges and calcines are processed (expected in 2007). Dismantling of the structure will be preceded by a detailed wash down of the building and its structural components. The rinseate will be directed to Middle Pud and then to the water treatment plant for removal of contaminants before discharge. The facility's shotcrete-lined interior pits will be cleaned out and the walls will be high pressure washed. The shotcrete liner, which restricts infiltration to the surrounding rock, will be left in place, however it will first be inspected to determine that it is intact. In the event that faults are detected in the liner, they will be repaired. The pits will then be backfilled and capped. Details for the caps are presented in Section 5 - Con and Negus ponds.

A list of all buildings on the property is noted below and the building type is included. The locations of the buildings are shown on Figures 2.2, 2.3, and 2.4.

TABLE 2.4: Miramar Con Mine Building List

Area	Building Number	Building Name	Building Type	Type of Construction	Comments
Dock Area	101	Burns Building	--	Burnt down	Removed
	102	Warehouse with cooler	1	Wood frame – single storey	Removed
	103	Warehouse	1	Wood frame – single storey	Removed
	104	Propane tank	2	Steel tanks	In use
	105	Pump house/boiler	1	Wood frame – single storey	In use
	106	House	5	Wood frame – single storey	Occupied
	107	* Old Stanton Hospital	5	Wood frame – single storey	Removed
	108	Tanks	2	Steel tanks	Removed
	109	* Recreation hall	1	Wood frame – two storey	On Hold for interested group.
	110	House	5	Wood frame – single storey	Occupied
	111	House	5	Wood frame – single storey	Occupied
	112	Garage	5	Wood frame – single storey	Occupied
	113	Garage	5	Wood frame – single storey	In use
	114	Garage	5	Wood frame – single storey	In use
	115	Apartment	1	Wood frame – two storey	Not in use
	116	Garage	5	Wood frame – single storey	In use
	117	Apartment	2	Wood frame – two storey	Occupied
	118	Garage	5	Wood frame – single storey	In use
	119	House	5	Wood frame – single storey	Occupied
	120	* Masonic Lodge	1	Wood frame – single storey	On Hold for interested group.
	121	Power sub-station	2	Steel frame	In use
	122	Garage	5	Wood frame – single storey	Removed

Note: In the case of buildings marked with an asterisk, demolition will be held off to allow the group in question to remove or otherwise establish ownership. If this has not taken place before June 30, 2008, these buildings will also be slated for demolition.

Area	Building Number	Building Name	Building Type	Type of Construction	Comments
C-1 Complex	201	Cabin	5	Wood frame – single storey	Removed.
	202	Gate House	5	Wood frame – single storey	Removed
	203	Office	1	Wood frame – two storey	Removed
	204	Warehouse	1	Wood frame – single storey	Removed
	205	Warehouse	1	Wood frame – single storey	Removed
	206	Storage	1	Wood frame	
	207	Electrical and carpenter shop	1	Wood frame – single storey	Not in use
	208	Refinery	1	Wood frame – single storey	Removed.
	209	Metallurgical lab	1	Wood frame – single storey	Removed.
	210	Pump house	1	Wood frame – single storey	In use
	211	Storage	1	Wood frame	Removed
	212	Mechanical room	1	Wood frame – single storey	Removed
	213	C-1 Dry	1	Wood frame – single storey	Removed
	214	Office	1	Wood frame – single storey	Removed
	215	Tank	2	Steel structure	
	216	Storage bin	2	Steel structure	Not in use
	217	Fine ore bin	2	Steel structure	
	218	Power plant	3	Steel structure	In use
	219	Pipe fitters shop	1	Wood frame – single storey	Removed
	220	Assay lab	1	Wood frame – single storey	Removed
	221	Hoist room	1	Wood frame – single storey	Not in use
	222	Storage bin	2	Steel structure	
	223	Tanks	2	Steel structure	
	224	Propane	2	Steel structure	
	225	Mill boiler	3	Steel structure	
	226	Oxygen plant	3	Steel structure	In use
	227	Tanks	2	Steel structure	In use
	228	Shed	1	Wood frame – single storey	Removed
	229	Storage	1	Wood frame – single storey	Removed
	230	Main mill	3	Steel structure	In use
	231	Autoclave	3	Steel structure	In use

Area	Building Number	Building Name	Building Type	Type of Construction	Comments
Robertson Shaft	301	Robertson shaft	4	Steel – multi storey	Not in use
	302	Office complex	1	Trailers	Removed.
	303	Environmental lab	1	Trailers	In long term use
	304	Warehouse	2	Steel – two storey	In use
	305	Vent structure	2	Steel	Not in use
	306	Materials yard	1	Open area	In use
	307	Shops	1	Wood frame	In use
	308	Shops	1	Wood frame	In use
	309	Blend plant	3	Steel structures	In use
	310	Water treatment complex	3	Steel structures	In long term use

The housing units in the area of Con Dock will be demolished or sold during the final stage of the mine life as the number of employees decreases. Structures scheduled for demolition will be checked for asbestos, demolished and removed. The building sites will then be scarified, fertilized, and seeded. Roadways will be tested for contaminants and excavated for capping material or disposal. The roadbeds will be then scarified and vegetated.

With the exception of one transformer that was recently tested and shipped to a hazardous waste disposal company, no PCBs are known to be stored on the Con minesite. All PCBs and PCB-contaminated materials were removed from the site in January 2000 and disposed of at a licensed facility in Canada. As noted earlier, PCB-contaminated ballasts or capacitators that are detected during the demolition process will be placed in PCB waste storage containers and shipped to a hazardous waste disposal facility.

If and when encountered, hazardous materials as indicated above will be stockpiled and transported to licensed and approved waste disposal facilities. An inventory of hazardous materials that remain on site or are transported off-site will be prepared and provided to MVLWB for placement on the public record. This will include arsenic contaminated wastes, tailing, and asbestos that is buried in the TCAs.

The Water Treatment Plant will continue to operate until such time as the Water Licence discharge limits can be met without treatment. At that time, the structure will be disassembled as per the Type "B" building criteria. The specific removal schedule will be predicated upon qualitative measures of the site's surface waters and the demonstrable establishment of water quality that consistently meets the Water Licence discharge limits. A cost component for this effort is included in the reclamation cost estimate summarized in Section 10.

2.9 Schedule for Reclamation

Demolition of the Robertson Shaft, office complex, mill, and C-1 Shaft complex is scheduled to commence in 2007. Demolition of the structures is scheduled for completion by the third quarter of 2008. Construction debris from the demolished buildings will be disposed of in the on-site hazardous and/or non-hazardous waste disposal sites in the Middle Pud TCA.

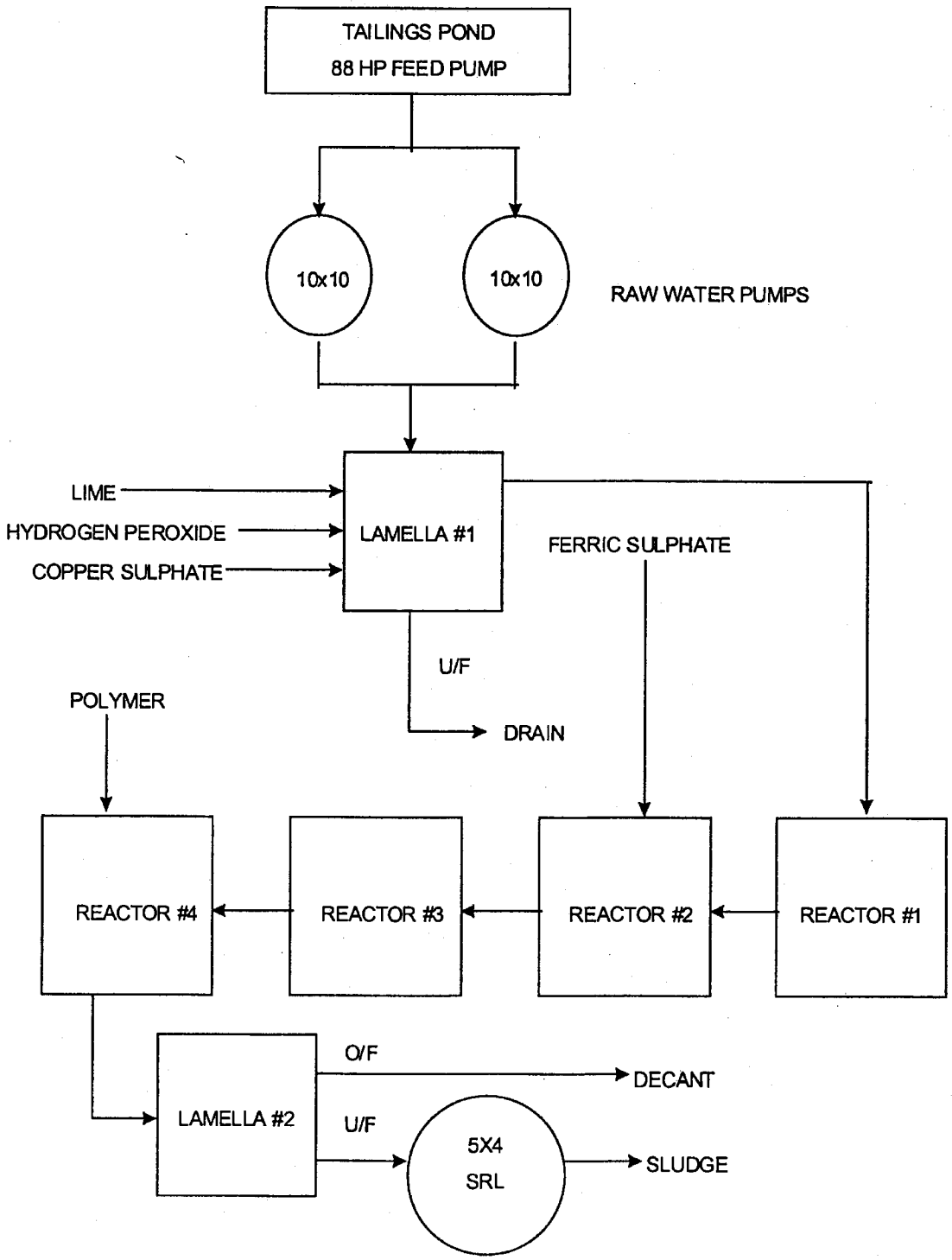
The C-1 Shaft and mill complex will be demolished once the last of the sludge is processed. Completion of this work is anticipated in 2007. Non hazardous demolition wastes will go to the non-hazardous waste disposal site in the Middle Pud TCA. Hazardous demolition debris, and wastes from the mill autoclave complex will be placed in the hazardous waste disposal area at the site of the former calcine storage area in the Middle Pud TCA. In the case of the autoclave, no hazardous materials are stored or contained in the facility. It is a stainless steel structure that can be disassembled and high pressure washed to remove contaminants. Following this it will be sold or placed in the non hazardous waste disposal area.

The closure plan allows for the removal of up to an average of 1.0 m or ~10,000 m^3 to ~15,000 m^3 of impacted soil from the mill after the mill structure is removed. The exposed new surface will be tested to determine the level of arsenic in the soil. The 1.0 m depth is anticipated to be an average thickness, as most structures in the mill area are founded on bedrock. Further, if the testing at the 1.0 m depth indicates more soil should be removed, another 0.5 m will be removed and the base area tested. This will continue until bedrock is encountered or the testing indicates the soil satisfies the accepted industrial criteria (340 mg/kg). If it meets the accepted industrial criteria, the area would be contoured, scarified, and revegetated. Vegetation work will consist of application of a mixture of seed and fertilizer for this site.

2.10 Cost Estimate

The unit rates for building demolition include an allowance for related disposal costs. The cost estimate for the removal of the buildings is presented in Section 10 of the C&R Plan.

WATER TREATMENT PLANT



Checked by: / Reviewed By: / Date	Miramar Con Mine, Ltd.				
	Water Treatment Plant Flow Diagram				
	Date: 16DEC02	Scale As Shown	Figure: 2.1	Rev. No.	

REVISION DATE: 04/10/28 9:20am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-11.dwg

Building #	Building Name
101	Burns Building
102	Warehouse with cooler
103	Warehouse
104	Propane Tank
105	Pump house / boiler
106	House
107	Hospital
108	Tanks
109	Recreation Hall
110	House
111	House
112	Garage
113	Garage
114	Garage
115	Apartment
116	House
117	Apartment
118	Garage
119	House
120	Masonic Lodge
121	Power Sub-station
122	Garage

LEGEND

172.9 SPOT ELEVATIONS
CONTOUR INTERVAL = 2 METRES

0 30 60 90 120 150
Scale in Meters

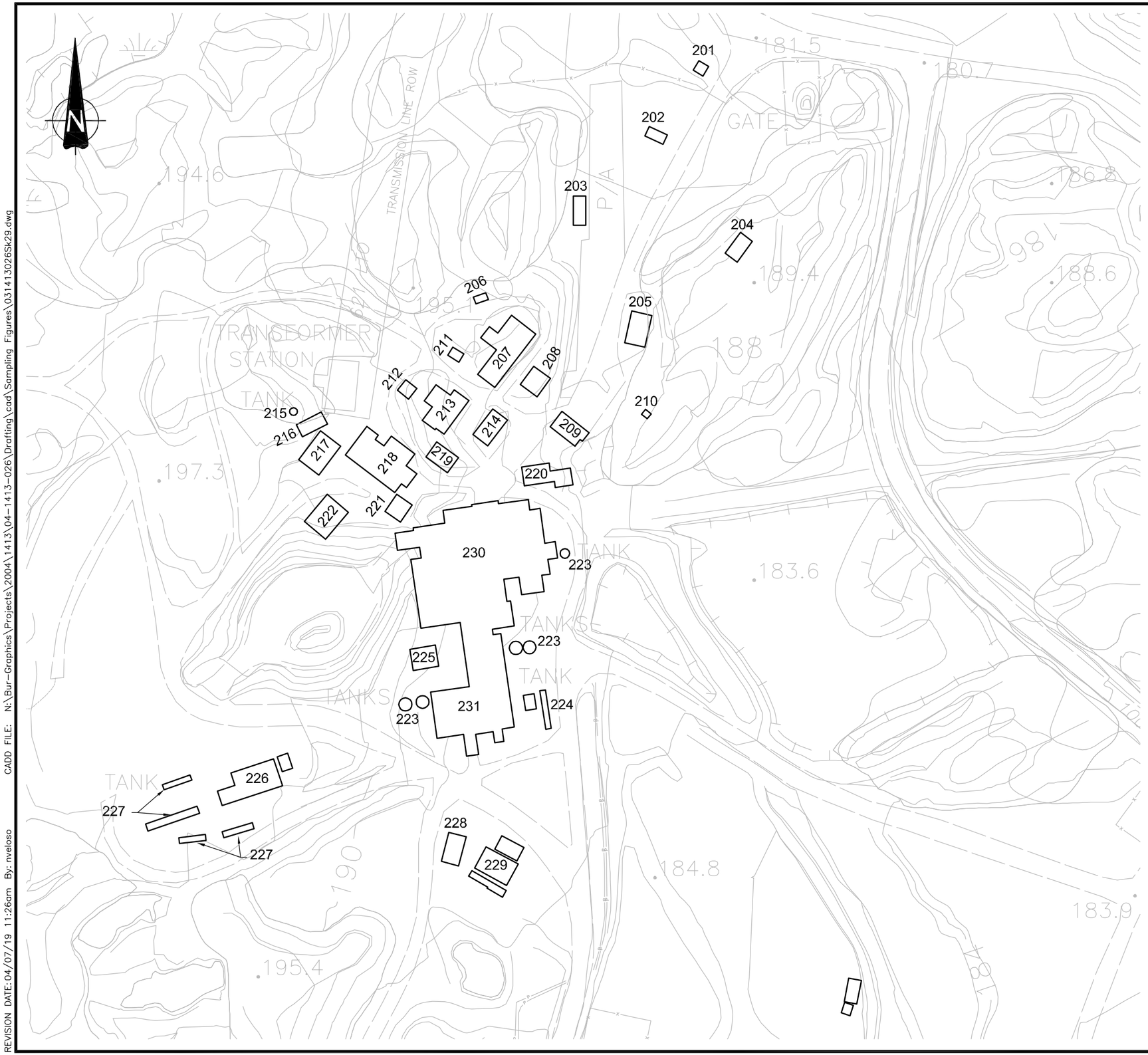
Checked by:
Revised By: Date:

Miramar Con Mine, Ltd.

Dock Area

Date: 19JUL04 | Scale As Shown | Figure: 2.2 | Rev. No.

REVISION DATE: 04/07/19 11:26am By: nveloso CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\Sampling Figures\03141302GSk29.dwg



Building #	Building Name
201	Cabin
202	Gate House
203	Office
204	Warehouse
205	Warehouse
206	Storage
207	Electrical and Carpenter shop
208	Refinery
209	Metallurgical Lab
210	Pump house
211	Storage
212	Mechanical Room
213	C-1 Dry
214	Office
215	Tank
216	Storage bin
217	Fine Ore bin
218	Power plant
219	Pipe fitters shop
220	Assay Lab
221	Hoist Room
222	Storage bin
223	Tanks
224	Propane
225	Mill Boiler
226	Oxygen plant
227	Tanks
228	Shed
229	Storage
230	Main mill
231	Autoclave

LEGEND

172.9 SPOT ELEVATIONS
CONTOUR INTERVAL = 2 METRES

0 20 40 60 80 100
Scale in Meters

Checked by:
Revised By: Date:

Miramar Con Mine, Ltd.

Mill Complex

Date: 19JUL04 | Scale As Shown | Figure: 2.3 | Rev. No.

REVISION DATE: 04/07/19 11:26am By: nveloso CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\Sampling Figures\031413026Sk29.dwg



Building #	Building Name
301	Robertson Shaft
302	Office Complex
303	Environmental Lab
304	Warehouse
305	Vent Structure
306	Materials Yard
307	Shops
308	Shops
309	Blend plant
310	Water treatment complex

LEGEND

172.9 SPOT ELEVATIONS
CONTOUR INTERVAL = 2 METRES

0 30 60 90 120 150
Scale in Meters

Checked by:
Revised By: Date:

Miramar Con Mine, Ltd.

Robertson Complex

Date: 19JUL04 | Scale As Shown | Figure: 2.4 | Rev. No.

REVISION DATE: 04/07/19 11:26am By: nveloso CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\Sampling Figures\03141302 6Sk29.dwg

3.0 UNDERGROUND

There were two main access and hoisting shafts at Con Mine: the C-1 Shaft, located adjacent to the existing mill, and the Robertson Shaft, south of the mill. Other openings to the surface included the Negus and Rycon shafts and a number of ventilation and manway raises as shown on Figure 1.6, the map of Con Minesite Surface Openings.

As illustrated on Figure 1.7, underground workings extend to a depth of over 750 m at the C-1 Shaft and to over 1,900 m at the Robertson Shaft. The primary mining methods were cut and fill, shrinkage, and long hole stoping. Ore was gravity fed to the loading pocket via the main ore pass, then hoisted to the surface.

Mine waste rock was defined as rock that was not mineralized or was sub-economically mineralized, but had to be mined to gain access to economic ore. Since the late 1930s, most of the mine waste rock produced by mine development remained underground as backfill (refilling mined-out voids to provide structural support). Mine waste rock not required underground was hoisted to the surface and used extensively on the Con minesite and throughout the City of Yellowknife for road construction, building foundations, lay-down or storage areas for equipment and parts, parking areas, and for construction of tailing dams on site.

Because mine development was typically carried out in the host rock outside the mineralized ore zone, the majority of mine waste rock is a basalt or chloritic schist, which is the same rock type as seen in surface outcrops adjacent to the Con minesite. Testwork conducted at Con Mine indicates that neither the ore, tailing, or, mine waste are potentially acid generating and the waste rock is acid consuming. As presented in the "Acid/Alkaline Rock Drainage and Geochemical Characterization Plan", the mine waste rock is characterized by a high neutralization potential. Neutralization potential (NP) is a measure of neutralizing capacity of a material, expressed as equivalency units of kilograms of calcium carbonate per tonne of material. The neutralization potential of Con Mine waste rock ranges up to 181 kilograms per tonne of calcium carbonate with neutralization potential to acid potential ratios ranging from 3.6 to 17.6, with a median of 11. Acid Potential (AP) is a measure of the acid generating potential of a material. Indian and Northern Affairs Canada's Acid Rock Drainage Guidelines (1992) states that mine rock with a neutralization potential to acid potential ratio of greater than 3 is net acid consuming.

Upon closure, the remaining stockpiled mine waste on surface will be used in the contouring of reclaimed areas and to augment the capping of Upper and Middle Pud tailing containment areas.

In November 2003, following cessation of underground mining operations and cleanup of the underground equipment, pumping for the mine dewatering system ceased and the mine is being allowed to flood.

3.1 Backfilling Operations

Backfilling of the underground stopes and workings was the practice of using waste material to fill underground voids in order to safely retain the structural integrity of a specific underground area. The use of tailing for backfill at Con Mine began in 1957, and the quantity placed underground has ranged from approximately 15% to as high as 40% of the total tailing produced.

Preparation of tailing for backfill usage was a three-stage process: dewatering the tailing, washing with fresh water, and removing the finest sized material and reducing the water content. By filtration, process water was removed from the tailing and it was then washed with fresh water. This slurry of fresh water and tailing was then processed through a two-stage cyclone system, which removed the smallest size fraction of the solids (generally particles less than 37 microns, referred to as "slimes") and reduced the water content to produce a slurry of about 60% solids. Recovered water and the finer "slimes" material reported to the tailing containment areas.

After being pumped underground to its final destination, the backfill was allowed to settle. The supernatant fluid was returned to the surface and reports to the tailing containment area. Backfilling stopped with the cessation of mining operations.

3.2 Closure and Reclamation Issues

Underground production ceased in September 2003. During October and November of 2003, underground operations were closed out as part of the overall plan to close the mine. The mine dewatering pumps, underground electrical systems, and surface vent fans were turned off on November 29th 2003. In early 2003, closure of the inactive stopes near the surface commenced. Work on permanent capping of the main shaft ages, vent raises, ventilation shafts, manways, and other openings to surface will continue through 2008. All openings to surface, both on lease and off lease, will be closed by the end of 2008.

A concrete cap will be placed on the 204Q stope opening. Design of the cap for this opening is in progress and is expected to be complete by the end of 2007. The investigation of the crown pillar at the 204Q stope opening is being on going and will be complete by the end of 2007. The near surface stope that is under the mill will be inspected and a drilling program will be carried out to check the stability of the crown pillar. The crown will be reinforced or the stope backfilled if needed. It is anticipated that work on this project will be completed before December 2008. The reports for both projects will be submitted the MVLWB.

During the final closure of underground operations in 2003, hazardous materials underground were removed to surface and disposed of in an approved manner off site. Fuels, lubricants, batteries and other hazardous materials were disposed of in the same manner as described for surface operations, or consumed during other closure activities. Because the underground inventory of fuels, lubricants, explosives, and other consumables was very small (consumables are supplied to underground operations on a daily "as-needed" basis), clearing the underground of deleterious materials did not involve significant cost or time expenditures.

3.3 Closure and Reclamation Plan

Closure activities for the underground operation were carried out as mine life progressed towards the last shift in November 2003. The remaining closure activities, such as capping shafts and vents, are scheduled for completion by the end of 2008. Demolition of the headframes and ventilation fan structures that are part of the underground operation are discussed in the section on buildings. These structures will be removed by the end of 2008.

As stated in Section 3.2, upon cessation of underground mining operations, hazardous products and petroleum waste materials were removed from underground and disposed of in licensed facilities, either in Yellowknife or in Alberta. Small equipment (pumps, motors, etc.) with salvage value were removed from the mine and disposed of as appropriate. The remainder of the equipment was left in a stope or drift when the underground areas of the mine were closed. The equipment was cleaned and all fluids were drained and flushed.

The mine dewatering system was comprised of a number of pumping stations located adjacent to the C1, B3 Winze, and Robertson Shafts. During the operational life of the mine, access was required to the dewatering pumps at the lowest levels of the mine. The underground workings were not allowed to flood until mining had ceased and underground closure activities were completed.

Historical minewater pumping rates for the last 14 years were initially used to predict the length of time needed for the mine to flood. Based on this 14-year average of 352,000 m^3 per year of minewater pumped from Con Mine workings, it was initially predicted that it would take four to five years to flood the mine. The 2004 mine flooding study conducted by URS estimated that, based on the first year of flooding, the mine would flood in approximately 20 to 25 years. Results of monitoring the water level after the first three years of flooding (2003 – 2006), now indicate that the actual groundwater inflows differ from the earlier predictions. The results of the monitoring carried out to date by MCML indicate that it will take approximately 11 years (to 2014) to flood to surface. The results of this monitoring are presented in Appendix IV. The rate of flooding will continue to be monitored annually to confirm this trend. The long-term groundwater monitoring program for the mine is detailed in Sections 8 and 9 of this document.

The conclusions of the groundwater study carried out by URS indicate that, when the minewater approaches surface, discharge of groundwater to the receiving environment is considered to have a low risk factor while the minewater is below Great Slave Lake water level. This report anticipates that, as the groundwater nears the surface, the minewater will initially flow along the Negus/Rycon fault towards Yellowknife Bay and the risk factor increases. MCML believes, based on its understanding of the mine workings, that minewater is most likely to seep to surface at the 204Q stope opening near Rat Lake. The detailed groundwater monitoring plan presented in Section 8 and 9 of this document addresses this risk concern. It includes installation of several additional shallow groundwater monitoring wells and two 30 metre deep groundwater wells.

As noted above, a concrete cap will be placed on the 204Q stope opening. This cap will incorporate hatches to allow sampling, and installation and operation of dewatering pumps as needed (see Section 8.6). The other mine shafts, ventilation openings, and raises will be capped with reinforced concrete by the end of 2008. Hatches to allow sampling and the installation of pumps will also be included in the caps on C-1 and Robertson shafts.

3.4 Schedule for Closure

As set out above, closure and reclamation of the underground mine was carried out as the mine progressed toward the last shift in November 2003. Hazardous products and petroleum waste materials were removed from the underground area and disposed of in licensed facilities. Equipment of value was removed.

It is anticipated that surface openings, on lease and off lease, will be closed or capped by the end of the construction season in 2008. The mine shafts, vent openings, and raises will be capped with reinforced concrete as per the standards outlined in the *NWT Mine Health and Safety Act* and as set out in Section VII of the *Ontario Mining Act*. At this point, the underground operations have ceased and the facility is considered as closed.

The post-closure minewater quality will continue to be monitored and the monitoring program is presented in detail in Sections 8 and 9 of this document. As recommended in the study conducted by URS Canada Ltd., the impact on the groundwater will be determined using a number of factors, which include the quality of surface inflow water, the contribution of chloride-rich Canadian Shield groundwater at depth, and the potential for contaminants leaching from mine tailing placed underground as backfill.

3.5 Cost Estimate

Closure of the underground mine workings was carried out at the end of the mine life. It was assumed, for cost purposes, that the remaining openings to surface will have been capped and closed by the end of 2008. It was assumed that, for cost purposes, equipment left in the underground operation had no salvage value. The costs are included in the plan cost estimate in Section 10.

4.0 RAT LAKE SURFACE WATER DRAINAGE

4.1 Rat Lake Drainage Basin

As noted previously, there are two watersheds on the minesite.

The first is the Pud Lake watershed, or western drainage system, which includes the original Pud Lake and drains in part to Kam Lake. The portion of the watershed that has traditionally been used for tailing disposal now drains by pipeline to Meg Lake, via the water treatment plant after all water is treated. This drainage basin has several sub-basins, which include the Taylor Road area, Upper Pud, Middle Pud, Lower Pud, Neil Lake, and Negus tailing areas.

The second is the Crank Lake watershed, or eastern drainage basin, which includes Crank Lake, and drains to Rat Lake to the north and to Yellowknife Bay to the east. Crank Lake has been a closed basin since the construction of tailing containment berms in the 1940s. The northern or north-western two-thirds of this basin were used for historical tailing deposition, from the start-up of the mine in 1938 until the mid to late 1950s.

These watersheds are shown on Figure 1.12, Map of the Con Mine Watersheds.

This section covers Crank Lake basin and the related Rat Lake area. The western or Pud Lake basin is discussed later, and closure plans for that area are presented in Section 6.

Before construction of the tailing containment berms, Crank Lake was originally the southern end of the Rat Lake watershed. Snowmelt and runoff from precipitation in the Crank Lake area now accumulates as surface ponding at the east side of the original lake basin. Ponded water, which collects in a sump near the Gatehouse at Con Road gate, is pumped to the Middle Pud Tailing Containment Area (TCA) as required.

Snowmelt and surface runoff on the northeast margin of the property flows towards Rat Lake. Over the operating life of the mine there has been some seepage from Crank Lake towards Rat Lake, but there does not appear to have been placement of tailing into Rat Lake. However, beginning in 1953 and continuing until just after 1961, a waste rock jetty was constructed at the south end of Rat Lake to stabilize the west shore of the lake. In addition, a portion of the south end of the lake was filled with waste rock. The waste rock was placed along the strike of the 204 stope to minimize the potential of water entering the mine from the lake area and is to be left in place to prevent a direct connection with the 204Q stope system with the lake. During the same period, the lake level was lowered by installation of an excavated drainage system at the lake's north end.

This work was undertaken to further reduce the potential of lake water entering underground mine workings that extend immediately below the lake. The lake level is now controlled by the invert level of a storm sewer that is maintained by the City of Yellowknife at the north end of the lake. As required under the Water Licence since the spring of 2000, the water at the south end of Rat Lake (SNP 40-12) is analyzed monthly for contaminants during open water season. In addition the water at the Taylor Road marsh (SNP-40-6) is analyzed weekly prior to and during pumping. There have been no levels of concern with respect to water quality at either of these two locations.

4.2 Rat Lake – Crank Lake Surface Water Drainage – Issues

The Crank Lake and Rat Lake watersheds are part of the mine's planned progressive reclamation work. The majority of the material in the bone yard on the Crank Lake TCA was removed when progressive closure of the area started in 2005. Some electrical equipment remains in the storage in this area. It will be sold or used elsewhere (off-site) and the area will be contoured to drain to the Middle Pud TCA and revegetated.

In 2000, approximately 5,000 m^3 of waste rock and impacted silt and tailing-like material were excavated from the south end of Rat Lake and placed in the Middle Pud TCA.

In order to determine the need for further work in the area of Rat Lake, the surface soils were sampled as a component of the ongoing soil sampling program to define the levels of arsenic at Con Mine. As part of this effort additional samples were collected in June 2004. The results of the 2004 sampling program and the results of previous studies are presented on Figure 4.1. A review of the results of samples from around the lake indicated that at, or just above, the lake level, isolated pockets of soil were found to contain higher levels of arsenic (values above 340 mg/kg). In most cases, a second sample taken at 20 cm below the surface in these areas exhibited a lower value of arsenic than the surface sample.

The 2004 sampling indicated that it would be necessary to remove the remaining material (2,500 cubic meters) at the south end of Rat Lake, which is comprised of soils with arsenic less than ~2000 mg/kg. [1] This material was excavated and placed in the Middle Pud TCA in the fall of 2005. In the fall of 2005 the excavated area was re-sampled to confirm results. It was determined that a small volume of material in the northwest corner of the excavated area still exceeded guidelines. This material was

[1] *It is noted that the material from Rat Lake should not be confused with the material referred to in the case of Negus and Con Ponds. The material from the Con and Negus ponds was arsenic sludge deposited at these sites by earlier operators of the mine. The arsenic concentration of this material is in the order of 50% (~500,000 mg/kg) arsenic.*

removed in the fall of 2006 and the area was re-sampled. The results indicate the material was removed successfully, however mine waste rock on the west side of the excavation still indicates levels of arsenic above 340 mg/kg. This waste rock will remain in place as noted in 4.1 above. The results of the above are detailed in Appendix V / Rat Lake Work Plan and Summary Results (Revision 2). The arsenic in the waste rock is naturally occurring arsenopyrite.

Several soil samples to the east of the lake, on Tin Can Hill, also exhibit higher arsenic values. These sample locations appear to be on the Negus mineralized strike line and highly localized, however the test results indicate that the arsenic is naturally occurring and not derived from mining activity. The results of the 2006 sampling program and a summary of previous work in this area are presented in Appendix VI.

4.3 Closure Plan

The Closure Plan required Crank Lake and Rat Lake watersheds to be reclaimed. As noted above, cleanup of the remaining approximately 2,500 m^3 of sediments and impacted soils was completed in the fall of 2006. The excavated area was backfilled with clean sand, re-graded and seeded. The soil reclamation criteria applied at Rat Lake is 340 mg/kg, which is the same as the industrial standard adopted by the Yellowknife Arsenic Soil Remediation Committee (YASRC) and MACA.

Signs and rock barriers have been installed to limit vehicular access into this area as much as practical. Space for parking of three to four cars along the side of the road would has been constructed at the southeast corner of the area on Con Road. A walking pathway would be developed to intersect with the existing walking trails on the east side of Rat Lake. This is shown on Figure 4.2. The walking trail and parking areas will be capped with material consistent with the material used for this purpose by the City of Yellowknife.

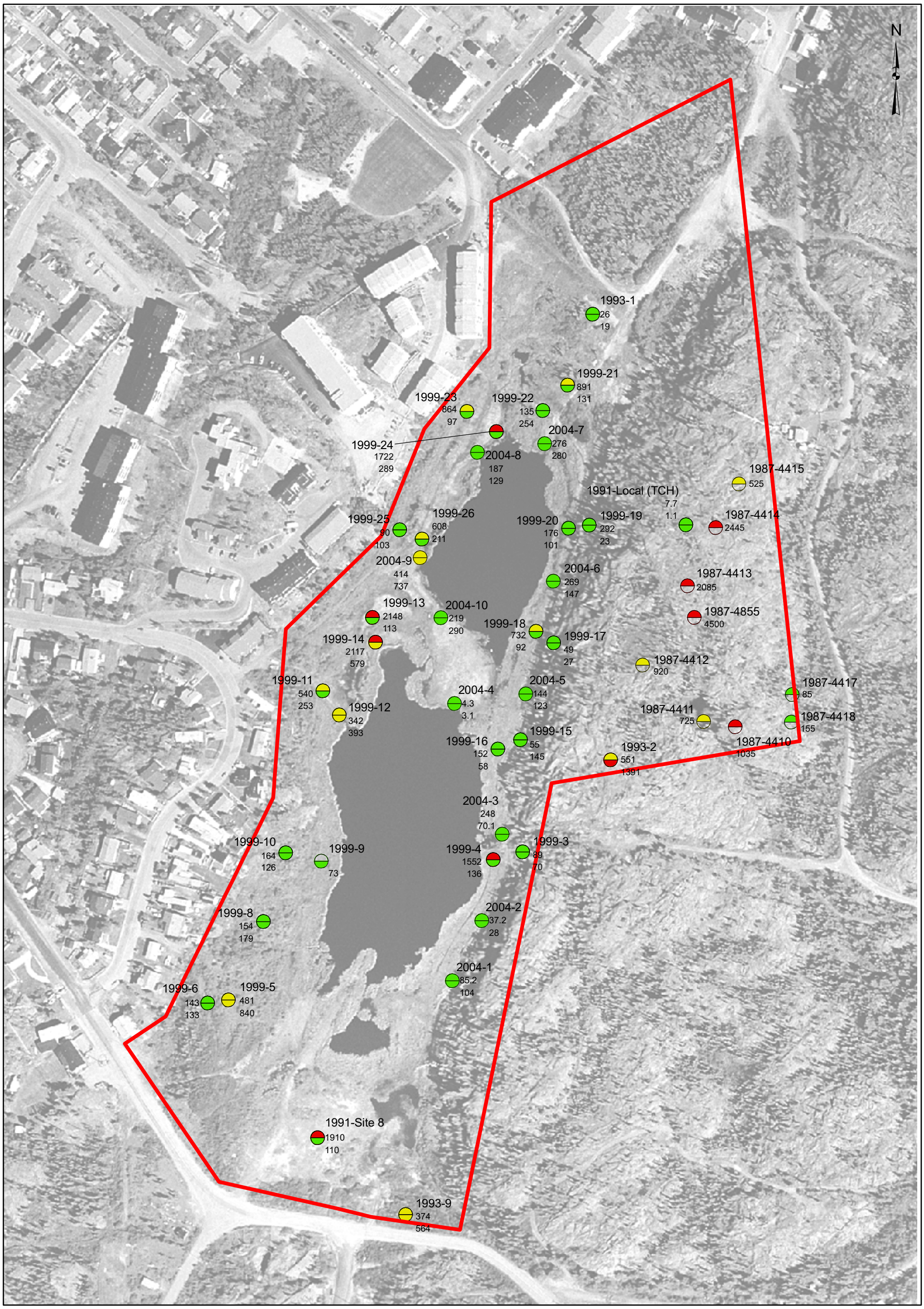
In the spring of 2004, two monitoring wells were installed at the south end of Rat Lake. The locations of the monitoring wells are shown on Figure 4.2. The water levels in the monitoring wells were measured on May 17, June 1, June 9, June 15, June 22, July 7, August 18, August 25, and September 30, 2004. Monitoring well MW-1 was either frozen or dry for the entire summer and MW-2 was dry except for the June 2004 event. The water quality data from the June 9th event at MW-2 indicated that the water was at a depth of 6.2 m or 0.3 m above the bedrock surface at the well location, the pH of the water was 7.2, the Arsenic (total) level was 0.036 mg/L; Copper was 0.010 mg/L; Lead was 0.03 mg/L; Nickel was 0.0288 mg/L; and Zinc was 0.122 mg/L, all well within the criteria specified under the Water License. The results of the groundwater monitoring in the shallow wells installed in 2004 and 2005 have been reported to the MVLWB in previous submissions. The wells were monitored again in 2006 and the report is being

prepared for submission to the MVLWB. The C&R Plan calls for these wells to be monitored annually through 2030. Based on the results of the sampling program, additional shallow monitoring wells will be installed to monitor groundwater quality.

Results of the separate underground groundwater study carried out by URS Canada on behalf of MCML are being used to determine the most appropriate deep groundwater monitoring network for the Rat Lake area, as set out in Sections 8 and 9 of this document.

4.4 Cost Estimate

Closure and reclamation of the Rat Lake area was completed in the fall of 2006. Consequently the only future costs for the Rat Lake area are related to ongoing monitoring, and completion of a walking trail. The cost for this work is presented in Section 10 of the closure plan.



LEGEND

- Soil Sample Location
  - Arsenic Concentration at 0.1 m Depth
  - Arsenic Concentration at 0.2 m Depth
  - Arsenic Concentration 0 - 340 ppm
  - Arsenic Concentration 340 - 1000 ppm
  - Arsenic Concentration > 1000 ppm
- Rat Lake Property Boundary

REFERENCE

Datum: NAD 83 Projection: UTM Zone 11

0 25 50 100

Meters

Scale - 1:2,500

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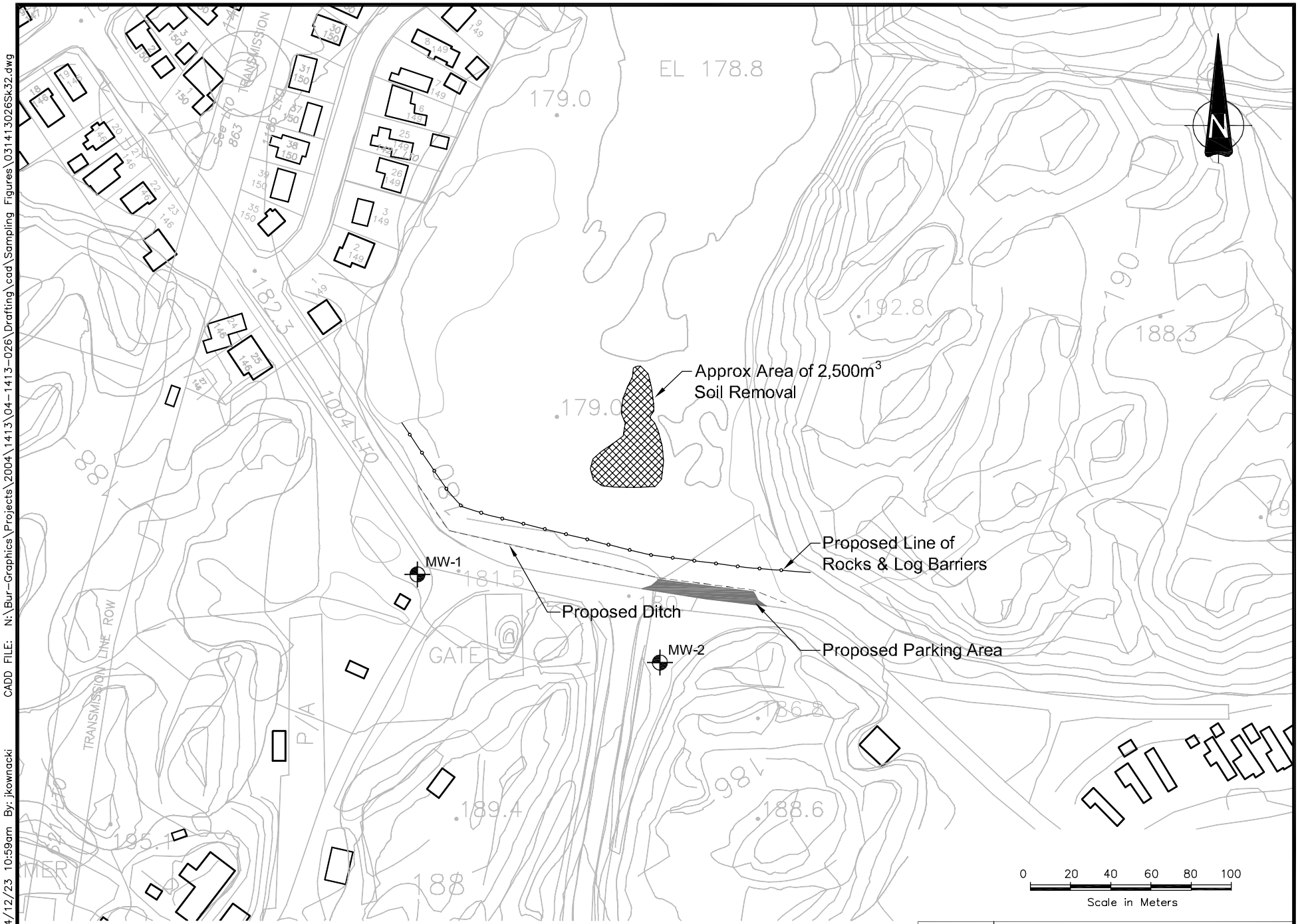
Revised By: Date

Miramar Con Mine, Ltd.

TOTAL ARSENIC CONCENTRATIONS WITHIN RAT LAKE LEASE BOUNDARY

Date: 22DEC04 | Scale As Shown | Figure: 4.1 | Rev. No.

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LEGEND

Approximate Monitoring Well Location

Checked by:		Miramar Con Mine, Ltd.			
Revised By:	Date	Proposed Work at Rat Lake			
		Date: 23DEC04	Scale As Shown	Figure: 4.2	Rev. No.

REVISION DATE: 04/12/23 10:59am By: jkownacki CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\Sampling Figures\03141 3026Sk32.dwg

5.0 CON POND AND NEGUS POND

5.1 Arsenic Sludges and Calcines

Between 1948 and its closure in 1970, arsenic bearing gas emissions from the roaster at Con were collected in a baghouse-scrubber system. The resulting arsenic bearing sludges produced from this operation were stored on surface in the Con and Negus Ponds in the central portion of the property. No arsenic bearing sludges were placed into the underground mine. Calcines, the residues from leaching the roasted gold bearing concentrate, were discharged with the tailing until 1963, following which they were stockpiled for potential re-processing just southwest of the mill. The calcines and arsenic sludges on site were initially estimated at ~30,000 metric tonnes of sludges, and ~40,000 metric tonnes of calcines. Site investigations in 2004 identified an additional ~30,000 metric tonnes of calcines just south of the oxygen plant, which were excavated and treated through the mill in 2005 and 2006.

By the end of year 2003 it was planned and anticipated that most of the sludges would have been treated. However, with the discovery of the additional calcine material near the oxygen plant, it took longer to complete this task. This treatment work was completed by the third quarter of 2006. The calcines were milled and a portion stockpiled for mixing with the remaining arsenic sludges to provide the required source of iron and sulphur for arsenic sludge stabilization in the autoclave. The final stabilization of the remaining arsenic sludges is scheduled for completion in 2007. The stabilized sludges will be deposited in the Middle Pud TCA.

The arsenic sludges / calcines, and the gravel and rocks contaminated by contact with these sludges / calcines in the storage ponds were part of the overall mining / milling process at Con. When treated through the autoclave, the arsenic is converted to Scorodite, an arsenic mineral that is chemically and physically stable. This material is placed in the TCA.

The arsenic contaminated gravel and rock that cannot be practically treated in the autoclave is still considered a product of the process. This material is being washed prior to disposal in the secure hazardous waste storage area. The wash water from this process is directed to the autoclave for final arsenic stabilization.

The hazardous waste storage area will be capped with an engineered low permeable cover designed to minimize the potential for arsenic to be carried to the environment by groundwater. The cover will reduce precipitation and snowmelt infiltration, consequently reducing potential flow to groundwater from this hazardous waste storage site. Further, any seepage will be directed to the Middle Pud water treatment plant.

MCML has committed to treating all of the arsenic bearing sludges and associated wash water through the existing autoclave plant and will not demolish or remove the autoclave until this work is complete.

5.2 Hazardous Sites – Issues

The Con Pond and the Negus Pond/Blend Plant areas will be closed after removal of the sludges and washing of the underlying rock as hazardous waste sites as originally proposed in the initial plans for closure. It was initially proposed to place contaminated material in both ponds, however with the identification of the large calcine storage / disposal area south of the oxygen plant, the plan has been modified. As the former calcine storage area must also be closed as a hazardous site, is closer to the Middle Pud TCA and the water treatment plant; it was determined this is a better location for an on-site hazardous waste disposal site. All three sites will be classified as hazardous waste sites, as some arsenic will remain even after high pressure washing of the rock base. Based on work completed in 2004, it is estimated that the level of residual arsenic that would remain after clean up of the two pond sites and the calcine disposal area would be in excess of 1000 mg/kg. As such, the high level arsenic sludges will be removed from the two ponds, the sites will be levelled or graded with mine muck to promote positive drainage. The sites will then be capped with a geosynthetic clay liner (GCL) and a soil/rock cover layer as set out in the guideline previously presented to the MVLWB in the Golder Associates 'Cover Design' report of March 2004. The closure of the area at the Negus Pond will include the Blend Plant footprint after the structure is removed.

As indicated above, the reclamation activity requires a location to dispose of hazardous materials from cleanup of the two ponds and from the mill and the general mine area. The existing non-hazardous waste landfill north and east of Dam A will be used for disposal of non-hazardous general or construction debris.

A conceptual design for the hazardous waste disposal area is provided in Section 5.3. This facility is founded on rock, and the base grades to naturally drain towards the Middle Pud TCA. Waste material from the mill and other buildings, such as old timbers that were in contact with elevated levels of arsenic and contaminated materials recovered during demolition of the mill will be placed in this area. Steel from the mill or blend plant that can not be power washed or steam cleaned to a level that allows recycling, or to allow placement in the non-hazardous or construction debris landfill, will also be placed in this hazardous waste disposal site. The hazardous waste disposal site will then be covered with a low permeable engineered cover system similar to the Con and Negus ponds.

5.3 Hazardous Sites – Plans

As indicated above, the Negus Pond/Blend Plant, the Con Pond and the Calcine disposal areas will be closed as hazardous waste sites as cleanup of these sites will leave residual arsenic levels above 1000 mg/kg in the underlying rock. It is anticipated that it will be necessary to regrade the sites after cleanup of the sludges and calcines is complete, to provide a contoured surface for a liner system. Therefore some of the low impacted soil (greater than 340 mg/kg and less than 1000 mg/kg) from the area south of the Con Pond area will be placed in these areas to achieve the desired grades. This will enable the cover system to be placed in such a manner as to reduce infiltration by contouring to promote positive drainage away from the area. The sites will be capped with a low permeable geosynthetic clay liner (GCL), a layer of drain rock and a mine waste rock cover.

Two design concepts were considered for the cap. Based on estimates from modeling, both systems will provide the desired level of infiltration reduction for closure, but the option with a geomembrane (Option A) required the mine to locate a large source of high quality clay on site, while the selected option (Option B) uses a synthetic clay liner (clay supplied from off site, so there is no need for large clay or peat borrow pit on property). Conceptual sections for the two cover systems are shown on Figure 5.1. The general drainage patterns for the area to achieve positive drainage from the three sites are presented on Figure 5.2. More detailed plans are presented on Figures 5.3 and 5.4 for the two ponds. The plan for the calcine storage area, to be used now as a hazardous waste disposal site, is presented in Section 5.3.2.

The Blend Plant is to be closed as part of the Negus Pond area. The last of the sludges and the calcines are scheduled to be processed through the Blend Plant by October 2007. Once it is determined that there are no more sludges to process, the Blend Plant will be cleaned and demolished in the late fall 2007 or early in 2008. Before the plant is decommissioned, the pits will be cleaned of any remaining sludges and inspected. The "As-built" drawings for the blend plant pits are shown on Figures 5.5 to 5.8. The plans show the pit depths and lining details. The cleanup schedule proposes that the autoclave be operated until October of 2007, to allow for wash water from cleanup of the Blend Plant to be processed and treated. After the autoclave is taken out of service in late 2007, any remaining wash water from the Blend Plant cleanup and later the mill will be sent to the Middle Pud Tailing Containment Area (TCA), and treated at the water treatment plant. The area around the autoclave will be tested for arsenic levels once the autoclave is removed from the building / mill. It is anticipated that material in this area will be similar to tailing and would be moved to the Middle Pud. If any material is identified with higher levels of arsenic than typical of the arsenic levels in tailing, the material would go to the hazardous waste disposal site.

The steel structure and cladding of the Blend Plant will be washed with high pressure steam and cut up in preparation for disposal. The wash water will be collected and directed to the Middle Pud TCA. If the work is performed when the autoclave is still in use, the water will be treated through the autoclave. It is anticipated that it will not be practical (cost effective) to power wash all of the metal cladding to remove all of the arsenic and that some of the material will go to the hazardous waste disposal site. It is anticipated that a large percentage of the structural steel can be washed for recycling. The steel may be sent to a recycling contractor based on the scrap metal market at the time. If not, the steel will be placed in the on-site hazardous waste disposal site and/or non hazardous waste landfill as appropriate (as noted above).

The success of the power wash will be based on swipe testing. If the swipe tests indicate arsenic levels higher than 340 mg/kg, the material will be placed in the hazardous waste disposal site.

The three mixing pits in the Blend Plant will be washed down with high pressure steam and the wash water pumped to the autoclave for treatment. The shotcrete lining will be inspected (remote controlled camera) and tested, but it will be left in place as a low permeability barrier to reduce seepage of contaminants into the surrounding bedrock. Any minor cracks in the shotcrete will be sealed with an epoxy resin. Larger cracks (greater than 3 cm wide and 5 m long) would be remediated with other materials such as a concrete grout. In addition, core samples will be obtained from 6 selected locations. The outer surface (inside) section will be tested for arsenic for the record. The holes will then be sealed.

Removal of the Blend Plant pit liner will not be undertaken as it would require drilling and surface blasting that could be dangerous to human health and potentially result in further spreading of contaminated material. In addition, it would expose and fracture the bedrock, allowing for the possibility of contaminants infiltrating into the groundwater. It is anticipated that, based on examination of the exposure surface of the bedrock at the plant, that the bedrock is competent and will have a low permeability. The three mixing pits would be carefully filled with soil that has arsenic levels above 340 mg/kg level, but below the 1000 mg/kg closure level of the adjacent pond. The top level or surface of the soil placed for the three pits will be graded to match the grades proposed for the Negus Pond. This area will be graded to drain ultimately to the west and towards the Middle Pud TCA.

5.3.1 Cover design

The conceptual cover design for the Con and Negus ponds is based on the 1991 Canadian Council of Ministers of the Environment (CCME) "National Guidelines for the Landfilling of Hazardous Waste". The CCME guidelines state the following:

- *"A final cover system should be installed over each area or landfill cell with the objective of isolating the wastes, controlling infiltration and providing weather erosion protection appropriate for the site. The barrier layer of the cover system should be integrated securely into the landfill liner system at the perimeter of the landfill cells. In addition, the cover system should be of sufficient thickness to minimize any stresses due to seasonal freeze/thaw cycles. The cover and bottom liner of the landfill should be designed such that the no buildup of fluid occurs in a landfill cell."*

The proposed engineered low permeable cover system for the hazardous waste sites will be approximately 0.8 to 1.1 m thick and is based on the 1991 CCME design guidelines. The upper portion of the cover allows for drainage. The bottom portion of the cover will reduce infiltration into the underlying soils and separates the vegetation layer from the underlying soils. The growth of vegetation will be discouraged to render the areas unattractive to animals and people and minimize potential damage to the engineered cover system.

The cover system will consist of a top layer 30 to 50 cm thick of waste rock or crushed rock surrounded by a barrier of ~1 m minus boulders spaced to discourage motorized vehicle access. The layer material will be a 40 cm minus material with a high gravel content. A 20 to 30 cm thick sand or gravel layer would underlie the upper layer and provide drainage to the edge of the cover system. A low permeability geosynthetic clay layer (GCL) will be placed below the drainage layer to impede infiltration. The results of modeling of the proposed cover system indicate the infiltration from the base of the cover system would range from 1.5 to 2 % of the average annual precipitation to achieve the goal for the engineered cover system. As the GCL uses a natural bentonite clay material, the liner life is expected to exceed 100 years. Long-term monitoring of the cover (Section 9) will evaluate performance of the overall cover system and thus indicate if maintenance is required. An allowance for such maintenance as a contingent measure has been included in the long-term monitoring and maintenance cost presented in Section 10. A levelling layer or transitional working pad of compacted silty sand or silty gravel will be placed beneath the GCL to provide for a levelling or grading layer. This layer will be at least 15 cm thick, but in general will be thicker. The mine waste rock or crushed rock fill material that will be used in the construction of the engineered covers for these hazardous waste sites will be tested using the following analytical procedures to verify that this rock is neither non-acid generating nor a source of arsenic:

- Conventional Acid Base Accounting analysis using the Modified Sobek Method; and,
- Trace Metals analysis using ICP-MS (30 element)

This is intended to ensure that the rock fill used in these covers does not become a source of future contaminant release, is non-acid generating, and is below 340 mg/kg arsenic. Typically a ratio of 5 samples per hazardous waste site cover will be used as a minimum guideline for this testing. This is approximately 15 tests for 35,000 cubic meters of rock fill material for the cover on all three hazardous sites.

Cover material will be obtained by excavation of the existing rock fill contained in the Robertson complex parking lot and associated lay down area, and around the shops and administration/warehouse complex area. Initial testing of these rock fill materials indicates that the material is acceptable for this purpose. Additional material will be obtained from a quarry to be developed east of the water treatment plant and south of the Middle Pud TCA. Both rock sources will be characterized as discussed above prior to use.

The quarry will be developed with long-term stable wall slopes and a flat floor surface that will naturally drain towards Middle Pud TCA. A rock berm 1 m high will be placed around the top edge of any high wall to warn of the quarry slopes.

5.3.2 Surface Grading

As indicated above, the Con and Negus ponds will not be used as hazardous waste disposal areas and only the calcine area will be developed as a hazardous waste disposal site. The conceptual design for the hazardous waste disposal site assumes that the present rock base will provide the desired sound foundation for the site. The base area of the site naturally grades to the south east and the Middle Pud TCA. It is proposed that an area approximately 150 meters by 150 meters will be developed to allow placement of 130,000 to 150,000 m^3 of hazardous material. It is estimated the hazardous waste disposal site will be ~6 meters high. The site does allow for more material by either expansion laterally or by increasing the disposal site height. Once the hazardous waste disposal site is full, it will be covered with an engineered low permeable cap similar to the cover system proposed for the Con and Negus ponds.

The available topographic survey data for the mine indicates that the current elevation of the rock surface below the sludges in the Con Pond is approximately 184 m Geodetic Datum. Observations at Con Pond indicate that bedrock is exposed under the entire pond footprint. At the Negus Pond, approximately half of the area has been cleaned to bedrock. Observations indicate that the Negus Pond is also underlain by bedrock.

Based on the above, it is proposed that, for preliminary planning, the top of the final cover for the Con pond would be 185 m and the top grade at the Negus pond would be set at approximately elevation 189 m Geodetic Datum or the approximate existing grade. The estimated area to be covered at the Con Pond is 8,000 m^2 and the estimated area to be covered at the Negus Pond is 12,000 m^2. The hazardous waste disposal site at the former calcine site will cover an area approximately ~10,000 to 12,000 m^2 and would have a top elevation at 192 meters Geodetic Datum. The final covers will be contoured to allow runoff to drain away from the site. A comprehensive survey of the pond areas will be conducted prior to detailed design to provide a better estimate of cover area and grades.

Drainage from the Con and Negus ponds and the surrounding area will be directed to Middle Pud TCA. Locations of the proposed engineered drainage channels from Negus Pond and Con Pond are shown on Figure 5.3 and 5.4. The current design for the drainage channels assumes a depth of 2 m, a base width of 1 m and 2 horizontal to 1 vertical side slopes. This wide cross-section minimizes the potential for ice dams to form during the spring thaw. Surrounding areas will require minor contouring to promote positive drainage towards perimeter channels. The drainage channel from Con Pond will have an initial invert at elevation 188 m with a 0.8% grade to 186 m at the north end of the east arm of Middle Pud TCA. The drainage channel from Negus Pond will have a proposed initial invert elevation of 188 m with a 0.5% grade to 184 m at the Middle Pud TCA. In addition, it is proposed to redirect runoff from the respective contributing watersheds around the ponds to the Middle Pud TCA. The channels will be lined with erosion resistant rock or coarse gravel.

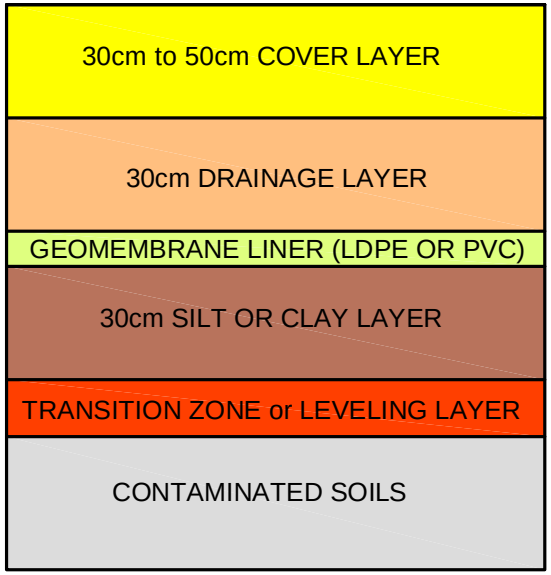
In addition to the boulder barrier (using ~1 m diameter boulders spaced at 1 m), warning signs will be placed around these areas to identify the hazardous waste sites. MCML recommends that permanent development restrictions or covenants be placed on these sites so that they are not used for other purposes without full consideration of the underlying contamination. The sites will be surveyed for this purpose and the records provided to the land owner and to the City of Yellowknife.

5.4 Cost Estimate

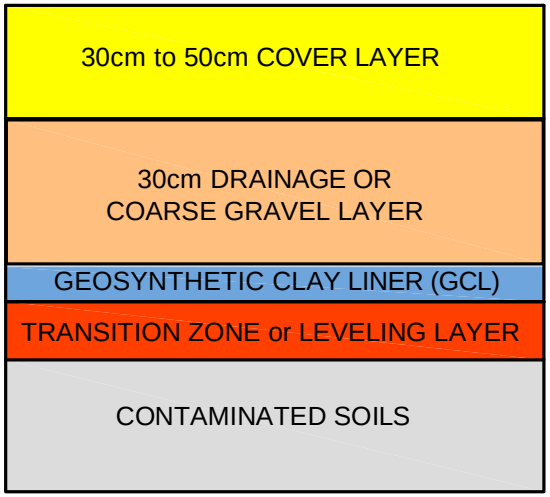
Reclamation of the Con and Negus Ponds is scheduled for completion in 2008. The hazardous waste disposal site is scheduled to be closed out by late 2009. The cost and schedule of this work is presented in Section 10 this plan.

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OPTION A



OPTION B (PROPOSED)



NOTES

1) Proposed Option B would be for Con Pond, Negus Pond and Hazardous Waste Disposal Site.

PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

HAZARDOUS WASTE SITE COVER SYSTEM

PROJECT No. 05-1413-016			FILE No. 051413016-5000-01	
DESIGN	JH	27FEB06	SCALE AS SHOWN	REV. –
CADD	SRR	27FEB06		
CHECK	JH	27FEB06		
REVIEW				

FIGURE 5.1

Con Pond Drainage Ditch Watershed

NOTE: Regrading and Shallow Ditch Construction Required to Divert Drainage Away from Con Pond

Hazardous Waste Site

Con Pond Drainage Ditch

Con Pond Hazardous Site

Propose to test Con Pond area and based on test results, extent of cover to be determined

Existing Sump Location

Limit of the pond

Non Hazardous Waste Site

Proposed Negus Pond Drainage Ditch

Drainage Area

Propose to test Negus Pond area and based on test results, extent of cover to be determined

Negus Pond Hazardous Site

Area to be investigated and remediated based on test results

Blend Plant

Area of Negus Pond should be regraded from southwest to northeast from El. 189m to 188m

Negus Pond Drainage Ditch Watershed

0 40 80 120 160 200

Scale in Meters

PROJECT

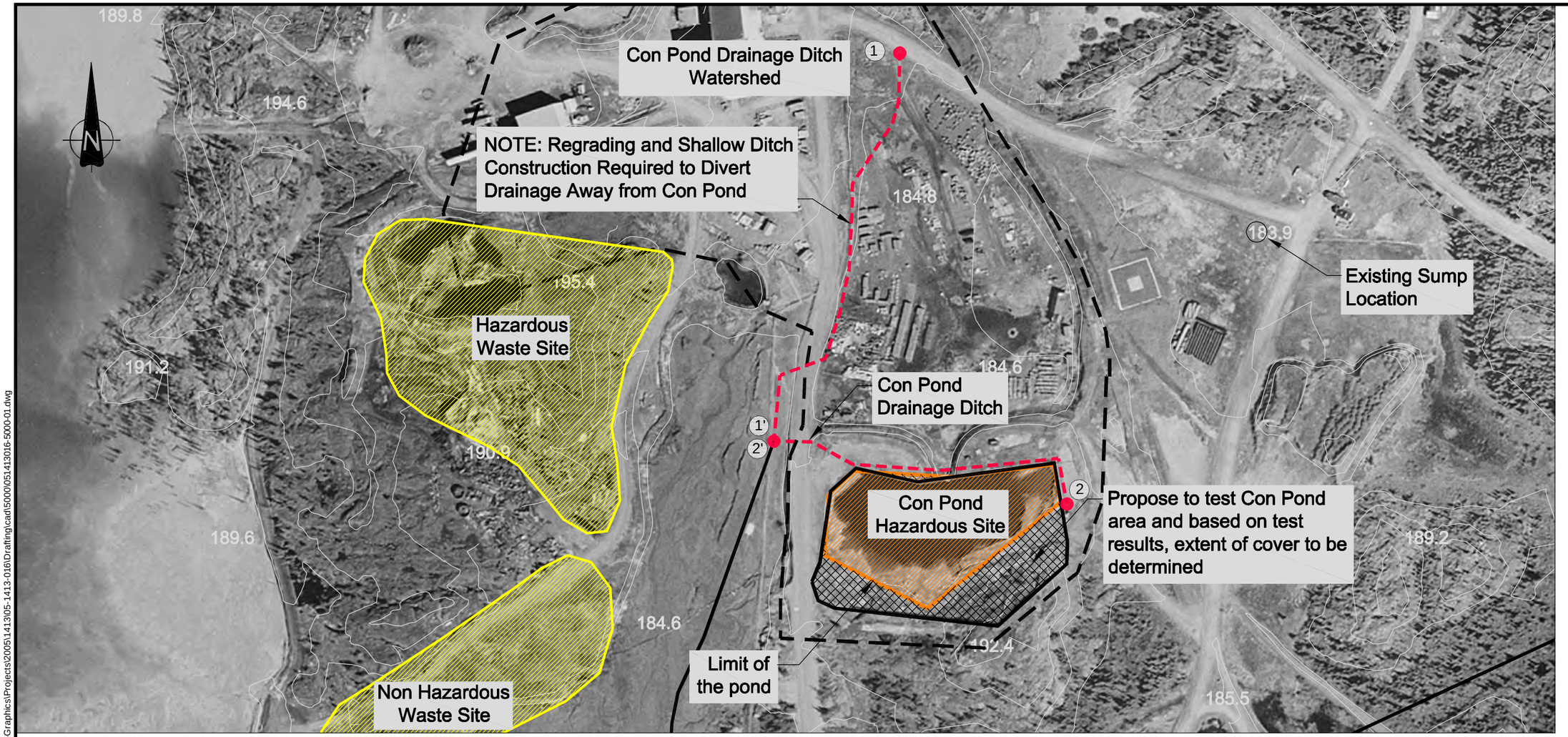
MIRAMAR CON MINE
YELLOWKNIFE, NWT

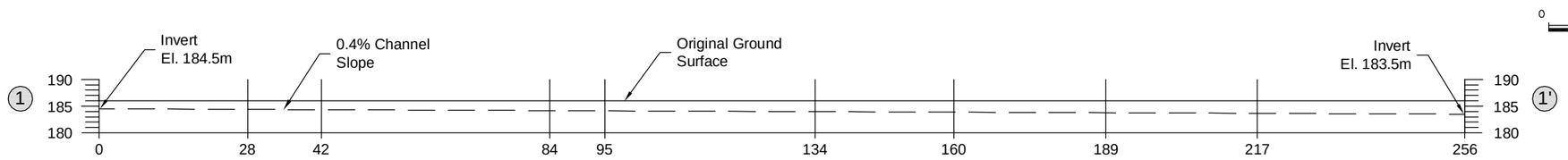
TITLE

CONCEPTUAL CON AND NEGUS POND DRAINAGE DESIGN

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			CHECK	JH	27FEB06		
			REVIEW				

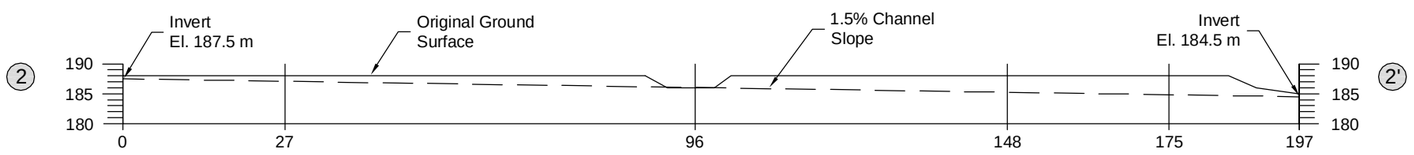
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SECTION 1

Scale 1:100



SECTION 2

Scale 1:100

0 20 40 60 80 100

Scale in Meters

PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

CONCEPTUAL CON POND DRAINAGE DESIGN

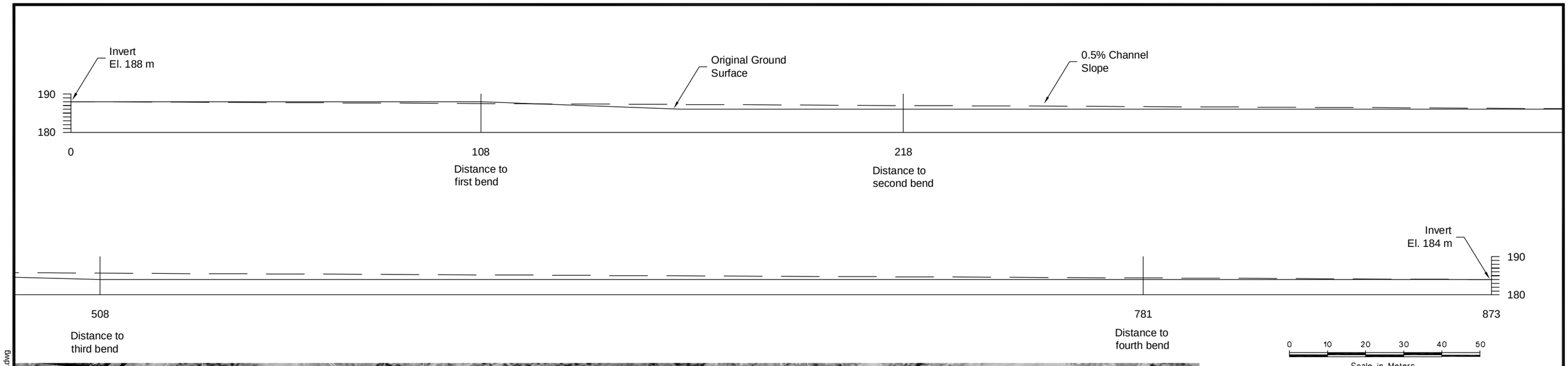
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	REVIEW				

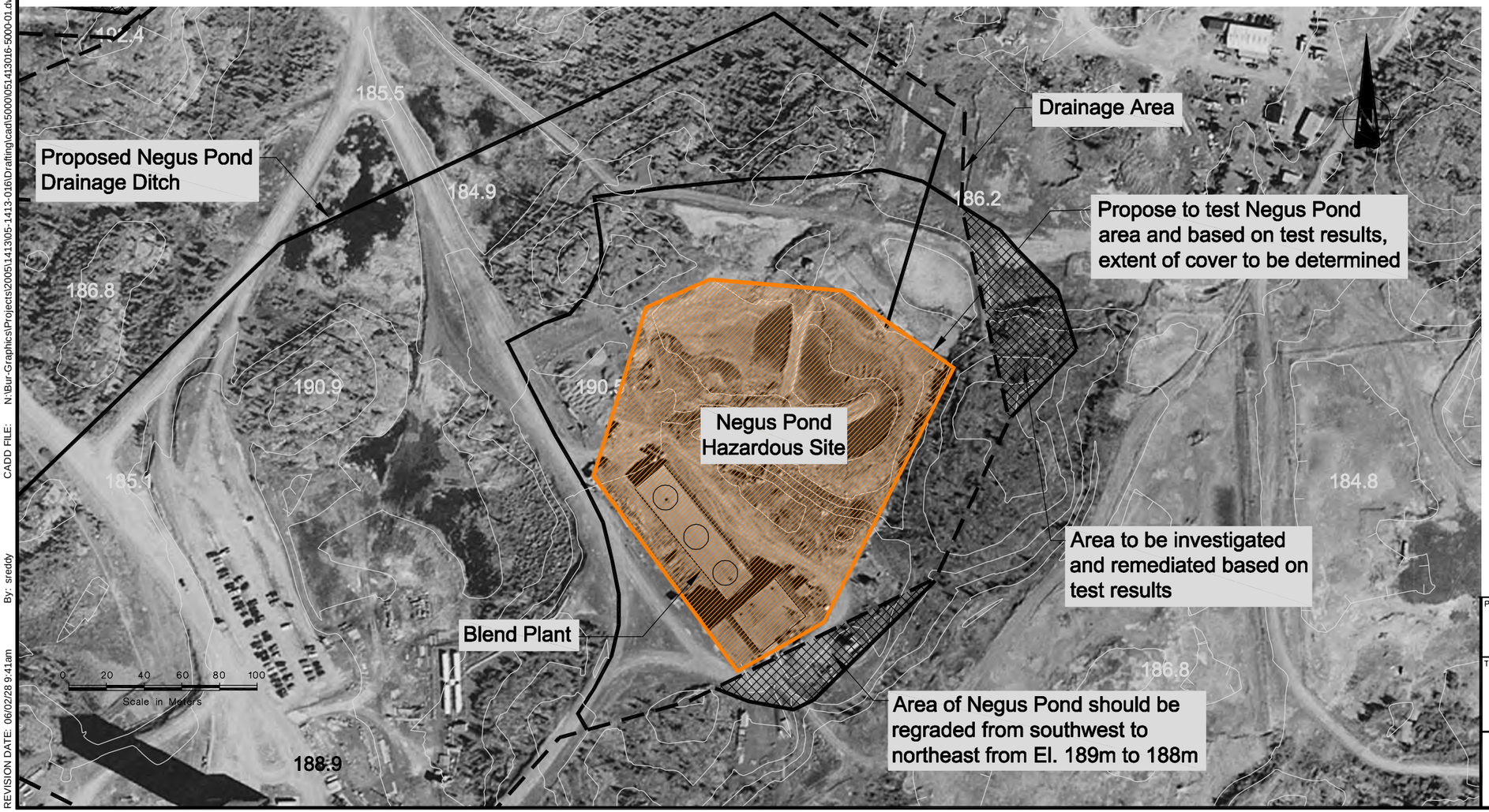
FIGURE 5.3

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By: sreddy

REVISION DATE: 06/02/27 11:51am





PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

CONCEPTUAL NEGUS POND DRAINAGE DESIGN

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DESIGN	JH	27FEB06	SCALE AS SHOWN	REV.	–
CADD	SRR	27FEB06			
CHECK	JH	27FEB06			
REVIEW					

FIGURE 5.4

REVISION DATE: 06/02/28 9:41am By: sreddy CADD FILE: N:\Bur-Graphics\Projects\2005\1413\05-1413-016\D\drafting\cad\5000\051413016-5000-01.dwg

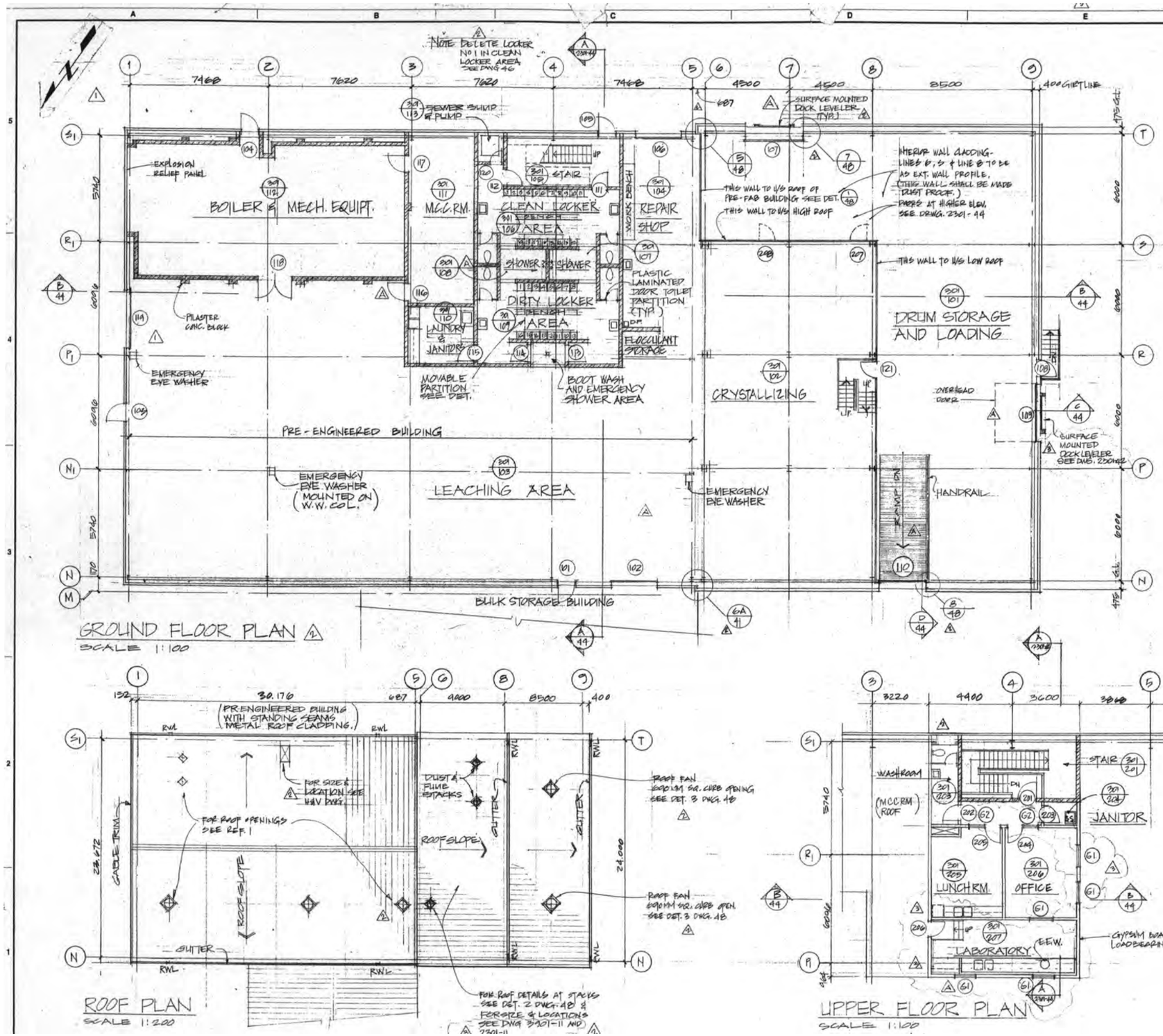
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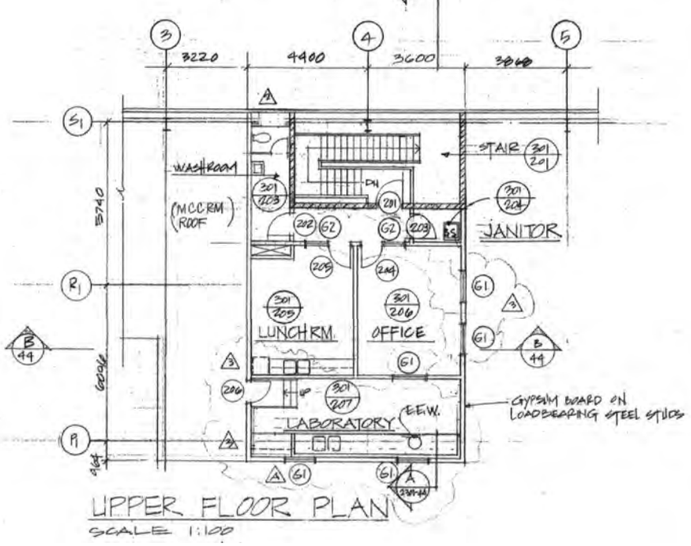
Bill of Material

Item No.	No. Req'd	Material	Description	Pattern or Drawing Number	Supplied or Made by	Date Ordered	Requisition No.

GENERAL NOTES: (A)

1. ALL OPENINGS ON A REQUIRED FIRE SEPARATION WALL, FLOOR ROOF AND CEILING FOR ELECTRICAL WIRES, HEATING AND VENTILATIN DUCTS AND MECHANICAL PIPES SHALL BE FILLED OR CLOSED WITH NON COMBASTABLE MINERAL FIBRE OR SILICONE RTV FOAM OR OTHER APPROVED CONFORMING TO NBC.





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PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, N.W.T.

TITLE

BLEND PLANT PLAN
FLOOR PLANS AND ROOF PLAN ASBUILTS

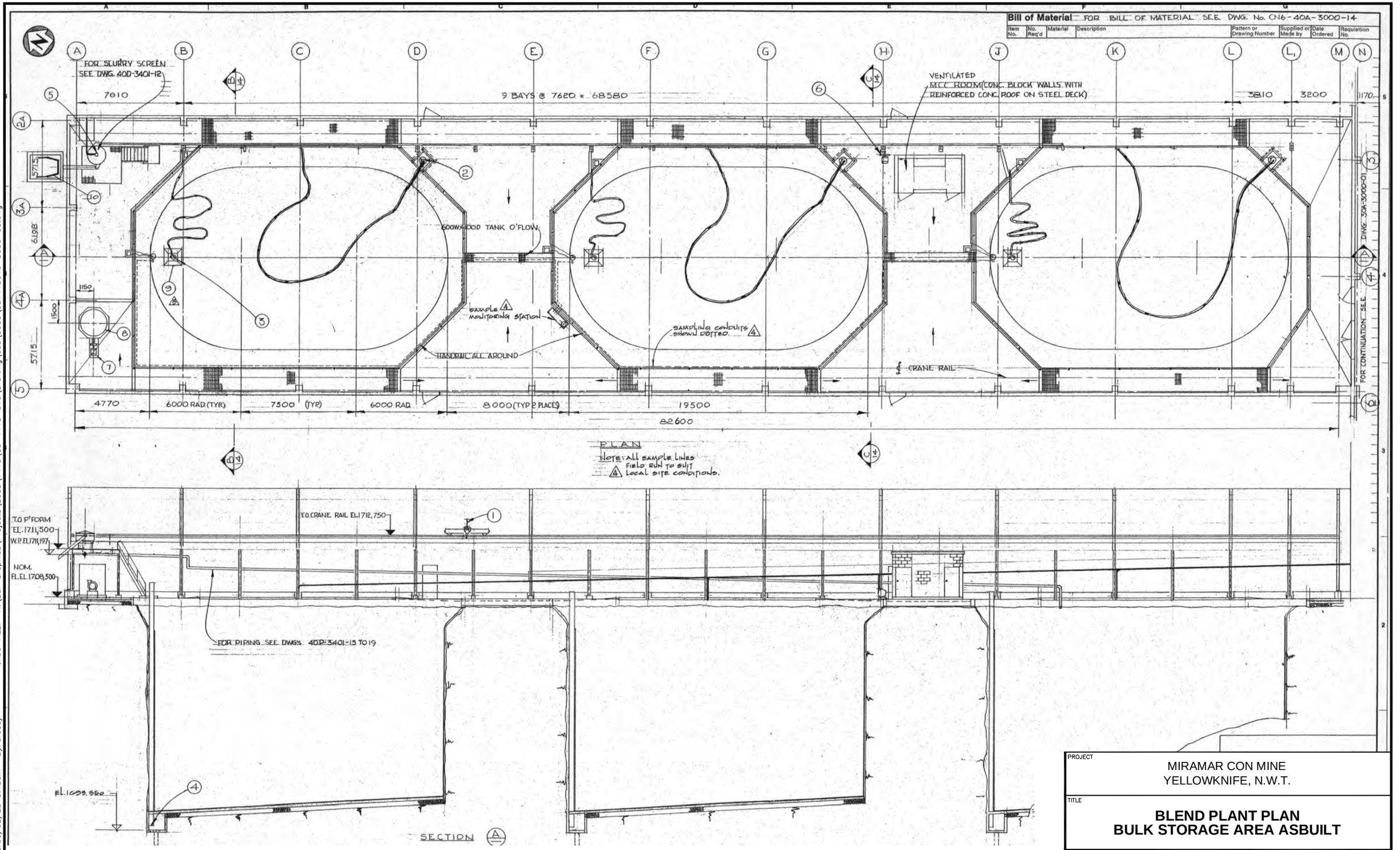
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			DESIGN	JH	27FEB06
			CADD	SRR	27FEB06
			CHECK	JH	27FEB06
			REVIEW		
			SCALE NTS	REV. –	

FIGURE 5.5

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Bill of Material FOR BILL OF MATERIAL SEE DWG. No. CN6-40A-3000-14

Item No.	No. Req'd	Material	Description	Pattern or Drawing Number	Supplied or Made by	Date Ordered	Requisition No.



PLAN

NOTE: ALL SAMPLE LINES FIELD RUN TO SUIT 4 LOCAL SITE CONDITIONS.

PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, N.W.T.

TITLE

BLEND PLANT PLAN
BULK STORAGE AREA ASBUILT

			PROJECT No. 05-1413-016		FILE No. 051413016-5000-03
DESIGN	JH	27FEB06	SCALE	NTS	REV. –
CADD	SRR	27FEB06			
CHECK	JH	27FEB06			
REVIEW					

FIGURE 5.6

REVISION DATE: 06/02/28 9:5am By: sreddy CADD FILE: N:\Bur-Graphics\Projects\2005\1413\05-1413-016\Drafting\cad\5000\051413016-5000-03.dwg

Bill of Material SEE DRWG. Nº 30A 3000-05

Item No.	No. Req'd	Material	Description	Pattern or Drawing Number	Supplied or Made by	Date Ordered	Requisition No.

BOILER ROOM. SEE REF. Nº 1

M.C.C. ROOM. SEE REF Nº 6

SUBSTATION AREA SEE REF Nº 6

LOCKER AREA SEE REF. Nº 2

REPAIR SHOP.

DRUM STORAGE / CLEANING AREA. PACKAGING AREA. SEE REF. Nº 4.

PRESSURE FILTER AREA. SEE REF Nº 5

COOLING TANK. 2000ϕ×2000

PULP STORAGE TANK 2000ϕ×1800

PULP STORAGE TANK

COOLING TANK

FLOCCULANT STORAGE.

SEAL TANK 1500ϕ×1500

ALKALI STOR. TANK 1200ϕ×2400

CRYSTALLIZER AREA SEE REF. Nº 3.

FOR SUMP PUMP DET'S SEE REF Nº 7. (TYPICAL)

HANDRAIL

RAMP DOWN

Nom. FLOOR EL. 1705.670

CLARIFIER TANK 5000ϕ×5200

SUCTION

STOCK TANK 7000ϕ×5000

CRYSTALLIZATION LIQUOR STORAGE TANK. 5000ϕ×5500

MOTHER LIQUOR STORAGE TANK. 5000ϕ×5500

FLOCCULANT STORAGE TANK. 1500ϕ×1800

PRIMARY LEACH TANK 3000ϕ×5000

PRIMARY THICKENER. 4500ϕ

SECONDARY LEACH TANK 2100ϕ×5000

SECONDARY THICKENER. 3700ϕ

* FOR BULK STORAGE BLDG. SEE DRWG. Nº 40A 3000-13.

READ THIS DRAWING IN CONJUNCTION WITH DRAWING Nº 30A 3000-02

FLOOR PLAN ON Nom EL. 1708.500 U.N.O.

PROJECT

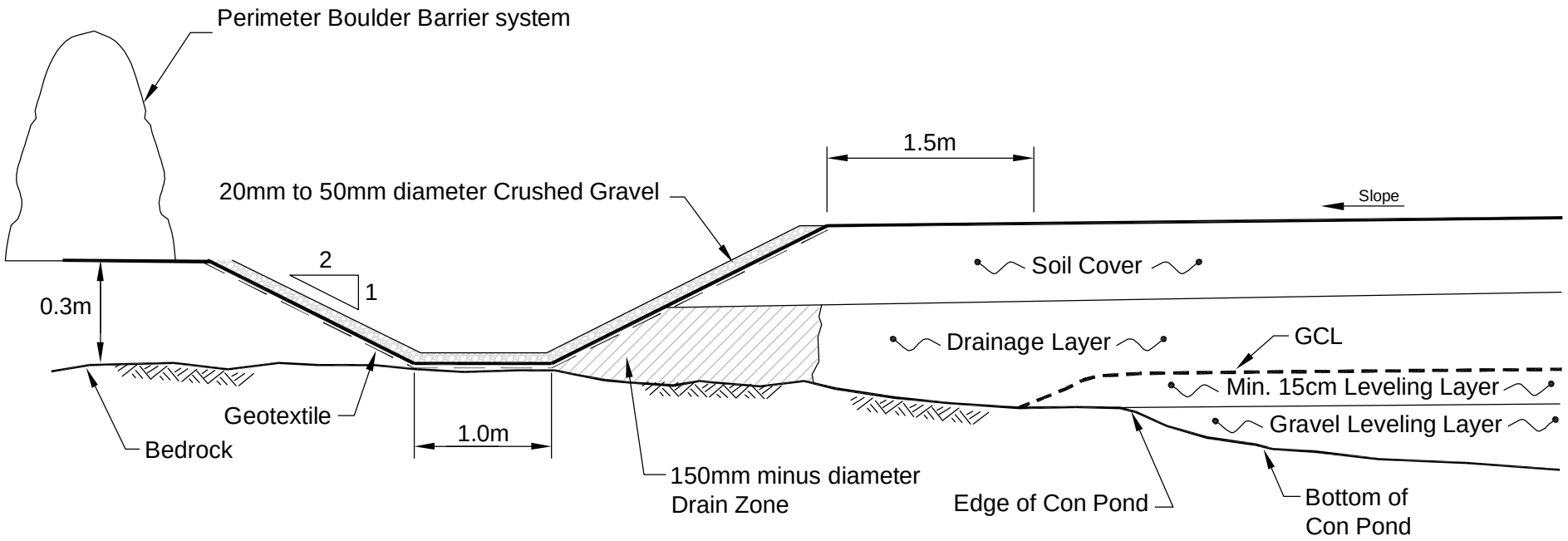
MIRAMAR CON MINE
YELLOWKNIFE, N.W.T.

TITLE

BLEND PLANT PLAN
G.A. PLAN SHEET No. 1 ASBUILT

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REVIEW					

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Schematic Only - Not to Scale

PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, N.W.T.

TITLE

HAZARDOUS WASTE SITE
COVER AND DRAINAGE DITCH DETAIL

PROJECT No. 05-1413-016			FILE No. 051413016-5000-02	
DESIGN	JH	27FEB06	SCALE NTS	REV. –
CADD	SRR	27FEB06		
CHECK	JH	27FEB06	**FIGURE 5.8**	
REVIEW				

NOTES

1) Detail would be for cover at Con Pond, Negus Pond and Hazardous Waste Disposal Site.

6.0 TAILING CONTAINMENT AREAS (TCAs)

The primary objective for reclamation of the Tailing Containment Areas (TCA's) is to stabilize the tailing surface in a manner that will minimize potential for dust generation by wind erosion, minimize contact with surface water to reduce the rate at which pore water contaminants are released, and minimize the potential for human and/or animal contact with the tailing. On historic tailings (tailing deposited many years ago which have subsequently been fully dewatered and consolidated such as the Negus TCA), these objectives will be achieved by establishing a self-sustaining vegetative cover over the entire tailing surface. Where this approach is not feasible such as on the recent tailing (tailing deposited in the more recent past that are still partially saturated and have not yet fully consolidated such as the Upper and Middle Pud TCA), these objectives will be achieved by installing a physical isolation barrier over the entire tailing surface and then establishing a self-sustaining vegetative cover over top of this barrier. The isolation barrier will be created by placing a minimum thickness of 50 to 60 cm of a geochemically stable layer of mine rock (rock that will not become a source of contaminant release in the future, i.e., non-acid generating and non-metal leaching rockfill).

Reclamation of all of the TCA on the Con minesite, both historic and recent, will require contouring of the tailing surface to allow precipitation runoff and snowmelt to be shed from the surface without coming into contact with the underlying tailing solids to the maximum practical extent through the construction of engineered drainage channels.

Reclamation Performance Criteria

The performance criteria for the self-sustaining vegetative cover to be placed over the entire surface of the historic TCAs are summarized as follows:

- To prevent dust loss from the tailing surface through wind erosion by establishing a self-sustaining vegetative cover over the entire surface; and,
- To reduce the amount of precipitation runoff infiltrating through the tailing by holding water within the vegetation cover system and allowing this water to run off the surface or evaporate from the surface without coming into contact with the underlying tailing surface.

It should be noted that the historic TCA's have fully consolidated and are comparatively dry. Consequently these areas are relatively stable from a physical stability perspective (i.e., they support people and light vehicles passing across them without sinking in). Monitoring of seepage and runoff water from these areas suggests that these historic TCA's have been flushed over time and thus do not release pore water contaminants as seen from the recent TCA's.

The performance criteria for the rockfill isolation barrier and overlying self-sustaining vegetative cover on the recent TCAs are summarized as follows:

- To provide a physical isolation barrier to minimize contact and provide separation from the tailings to people and wildlife; and,
- To reduce the amount of precipitation runoff infiltrating through to the base of the cover to a target level of 5% to 7%.

Proposed End Land Use

The proposed future end land use for the overall minesite is a combination of industrial use and open space suitable for light non-vehicular recreational use (walking, jogging, dog-walking, etc.). After reclamation is complete, it is anticipated that the mill complex area and the shop areas will be suitable for other industrial activities (warehousing, light commercial use), while the tailing containment areas will be reclaimed as open areas with a potential for light recreational use, but not for vehicular traffic. The historic TCA's will be reclaimed by seeding and fertilizing with some soil amendment to create a self-sustaining vegetative cover over the entire tailings surface. The low level of salinity remaining in the tailing pore water in these areas will allow vegetation to grow and be sustained. The recent TCA's have a much higher pore water salinity coming from the deposition of mill tailing from the deeper underground workings, requiring that these areas be capped with a layer of geochemically stable waste or mine rock, followed by seeding and fertilizing with some soil amendment (creation of soil islands) to establish a self-sustaining vegetative cover over the entire surface of these areas.

Background

Tailing is the residual product of ore processing and is composed essentially of pulverized rock. The tailing discharged into the TCA's at Con Mine was a slurried mixture of finely ground rock, water, and chemical residues that remain after the extraction of valuable minerals has taken place. When mining began in the 1930s, tailing was initially discharged into the Crank Lake TCA, and then to Lower Pud.

Since 1987, with the start of the Water Treatment Plant (WTP), tailing has been pumped from the mill to the Upper Pud TCA, and the solids have been allowed to settle out. The clear water is presently siphoned or pumped to Middle Pud TCA, and then directed to the WTP, where the remaining chemical residues are removed. A permanent engineered spillway will be constructed to replace this siphon in 2007 and the siphon will be removed. Treated water is released to the environment once it meets water discharge quality limits specified in the NWT Water License and the federal Metal Mining Effluent Regulations.

6.1 Chemical Characterization of the Tails

Gold mineralization, or ore at the Con Mine, is hosted in shear zones in the Yellowknife Bay Formation. Mineralogically, the composition of the shear zones is predominantly chlorite-carbonate schist with increasing sericite, sulphide and quartz content in zones of higher gold mineralization. Sulphide minerals within the mineralized zones comprise less than 3% of the host rock and include pyrite, pyrrhotite, arsenopyrite, sphalerite, gold, galena, chalcopyrite, sulphosalts and tellurides. Gangue minerals include quartz, ankerite, sericite, chlorite and carbonate.

The mineralogical composition of the tailing is predominantly quartz (40% to 50%), chlorite (10% to 20%), ankerite (10% to 20%), muscovite (10% to 15%), calcite (5% to 10%) and sulphide minerals (1% to 3%). The mineral composition of four typical tailing samples, as measured by x-ray diffraction, is shown in Table 6.1 and the tailing's elemental or chemical compositions are shown in Table 6.2.

The tailing and waste rock at Con Mine are not acid generating and in fact are net acid consuming. This has been confirmed by several studies carried out on the potential for acid rock drainage of mine waste and tailing on the property. The most comprehensive study, completed by URS Canada in 2000, concluded that both the waste rock and tailing are characterized by high neutralization potentials (NP) ranging up to 180 kg $CaCO_3$/tonne in waste rock and 260 kg $CaCO_3$/tonne in tailing. The waste rock NP/AP (neutralization potential / acid potential) ratios range from 3.6 to 17.6 with a median of 11. The tailing NP/AP ratios ranged from 2.1 to 102 with a median value of 8. All the waste rock and all but two of the tailing samples reported NP/AP greater than 3.

The NP/AP ratios and the above conclusions were compared to criteria proposed in the *Draft Guidelines and Recommended Methods for Predictions of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia* (Price 1997). The guidelines state that the potential for ARD for a NP/AP ratio greater than 4 is 'none' and for a NP/AP ratio in the range of 2 to 4 the potential for ARD is estimated to be low and not possible unless significant local concentrations of sulphides are present in amounts that may overwhelm the local neutralization potential. This is unlikely to occur in the tailing containment areas as the ore from the milling process would 'mix' the sulphide materials uniformly throughout the sites.

6.2 Historic Deposition

Mining began in the late 1930s, initiated by two different mining companies at separate locations: the C-1 shaft area (Con Mine), and the Negus shaft area (Negus Mine). Tailing from the mill at Con Mine was initially discharged to the east and southeast of the mill into the Crank Lake basin (south of the east-west fresh water line from Yellowknife Bay). It then flowed south-southwest to Pud Lake. Areas on the property that have been subjected to tailing deposition are depicted on the map in Figure 6.1.

Deposition of tailing into Crank Lake basin was complete by 1961. Between 1961 and the mid-1970s, tailing was deposited in both Upper Pud TCA and into the Neil Lake basin (between the Negus TCA and the Lower Pud basin). Since then tailing has been deposited only into the Upper and Middle Pud TCA's.

Tailing from the Negus mill operation was discharged to the south of the mill complex and mine operation. It flowed to the Negus TCA (Figure 6.1) and then southwest into Neil Lake and the Lower Pud basin. Milling operations and tailing production from Negus Mine ceased in 1952.

Initially, the excess run-off from Pud Lake basin drained towards Kam Lake. Dykes were developed around the Lower Pud area in the mid-1960's on the west side of the basin to direct the flow into the Meg-Keg-Peg Lake system. A study by EBA Engineering in the early 1970's indicated that there was some seepage from Pud Lake migrating towards Kam Lake, but most of the seepage and all of the surface flow from the basin was to the south.

6.3 Active Areas: Upper and Middle Pud

In the early 1970's construction began on several dams around the Upper and Middle Pud basins in order to increase the retention capacity of the TCA. As shown on the map, (Figure 6.1) there are some 23 retention structures in the Upper and Middle Pud TCA's. Seven dams make up the external retention structures of the Upper Pud TCA: Dam 1, Dam 1 North, Taylor Road Dam West, Taylor Road Dam Southwest, Taylor Road Dam Extension, Taylor Road Dam, and Taylor Road Dam East Dyke. Nine dams make up the external retention structures of the Middle Pud TCA: Dam 2, Dam 2 North, Dam 3 Central, Dam 3 West, Dam 3 East, Dam 4, Dam 5, Dam 6 and Dam 7. There are six "internal" dams between the Upper and Middle Pud TCAs: Dams A, B, C, D, E, and F. The individual dams, their dimensions, construction methods and materials, and references to their specific as-built reports and drawings are detailed in a 'Summary of Dam As-Built Information' that has been submitted to the MVLWB as Technical Memorandum under separate cover for placement in the public registry.

6.4 Closure and Reclamation Issues

There are six TCA's on the property, of which the Upper Pud and Middle Pud basins were operational until the mill stopped processing ore in 2004. These basins are still in use to manage water from the autoclave operation. The other four TCAs are historic areas and are the Crank Lake, Lower Pud Lake, Negus, and Neil Lake TCA's.

The Upper Pud TCA was approaching design capacity when production ceased in 2004. Therefore any sludges or residues generated during the final closure effort will be disposed of in the Middle Pud TCA. The Middle Pud TCA has adequate capacity to accommodate all of the sludges that are to be treated in 2007 and any water used for washing, that needs to be stored during the closure/reclamation effort. Further, there is adequate storage capacity in the Middle Pud pond to store the annual runoff from the TCA's. Each year the water collected over the winter will be treated during the summer to provide storage space for the precipitation water volumes that would be collected in the following year. It is planned that the WTP will operate for at least the next 15 to 25 years on to manage the runoff water from the TCA's and potentially the minewater when it reaches surface. The water balance for the operation during reclamation effort are presented in the Water Management section (Section 8).

During operations, the TCA's were monitored and inspected throughout the year on a daily basis. Tailing dust suppression has traditionally not been an issue at Con Mine. In the winter months, dust control was maintained naturally with the presence of an ice and snow cover, and during the spring by water. In the summer months, the high saline content from the minewater created a dry crust on the exposed tailing areas, which largely suppressed any fugitive dust emission. Conditions that could create the risk of wind blown dust may occur during the summer and fall months, with drier conditions and greater areas of tailing exposure during operation of the WTP, resulting in lower water levels in the TCA's. If air quality monitoring indicates that remedial action is required, measures will be taken as needed, and these include the use of a synthetic dust suppressant, and/or fences to reduce wind soil erosion and dust generation.

Reclamation of the recently operational TCA's will focus on progressive closure of the Upper Pud TCA. Reclamation of the Middle Pud TCA will begin after cessation of clean-up activities in late 2007 and continue into 2009. As the tailing in these impoundments is very saline and not expected to support revegetation, it is proposed to cap these areas with an engineered cover of mine waste rock to achieve the end land use of open space consistent with the surrounding undisturbed areas, and potentially for light recreational uses.

As shown in Figure 6.1, the four historical TCA's constitute a total area of approximately 65 hectares. Progressive reclamation is presently underway at both the Crank Lake and Neil Lake TCA's. With the exception of a portion of the Lower Pud TCA, all of the historical TCA's are scheduled to be drained, contoured, fertilized, and seeded in 2007 and 2008. The southern and central portions of Lower Pud are currently too wet to reclaim and final closure will be delayed to allow these areas to "dry out" (consolidate and drain) until access to the tailing surface is practical. An engineered drainage channel will be excavated from the south end of the Lower Pud basin to the area near Dam 4. This will allow the water at the south end of the area to be pumped to the Middle Pud

TCA, allowing the south end of the basin to be drained. This will allow for limited re-contouring and seeding in 2007 in the Lower Pud TCA. It is estimated that reclamation work in the Lower Pud area will be completed in 2008.

6.5 Reclamation Plan

As stated above, the primary objective in dealing with the TCA's is to reclaim the tailing surface in such a manner as to make the surface area physically stable, to minimize dust generation, to minimize surface water contact and to minimize the potential for human and animal contact with the tailing substrate. This will be achieved by revegetation with a combination of native species, with fast growing species to establish the initial growth on the historic areas such as the Negus, Neil Lake, and Lower Pud TCA's. Where this approach is not practical due to the high salinity of the Upper Pud and Middle Pud TCA's, a physical cap will be applied to the tailing surface with a suitable material such as a mine waste rock, and/or granular or gravel overburden where available.

It is proposed that the mine muck or waste rock would be material obtained from the site in areas such as the parking lot at the Robertson Shaft. This material is from the construction (excavation) of the Robertson shaft and generally has a consistent gradation. Some cover material will have to be quarried as discussed in Section 5.3.1 and this material will have a controlled or specified gradation as specified by the design engineer.

Vegetation would be encouraged by direct seeding to complete the cover, however it is expected that a self-sustaining vegetation cover will take several years to establish due to the substrate involved. This cover design approach will follow the concept presented to the Con Mine Closure and Reclamation Working Group with the Mackenzie Valley Land and Water Board by Carol Jones (C.E. Jones and Associates) in June 2004. In summary, reclamation of the tailing surfaces consists of contouring, constructing engineered drainage channels to facilitate runoff, physically covering or capping the surface with a minimum 50 to 60 cm of rock fill, preparing the surface, and the application of seed and fertilizer.

6.5.1 Recently Active Tailing Containment Areas

The Upper Pud TCA has almost reached its maximum solids retention capacity. The final placement of material was directed toward creating "beaches" so that the surface slopes from the margin of the containment area towards the center. This created a "horseshoe" configuration around the margin of the disposal area, open towards the Middle Pud TCA to the south. The surface of the Upper Pud TCA, if necessary, will be graded to direct drainage toward the center of the present TCA, to an engineered drainage channel, or spillway that will be cut through the area between Dam C and Dam D.

The engineered drainage channel in the Upper Pud will be designed to manage major storm events. The spillway will be designed to manage 24 mm of precipitation over 24 hours, which is the assumed 100 year return storm event for the basins. The design storm for the entire site, including engineered drainage channels and sediment ponds developed for the closure is this 100 year storm event. Excavation of the drainage channel will be completed in 2008. It is anticipated that once the tailing ponds have been allowed to drain and consolidate for two years, construction of channels will be possible using a light backhoe. It is also anticipated that after several summers of lower water levels, a crust will develop on the tailing, thus improving access on the tailing surface for the construction equipment needed to place the rock fill isolation capping layer. This reduction in water levels within the tailing is also expected to result in some settlement due to consolidation, thus final grading of the tailing basin may have to be deferred until 2008. Placement of the rockfill cover will start from the TCA perimeter and work inwards as the tailing are similarly expected to consolidate and dewater from the outside perimeter inwards towards the engineered drainage channel installed to drain the TCA.

The extent of tailing surface preparation and cover placement over the Upper Pud area may initially be limited until equipment can be operated safely on the tailing surface. It is proposed to allow the Upper Pud to drain and to construct localized test pads of mine waste rock in order to develop procedures to place the material on the tailing surface. Initial attempts will be restricted to test areas at the edge of the basin to assess surface physical stability. A test pad was constructed in the area in front of the Taylor Road Dam in the northwest corner of the Upper Pud basin in 2005 and the results of this effort will be used to confirm the details for the final cover placement. A settlement plate was installed in this test pad in October of 2005 and surveyed in place. Results to date indicate minimal subsidence, confirming that construction of the cover on the tailing is viable. This test pad was also seeded and fertilized in October of 2005. By the summer of 2006 vegetation had been successfully established over ~50% of the surface area of the test pad, which confirms that establishing vegetation directly onto the rock surface is possible.

A preliminary tailing cover design study was completed by Golder Associates Ltd. on behalf of MCML and submitted under separate cover to the MVLWB in August of 2006 (Preliminary Study on Tailing Cover System Upper and Middle Pud Tailing Containment Areas Final Closure and Reclamation Plan Con Mine, Yellowknife, NT, Golder Associates Ltd. dated August 1, 2006). A copy of this study is included as Appendix V to this document. The design rationale for the selection of the cover system is addressed in this study report and reflected in the cover performance criteria.

Discussions with local contractors indicate that there are no known suitable borrow sources within a reasonable haul distance in the Yellowknife area that could supply the volume of clay or equivalent cover material that would be required to construct a low permeable cover system on the recent tailing containment areas at the Con Mine. Consequently use of clay and/or tills to create any alternative cover design was deemed to be impractical given the absence of alternative soil materials within a reasonable haul distance of the minesite. This lack of available material reduced the available options that could be considered for this cover system. However the study completed by Golder Associates Ltd. ("Golder") in 2006 confirmed that the proposed cover system consisting of a rock fill isolation barrier with an overlying vegetative layer will meet the intended performance criteria for the cover system on these recent TCA's. Consequently it was considered impractical to conduct a full cost-benefit analysis for alternative cover systems.

The tailing surface of the basin will be covered with a 50 cm to 60 cm thick layer (minimum of 50 cm) of 40 mm to 60 mm minus mine muck or waste rock. Numerical modeling was carried out for several different cover system configurations in the Golder study using the one-dimensional finite element model SoilCover (Unsaturated Soils Group, 2000). The model was used to predict and compare the amount of water that will infiltrate or seep out the base of the "proposed cover" design for the TCA. The weather data used was based on data from the Yellowknife airport and covers a 20 year return period. The model was run for a "typical" year and a "wet" year. In addition, the effect of varying the cover thickness and existence of vegetation were also simulated. The results of this modeling are presented in the appended Golder study (Appendix VII and suggest that an infiltration rate of between 5% and 7% can be expected for the selected cover thickness of 50 to 60 cm. MCML will conduct additional field testing in 2007 to validate the predictions of the modeling, the selected cover thickness, and the proposed material gradation. The following type of instrumentation will be installed within the planned 2007 test pad to verify the predicted performance of the proposed cover:

- Settlement plates to determine long term stability;
- Thermistors to monitor temperature effects at the cover – tailing interface and within the tailing at depth, especially during the spring thaw, to aid in verifying the predictions of how infiltrating water will flow from the base of the cover;
- A Lysimeter to verify the predictions of infiltration through the cover; and,
- Piezometers to measure the change in the water table below the cover.

MCML has retained the services of a qualified geotechnical engineering consulting firm (Golder Associates Ltd.) to design the final cover. MCML will have qualified QA/QC monitoring during the cover construction phase to verify that the contractor that is hired by MCML to construct the cover does so in accordance with the design, that materials used meet the design specifications, and to oversee the installation of the instrumentation called for in the design.

Seeding and fertilization will be carried out over the full surface area of the mine muck/rock cap to encourage revegetation. In addition, it is planned to construct several small "islands" of up to ½ hectare each on which a 30 cm to 50 cm thick layer of organic material will be placed to encourage early vegetation success and to create a place where vegetation will be sustained. Maintenance will be carried out over the first three years and include application of additional fertilizer and overseeding in areas of sparse growth. It is anticipated that maintenance requirements will reduce with time. MCML has included an allowance for ongoing vegetation maintenance as part of the post closure monitoring and maintenance cost allowance. The success of the vegetation will be monitored each summer during the growing season for a minimum of the first five years. The results of this monitoring will be included in the annual SNP report that is submitted to the MVLWB. Success will be measured using the following techniques:

- Quantitative evaluation of the ground cover measured using staked out test plots with an approximate dimension of 3 m by 3m (target of 1 test plot per 5 hectares spread evenly over the reclaimed tailings surface). This would result in approximately four test plots on the Upper Pud and four test plots on the Middle Pud. A ground cover of 60% would be set as the target for defining successful establishment of vegetation after 4 to 5 years.

- Quantitative evaluation of the biomass produced by the growing vegetation as a function of biomass per unit area. Biomass will be determined using test plots of 1 m by 1 m (target of 1 test plot per 5 hectares spread evenly over the reclaimed tailings surface). This would again result in 4 test plots on each of the Upper and Middle Pud TCAs. The target for determining success would be to see a steady increase in the yield of biomass per plot over the first three years of growth. It is anticipated that the amount of biomass will peak as the early succession plants gain a foothold and then plateau or even decrease as the native species gain a foothold.

- Vegetation monitoring will be continued to ensure that the native species included in the initial seeding are successfully replacing the quick growing annual agronomic grasses planted in the first year. The target would be to have 40% to 50% of the ground covered by self-sustaining native species within a timeframe of 4 to 5 years after the date of initial seeding and fertilization.

MCML will retain the services of a qualified vegetation specialist to oversee this monitoring and to advise MCML on whether the vegetation has been successfully established and is self sustaining and to assist MCML in developing and implementing remedial/contingency measures. Contingent measures will include but not be limited to:

- Additional application of fertilizer and seed (re-seeding);
- Limited and selective use of irrigation to establish growth in difficult areas; and,
- Addition of soil amendments in areas of poor vegetation success.

In the reclamation cost estimate an allowance is provided for the above contingent measures plus there is an additional 10% contingency allowance on the overall cost to cover implementation of any required contingent measures such as adding a soil amendment to areas on the cover where vegetation is sparse after 4 to 5 years.

The downstream slopes of the Upper Pud dams will also be revegetated. A soil amendment may be required for areas that do not vegetate after three years. The amendment, peat or a highly organic soil cover, will be spread and if needed, tilled into areas with minimal vegetative cover.

Failure Modes and Contingent Measures

MCML through its engineering consultant have considered potential failure modes for this cover system. Two main types of "failure" mode were noted:

- A physical penetration of the rockfill isolation barrier. This could be a hole created in the cover by unplanned activity such as spinning wheels on recreational motorized vehicles such as a four wheel drive truck, an ATV or dirt bike, etc. Alternatively it could be a small hole created by extreme localized settlement of the underlying tailings that grows through water erosion; and,
- Failure of the cover system to shed precipitation runoff and snowmelt as expected due to the absence of a full vegetative cover in a localized area or through unplanned placement of a coarser than specified cover material in a localized area.

In the case of the first type of failure mode, precipitation runoff and snowmelt would be allowed to drain directly into the underlying tailing, potentially causing localized erosion of the tailing, creation of an unplanned pond area and/or release of tailing through wind or water erosive forces. This type of failure would potentially allow contact by people and animals with the underlying tailing either directly through the opening or by tailings transported from the failure zone by wind or water. This type of failure would also potentially increase the volume of precipitation runoff and snowmelt water reporting to the base of the cover increasing the volume of displaced contaminated pore water reporting to the Middle Pud TCA pond to be treated in the water treatment plant. This could increase both the volume of water and the load (mass) of contaminants that have to be treated through the water treatment plant.

MCML will address this type of failure through two means:

- Installation of a physical barrier system at appropriate locations (consisting of large boulders and/or fencing) to minimize the opportunity for motorized vehicles (including four wheel drive trucks, jeeps, ATV's, dirt bikes, etc.) from getting onto the capped TCA's and creating damage to the isolation barrier; and,
- Periodic repair of the cover system to address this type of damage where it occurs. MCML has built an allowance into the post-closure monitoring and maintenance cost allowance for this type of maintenance in the future.

In the event that this type of failure is prevalent and causes the overall cover system not to meet the stated performance objectives, MCML will implement the following contingent reclamation measures;

- MCML will strengthen and improve the access barrier system around the TCA's to stop motorized vehicles from getting onto these reclaimed TCAs. This will involve installation of stronger fencing, construction of rock fill barriers (berms), and/or construction of isolation ditches. The appropriate type of barrier needed will be addressed on a case by case basis and in consultation with appropriate groups such as the City of Yellowknife, local resident groups, or other stakeholders who can help identify suitable access control measures for each specific circumstance. In other words MCML will address these access problems in an adaptive manner as they become evident. It may not be necessary to install a barrier around the entire facility but rather address each potential access point in a suitable manner. Advisory signs will also be used to help educate citizens as to why these access control measures are being taken and the potential adverse consequence resulting from damage to the cover systems.

- In areas where the cover system fails to perform due to this type of ongoing damage, MCML will re-visit its cover design and modify the cover design to address the type of failures that are occurring. This will include measures such as: a) placing additional rock fill material to thicken the isolation barrier component of the cover in areas where damage is prevalent on a repetitive basis with the objective of reducing the potential for vehicle wheels to reach through to the tailings and then reseeding to replace the vegetative cover; and/or b) Placement of trees, boulders or other physical impediments that will make an area less desirable to recreational motorized vehicle users who are entering the cover despite the access barriers.

In the case of the second type of failure mode, more precipitation runoff and snowmelt will potentially pass through the cover than intended in the performance criteria (set at 5% to 7% of precipitation reporting to the base of the cover). This potentially will result in larger volumes of water and increased contaminant loads through higher pore water displacement reporting to the Middle Pud storage pond for treatment in the water treatment plant. MCML would address this type of failure through two means:

- Treat the additional water and contaminant load reporting to the Middle Pud pond through the water treatment plant to continue to meet the Water License discharge limits. The current WTP was constructed to deal with much higher volumes and contaminant loads that were experienced during the mine operating life and consequently has capacity to address these upset conditions.

- MCML would take action to improve the vegetative cover in these areas of failure by additional fertilization, re-seeding, and/or by adding soil amendments to the localized area of these types of failure.

In the event that this type of failure is prevalent and causes the overall cover system not to meet the stated performance objectives, MCML will implement the following contingent reclamation measures:

- Under the guidance of a vegetation specialist, identify the areas where vegetation success was not achieved and then develop and implement remedial measures to develop a self-sustaining vegetative cover in these areas. The remedial measures would be tailored to meet the specific reasons for the initial lack of success, but will likely draw on a combination of the following types of measures as appropriate: a) re-fertilization of the area; b) re-seeding of the area; c) addition of a soil amendment in the area combined with re-fertilization and reseeding; and/or d) use of short term irrigation techniques to get the vegetation started.

- In the event that these first measures are either unsuccessful or where the vegetation specialist determines that stronger action is needed, MCML would bring in overburden or other suitable soil substrate from off-site and cover the area of non-success with an adequate layer of organic growth media and then re-seed and fertilize the area to establish a new self-sustaining vegetative cover with sufficient ground cover and rooting system to meet the infiltration performance criteria.

TCA Reclamation Schedule

The reclamation schedule (see detailed schedule in Section 10 of this document) calls for reclamation of the historic TCAs to start in 2007 and be essentially complete in 2010. Establishment of a successful self-sustaining vegetative cover may take a full five years.

Reclamation of the Upper Pud TCA is scheduled to begin in 2008 following the cessation of mill cleanup operations in 2007. The cover system is scheduled for completion in 2009.

Reclamation of the 41-hectare Middle Pud TCA is scheduled to begin in 2009 allowing an additional year for the tailing to drain and partially consolidate. This also allows for the treatment of the last process solutions through the Water Treatment Plant. The cover system is scheduled for completion in 2009. Establishment of a successful self-sustaining vegetative cover may take a full five years. It should be noted that the southern half, or some 20 hectares of Middle Pud, will remain as a clear water pond to collect surface water runoff from the Upper and Middle Pud basin. This water will be treated at the WTP.

The reclamation plan for the Upper and Middle Pud TCA's assumes that contouring will require the movement of about 30,000 m^3 of material to infill depressions and create the designed drainage flow patterns. The plan also includes removal or scarification of all relevant and unnecessary roads in and around the TCA's.

In 2006, MCML following consultation with GNWT and the MVLWB, accepted two materials form offsite remediation work conducted by other parties within the City of Yellowknife:

- Contaminated soils and gravel derived from the remediation of the Con and Rycon trailer park areas under arrangements made by MACA and the trailer home owners with respect to transfer of these lots. This material was tested by the GNWT to determine contaminate levels. The material is largely crushed waste rock that originally came from the Con mine.

- Contaminated concrete (concrete that was made using local mine waste rock that contained elevated concentrations of arsenic) from the demolition of Akaitcho Hall. The total volume of contaminated concrete was estimated at ~4,000 m^3 with arsenic concentrations ranging between 250 and 860 mg/kg. TCLP leachate testing carried out Artic Environmental Services indicated that little of this arsenic was leachable. The concrete was broken up and mixed with approximately 26,000 m^3 of uncontaminated concrete and concrete block and then trucked to the minesite and placed on the edge of the Upper Pud TCA.

The intent is to use these materials as fill material in grading the final surface of the Upper Pud TCA prior to construction of the final rock fill cap. These materials were both characterized by extensive sampling conducted by the parties carrying out the remediation prior to their being accepted at the minesite. In both cases, the material contains arsenic, mostly present in naturally occurring mineralized rock that is lower or

equivalent in concentration to the tailings contained in the Upper Pud TCA. The mixed material does not exceed the GNWT guideline of 340 mg/kg and thus the material was not classified as hazardous materials. The objective was to find a 'win-win' solution for disposal of these materials and to deflect them from the City of Yellowknife landfill. The material will help in-fill depressions created in the Upper Pud TCA through natural settlement as the tailing drain and consolidate. Both the GNWT (through MACA and ENR) and the MVLWB approved this transfer of material and agreed to its incorporation as stated above in the final closure plan for the minesite.

6.5.2 Historical Tailing Containment Areas

The four historical TCA's are Crank Lake, Lower Pud, Negus, and Neil Lake. These are shown on Figure 6.1. Progressive reclamation work is underway in these areas, with the expectation that a large part of the work will be completed by 2008.

Crank Lake reclamation began in 2002, as part of the mine's progressive reclamation program. The first phase was completed by fall of 2003. Since deposition of tailing into the Crank Lake area stopped (the area was used for tailing between the late 1930s, and ended prior to 1953), the basin area has been used to stockpile waste rock, as a storage or bone yard area for parts and equipment, and for drill core storage. Everything has now been removed from this area and MCML has evaluated the lateral extent of the tailing deposit. Reclamation will include capping the tailing with mine waste rock, and seeding/vegetation of the contoured surface.

Based on Harvey Martens & Associates review of earlier revegetation test plots, a 4.5-hectare (11-acre) pilot revegetation test was initiated in the Neil Lake TCA in the fall of 2002. The area was cleared of surface debris, drained and graded. The surface was amended with fertilizer and a small amount of clay, and then seeded. Based on positive results of this initial pilot effort, and in conjunction with the guidelines set forth in the Harvey Martens' study, the Negus and remaining Neil Lake TCAs areas will be reclaimed in 2007 and 2008. This approach was also discussed in June 2004 with Carol Jones of C.E. Jones & Associates, at which time she indicated that vegetation will grow on old tailing areas (the subsequent C.E. Jones and Associates report prepared for MCML has been previously submitted to the MVLWB). The vegetation will require maintenance (fertilization and overseeding for several years). Vehicular and recreational traffic will be restricted from these historic areas for several years until the vegetation has been successfully established and is self-sustaining. This approach is planned for all of the historic TCAs.

Reclamation pilot plots (2 to 4 hectares each) were established on the Neil Lake TCA and showed successful vegetation on tailing (Harvey Martens & Associates report previously submitted to the MVLWB). Based on the pilot plots and soil salinity measurements, it is estimated that about one-third of the historic tailing surface will require soil amendments such as peat or clay. Additional soil amendments and/or fertilizer may be required over areas where vegetation is not established within a three or four year period. Progressive reclamation in the Negus, Neil Lake and Lower Pud TCAs will also include the construction of engineered drainage channels for the entire area. The historic TCA's will be developed with the anticipation that access for recreational or All Terrain Vehicles (ATV's) will be discouraged, and prevented where possible and practical by using the existing fencing and signage. In addition, the natural swampy areas around the TCA's will be used to discourage access, and in other areas 1.0 meter diameter rocks will be placed 1 meter apart to develop 'natural' rock barriers. These areas will be reclaimed to be accessible for walking or hiking and as open areas, but not as recreational areas for vehicular use.

The measure of success applied for the historic TCA's will be the same as that outlined in Section 6.5.1 for the recent TCA's. However, if after four to five years the vegetation, with the over seeding and fertilization, is not providing a cover that satisfies the "measure of success", MCML will then implement the contingent measures also outlined in Section 6.5.1 above.

6.6 Schedule for Closure

Reclamation of the historic tailing areas is underway. The schedule for this work calls for the Negus and Neil Lake TCAs to be over 50% complete and the Lower Pud area to be started by the fall of 2007. The Crank Lake area, in 2007, will also be well along with final reclamation. An area at the north end of Crank Lake will be left as a work area for the contractor during demolition of the C-1 mill complex and revegetation will follow once this work is completed.

Reclamation of the Upper Pud TCA would begin in the third quarter of 2008 following completion of mill cleanup operations in 2007 and early 2008. Time will be given to allow for settling and consolidation of the tailing before the work commences. At present there is limited fugitive dust emission from the TCA's on the mine property. This will continue to be monitored and if dust is noted, a dust suppressant will be applied to manage the issue. This concern will be addressed in the long term by the vegetative cover that is proposed for all of the TCA's. The placement of the rock cap layer on the Middle Pud TCA will begin in the third quarter of 2009. Time will be given to allow for settling and consolidation of the tailing around the Middle Pud pond area in the west corner of the basin before the work commences. It is anticipated that the work to be completed in 2009 will include grading at the edges of the TCA. Initial placement of a 50 cm to 60 cm cap on Middle Pud TCA will start in 2009 and be based on the experiences and successful methodologies from the reclamation of the Upper Pud TCA.

6.7 Post Closure Monitoring

Post closure monitoring is outlined in Section 9 of this C & R Plan for the TCA dams, general areas of the TCA's, the TCA covers, the engineered drainage channels, and the Upper/Middle Pud spillway. Based on the results of monitoring, the dams, covers, spillway and drainage channels will be maintained as part of a long term monitoring and maintenance program. The details of the program are identified in the Section on Post-Closure (Section 9). It is anticipated that the Water Treatment Plant will operate each summer for the next 15 to 25 years. Over time, it is anticipated that the water quality in Middle Pud will improve and will satisfy discharge criteria. Water will then be discharged from the pond by way of a spillway at Dam 4. This channel and spillway will be inspected and maintained as part of the long term monitoring and maintenance program for the property.

The dams which are part of the TCA, are currently inspected each year in accordance with the Water Licence. The inspections are completed each June and the results are reported to the Mackenzie Valley Land and Water Board each August. As outlined in Section 9, these annual inspections will be continued and expanded in the post-closure period to comment on the performance of the covers developed on the TCAs and all drainage channels. The inspections will note the condition of the dams, drainage channels and the cover systems, and propose maintenance work that is to be completed each year before the end of the summer construction period.

6.8 Cost Estimate

Reclamation for the tailing areas is anticipated to continue and to be essentially completed in 2010. The cost and schedule for this work is presented in Section 10 of this plan.

TABLE 6.1: Mineralogical Composition of Tailings from Upper and Middle Pud Basins

Sample Number	Chemical Composition	Sample Location			
		Upper Pud	Middle Pud		Negus
		Con-TL-07 %	Con-TL-01 %	Con-TL-34 %	Con-TL-29 %
Albite	$NaAlSi_3O_8$	4.0	4.2	6.4	2.8
Ankerite	$Ca(Fe,Mg,Mn)\ (CO_3)_2$	18.4	11.3	11.2	9.6
Calcite	$CaCO_3$	7.5	9.2	6.5	5.5
Muscovite	$KAl(AlSi_3)O_{10}(OH)_2$	16.6	11.3	12.5	9.9
Quartz	SiO_2	33.6	41.5	40.7	51.8
Pyrite	FeS_2	1.4	1.5	5.3	2.8
Chamosite (Chlorite)	$(Mg,Fe)_3Fe(AlSi_3)O_{10}(OH)_8$	15.2	17.7	14.7	10.5
Ferric Arsenate Hydrate	$FeAsO_4.2H_2O$	0.2	0.9	0.2	0.7
Gypsum	$CaSO_4.2H_2O$	Trace	Trace	Trace	2.9
Rutile	TiO_2	0.7	0.6	0.7	0.8
Orthoclase	$KAlSi_3O_8$	2.4	1.8	1.9	2.6
	Total	99.9	99.9	99.9	100.0

TABLE 6.2: Elemental Composition of Tailings from Upper and Middle Pud Basins

Sample	Element Composition																												
	B ppm	Na %	Mg %	Al %	P %	S %	K %	Ca %	Sc ppm	Ti %	V ppm	Cr ppm	Mn ppm	Fe %	Ni ppm	Co ppm	Cu ppm	Zn ppm	Ga ppm	As ppm	Sr ppm	Mo ppm	Ag ppm	Cd ppm	Sb ppm	Ba ppm	La ppm	W ppm	Bi ppm	Pb ppm	Th ppm
Con-TL-06 UP*	7	0.045	3.21	3.0	0.040	1.3	0.07	6.4	12.0	0.006	112	107	1158	8.19	83	31	148	1377	9	5921	131	1.9	7.3	7.2	243	19	7	13	3.8	639	3
Con-TL-07	14	0.012	3.11	2.12	0.046	0.8	0.04	7.1	9.4	0.006	82	61	1371	6.09	53	21	163	317	7	2406	88	0.5	1.9	1.8	32.4	11	6	10	1.8	143	3
Con-TL-08	1	0.088	2.15	1.51	0.038	1.2	0.04	5.6	6.7	0.006	60	81	964	5.12	53	21	84	250	5	3304	95	3.2	2.4	1.9	100.0	7	5	13	4.4	170	2
Con-TL-09	7	0.019	2.43	1.63	0.041	1.2	0.06	6.3	7.4	0.004	59	94	1012	5.49	58	28	112	431	5	3817	88	3.7	1.8	3.5	65.9	13	4	25	2.6	208	2
Con-TL-10	1	0.016	2.59	2.18	0.049	2.8	0.05	5.8	9.6	0.006	89	116	1196	7.95	95	71	160	233	7	5570	108	5.1	1.9	2.1	18.2	15	7	71	3.3	152	3
Con-TL-11	4	0.075	3.32	2.59	0.039	0.8	0.05	6.6	10.6	0.007	98	89	1288	6.89	68	25	259	866	8	3614	120	1.0	1.7	2.6	99.8	12	4	11	4.1	324	2
Con-TL-12	4	0.044	2.52	1.58	0.042	1.1	0.06	6.4	7.6	0.014	62	87	1231	5.54	52	27	140	396	5	2977	93	4.1	3.1	4.2	56.7	10	4	25	8.0	246	2
Con-TL-13	4	0.038	2.54	1.62	0.063	1.3	0.05	7.0	7.8	0.005	62	108	1186	5.61	62	31	112	366	5	4376	150	4.1	1.6	3.2	54.9	30	8	26	0.8	223	3
Con-TL-14	1	0.026	2.67	1.74	0.048	1.3	0.05	6.9	8.2	0.005	69	96	1330	6.13	63	33	108	347	5	5191	107	3.6	1.7	2.8	73.9	18	6	15	0.6	268	2
Con-TL-15	4	0.023	2.90	2.0	0.051	1.2	0.04	6.8	8.9	0.007	77	87	1295	6.35	68	31	123	420	6	5529	130	0.5	2.5	3.2	90.9	21	6	25	1.2	254	3
Con-TL-35	5	0.060	2.42	2.16	0.038	0.9	0.04	6.2	9.7	0.006	82	102	1123	5.62	54	28	114	325	6	1855	117	4.4	1.2	2.6	14.5	10	6	20	2.3	77	1
Mean UP*	5	0.041	2.71	2.0	0.045	1.3	0.05	6.5	8.9	0.007	77	93	1196	6.27	64	32	138	484	6	4051	112	2.9	2.5	3.2	77.3	15	6	23	3.0	246	2
Con-TL-01 MP*	8	0.397	2.67	2.23	0.044	0.8	0.03	7.1	9.7	0.008	86	73	1324	6.11	63	32	140	290	7	1758	235	0.3	1.4	2.2	10.3	10	3	19	8.7	137	2
Con-TL-02	9	0.124	3.79	4.0	0.038	0.6	0.04	5.9	15.7	0.007	150	123	1308	8.39	84	29	87	282	13	1177	143	0.8	0.8	1.2	4.3	16	5	21	5.2	82	3
Con-TL-03	4	0.261	2.58	2.33	0.039	0.8	0.04	6.9	10.0	0.005	86	98	1282	5.88	63	31	126	207	7	1403	186	2.6	0.9	1.7	7.1	10	3	23	4.0	85	2
Coin-TL-04	7	0.295	3.37	3.24	0.045	0.6	0.04	6.1	13.3	0.008	128	105	1303	7.39	73	26	105	299	10	1151	185	1.0	1.3	1.7	7.1	16	9	16	19	133	4
Con-TL-05	5	0.246	2.79	2.42	0.048	0.8	0.03	6.4	10.5	0.011	94	62	1176	6.36	58	27	85	298	8	1681	179	0.8	0.9	1.6	13.2	25	9	18	5.5	123	3
Con-TL-26	3	0.084	2.26	1.78	0.044	1.0	0.02	6.6	7.9	0.005	70	58	1176	5.39	55	30	119	195	4	1788	179	0.2	1.4	1.5	8.9	7	3	18	6.7	107	2
Con-TL-27	4	0.013	2.33	1.62	0.049	1.2	0.04	6.3	7.4	0.008	63	85	1132	5.52	61	34	126	281	4	2849	118	3.2	1.7	2.3	30.2	15	5	27	4.3	141	5
Con-TL-28	4	0.009	3.48	3.5	0.056	0.7	0.05	5.6	13.3	0.007	132	94	1183	7.69	78	29	83	309	11	1450	148	1.8	0.6	1.3	8.3	24	14	21	3.8	102	5
Con-TL-33	7	0.129	3.14	2.74	0.058	0.8	0.04	6.5	11.2	0.006	103	70	1255	6.73	62	26	86	259	8	1838	138	0.7	0.8	1.5	30.2	14	11	19	2.3	105	3
Con-TL-34	10	0.082	3.78	1.93	0.049	2.3	0.08	5.4	8.5	0.026	79	123	1067	7.13	190	56	152	268	6	5103	148	3.5	3.1	2.4	72.4	101	13	17	4.1	182	3
Mean MP*	6	0.164	3.02	2.58	0.047	1.0	0.04	6.3	10.8	0.009	99	89	1221	6.66	79	32	111	269	8	2020	166	1.5	1.29	1.7	19.2	24	8	20	6.3	120	3

Notes: UP – Upper Pud
MP – Middle Pud

N

YELLOWKNIFE BAY

RAT LAKE

MOSHER ISLAND

EAST TAYLOR ROAD DAM

TAYLOR ROAD DAM

TAYLOR ROAD DAM EXTENSION

TRDSW

TRDW

UPPER PUD TAILINGS POND

CALCINE STORAGE

MILLING COMPLEX

CON TRAILER PARK

CRANK LAKE

CON POND

DAM 1N

DAM F

DAM C

DAM B

DAM A

DAM 1

DAM E

DAM D

DAM 7

MIDDLE PUD TAILINGS POND

DAM 6

DAM 2N

DAM 2

DAM 5

DAM 4

DAM 3

NEGUS POND

NEGUS TAILINGS

ROBERTSON SHAFT

NEIL LAKE

LOWER PUD TAILINGS

NEGUS POINT

MEG LAKE

LEGEND

- LEASE BOUNDARY
- BUILDINGS ON MINE LEASE
- HISTORICAL TAILINGS
- SWAMPS

SCALE (METRES)

0 300

SCALE (FEET)

0 500

REFERENCES

1) Miramar Con Mine
File: Figure 5 3d Plan Current.dwg
Dated: Jan 2001

Checked by:		
Revised By:	Date	

Con Minesite Tailings Containment Areas

Date: 16DEC02 | Scale As Shown | Figure: 6.1 | Rev. No.

REVISION DATE: 05/03/18 1:23pm By: ggorczynski CADD FILE: N:\Bur-Graphics\Projects\2004\1413\04-1413-026\Drafting\cad\P041413026-07.dwg

7.0 CONTAMINATED SOILS

7.1 Studies of Contaminated Soils

The Con minesite has been the subject of numerous studies to determine the levels of arsenic, hydrocarbons, and other metal constituents, in the surface soils. The objective is to identify areas of soil contamination that require remediation as part of minesite reclamation. The constituents tested for these studies included, at a minimum, Arsenic, Copper, Nickel, Lead and Zinc. On the majority of soil samples collected, a full 30 Element ICP Scan was undertaken. Based on the results obtained from this sampling, MCML in this Closure and Reclamation Plan has used arsenic as the surrogate for the other metal contaminants that were typically associated with the areas of contaminated "soil" identified on the minesite. This approach was taken as MCML recognized that the treatment methodologies utilized to effectively remediate the arsenic contaminated soil also applied to the remediation of the other metals listed under the GNWT Contaminated Sites Regulations. Specifically remediation involves identifying the extent of contamination and excavating the contaminated "soils" (soils as used here includes other soil-like material such as Calcine, sludges or mill tailing not located within the historic or recent tailing containment areas) and transporting these soils to an appropriate managed repository such as the hazardous materials disposal site or Upper Pud Tailing Containment Area. In most cases at the Con minesite, areas identified as contaminated by other metals were also contaminated by arsenic, meaning that arsenic was by and large the controlling parameter. However it should be noted that other possible soil contaminants such as hydrocarbons were not ignored and were addressed as indicated later in this section.

The soil contamination studies referenced above have been performed by a number of parties, including MCML, other past owners/operators of the Con Mine, Environment Canada, the Department of Indian Affairs and Northern Development (DIAND); and Indian and Northern Affairs Canada (INAC) – Water Resources Division. These studies have enabled the characterization of the area on the operational mine leases and the areas immediately adjacent to these leases, for arsenic, copper, nickel, lead, zinc and hydrocarbons (Figure 7.1). In preparing this Closure and Reclamation Plan, MCML (through its consultant, Golder Associates) has collated the information from these soil contamination studies to identify where soils need to be remediated and to develop appropriate remediation plans as outlined in this Section. From this work it was confirmed that on the Con minesite, arsenic is the primary contaminant of concern and in dealing with the arsenic contaminated soils other metal constituents will be adequately addressed.

Based on an understanding of the historical site operations, the 5 mine leases were divided into a series of zones. These zones were set up to reflect areas of similar historic mine use. The zones are shown on Figure 7.2. This split was then used to determine the remediation options and the potential long term land uses for the areas. As an example, areas that are outside the immediate footprint of historic mine activity will be left as is, i.e., as open space as by and large these areas are undisturbed and are in their natural pre-mining state. Areas where there was historic mining activity, such as in the area of the mill complex and the Robertson Shaft, will be reclaimed for potential future industrial use, while the Tailing Containment Areas (TCA's) will be restored as open areas that would be suitable for light recreational use. While the proximity of the City of Yellowknife will make it difficult to completely prevent access to the site, MCML will continue to discourage activity on the minesite and on the TCA's after closure. These activities will include maintenance of existing facilities such as fencing and gates while the Water Treatment Plant is operational. In addition, soil or rock berms will be placed, steep sided ditches will be constructed to control vehicular access, and security patrols will be continued. All of the mine leases have been included in determination of the zones, even though, as noted previously, the mining activity on the eastern leases has been limited and these areas have traditionally been used for residences (Con Camp), and warehousing (Con Dock area).

The overall minesite has been split into four zones based on the historic mine use (see Figure 7.2):

- ***Zone 1*** includes the areas used to store or treat the arsenic sludges or calcines and incorporates the Blend Plant, Negus Pond, Con Pond and the calcine storage area (see Section 5);
- ***Zone 2*** includes the current and historic TCA's: Upper Pud, Middle Pud; Lower Pud, Neil Lake, Negus Tailing, Crank Lake, and the area between the Negus TCA and Neil Lake (see Section 6);
- ***Zone 3*** includes the remaining areas on the main mine lease (L-8658 T) and includes the C-1 Mill complex, the Robertson Shaft complex, the area between the Mill and the Robertson shaft complex, and the area around the TCA's to the south, west and north. This zone will be reclaimed to allow potential future industrial use after the mine activities are complete; and,
- ***Zone 4*** includes Rat Lake, Tin Can Hill, the Con and Rycon Camp areas, and Mosher Island.

The proposed City of Yellowknife planning zones are presented on Figure 7.3 and show the mine features and some of the key structures on the mine in relation to these planning zones. Figure 7.4 shows the areas where the zones overlap. The plan shows that the main overlap in closure plans / zoning plans use is the hazardous waste sites and the tailing areas with the City of Yellowknife's open spaces.

The distribution of arsenic and other metal constituents in the area soils was then collated and reviewed from the soil contamination studies previously conducted at the Con minesite. These soil contamination studies included a number of surface and sub-surface soil sampling programs, as listed below:

- Soniassy and Brown, Department of Indian and Northern Affairs (1980);
- EBA Engineering for Indian and Northern Affairs – Water Resources Division (1991);
- Nerco Minerals Limited (1993);
- Golder Associates Ltd. for Miramar Con Mine Ltd. (1997 and 2004);
- Miramar Con Mine (1999); and,
- RiskLogic Scientific Services for Environment Canada (2001).

All of the studies focused on determining the distribution of arsenic in surficial soils, as arsenic has been long recognised as the primary contaminant of concern for this site. All of the data points obtained through these studies on the minesite are shown on Figure 7.3. Over 2000 surface and some 150 subsurface samples (depths for all samples ranging from 0.1 m to 0.5 m) were collected. All of these samples were analysed for total arsenic concentration. In the studies for the Department of Indian and Northern Affairs (DIAND) (1980) and Golder Associates Ltd. (1997), samples were analysed for both total and soluble arsenic. The Golder study also analysed for a full metals suite, sulphur speciation, grain size distribution and arsenic concentration in the fine soil fraction. A copy of the Golder study was previously submitted to the MVLWB under separate cover and is on the public record.

7.2 Arsenic Contaminated Soils

The presence of arsenic in the soils at concentrations that exceed local background levels can be related to several sources. These include naturally occurring arsenic minerals (arsenopyrite) present as surface exposures in rock on the eastern portion of the site (along strike of Con shear or Rycon-Negus shear), waste rock used as construction material for roads, arsenic-bearing dust from the roaster and/or a combination of these sources.

The levels of arsenic present on site have been segregated based on concentration. The divisions have been established in part based on the Environmental Guidelines for Contaminated Site Remediation for the Northwest Territories (GNWT November 2003). The Guidelines provide for site-specific human-health remediation targets based on soil quality remediation objectives for residential and industrial land use. The site specific number for remediation on industrial sites proposed for future industrial use was compared to the work completed in 1997 for Miramar Con Mine (MCML) which proposed targets for soil remediation based on a site-specific risk assessment and

remediation plan. The target limit proposed by MCML in 1997 was 370 ppm arsenic in the soil. The study suggested that soluble arsenic not total arsenic should be considered as the key for remediation.

The GNWT Guidelines for the Contaminated Site Remediation for the NWT – November 2003, recommended a target level of 340 ppm total arsenic in soil for remediation at industrial sites. These Guidelines use the conservative assumption that all forms of arsenic are included, as it may become soluble or available and thus is a potential risk. MCML has subsequently reviewed the initial work (Golder 1997), the background study (Risk Logic Scientific Services Inc. 2002), and the GNWT Contaminated Site Remediation guidelines for the NWT, and proposes to use the guideline recommended by the GNWT under the Contaminated Site Remediation Guideline, NWT – November 2003 (340 mg/kg).

In 2006 on behalf of MCML, Golder Associates completed a "Site Specific Arsenic Soil Quality Guidelines" study. This study concluded that it would be appropriate to use a risk based site specific arsenic remediation criteria of 360 mg/kg at the Con minesite. A copy of this report was previously submitted to the MVLWB and is on the public record.

In November of 2006, the GNWT Department of Environment and Natural Resources asked Health Canada to conduct a peer review of the Golder 2006 study. Health Canada concluded that the implementation of a site specific arsenic remediation criterion of 360 mg/kg will be indistinguishable from the existing GNWT guideline value of 340 mg/kg in practical terms. Health Canada went on to indicate its support of the use of bioaccessibility assays to determine site specific arsenic bioavailability from soil, but would generally request more tests and analyses to ensure that the data are statistically representative of all zones to which this adjustment would be applied, and to ensure that the measurements of bioaccessibility is free of any artefacts of assay design.

Taking all this information into consideration, MCML concluded that it was appropriate to use the GNWT 340 mg/kg guideline for arsenic remediation at the Con minesite. MCML has asked Golder Associates to revise the 2006 "Site Specific Arsenic Soil Quality Guidelines" study report to capture the corrections and address the recommendations made by Health Canada. This revision will be submitted under separate cover to the MVLWB to be placed on the public record; however this revision will not alter MCML's commitment to use the GNWT arsenic remediation guideline of 340 mg/kg for industrial sites at the Con Mine.

The arsenic concentrations for each sample collected across the mine site, on the mine leases, and to the immediate south of the mine leases, were colour-coded based on concentration. They are presented on Figure 7.4. For the purposes of this plan, the arsenic levels in the soil have been categorized according to total arsenic content as follows:

- ***Low concentrations*** - arsenic concentrations from 0 to 340 mg/kg (below the industrial limit);
- ***Moderate concentrations*** - arsenic concentrations between 340 and 1000 mg/kg (1000 mg/kg is the lower limit of arsenic levels typically found in tailing on the minesite); and,
- ***High concentrations*** - arsenic concentrations above 1000 mg/kg.

The main mine lease has been divided into several areas or sectors exhibiting similar characteristics (Zone 1 and Zone 2 are not included here as specific reclamation plans for these zones were previously addressed in this Closure and Reclamation Plan in Section 4 (Rat Lake), Section 5 (Con and Negus Ponds) and in Section 6 (Tailing Containment Areas).

Consequently for soil remediation planning purposes the sectors which were established are:

- *The area south of Lower Pud and Neil Lake, west of Upper and Middle Pud, and north of Upper Pud.* Arsenic levels in the soils of these areas are typically below the 340 mg/kg industrial guideline set for the remediation of contaminated industrial sites. There are occasional higher values – three samples with *high concentrations* were noted west of the Middle Pud TCA. These appear to be isolated occurrences. The majority of the data indicates that in these areas most of the soil has low concentrations of arsenic (i.e. less than 340 mg/kg). There are 10 to 15 soil samples that have arsenic levels above 340 mg/kg out of approximately 170 soil samples that have been tested in this area. The plan is to inspect these specific areas in June and July 2007 and obtain new samples at surface and at a depth of 200 mm. Based on the results of this soil sampling, if the arsenic in the soil is still above 340 mg/kg, a site specific risk assessment would be prepared. The assessment may include arsenic speciation and/or testing to determine bioavailability. The results of the risk assessment would form the basis for the reclamation and closure plan for the specific isolated site.

- *Robertson Shaft Complex.* The arsenic concentrations in the soil samples from this area were moderate; supporting the historic information which indicates that the material used to develop these areas as parking lots and mine work yards was brought to surface as part of the construction of the Robertson Shaft.

- *Mill Complex at C-1 Shaft*. Arsenic concentrations in these samples are moderate to high, suggesting or supporting historical data that indicates the impact was from the mill activities and the roaster that was part of this complex. This area is also adjacent to the surface expression of the Con Shear, which exhibits mineralized (arsenic-bearing) outcrops.

- *The area between the Mill (Autoclave site) and the Robertson shaft – Negus Pond/Blend Plant (not including Crank Lake).* The concentrations are high in this area as they are in the immediate vicinity of the Con Pond and Negus Pond and intensive historic mine activity.

Zone 4, the area outside the main mine lease, is on the other mine leases. The results of soil sampling and other information from the mine records suggest that there has been minimal historical mining impact on these areas. MCML will assess these areas and remediate them if measured arsenic levels indicate that such remediation is needed using the methods as outlined in Section 7.5. These areas include Rat Lake, the south portion of Tin Can Hill, Con Dock and Garden Draw. The Rat Lake lease includes a surface expression of the Con Shear (northeast corner), and the Tin Can Hill area includes the Rycon R1 shaft. Con Dock includes some samples that are near the original Negus headframe/mill and the Rycon-Negus shear. It appears that most of the arsenic impacted soils resulting from the Negus operation (headframe and mill) are on the main MCML mine lease.

The sediments at the south end of Rat Lake were removed (taken to Middle Pud TCA) in October 2005 and sampling was completed to confirm that all of the arsenic impacted soils were removed. The results indicated that some additional material needed to be removed from the northeast and northwest corners of the area remediated in 2005. This additional material was removed in October of 2006 and the area re-sampled to confirm that all contaminated material has now been removed from this area. The area at the Rycon R1 shaft was remediated, the shaft backfilled and a survey monument set up to monitor any settlement of the backfill. The Rycon R57 and Negus 220 mine openings in Zone 4 were closed by installation of concrete caps.

MCML commits to the collection of additional soil samples to the northeast of the Rat Lake area and in Garden Draw in 2007 to determine the nature of the arsenic noted in several previous soil samples that returned elevated levels of arsenic. Based on the results of this testing, MCML will develop site specific remediation plans for these areas to manage any remaining soil contamination.

7.3 Reclamation and Closure Issues

The Con minesite has been used for industrial purposes, specifically mining and milling, since the start of the mining operations in 1938. MCML proposes to reclaim the main Con Mine lease area to the GNWT guideline for industrial areas of 340 mg/kg so that the area could be used in the future for other industrial purposes. This does not include the TCA's or areas utilized as hazardous waste disposal sites, or the non-hazardous waste landfill. Thus, the central area of the minesite could be used in the future by industrial users (warehouses or transportation users who would want to be near the waterfront on Yellowknife Bay) as determined by the GNWT and City of Yellowknife. The remainder of the minesite will be returned to a state compatible for use as open areas or open spaces. It recognized by MCML that the actual use of any of these areas will be determined by future land owners based on the current/future development guidelines for these areas. In other words, MCML does not own this land but leases it for mining and milling purposes from the GNWT. MCML will reclaim the land and maintain it until its return has been accepted by the GNWT.

In summary, the areas of historic mining activity, which includes the TCA's, the areas identified as hazardous waste sites, and the hazardous waste disposal site, will be closed as set out in Sections 5 and 6 and as noted below. The areas outside of historic mining activities on the five mine leases will be remediated to standards required for future industrial use, or to an arsenic level of 340 mg/kg or less. In areas outside the historic mining activity where the land has not been disturbed, MCML will leave the land as is.

As presented in Section 5, the areas noted as the Con Pond, Negus Pond and the hazardous waste disposal site should not be used for other uses in the future. MCML recommends that these areas be permanently designated and identified as hazardous waste sites or hazardous waste disposal areas with engineered low permeable covers and rock barriers to prevent access. These sites are all above the local groundwater table and engineered drainage channels will direct all surface water to the Middle Pud TCA at the completion of capping. MCML recommends that a development restriction be placed on these sites and that they be monitored and maintained as closed out hazardous waste sites in perpetuity, a MCML responsibility.

The former tailing containment areas are not suitable for future industrial purposes due to the presence of tailing which, while chemically and physically stable, contain arsenic in levels that exceed the GNWT Guidelines for Soil Contamination for industrial sites. MCML recommends that these areas not be used for future industrial purposes. As noted in Section 6, the Upper and Middle Pud TCA's will be capped with non-acid generating waste rock to provide a physical barrier between the tailing surface and wildlife or humans frequenting the area. MCML's reclamation plan calls for establishing vegetation on top of the rock cover. At that time, MCML recommends that these areas will only be

suitable for light impact uses that will not damage or remove the rock cap and overlying vegetation. The historic TCA's (which include the rest of the tailing areas) will be re-vegetated, contoured and provided with engineered drainage channels to manage surface runoff. MCML recommends that these areas should only be utilized for light impact activities that do not damage or remove the vegetation cover.

A human health risk assessment was conducted for MCML to determine a target remediation limit in 1997 (Golder 1997). This assessment was then used to develop a site specific maximum allowable arsenic concentration after closure of the site. This risk assessment was updated (Golder 2006) to reflect current practice and the work previously completed by Risk Logic Scientific Services in 2002. In developing the assessment, a series of conservative assumptions were made regarding the future use of the site. Airborne particulate was assumed to be the primary mode of contaminant transport, and pathways to human receptors included respiration, ingestion and dermal contact. Particle size distributions were obtained in each area of the site, and the arsenic concentration was analyzed in the potentially airborne fraction. The receptor was assumed to be at the worst point on the entire lease property at all times when out of doors, which was assumed to be 10 hours per day for 5 days a week, for 20 weeks per year. It is assumed that for days with maximum temperatures below zero, there is no exposure (exposure mitigated by frozen soil, snow cover and limited outdoor activity). The maximum allowable arsenic concentration (which was assumed to be 100% bio-available to the receptor) was determined to be 400 mg/kg for remediation of the site as a 'brown field' industrial site that would potentially be re-developed for future industrial uses (a copy of this report was previously submitted to the MVLWB under separate cover and is on the public record).

This allowable concentration could be increased by utilizing less conservative assumptions regarding exposures, by strategic site development to cover materials with buildings or paved parking areas, and/or by placing a development restriction on the industrial land specifying that the site was used previously as a mine mill complex and future industrial users should identify this fact to workers. It could also include use of protective measures, and/or restricting the duration of outdoor activities in specific areas of the site.

It should be re-iterated that MCML has committed to using the GNWT Guideline for arsenic in contaminated soil of 340 mg/kg (industrial use standard). Contaminated soils and rock outside of the tailing containment areas will be excavated and relocated to the Upper Pud TCA. The more soluble remnants of calcine and sludge material will be deposited in the hazardous waste disposal site. It should be noted that MCML has committed to process all arsenic bearing sludge through the autoclave in 2007, and to place the stabilized product (Scorodite) in the Upper Pud TCA. A remnant material refers to oversize rock and gravels that were in contact with the arsenic sludges that were previously stored in the Con and Negus Ponds and in the blend plant storage pits.

As discussed in previous sections, the focus for the remediation of contaminated soils is the main mine lease (L-8658T) and Zone 3. The main mine lease covers some 261 hectares and Zone 3 covers some 182 hectares of the main lease area. The results of the testing on the soil samples indicates that approximately 126 hectares or 69% of Zone 3 has arsenic values less than 340 mg/kg (target for industrial use). Approximately 18 hectares or 10% has moderately impacted soils (340 to 1000 mg/kg) and 36 hectares or 20% has arsenic levels in the soil above 1000 mg/kg arsenic or the lower limit or level of arsenic observed in the tailing disposed of on the main mine lease.

All recent testing indicates that, as MCML removes the identified arsenic contaminated soil in these areas; all other metals on the GNWT Contaminated Sites List are also remediated to levels below the respective GNWT Guidelines for those metals. As such, remediation of the arsenic contaminated soils will address all other constituents of concern.

In terms of hydrocarbon contaminated soils on the minesite, the majority of these materials have already been addressed as part of the progressive reclamation measures. All bulk fuel storage tanks on site have been removed and the underlying contaminated soils were identified, excavated and removed by Arctic Environmental Services. With the exception of one buried fuel tank (gasoline) and one surface storage tank (diesel), which are still in use, all fuel storage tanks have been removed. During the final site reclamation process, sites that are presumed to have hydrocarbon contaminated soils, specifically the area around the two fuel stations, the heavy equipment garage, and the mechanical shops and services area will be tested and remediated as required.

Effective December 31, 2006, all spill reports have been closed and the sites of these spills have been reclaimed to the satisfaction of the Inspectors and the standards specified by INAC.

7.4 Contaminated Soil Test Protocol

In addition to the sampling already completed, MCML proposes to collect additional soil samples as part of the mine reclamation effort to evaluate or confirm the levels of arsenic and other metals remaining in the soils at specific sites around the mine. The locations for the sampling have been discussed above. It is planned that the sampling protocols will follow guidelines as set out by CCME for such sampling. The sampling program will be managed by MCML or a designated party with experience in collecting soil samples at sites with contaminated soils. The sample collection will be completed by a third party and testing of the soils will be completed by an independent laboratory. The results of the testing will be subject to review by MVLWB and other regulatory agencies associated with the reclamation of the Con Mine.

The results of future sampling will be used to develop site specific risk assessments and to establish reclamation plans for the specific sites that are identified as have arsenic or metal contaminant levels above the target reclamation levels as set out by the GNWT guidelines for contaminated soils at sites in the NWT.

These sampling protocols will also be used at the mill after the structure is removed to test for arsenic and metals contaminated soils. It is proposed that at least 50 cm of soil will be removed initially, following which the soils will be tested as noted above. The soil samples will be collected at the grid points or sites on a grid 10 meters by 10 meters. The samples will be taken at 30 to 40% of the grid points selected on a random basis. In addition, up to 10% of the samples will be at locations selected between the grid points. The results of the tests at the mill and any other location that may require soil removal, will determine if an additional 50 cm thick layer of soil has to be removed. If the additional soil is removed, the sampling procedure will be repeated until the soil has arsenic levels below 340 mg/kg or bedrock is encountered.

The location of the mill is such that any water in the mill excavations will not be from groundwater but from precipitation runoff. Water accumulating in the excavation will be directed to construction sumps that will be pumped to the Middle Pud TCA. The excavations will continue to bedrock if necessary and the contractor will power wash all depressions and open fractures in the exposed bedrock. Water from the power washing will be directed to the construction sumps installed to manage runoff. The exposed bedrock will be inspected and any remaining soil will be sampled (see above paragraph). The bedrock will not be excavated. Finally after all contaminated soil has been removed; a levelling layer of uncontaminated gravel or mine waste rock will be placed in the resulting excavation area to facilitate future redevelopment.

This work is scheduled for 2008 once the mill complex is removed. A report will be developed to document this work once complete. A copy will be submitted to the MVLWB for entry on the public record.

7.5 Reclamation Plan

The Plan to remediate the arsenic contaminated soils on site, as well as the soils contaminated by other metals (as listed in the GNWT Contaminated Soils Regulation), or hydrocarbons, is focused on the Zone 3 area of the mine lease and covers an area of approximately 44 hectares.

The areas in Zone 3 that have arsenic levels below 340 mg/kg will not be disturbed. In general these areas are to the north, west and south of the TCAs. The isolated locations that have arsenic levels above 340 mg/kg will be inspected and samples obtained at selected sites. Based on the results of testing, a risk based remediation plan for the

specific site will be developed utilizing the guidance presented in the document, 'Site Specific Arsenic Soil Quality Guidelines, Con Mine, Yellowknife', April 2006 and in the guidelines developed by the GNWT.

The soils at and around the Robertson headframe and the parking areas around the structures in this complex will be used to cover the tailing containment areas. Some of the material has arsenic levels at or above 340 mg/kg and this material will be used as the lower layer of cover material for the Upper and Middle Pud TCA's. The upper layer of the tailing containment area cover material will have levels of arsenic at or below 340 mg/kg. The soils that have a moderate level of arsenic, particularly at and around the Robertson shaft and the parking areas around the warehouses in this complex, will be used as cover material for the Upper and Middle Pud TCA's. It is estimated that there are 150,000 to 175,000 m^3 of material in this area for use as cover material. Some of the material may also be used in the closure of the Con and Negus Ponds. Once the mine waste rock or granular material is removed, the exposed original surface soils will be tested to determine the level of arsenic remaining in the soil after remediation is completed. If the arsenic levels are still in the moderate or high concentration ranges, further remediation will be undertaken. As the work progresses, the contractor's effort to remove the soil will be monitored for dust, as the soils to be removed potentially have high levels of arsenic. The plans to control and monitor the dust will be part of the contract document package developed to perform this task. In addition, site specific Health and Safety Plans will be developed with the contractor to monitor the work.

Soils in areas where batteries, mill reagents, or hydrocarbons were stored will be tested for the presence of contaminants. Any contaminated soils that are identified will be excavated and placed within the hazardous waste disposal site. All former spill sites have been previously addressed.

The main area within Zone 3 that will require remediation is between the Con Pond and Robertson shaft complex. The area is underlain by rock at surface or peat and clay of varying depths. Several mine roads cross the area. The plan for this area is to remove the upper 50 to 75 cm of the roads and the organic peats/clays and then test the remaining material for arsenic. Based on the results of testing, additional material will be removed if the arsenic levels are above 340 mg/kg. This sequence will be continued until bedrock is encountered, at which point the excavation will be terminated. The arsenic impacted soils will be placed in the hazardous waste disposal site that has been developed in the area of the original calcine storage site. Based on a preliminary review of the data on the soil arsenic level in this area, and the proposed initial excavation of 50 cm of material, it is estimated that ~150,000 to ~175,000 m^3 of material will need to go into the hazardous waste disposal site. The mining history for the site suggests that the arsenic contamination of these soils was either from airborne sources (roaster) or from spills from the Blend Plant. It is not anticipated that the contamination extends to depth.

The data collected for this plan indicates that approximately 7,000 to 10,000 m^3 of near surface soil requires excavation and removal from the historic operations area at and around the mill complex. This volume estimate is reduced from earlier estimates, as work in 2005 to remove buildings north of the mill complex found that there is limited depth of soil under the buildings, and in some cases the building were founded on rock. The above estimate continues to require an average excavation depth of ~1.0 m in and under the main mill complex.

As outlined in Section 2, during the demolition process each structure will be inspected for the presence of hazardous wastes, including the above noted metals and hydrocarbons, to ensure that they are not present in the structure prior to demolition. The underlying soils will be tested for the presence of these contaminants once the structures have been removed. Any contaminated soils that are identified will be excavated and placed within the hazardous waste disposal site. All former spill sites have been previously addressed.

7.6 Other Soil Contamination

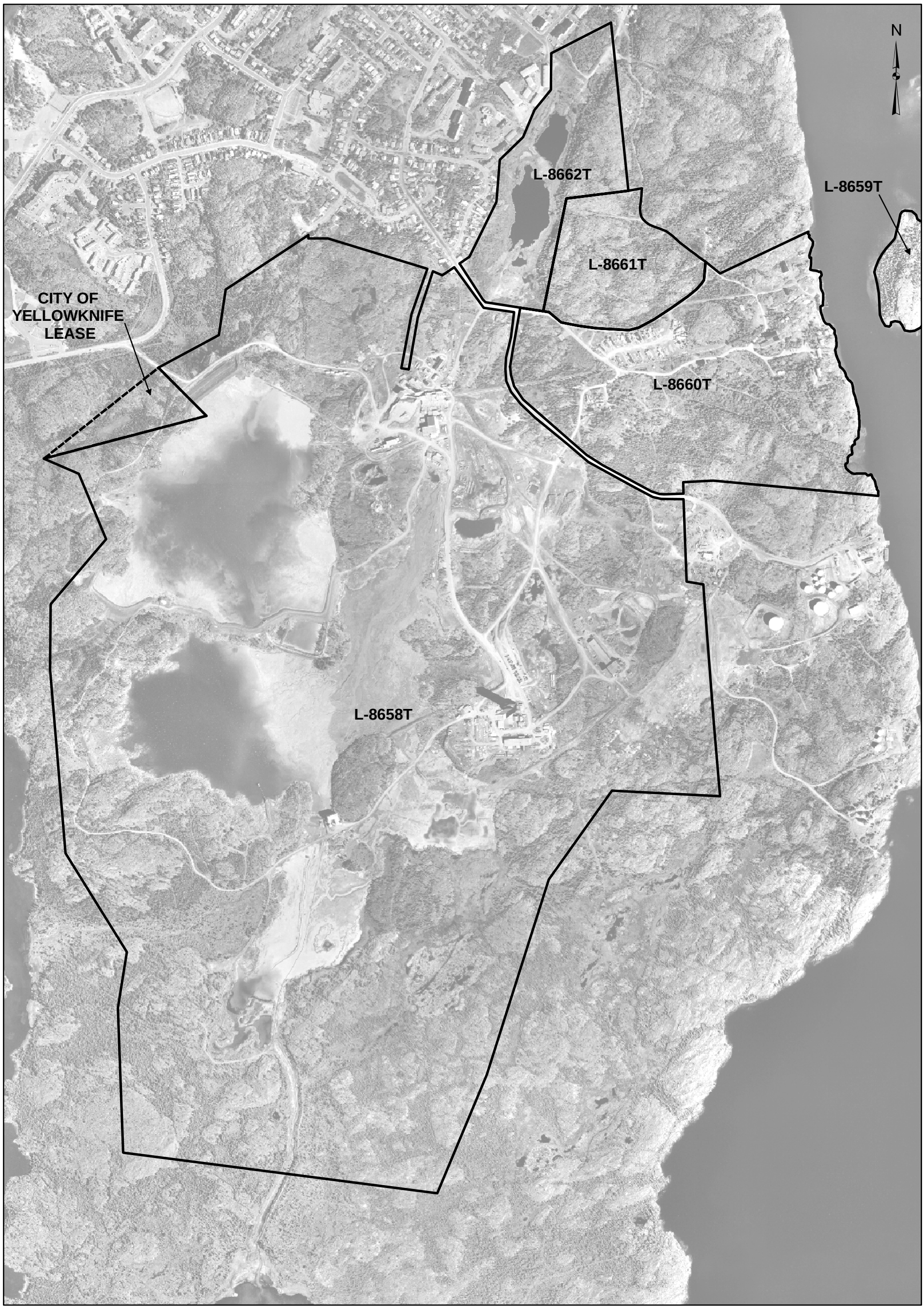
MCML has identified other types of contaminated soils during the progressive reclamation effort. These include other metals, hydrocarbons and historic spills of tailing and or other hazardous liquids, the sites of which were reclaimed following the incident. In general, the other metals on the site are at or below the criteria for clean up in areas outside the areas where arsenic is a concern. Thus, once the arsenic is managed, the other constituents will be addressed.

The sites of historic spills of materials such as hydrocarbons, tailing or other hazardous materials were clean up at the time and the remediation work has been inspected and approved by inspectors with INAC.

Other materials such as waste batteries have been collected and disposed of off site at a licensed facility that accepts these materials. Solvents that may have impacted soils locally – in or around maintenance shops or warehouses - will be cleaned up and disposed of as needed off site.

7.7 Cost Estimate

Reclamation for the areas around the mill and the Robertson shaft is scheduled for completion in 2008. The estimated cost and schedule for all contaminated soil remediation work on the Con minesite is summarized in Section 10 of this plan.



LEGEND

Con Mine Lease Boundary

0 100 200 400 Meters

Scale - 1:10,000

REFERENCE

Datum: NAD 83 Projection: UTM Zone 11

PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

MINE LEASE BOUNDARIES

PROJECT No. 05-1413-016			SCALE AS SHOWN	REV. 1
DESIGN	AS	22 Nov. 2004	FIGURE 7.1	
GIS	CDB	22 Nov. 2004		
CHECK	JH	03 Oct. 2005		
REVIEW				

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N

RAT LAKE

TIN CAN HILL

MOSHER ISLAND

ZONE 4

ZONE 3

ZONE 4

CON CAMP

MILL COMPLEX

HAZARDOUS WASTE DISPOSAL SITE

UPPER PUD TCA

CRANK LAKE

CON POND

NON-HAZARDOUS WASTE LANDFILL

NEGUS POND

ZONE 2

ZONE 1

BLEND PLANT

OLD NEGUS TAILING TCA

MIDDLE PUD TCA

ROBERTSON COMPLEX

NEIL LAKE TCA

LOWER PUD TCA

ZONE 3

LEGEND

- Con Mine Lease Boundary
- Miramar Zone Boundaries
  - Zone 1 - Hazardous Waste Site
  - Zone 2 - Open Space - No Development
  - Zone 3 - Industrial
  - Zone 4 - Industrial/Commercial
- New Road
- Trail

0 100 200 400 Meters

Scale - 1:10,000

REFERENCE

Datum: NAD 83 Projection: UTM Zone 11

PROJECT

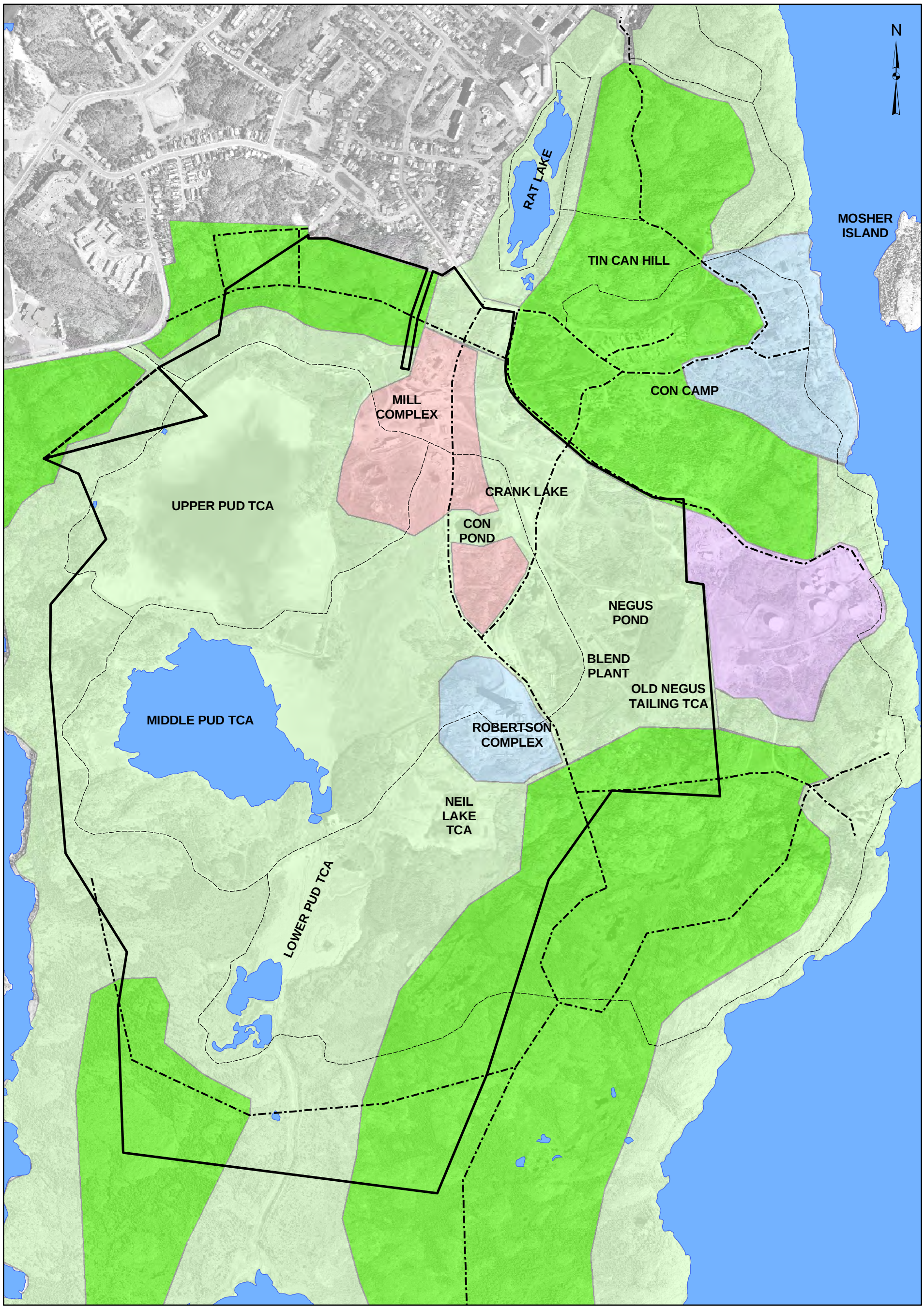
MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

MIRAMAR ZONE BOUNDARIES

PROJECT No. 05-1413-016			SCALE AS SHOWN	REV. 1
DESIGN	JH	17 Feb. 2006	FIGURE 7.2	
GIS	CDB	17 Feb. 2006		
CHECK	JH	17 Feb. 2006		
REVIEW				

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LEGEND

- Con Mine Lease Boundary
- Proposed City Planning Zones
  - Commercial
  - Industrial
  - Open Space
  - Recreation Area
  - Residential Area
- New Road
- Trail

REFERENCE

Datum: NAD 83 Projection: UTM Zone 11

0 100 200 400 Meters

Scale - 1:10,000

PROJECT

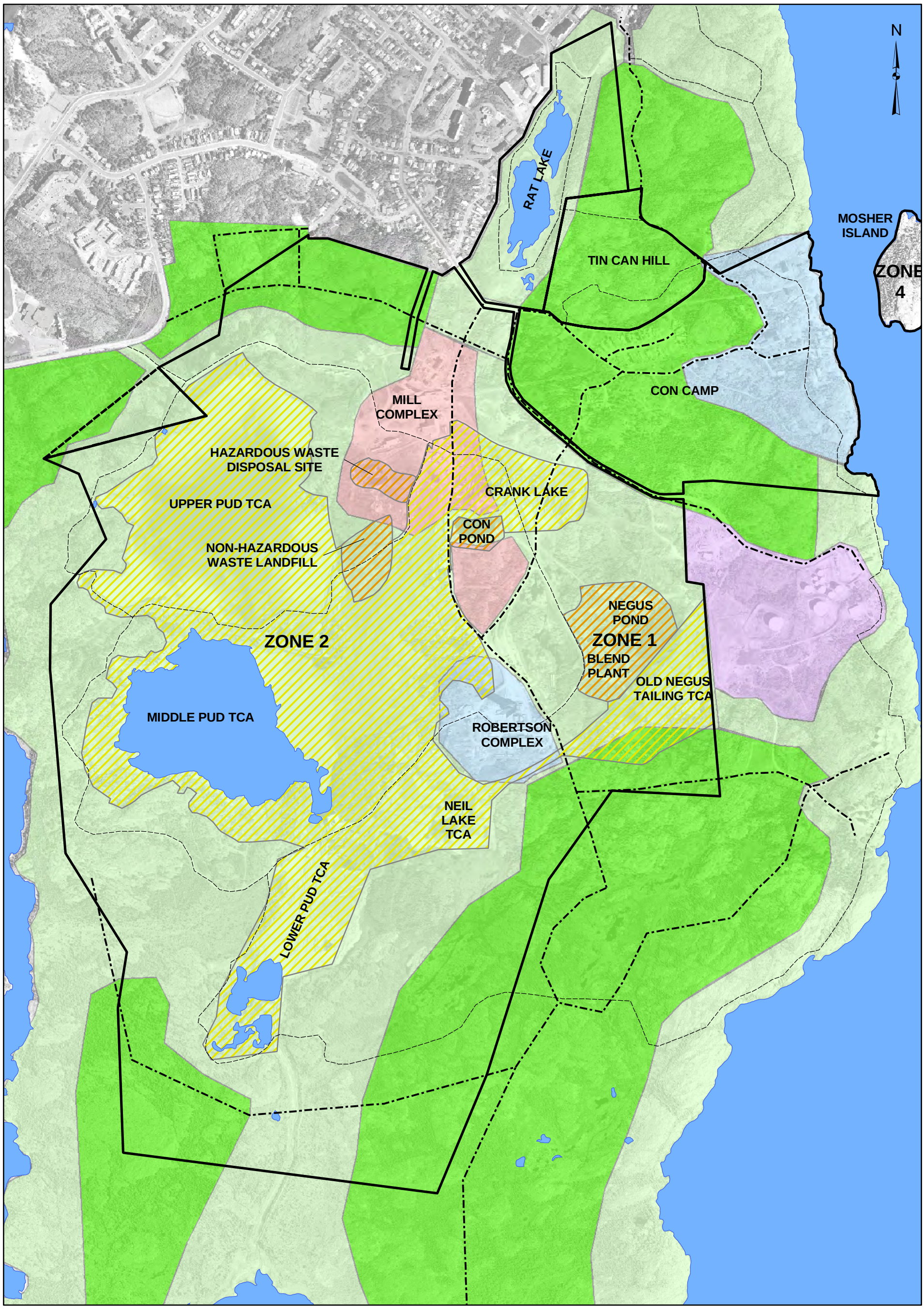
MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

PROPOSED CITY PLANNING ZONES

PROJECT No. 05-1413-016			SCALE AS SHOWN	REV. 1
DESIGN	JH	17 Feb. 2006	FIGURE 7.3	
GIS	CDB	17 Feb. 2006		
CHECK	JH	17 Feb. 2006		
REVIEW				

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LEGEND

- Con Mine Lease Boundary
- Miramar Zone Boundaries
  - Zone 1 - Hazardous Waste Site
  - Zone 2 - Open Space - No Development
- Proposed City Planning Zones
  - Commercial
  - Industrial
  - Open Space
  - Recreation Area
  - Residential Area
  - New Road
  - Trail

0 100 200 400 Meters

Scale - 1:10,000

REFERENCE

Datum: NAD 83 Projection: UTM Zone 11

PROJECT

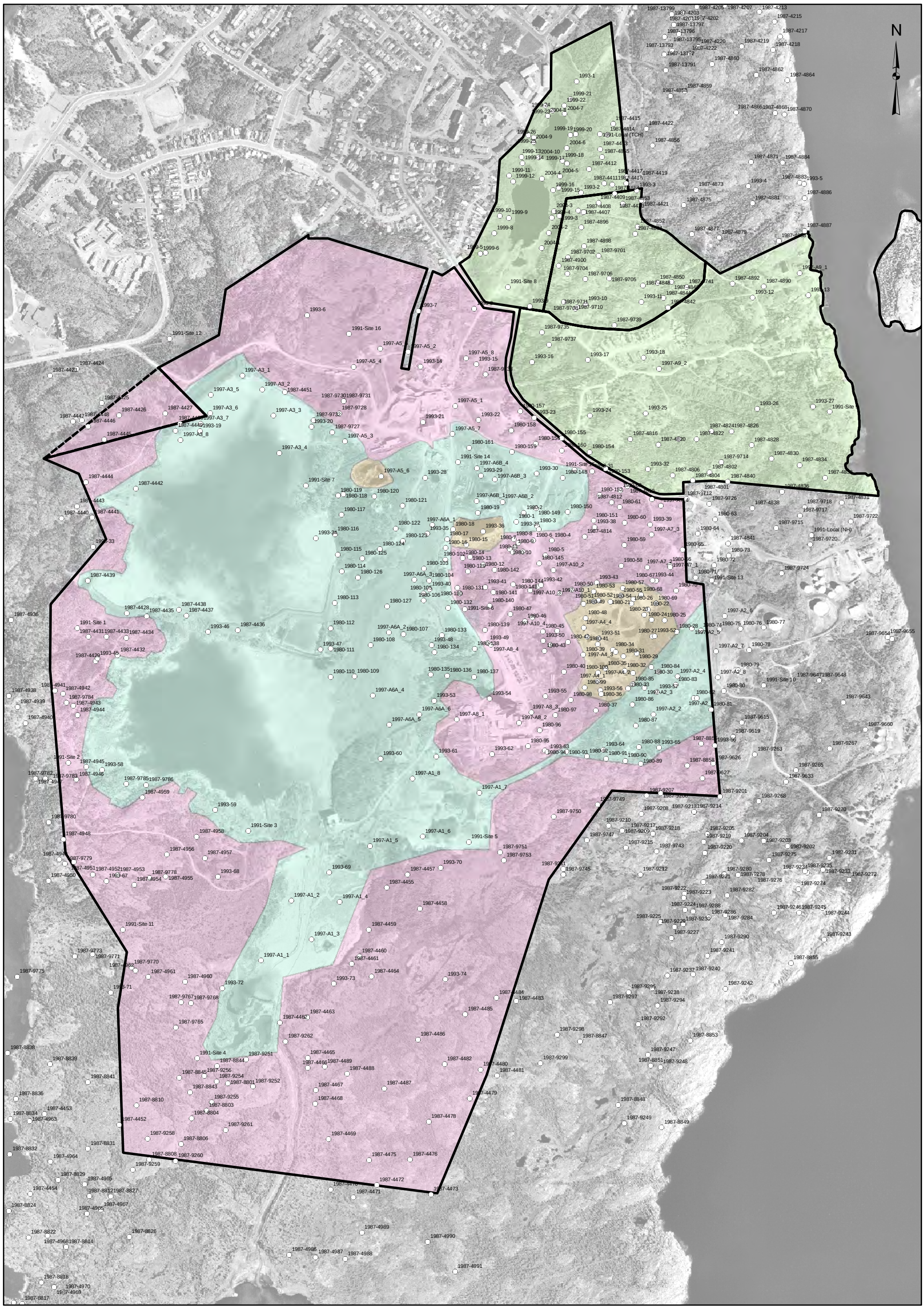
MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

OVERLAP OF ZONE BOUNDARIES

PROJECT No. 05-1413-016			SCALE AS SHOWN	REV. 1
DESIGN	JH	17 Feb. 2006	FIGURE 7.4	
GIS	CDB	17 Feb. 2006		
CHECK	JH	17 Feb. 2006		
REVIEW				

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LEGEND

- 1987-4960 Sample Location (year, sample number)
- Con Mine Lease Boundary
- Zone 1
- Zone 2
- Zone 3
- Zone 4

REFERENCE

Datum: NAD 83 Projection: UTM Zone 11

0 100 200 400 Meters

Scale - 1:10,000

PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

SOIL SAMPLE LOCATIONS - TOTAL ARSENIC

PROJECT No. 05-1413-016			SCALE AS SHOWN	REV. 1
DESIGN	AS	22 Nov. 2004	FIGURE 7.5	
GIS	CDB	22 Nov. 2004		
CHECK	JH	03 Oct. 2005		
REVIEW				

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N

LEGEND

1987-4960 Sample Location (year, sample number)

Total Arsenic Concentrations in Soil

- Low (0 - 340 ppm)
- Moderate (340 - 1000 ppm)
- High (> 1000 ppm)
- Con Mine Lease Boundary

REFERENCE

Datum: NAD 83 Projection: UTM Zone 11

0 100 200 400 Meters

Scale - 1:10,000

PROJECT

MIRAMAR CON MINE
YELLOWKNIFE, NWT

TITLE

DISTRIBUTION OF ZONE 3 SURFICIAL SOILS TOTAL ARSENIC

PROJECT No. 05-1413-016			SCALE AS SHOWN	REV. 1
DESIGN	AS	23 Nov. 2004	FIGURE 7.6	
GIS	CDB	23 Nov. 2004		
CHECK	JH	03 Oct. 2005		
REVIEW				

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8.0 WATER MANAGEMENT

8.1 Water Treatment Background

Water treatment became mandatory with Water Licenses in 1978. From the start of mining operations in the 1930's until the creation of the Northwest Territories Water Board in the 1970's there was no treatment of effluents prior to discharge. Between the late 1970's and early 1980's, metals were precipitated by the manual application of iron sulphate and lime directly into the waters of Pud Lake from a small-motorized barge during open water periods. After the precipitates were allowed to settle, the clear water was allowed to flow out of the Pud Lakes Tailing Containment Area (TCA) into the Meg-Keg-Peg Lakes system.

In 1986, what is now the Blend Plant was temporarily converted to a water treatment facility while the present-day Water Treatment Plant (WTP) was constructed between the Middle and Lower Pud basins, adjacent to Dam 4. The present WTP began operation in September 1987. Treated water is discharged annually between late spring and early fall via a pipeline over the Lower Pud TCA to the Meg-Keg-Peg Lakes system.

In addition to sampling at the WTP before discharge, water quality is monitored at eight additional sites on or adjacent to the property. Including the WTP site, these sampling locations are established under Water License N1L2-0040 (Appendix I), and included in the Surveillance Network Program (SNP) that forms part of the license. The stations are used to monitor the quality of the treated effluent discharge and other potential discharges from the site. A map of the SNP station locations is shown in Figure 8.1.

Sampling at SNP Station #40-1, located at the WTP, monitors the water quality prior to discharge to the environment. SNP Station #40-10 monitors the discharged water quality at the entrance to Meg Lake, 1,300 m south of the WTP. SNP Station #40-5 monitors the drainage 6,500 m to the south at the point of the Meg-Keg-Peg Lakes system discharge into Great Slave Lake.

8.2 Water Treatment Plant and Operations

The WTP is designed to destroy cyanide and remove Total Suspended Solids and soluble metals from mine wastewater and to produce a treated effluent that meets the mine Water License discharge limits. The quality and volume of treated water discharged from the WTP is dictated by MCML's Water License and the federal Metal Mining Effluent Regulations (MMER) (Appendix II). The water quality requirements of the two regulations are presented in Table 8.1. Stringent regulations require sampling of the treated effluent each day during treatment and discharge periods.

TABLE 8.1: Comparison of MVLWB & MMER License Limits and Drinking Water Standards

Constituent	Units	MVLWB		MMER			Drinking Water Standards
		Sample Type		Sample Type			
		Grab[a]	4-day moving average[b]	Grab	Composite[c]	Monthly average of composite	Maximum allowable concentration
Arsenic	mg/L	1.0	0.50	1.0	0.75	0.50	0.025
Copper	mg/L	0.60	0.30	0.60	0.45	0.30	≤1.0
Cyanide (total)	mg/L	1.60	0.80	2.00	1.50	1.00	0.20
Lead	mg/L	0.40	0.20	0.40	0.30	0.20	0.010
Nickel	mg/l	1.00	0.50	1.00	0.75	0.50	In preparation
Zinc	mg/L	0.40	0.20	1.00	0.75	0.50	≤5.0[d]
Radium 226	Bq/L	n/a	n/a	1.11	0.74	0.37	0.60
pH	pH unit	6.0-9.5	n/a	6.0-9.5	n/a	n/a	6.5-8.5
T.S.S.	mg/L	40	20	30.00	22.50	15.00	≤500.00[d]
Oil and Grease	mg/L	5.00	n/a	n/a	n/a	n/a	n/a

a. MMER definition: a quantity of undiluted effluent collected at a prescribed time.
b. MVLWB definition: the moving average of any four consecutive composite samples. Each composite consists of 24 equal volumes of 400 mL of flow collected at a frequency of one hour over a period of 24 hours for a total of 9.6 L of sample. The samples are collected in 10 L neoprene containers.
c. MMER definition: a quantity of effluent consisting of not less that three equal volumes or three volumes proportionate to flow that have been collected at approximately equal time intervals over a sampling period of not less than seven hours and not more than 24 hours or a quantity of effluent collected continuously at a constant rate or at a rate proportional to the rate of flow of the effluent over a sampling period of not less than seven hours and not more than 24 hours.
d. Values represent aesthetic parameters.

The water treatment plant flow diagram is shown on Figure 8.2. The plant circuit, as shown, operated during the last years of mill processing and effectively treated the water in Middle Pud to the desired permit discharge levels. The plant is maintained each year to ensure efficient operation during the summer months and will be maintained utilizing a similar design. MCML will continue to stay abreast of changes in water treatment technology and will upgrade the plant circuit when treatment costs and/or efficiency can be improved on a practical basis.

The plant currently treats all contaminated water from the minesite using reagents that cause the contaminants to either chemically break down, as with cyanide, or to precipitate gravimetrically. The reagents used in the water treatment process are shown on Table 8.2.

TABLE 8.2: Reagents Used in the Con Mine Water Treatment Plant

Calcium Hydroxide (Lime)
Copper Sulphate
Ferric Sulphate
Flocculant
Sulphuric Acid
Hydrogen Peroxide

Water is collected in the Middle Pud TCA pond and pumped into a series of mixing tanks where the initial reagent addition takes place. After addition and mixing of copper sulphate, hydrogen peroxide, and ferric sulphate, the water flows to a series of secondary reactor tanks for continued mixing, additional retention time, and addition of a lime and a flocculent. From the reactor tanks the solution flows through a lamella settling tank where the flocculated soluble metals precipitate gravimetrically. Finally, using Sulphuric Acid, the pH of the treated effluent is adjusted to ~7.0 prior to discharge.

The treated water is then pumped to the south end of the Lower Pud TCA and discharged to Meg Lake. The underflow or sludge is sent to Middle Pud and deposited in a segregated area within the Middle Pud TCA. Should there be any leachate, it would be treated through the water treatment plant.

8.3 Closure and Reclamation Issues – Surface Water

There are two watersheds on the minesite:

- Pud Lake west to Kam Lake, with sub-basins for the Taylor Road area, Upper Pud Lake, Middle Pud Lake, Lower Pud Lake; and,
- Crank Lake north to Rat Lake or east to Garden Draw, then to Yellowknife Bay.

These watersheds are defined on Figure 8.3, Map of the Con Minesite Watersheds.

At the northwest margin of the property, the Taylor Road watershed collects surface runoff from north and northwest of the property. The water accumulates in a marsh at the downstream toe of the Taylor Road Dam. This system reflects the remnants of the interrupted drainage system that flowed into the north end of Pud Lake prior to construction of the tailing containment dams. At present, during the summer, the accumulated water is routinely analyzed and pumped to Kam Lake if the water meets the mine discharge criteria. In the event the water does not meet the discharge criteria, it will be pumped to the Upper Pud TCA; however the water quality for at least the last 5 years has met all Water License discharge standards and consequently the water was pumped directly to Kam Lake.

In the northeast part of the property, the Crank Lake/Rat Lake watershed originally collected runoff from the area that is now the north end of the Crank Lake TCA. Between 1953, and 1961 a jetty was constructed at the south end of Rat Lake, and a portion of the lake was filled with waste rock. About the same time, a drain connected to a storm sewer was installed at the north end of the lake to lower and control the water level of the lake. This work was done to prevent flooding of near-surface underground mine workings under the lake.

The Crank Lake watershed has been a closed basin since the construction of tailing containment berms in the 1940's. It includes part of what was originally the southern end or headwaters of the Rat Lake watershed. The northern or north-western two-thirds of the Crank Lake basin was used for historic tailing deposition, from the time of the mine's commissioning in 1938 until the mid or late 1950's. Snowmelt and runoff accumulates as ponded water in the Crank Lake sump at the east end of the old lake area, and the water is pumped into the Middle Pud TCA.

Following cessation of mining and milling activities, water entering the Middle Pud TCA will be predominantly rain water and snowmelt from the Upper and Middle Pud basins and from areas around the mill site and Robertson headframe. Water may be pumped from the Crank Lake and Lower Pud sumps in the initial years of the post-closure period. Until these waters meet Water License discharge limits, they will be directed through the Middle Pud TCA to the Water Treatment Plant prior to discharge to the environment. The surface water flows from east of the trailer court and/or east of Con Road towards Yellowknife Bay (Great Slave Lake).

A number of historic tailing deposition areas are located along the south margin of the property and these are referred to collectively as the Lower Pud area, and include the Negus TCA, Neil Lake TCA, and Lower Pud TCA. Historically, surface water flowed from the Negus TCA to the Neil Lake TCA then to the Lower Pud TCA, where it ponded or flowed to the west and toward Kam Lake (prior to the 1960s). In the early to mid 1960s, dykes were developed along the west side of Lower Pud basin and the north end of the Meg-Keg-Peg Lakes watershed was breached with a man-made channel to divert surface water from the area away from Kam Lake.

8.4 Closure and Reclamation Issues – Groundwater

The regional geology in the Yellowknife area is such that bedrock across the minesite is close to the surface. Shallow surface deposits of silt, clay and peat overlie the bedrock locally. These deposits are discontinuous across the property and in some areas may be permanently frozen at depth. The distribution of permafrost in soil on site is not known, however it is reported in previous investigation work on site that some of the peat in the swamp north of the Taylor Road Dam is permanently frozen. Recent drilling has not encountered permafrost.

The upper several metres of bedrock have been fractured by frost action. The available information suggests that these fractures are not continuous for long distances, but they contribute to the conveyance of shallow groundwater flows. The bedrock at depth generally has a low permeability except near the main shear zone or the zone being mined.

Historically or before the mine was developed, the groundwater flows at the site followed the topography and the flows were in the overburden deposits or in the upper fractured zones in the near surface bedrock. Once the mine was developed, the groundwater in the areas away from the underground works of the mine continues to be controlled by topography and the shallow fractured bedrock near the surface.

The underground mine workings, however have changed the groundwater flow patterns on the central part of the property or in the areas underlain by the mine workings. The underground mine works were dewatered to a depth of 6,000 ft or 1,800 meters below the ground surface. This created or resulted in a downward gradient of groundwater flow to the mine from the surface, and from the large water bodies to the west (Kam Lake) and to the east (Yellowknife Bay) as noted on Figure 8.5.

Data from the mine operation indicated that at depth, the inflow of water was limited and in fact the water was historic Canadian Shield saline water. The mine records indicate that the majority of the inflow to the mine was from the upper levels of the mine and / or from fractures that intersected the upper levels of the mine workings and water sources on surface. The records also indicate that there was not a single fracture that contributed a larger flow than any other fracture or fault system. It was noted that in some areas of the mine in the spring during snow melt there were higher inflows of water. These flows were considered to be from old boreholes that were not properly sealed or from fractures that extended to surface. There is no record of large inflows of water to the underground mine from Great Slave Lake.

The small lakes (Rat Lake) and ponds (Con Pond, Negus Pond) over the mine workings remained, as the bedrock below the upper frost fractured bedrock zone has a low permeability. Thus, while there would have been some downward flow from these lakes and ponds, the volume of the flow would have been relatively small and a portion of the groundwater resulting from seepage from the small lakes or ponds would have moved laterally towards Kam Lake or Yellowknife Bay. This flow would have included any groundwater flow from the tailing containment areas and the central area around the mill. These shallow or near surface groundwater flow patterns and the surface water flow patterns would have been towards the surrounding lakes and would be influenced by the site topography. Thus, the surface water and near surface groundwater would flow from the area east of the Upper Pud and Middle Pud ponds towards Yellowknife Bay. From the area to the west of the site, or the Pud basin, the flow is towards Kam Lake. There

would also be a component of groundwater flow from the Lower Pud basin to the south. This flow would be towards Meg Lake. It is also inferred that the groundwater flow from the area north or downstream of the Taylor Road Dam follows the surface water flows and is towards the Upper Pud Basin.

If permafrost is present in the zone it would influence the flows. Permafrost if present would potentially reduce the flow rate and/or cause minor changes in direction.

8.5 Closure and Reclamation Plans – Surface Water

Surface water flow directions are shown in Figure 8.3. The plan shows the flows from the east portion of the site moving towards Yellowknife Bay and from the west of the tailing containment areas moving towards Kam Lake. The flows from the north are towards the Taylor Road Dam and the swamp beside Taylor Road.

In order to manage the uncontaminated storm water and snowmelt that flows to Taylor Road, a storm drain system will be installed by MCML and/or the City of Yellowknife, to divert accumulations of uncontaminated natural runoff water from the Taylor Road basin to Kam Lake. During reclamation, MCML will construct a new storm water drain line of approximately 1,000 m in length, extending from the marsh at the base of the Taylor Road dam paralleling Taylor Road, to Kam Lake. This storm drain system will be constructed in consultation with the City of Yellowknife to specifications acceptable to the City, with the expectation that the City of Yellowknife will take possession of, and responsibility for this storm drain system moving forward. Discussions with the City on this arrangement have been initiated and will continue until a mutually acceptable arrangement is achieved.

The original surface water flow pattern that was in place before the Crank Lake TCA was developed was directed both to the north and east. The lake is now a closed basin, as it was used for tailing deposition for almost twenty years, from the late 1930s into the 1950s. The surface water is now collected and pumped to the Middle Pud TCA. As part of MCML's progressive reclamation, surface cleanup in the Crank Lake TCA area began in 2002. Once cleanup is complete, the tailing area, which has already been capped with mine waste rock, will be regraded. The grade for the east half of the TCA will be raised by 0.7 m to 0.9 m and graded toward the west and Middle Pud. The north portion and the west area will all be graded to drain to Middle Pud. An engineered drainage swale with an erosion resistant lining will direct water to the Middle Pud TCA. A growth medium and fertilizer will be applied to the surface, followed by seeding. Water from snowmelt or precipitation accumulating in the sump will be pumped to the Middle Pud TCA for treatment in the WTP. Reclamation of the area will continue in 2007.

Upper and Middle Pud TCA's continue to be utilized as part of the progressive reclamation activity and planned autoclave operation. After reclamation, surface water in the Upper Pud TCA will flow through a central spillway into the Middle Pud TCA. This water, along with any Middle Pud precipitation accumulation, will report to the WTP. Until such time as the water quality in the Middle Pud pond is within Water Licence discharge limits, the water in the Middle Pud TCA will continue to be treated. Once the water quality consistently meets the Water License discharge limits for several years, the water in the Middle Pud will be released directly to the Lower Pud and the general surface water drainage system to the south. This would be achieved by excavating an engineered channel through Dam 4 adjacent to the water treatment plant. The channel base would have an engineered lining to resist erosion and maintain the water level in the Middle Pud at a predetermined level. A more detailed presentation of the closure and reclamation of the active tailing areas are provided under 'Tailing' in Section 6.

Drainage from the Negus TCA and Neil Lake TCA will be accomplished with the construction of a shallow engineered drainage swale from the Negus TCA southwest through the Neil Lake TCA and into east portion of the Lower Pud basin. Construction of this engineered drainage system is scheduled to commence in 2007. The area of wetlands on the east side of the Neil Lake area will remain, and the new drainage system will direct surface waters into the south end of Lower Pud Lake where it will be monitored. If the water quality meets Water License discharge limits, the water will be discharged to the south and into Meg Lake. If water quality does not meet Water License discharge limits, the water will be pumped into the Middle Pud TCA for treatment. Once the Negus, Neil Lake, and Lower Pud areas have been successfully revegetated and water quality reaches Water License discharge limits, runoff will be allowed to drain naturally to Meg Lake by removing the low water retention dike at the south end of the Lower Pud TCA. A small area of wetlands is expected to remain on the east side of the Neil Lake area as well as in the southwest area of the Lower Pud basin.

MCML's plans, as outlined in Section 6, include monitoring, maintenance and contingency measures to confirm the successful cover systems for the tailing containment areas. The plan, with the incorporated contingency allowances, will enable MCML to provide the desired long-term sustaining cover system. A cost allowance has been included in Section 10 to cover this contingency requirement.

8.6 Closure and Reclamation Plans – Groundwater

Commencing in November 2003, the mine is being allowed to flood. It is anticipated that the water level in the mine will reach a stable equilibrium water level at or near surface in ~2014. The mine workings are inter-connected by drifts, ramps and stopes, therefore it is expected that the water level in all the near surface workings will be similar and will stabilize within a 1.0 meter range. The difference will reflect the drainage rates of the

water to a surface opening, and the gradient of the water in that direction. The water level will continue to be confirmed by monitoring through designed and engineered openings in the closure caps, which are being constructed as the mine moves towards final closure. It is not anticipated that the water level in the mine will rise to the level of the original groundwater system, as the maximum water level will now be influenced by the openings to surface that will allow the mine to drain. Based on available information, MCML predicts the minewater will exit the underground workings at the 204Q stope opening to surface near Rat Lake. As such, a contingency plan has been developed to pump this water to the Middle Pud for treatment in the event that it does not meet Water License discharge criteria. This plan is outlined later in this section.

The groundwater inflows that will flood the mine are from several sources. The deep groundwater system, which has saline water, will contribute to inflow at depth. However, as the mine floods these flows will subside and eventually cease as the water level in the mine rises above the zones that contribute the saline water. The inflows to the whole mine, and particularly the upper parts of the mine, will be from precipitation collected in surface sources such as Rat Lake, and Middle Pud. Initially there may be flow from Yellowknife Bay and Kam Lake, however when the water in the mine reaches equilibrium, it is predicted to be above the water level in either Yellowknife Bay or Kam Lake. This stable level will then be influenced by potential water inflows from ponds that will be left at closure in the Middle Pud TCA, Neil Lake TCA, Rat Lake, and seepage from surface sources or areas of ponded water such the area just south of Con Pond. The highest planned pond elevation at closure is the Middle Pud TCA, which is an indication of the potential stable or long term average high water level in the mine at equilibrium, as noted on Figure 8.6.

The second contributing factor to the long term stable water level in the mine is the point at which water will seep out of the mine to establish the maximum water level. The lowest known opening that will drain the mine is on the south end of Rat Lake at the 204Q stope. As such, the concrete cap for the 204Q stope will be designed with a drain portal to allow minewater to flow out of the mine. The concrete cap will also be designed with a sampling port to allow monitoring of the minewater to confirm the water quality before it is allowed to flow to Rat Lake, plus a large enough opening to install a pump to transfer the water to the Middle Pud TCA, should the water quality not meet Water License discharge limits (Table 8.1). Additional, alternative pumping arrangement will be provided in the Robertson Shaft and C-1 cap designs. Based on the rate of underground flooding over the past three years, the calculated inflow is ~120,000 m^3 per year. The Water Treatment Plant is designed to treat 10,000 m^3 per day, therefore this flow represents 12 days of treatment annually from this source should it be necessary to treat the minewater.

It is possible that some seepage would occur from fractures or faults that connect the mine to other openings, such as old boreholes that were not properly sealed. These seepage points will be identified as the water level rises in the mine during the final years of flooding, and confirmed by water testing. It is anticipated that, as there is not a large inflow from any of these sources, there should not be a large outflow. This will be confirmed by ongoing monitoring as the mine floods.

As discussed above it is anticipated that the regional groundwater flow pattern will try to return to the original configuration as the mine is allowed to flood. However, as noted above, the mine workings will continue to influence the final groundwater levels. Thus, in the post closure period there will be a perched groundwater system similar to the system noted at present in the shallow monitoring wells on site, and a slightly deeper system controlled by the upper workings of the mine. The water in the shallow perched groundwater system will flow laterally to the lakes east and west of the mine, and a portion of this water will infiltrate to the mine.

The shallow perched groundwater flow patterns will reflect the water levels in the tailing basins or local ponds. The Upper Pud area will be drained to the Middle Pud and the groundwater levels under the Upper Pud basin will stabilize at a level lower than the present surface, but above the maximum water level maintained in Middle Pud. It is anticipated that the groundwater under the Upper Pud basin will drain south to Middle Pud. This water will be collected in the Middle Pud TCA and treated before discharge to the environment, as necessary.

Surface water in the Crank Lake area will be redirected to flow to Middle Pud. This will manage most of the surface water, but some water will infiltrate to the mine workings under the TCA. MCML will install groundwater monitoring wells on the east side of the Crank Lake area to collect information on the amount and quality of the flow. The length of time that the surface water and groundwater will be monitored will be based on the results of the monitoring information.

The monitoring plan for the minewater is discussed briefly here, and in detail in Section 9 – ‘Site Monitoring’. The plan is to continue monitoring the wells installed to date in the shallow perched groundwater system. Monitoring to date suggests that at the Crank Lake TCA, there is a downward flow or gradient from the surface groundwater system to the mine. The data also indicates that the quality of the porewater in the tailing deposited in Crank Lake is the same as that associated with tailing water. Similarly, the quality of the groundwater immediately beside the lake (east end) is typical of tailing water. The water quality away from the ponds in the shallow groundwater system has been impacted by the mining activities, but there are some parameters being monitored that are at or below Water License discharge limits. These shallow wells will continue to be monitored.

MCML will monitor the water in the mine workings for both depth and water quality on a minimum frequency of once per year until the water in the mine reaches a level within 300 m of the surface. Under current projections of the mine flooding rate, the water is expected to reach this level in ~2012. The projected flooding rate will be revised on an annual basis using the actual depth data collected in the field. This information will be reported to the appropriate regulatory agencies and to the public. Once the water level within the mine reaches 300 m from surface, the minewater depth and water quality will be monitored on a more frequent basis, as outlined below and detailed in Section 9.

As it is the deepest shaft, the water depth and quality in the underground mine workings is monitored on an annual basis using the Robertson shaft. As the mine continues to flood, this will be achieved through lockable openings in the concrete caps that will be installed in the 204Q stope, Robertson shaft, and C-1 shaft caps. Sampling is accomplished by lowering a specially designed water sampling device on an aircraft cable attached to a winch. Water depth is measured using a conductance or water sensor probe. Water quality is measured at a depth of approximately 3 meters below the flooded surface at the time of sampling. The results of this monitoring will be reported to the MVLWB, to the appropriate regulatory agencies, and to the public at large.

The 204Q stope, Robertson shaft, and C-1 shaft caps will be equipped with openings large enough to allow for a pump to be lowered as needed to control the water level in the underground workings. If needed, based on water quality, minewater will be pumped to the Middle Pud TCA from which it can be treated through the water treatment plant. When not in use, these openings will be secured with locking manhole covers.

As the minewater level reaches the 2300 level, or 700 meters below surface, monitoring will either continue in the Robertson shaft, or shift to the C-1 shaft. Monitoring will continue to be performed in order to provide a clear understanding of the rate of mine flooding and quality of the minewater as the water level approaches surface.

At a minimum, over the next five or six years, MCML believes that the risk to the environment related to minewater release to surface waters should be classified as “low”. This risk rating will be confirmed annually through the planned annual monitoring of the flooding rate and minewater quality. Monitoring of the minewater level and quality will increase in frequency as the water level approaches within 300 meters of surface.

MCML believes that, as the water level within the mine reaches 300 meters from surface, the risk to the environment associated with the release of minewater to surface waters should be classified as “moderate” with this being dependent on the minewater quality. At this stage, monitoring of both the flooding rate and water quality will be increased to quarterly to ensure adequate response time should it be necessary to manage this water through pumping and treatment. At this point in time the gradient for groundwater flow

will still be into the mine, however it is acknowledged that as the water level in the mine increases, the potential risk to the environment associated with release of minewater to surface waters will increase, requiring additional monitoring. It is also anticipated that, at this point in time, mine flooding will still take several years before the water reaches to within 30 meters of surface, or to a level equal to the lake level in Yellowknife Bay.

The risk to the local environment related to minewater release to surface waters will be classified as "high" once the mine flooding level reaches 50 meters from surface. MCML will, through the related closure activities, reduce the potential for seepage of contaminated groundwater to the mine. Potential sources of metal contamination (arsenic) such as Con Pond, Negus Pond, and the hazardous waste disposal site, will be capped with specially designed covers to reduce infiltration to the deep groundwater system to 2 or 3 per cent of total annual precipitation. Seepage from the tailing containment areas will be further reduced as these areas are capped and/or vegetated. However, MCML will continue to rate the risk as 'high' to the environment, and proposes implementation of an action plan consisting of the following measures once the flooding level reaches the 50 meter depth:

- At this point in time, the frequency of water level and water quality sampling will be increased to monthly from the Robertson and/or C-1 shaft monitoring point. This increased frequency of water quality monitoring will provide the needed data to determine: a) if mine flooding is continuing or an equilibrium level has been reached; and b) if water quality meets Water License discharge limits (Parameters and threshold limits are presented in Table 8.1) and is acceptable for direct release to the environment.

- If water quality does not meet current Water License or MMER discharge limits, then pumps will be installed in the C-1 and/or Robertson Shaft caps to control the mine flooding level at or below 40 meters from surface. In this event, minewater will be pumped to the Middle Pud TCA for storage prior to treatment through the water treatment plant. The rate of pumping will be set to maintain the water level at this depth. Once ongoing water quality monitoring indicates that minewater meets Water License discharge limits for release without treatment, flooding of the underground mine will be allowed to continue.

- Water quality and water levels within the mine will continue to be monitored on a monthly basis as the minewater continues to rise. If water quality continues to be acceptable for discharge, the water will be allowed to reach a 'stable' level and discharge to surface through the opening installed in the 204Q stope cap. If water quality does not meet Water License discharge limits, then pumping and water treatment will be restarted and continued until water quality consistently achieves Water Licence discharge limits. During this period, the water level within the mine will be controlled at a depth of at least 10 meters below surface and maintained at that level by pumping and treating until Water License discharge limits are again achieved.

- Once Water License discharge limits have been achieved, the discharge of minewater to surface will be monitored by MCML on a monthly basis during periods of flow. This monitoring will continue for a period of five (5) years after the minewater reaches a "stable" level, to ensure that water quality continues to be acceptable for discharge. Once it has been demonstrated that minewater discharge consistently meets Water License discharge limits, MCML will apply to the MVLWB to discontinue this monitoring activity.

8.7 Water Treatment

At the completion of the closure activities, the volume of water to be treated from the last year of the closure effort is estimated to be ~354,000 m^3. This estimate is based on current water levels in the pond and historical operations. This water will contain base metals such as arsenic, copper, nickel, and zinc, which will require treatment prior to release. Treatment of the water from the last year of the closure operation would be completed during the following summer. The WTP is capable of treating up to 10,000 m^3 per day. This is based on the historical capability of the mine to treat water each summer and to provide storage for the next year's tailing or minewater.

A circuit diagram of the water treatment plant is presented in Figure 8.2. As noted above, this would not be substantially changed unless the changes improved the operation efficiency. When the plant is in operation, samples are analyzed at the on site commercial laboratory on a daily basis, and verified by an off site commercial laboratory. Results of the water quality monitoring can be found in the Monthly and Annual SNP Reports on the MVLWB website. In addition to the testing required under the Water License, the discharge is sampled and tested as per requirements under the federal MMER program. These results can be found in the Quarterly and Annual reports on the Environment Canada Regulatory Information Submission System (RISS) website.

8.8 Water Management – Post Closure

Following completion of operations and all closure activities, inflow of water to the Upper and Middle Pud TCA's will be from precipitation (snow melt and rainfall) and some surface runoff from the limited catchment area around these basins. It is estimated that over a 10 to 20 year period, the quantity of water from surface sources to be treated post closure should be reduced by an estimated 50% of annual precipitation on the area of the Upper Pud and Middle Pud TCA's. This estimate assumes that the TCA's will be successfully vegetated and there will be increased water uptake in the grass and plants that develop on the tailing. Further, there would be water losses due to evaporation, sublimation, and evapotranspiration. The water that is to be treated during this period is not expected to contain any cyanide and much lower concentration of base metals that was produced during the operating phase of the mine.

This progressive reduction in the predicted volume reporting to the water treatment is summarized in Table 8.3.

TABLE 8.3: Projected Post-Closure Water Treatment Requirements and Estimated Cost

Annual Volume of Water	Cubic Meters			Treatment Cost		Capital Replacement Cost	Total Treatment Cost
Year	Surface	U/G	Total	per m^3	Per Annum		
2007	354,000		354,000	$0.81	$287,420		$287,420
TCA cover complete 2008	300,000		300,000	$0.96	$287,420		$287,420
2009	200,000		200,000	$0.73	$146,560		$146,560
2010	190,125		190,125	$0.77	$146,560	$25,000	$171,560
2011	180,619		180,619	$0.81	$146,560		$146,560
2012	171,588		171,588	$0.85	$146,560		$146,560
2013	163,008		163,008	$0.90	$146,560		$146,560
2014	154,858		154,858	$0.95	$146,560		$146,560
Mine Flooded 2015	147,115	120,000	267,115	$0.55	$146,560	$100,000	$246,560
2016	139,759	120,000	259,759	$0.56	$146,560		$146,560
2017	132,771	120,000	252,771	$0.58	$146,560		$146,560
2018	126,133	120,000	246,133	$0.60	$146,560		$146,560
2019	119,826	120,000	239,826	$0.61	$146,560		$146,560
2020	115,000	120,000	235,000	$0.62	$146,560	$25,000	$171,560
2021	115,000	120,000	235,000	$0.28	$65,310		$65,310
2022	115,000	120,000	235,000	$0.28	$65,310		$65,310
2023	115,000	120,000	235,000	$0.28	$65,310		$65,310
2024	115,000	120,000	235,000	$0.28	$65,310		$65,310
2025	115,000	120,000	235,000	$0.28	$65,310		$65,310
2026	115,000	120,000	235,000	$0.28	$65,310		$65,310
2027	115,000	120,000	235,000	$0.28	$65,310		$65,310
2028	115,000	120,000	235,000	$0.28	$65,310		$65,310
2029	115,000	120,000	235,000	$0.28	$65,310		$65,310
2030	115,000	120,000	235,000	$0.28	$65,310		$65,310
2031	115,000		115,000	$0.00	$0		$0
Treatment Time (years)	25	16					
Average Annual Volume - m^3		120,000	227,192				
Total		1,920,000			$2,986,660	$150,000	$3,136,660
Average Annual Cost					$119,466	$7,895	$125,466
NPV at 3% Discount Rate					$2,293,398	$141,410	$2,408,779

Assumptions:

1. The Upper and Lower Pud TCA's would be fully capped in 2010. Volume of water draining from the capped TCA's that requires treatment will drop significantly once the cap is in place - 300,000 m^3 in 2009 to 200,000 m^3 in 2010 and then by ~5% each year thereafter until reaching a level volume of 115,000 m^3 in 2020.

2. Water quality draining from the capped TCA's will continue to improve to the point where starting in 2021 (11 years after placement of cap) closure discharge standards should be met by using water treatment ponds with a drip of lime and ferric sulphate added at culverts between ponds. The water treatment plant may no longer be needed. Thus, by 2030 water quality would have improved where no further treatment of this water should be required.

3. The minewater will reach the surface in 2014 or 2015. While, it is not known whether the minewater will discharge at surface or reach an equilibrium at some level below surface such as at the Great Slave Lake elevation, a contingent allowance has been added to pump mine water and treat for 16 years until water quality meets the Water Licence discharge limits at which time no further treatment would be required at the Con Mine. It is assumed that mine water quality will improve over this period.

4. An allowance of $5,000 per year has been included for maintenance of the water treatment plant.

5. An allowance of $500 has been included for maintenance of the water treatment ponds after the WTP is shut down in 2021.

6. An allowance of $100,000 has been included in 2015 to purchase and install pump to transfer and treat mine water.

7. An allowance of $25,000 has been included in 2010 and 2020 for capital replacement equipment in the WTP and construction of water treatment ponds.

8. Sampling of minewater indicates that Zinc is the major element to be removed with a minor adjustment to Arsenic (As) (current As concentration is 0.54 ppm). Minewater quality should improve over time as main influx is surface drainage. Worst case is equivalent to current tailings pond water. Project that as water quality improves unit cost for treatment will decrease to the order of $0.25 per cubic meter through surface ponds.

MCML has based the predicted WTP volume on the expectation that the volume of water reporting to the Middle Pud will decrease from ~350,000 m^3 to ~200,000 m^3 over the two years of active demolition. The volume is predicted to continue to decrease at approximately 5% per year to a stable level of ~150,000 m^3 in less than 10 years (not including minewater). It is anticipated that water treatment will be required for another 15 to 16 years. This prediction will be periodically reviewed, however MCML accepts that water treatment will be required until water quality continuously satisfies the Water License discharge limits.

The majority of the arsenic in the tailing is stabilized as ferric arsenate (Scorodite) and should remain in that form. However, kinetic testing on a representative sampling of tailing from Upper, Middle and Lower Pud TCA's is ongoing with the objective of improving the predicted duration of the time frame over which water treatment will be required. Upon completion of this study a report will be submitted to the MVLWB. This is expected in mid 2007.

Starting in 2015, the volume of water to be treated has been increased to allow for the minewater. This additional allowance of 120,000 m^3 covers the predicted volume of water from the underground mine and assumes that this water will require treatment. This predicted volume is based on the current mine annualized flooding rate.

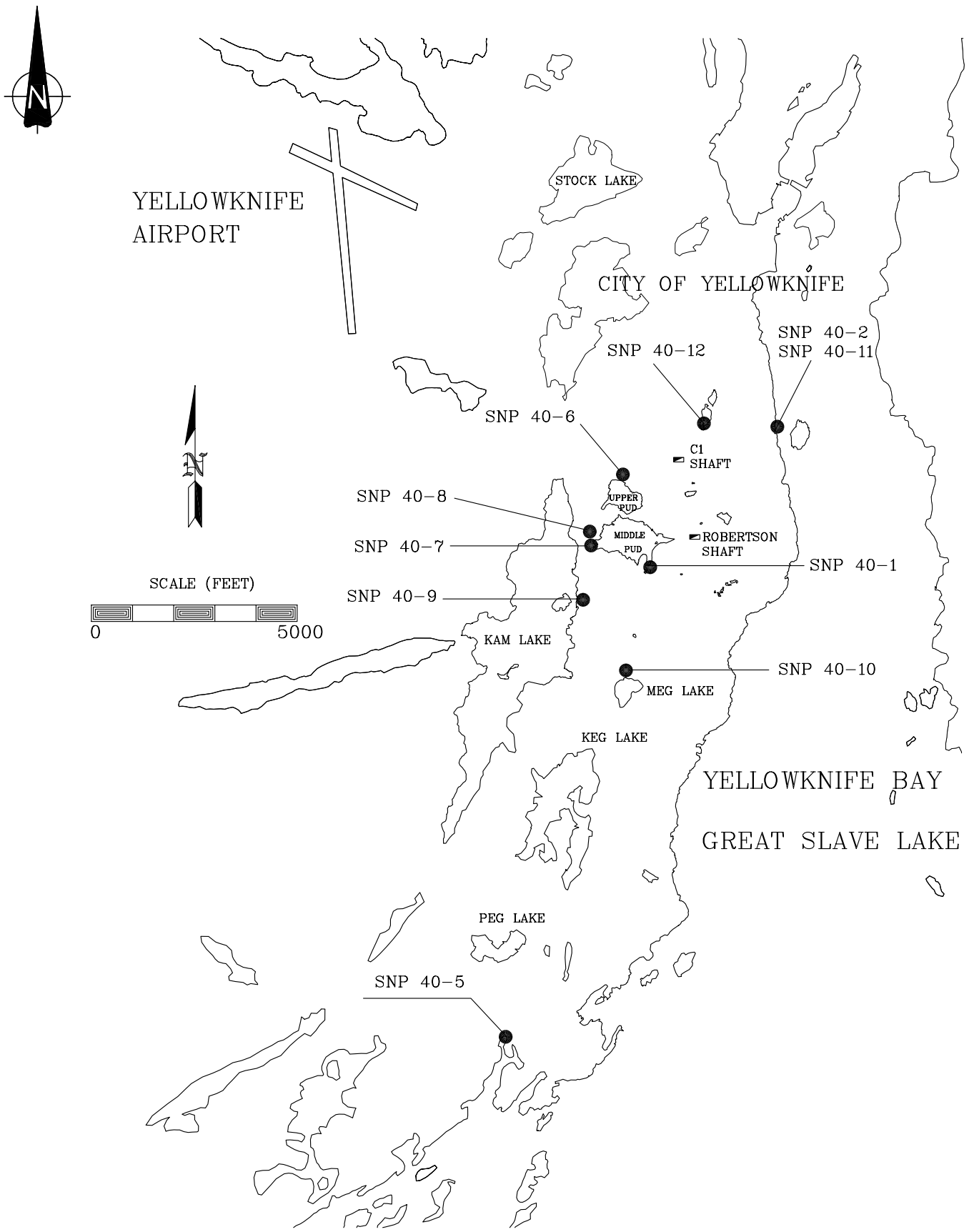
It is anticipated that, based on the volume of water that has been pumped from the mine during mining operations, the water treatment plant will readily handle and treat the quantity and quality of any water that would require treatment. It is also anticipated that with the reduced volume of surface water, the present plant would have more than adequate capacity to treat the minewater, should it be necessary. The pond that will remain in the Middle Pud basin at closure will have ample capacity to store both the surface water and the minewater each year. The water accumulated in Middle Pud would be treated each summer to allow sufficient capacity for storage of the water that will be collected over the next year.

As noted earlier, the water treatment precipitate will continue to be placed in a separate area of the Middle Pud TCA adjacent to Dam 5. Upon completion of water treatment operations, a cover similar to that placed over the tailing will be placed over the precipitates.

Water that collects north of the Taylor Road Dam is to be drained via a storm sewer to Kam Lake. It is anticipated that as part of the costing for the sewer, the long-term sewer maintenance would be managed by the City of Yellowknife.

8.9 Water Management – Cost Estimate

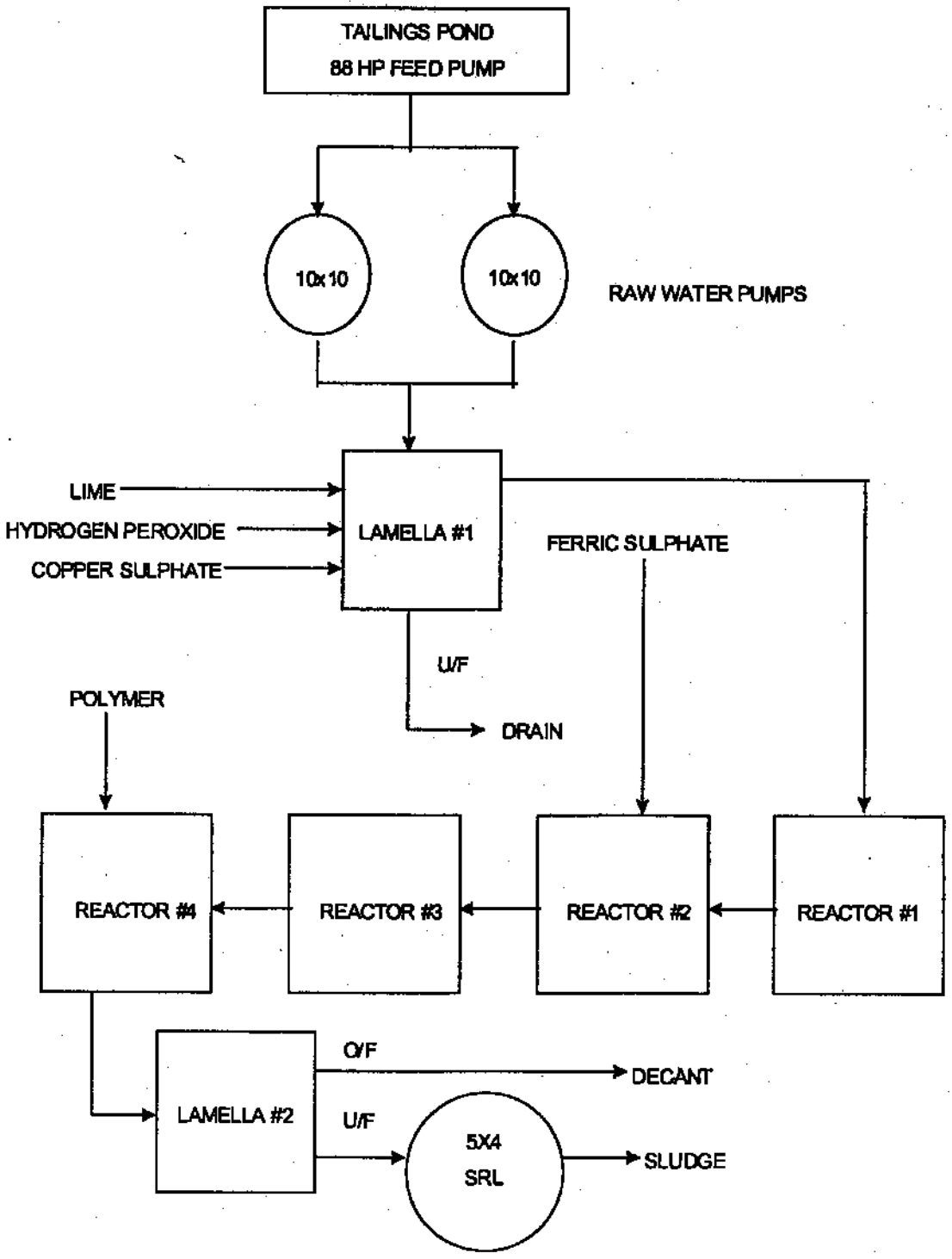
The cost and schedule for implementation of the water management plan, including post closure water treatment, is presented in Section 10.



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Checked by:		Miramar Con Mine, Ltd.			
Revised By:	Date	Con Minesite Surveillance Network Program Sampling Stations			
		Date: SEPT. '05	Scale As Shown	Figure: 8.1	Rev. No.

WATER TREATMENT PLANT



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Checked by: / Revised By: / Date	Miramar Con Mine, Ltd.
	Water Treatment Plant Flow Diagram
	Date: 16DEC02 | Scale As Shown | Figure: 8.2 | Rev. No.

N

YELLOWKNIFE BAY

MOSHER ISLAND

RAT LAKE

CON ROAD

940 LEASE BOUNDARY

LEASED FROM CITY OF YELLOWKNIFE

TAYLOR ROAD

PUMP TO KAM LAKE

TAYLOR RD. GATE

CON RD. GATE

CRANK LAKE WATER SHED

CON TRAILER PARK

MILLING COMPLEX

WATER LINE

LAKEVIEW ROAD

MAIN GATE

CRANK LAKE SUMP

CRANK LAKE

CALCINE STORAGE

UPPER PUD TAILING POND

TO KAM LARE

CON POND

NEGUS POND

IMPERIAL OIL

MIDDLE PUD TAILING POND

NEGUS TAILING

ROBERTSON SHAFT

BLEND PLANT

WAREHOUSE

PUD LAKE WATER SHED

NEIL LAKE

940 LEASE BOUNDARY

LOWER PUD SUMP

WATER TREATMENT PLANT

LOWER PUD TAILING

MEG LAKE

LEGEND

- LEASE BOUNDARY
- BUILDINGS ON MINE LEASE
- HISTORICAL TAILINGS
- SWAMPS
- SURFACE WATER FLOW PATTERNS
- WATERSHED BOUNDARY

SCALE (METRES)

0 300

REFERENCES

1) Miramar Con Mine. Dated: Jan 2001/Jan 2004

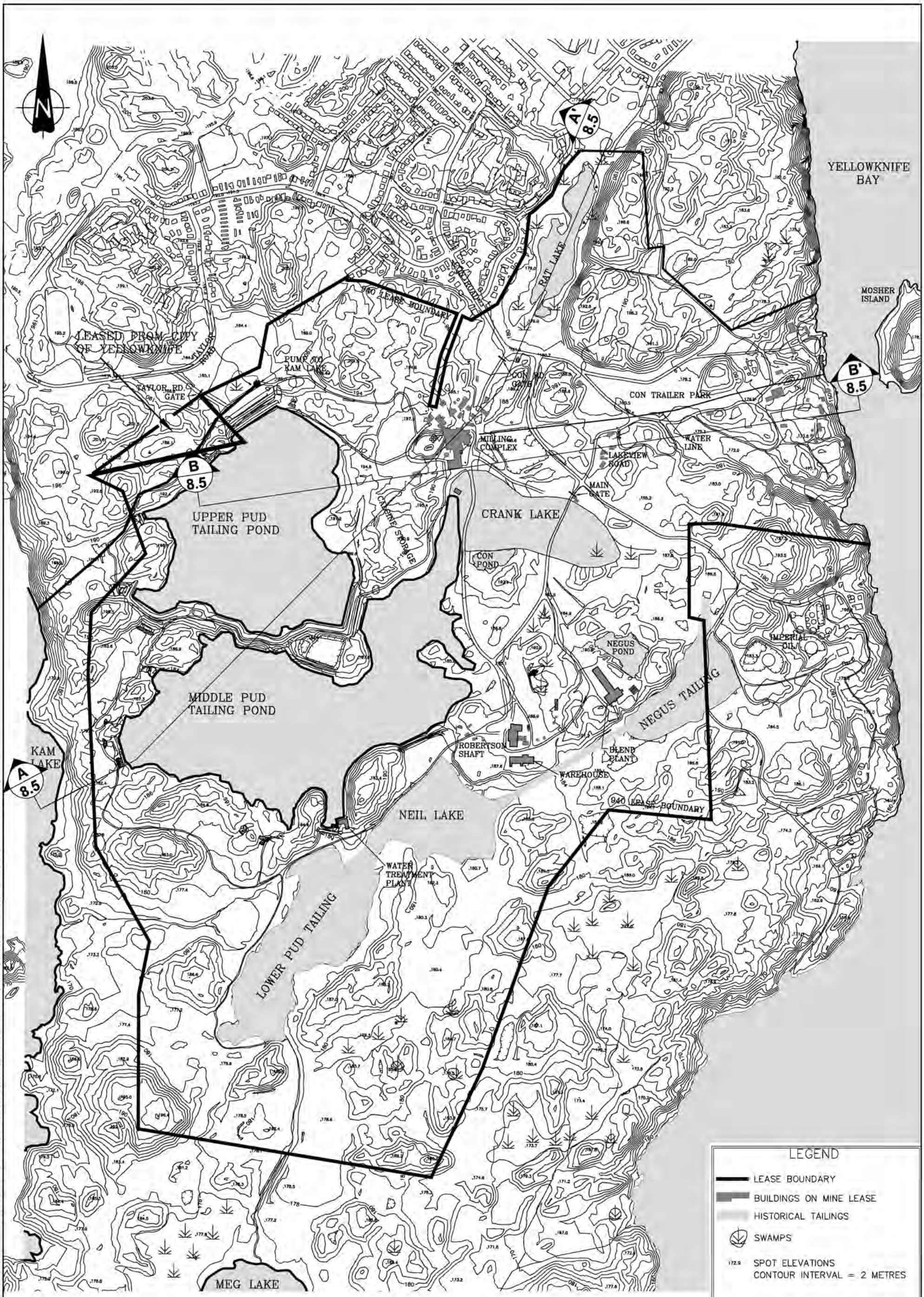
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Miramar Con Mine, Ltd.

Con Minesite Watersheds

Date: 16DEC02 | Scale As Shown | Figure: 8.3 | Rev. No.

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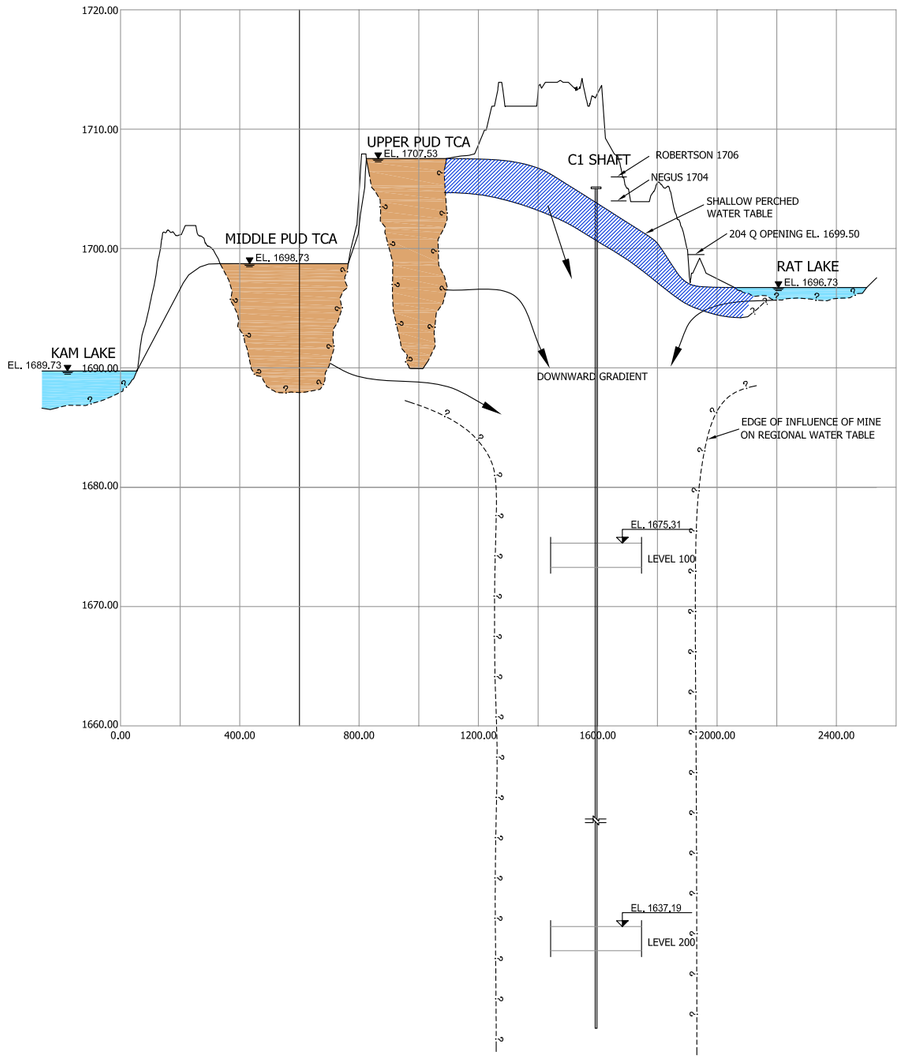
1) Miramar Con Mine. Dated: Jan 2001/Jan 2004

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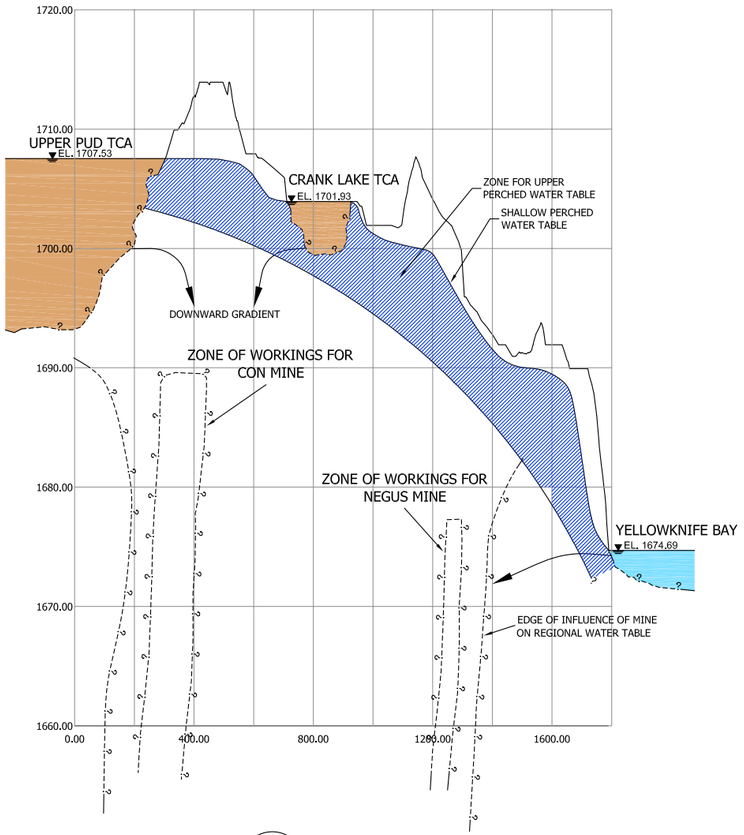
Con Minesite Topography
Site Plan

Date: 16DEC02 | Scale As Shown | Figure: 8.4 | Rev. No.

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A 8.4 **SECTION** (40X VERTICAL EXAGGERATION)



B 8.4 **SECTION** (40X VERTICAL EXAGGERATION)

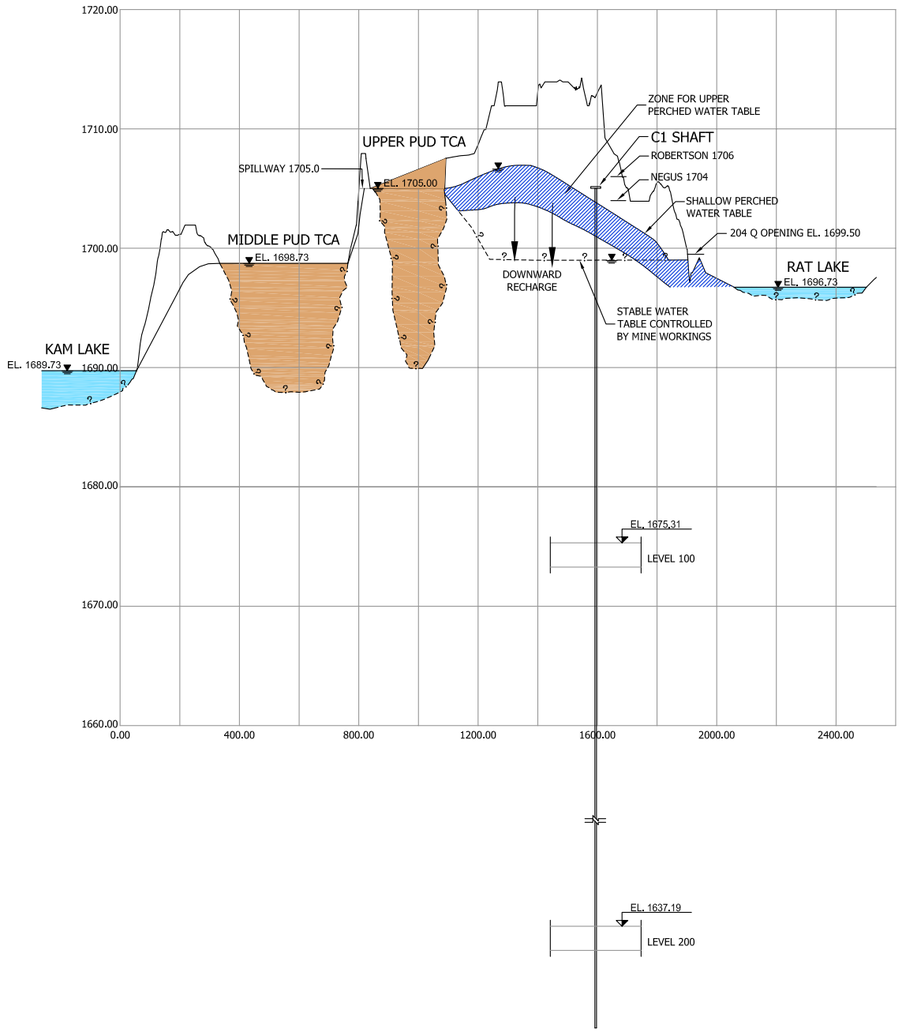
NOTES

1) ALL DIMENSIONS AND ELEVATIONS IN METER, UNLESS SPECIFIED OTHERWISE.

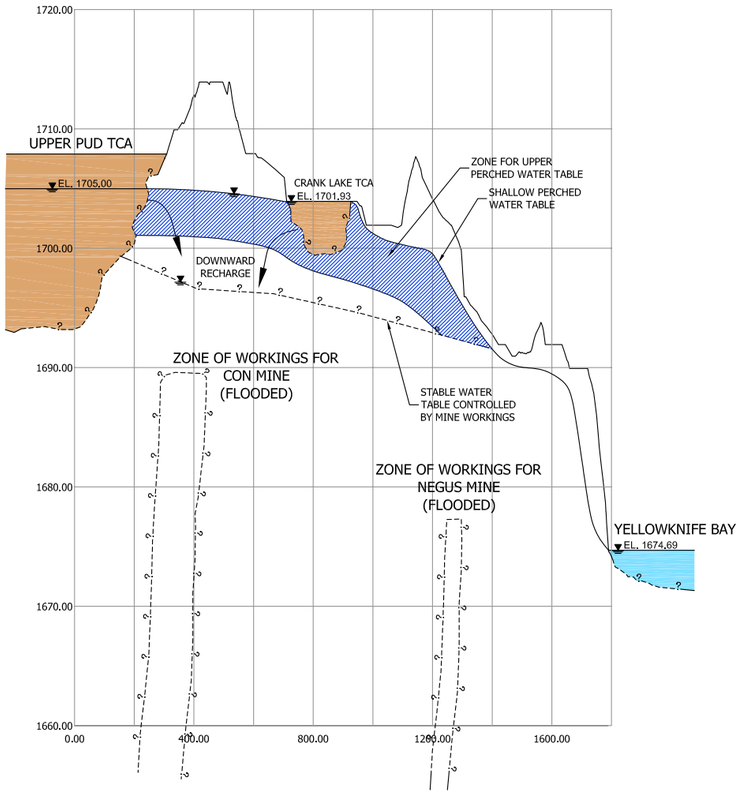
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Revised By:	Date	Miramar Con Mine, Ltd.	
		Groundwater Conditions 2006 Sections	
		Date: 16DEC02	Scale As Shown	Figure: 8.5	Rev. No.

REVISION DATE: 06/09/19 11:22AM By: nveloso CADD FILE: N:\Bur-Graphics\Projects\2005\1413\05-1413-016\Drafting\cad\Miramar Report 19Sep06\051413016-sk5.dwg



A 8.4 SECTION (40X VERTICAL EXAGGERATION)



B 8.4 SECTION (40X VERTICAL EXAGGERATION)

NOTES

1) ALL DIMENSIONS AND ELEVATIONS IN METER, UNLESS SPECIFIED OTHERWISE.

0 100 200 300 400 500
Scale in Meters

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Revised By:	Date:	Groundwater Conditions 2020 Sections			
		Date: 16DEC02	Scale As Shown	Figure: 8.6	Rev. No.

REVISION DATE: 06/09/19 11:23AM By: nveloso CADD FILE: N:\Bur-Graphics\Projects\2005\1413\05-1413-016\Drafting\cad\Miramar Report 19Sep06\0514130 16-sk6.dwg

9.0 SITE MONITORING

9.1 Closure Monitoring (During Reclamation Period)

The Closure and Reclamation Plan includes a commitment to monitoring during the final stages of the mine life, through the period during which reclamation is being carried out, and during the post reclamation period. The plan requires the current monitoring activities that are being conducted under the existing Water License to continue through the life of the existing Water License, and to be continuing in future Water Licenses. MCML anticipates that future Water Licenses will incorporate measures that deal specifically with the activities that are consistent with a "closed" minesite. In addition to the water quality limits specified in the current and future Water Licenses, MCML also anticipates that the criteria specified in the federal Metal Mining Effluent Regulations (MMER) will also continue to apply to the closed minesite, including the Environmental Effects Monitoring (EEM) program of these regulations.

The limits under both the federal MMER and the Water License are shown in Table 8.1 of Section 8 of this plan. The frequency of water quality monitoring, parameters, sampling and analytical protocols, and the analytical method detection limits are all specified within the context of these regulations.

MCML will continue the various monitoring programs into the reclamation implementation period to provide data to determine and verify that the closure activities achieve the proposed remediation targets and remain in compliance with all applicable regulatory requirements. Information obtained through these monitoring programs will be used to initiate any corrective or maintenance activities required to remain in compliance.

The water quality monitoring program will include monitoring of surface, minewater, and groundwater, and water levels within the underground mine. The frequency of the surface water quality monitoring events is set out in the Water License/MMER as noted above. The groundwater monitoring wells are monitored monthly from June to September. The minewater is currently monitored annually during the summer months.

The annual geotechnical inspection/monitoring program includes geotechnical stability of the tailing dams, and success of vegetation growth on all reclaimed areas at the minesite. It will also include monitoring of the existing fences, signage, rock/boulder barriers, covers over the concrete caps on the mine openings to surface, engineered drainage channels, the spillway between Upper and Middle Pud and the waste rock cover systems on these areas, and the cover system on the hazardous waste sites, as these systems are completed.

The monitoring program that will continue through closure and into the post-closure period is an extension of the present Surveillance Network Program (SNP) that is currently in place at the mine. As noted above, the terms of the SNP are set out in the current Water License and it is anticipated that they will be expanded to include additional sampling on the east, west, north and south limits of the mine lease in future Water Licenses. The monitoring program will include several groundwater monitoring wells placed around the perimeter of the property.

It is anticipated that the initial closure period will cover a four to five-year time frame. This will provide time to remove all the buildings, cap the underground openings to surface, cap the recent TCA's, and establish vegetation on both the historic and recent TCA's. After this initial period, the long term or post-closure period will start. It is anticipated that the post-closure monitoring and maintenance period will cover, as a minimum, 20 to 25 years. The length of this period will be based on the results of the post-closure monitoring that is conducted to confirm the physical and chemical stability of the closed site.

The current monitoring program includes both the MMER and the SNP. These programs are discussed below. Additions to the SNP program are also presented. The locations of the existing monitoring points are presented on Figure 9.1 and the proposed additions to the system are presented on Figure 9.2.

The SNP monitoring system includes three surface water monitoring points related to the Water Treatment Plant (WTP) and the discharge of treated effluent from the site to Meg Lake each summer. These points – SNP 40-1; SNP 40-10; SNP 40-5 – are monitored during WTP discharge and they would continue to be monitored when the WTP is in operation and discharge is in progress. SNP 40-1, the discharge from the WTP, is also the key monitoring point under the federal MMER, on which water quality, bioassays, and environmental effects are monitored. SNP 40-10 is located downstream of the end-of-pipe at the north end of Meg Lake. SNP 40-5 is located at the end of the Meg-Keg-Peg water system near its confluence with Great Slave Lake.

It is anticipated that in time, the water quality of the runoff from the Lower Pud/Neil Lake TCA will improve and it would be practical to discharge this water directly off site, as no treatment would be needed. Thus, a new monitoring point would be added at a point between the locations of SNP 40-1 and SNP 40-10, near the south lease boundary. This point would monitor the water quality once the present dike is removed at the south end of the Lower Pud TCA, to allow the flow of surface water from the Lower Pud and Neil Lake TCA's. Flow at this point would be monitored for at least ten years, or until the water quality remains consistent and within Water License discharge limits. At that time MCML will apply to have this monitoring point removed from the program.

The SNP system also monitors the water quality to the southwest of the Lower Pud, where surface water flows to Kam Lake in one of the original stream channels from Puddle Lake. The water quality is presently monitored at SNP 40-9 near the edge of Kam Lake. An additional monitoring point is proposed on this stream channel at the lease boundary. Groundwater monitoring is not proposed in this area, as bedrock is near surface.

Surface water runoff west of the Middle Pud is monitored at two points – SNP 40-7 and SNP 40-8, however no surface water runoff has been observed at these locations for several years. SNP 40-7 is located between Dam 2 and Dam 2N, and Kam Lake, and SNP 40-8 is located between Dam 1 and Kam Lake.

Monitoring at SNP 40-7 was intended to assess the surface water in the area west of Dam 2, and Dam 2N, as there is no channel or stream that will allow monitoring of spring runoff or stream flows in the area. Surface water intermittently collects in a low area in this vicinity, however water was last observed at this station in May 2001. It is now proposed to monitor the groundwater flow and quality by installing a groundwater monitoring well down slope from the Dam 2 / Dam 2 North site and near the lease limit. The well screen will be installed at least 1.5 m into the bedrock which underlies this area.

Monitoring at SNP 40-8 is to assess the water quality of runoff flows in the spring, as the area is normally dry during the rest of the year. It is anticipated that there is a groundwater component to this flow and it is proposed to add a groundwater well to monitor the groundwater flows in this area. The well will be located at the lease boundary near SNP 40-8 and between the Middle Pud and Kam Lake. The well will extend at least 1.5 m into the bedrock that underlies this area. The sump at Dam 1N will be backfilled once the permanent spillway for the Upper Pud TCA is installed.

Samples of the surface water runoff flow to the north of the site are collected at the swamp north of the Taylor Road Dam. This monitoring point, SNP 40-6, monitors the water quality in the swamp during periods when water is being pumped to Kam Lake. This takes place when the water level is high and the water quality satisfies Water License discharge limits. If the water does not satisfy Water License discharge limits, the water is pumped to the Upper Pud basin so it can be treated at the Water Treatment Plant before discharge to Meg Lake. Records indicate that the water quality has routinely satisfied Water License discharge limits. The present monitoring point is near the intake of the Kam Lake pump. The Closure Plan calls for construction of an engineered drainage channel from the pump station to Taylor Road, at which time the monitoring point will be moved to the lease line. The engineered drainage channel will allow the surface water to flow from the swamp to a new storm sewer that will be installed along the south side of Taylor Road. It will drain the swampy area by gravity. The monitoring point installed at the lease limit will confirm the continued compliance of the water quality with the Water License discharge limits.

Surface water that flows off the property to the north, and to Rat Lake, is monitored at the south end of the lake at SNP 40-12. This sample station monitors surface water quality before the water flows off the lease. At present, two groundwater monitoring wells have been added to collect data on the quality of water that flows north. These wells are located just at or inside the main lease limit. They will be added to the SNP system and monitored on the same frequency as the surface water monitoring in Rat Lake.

SNP 40-11 is located on Great Slave Lake at an area just below the Boiler/Pump house at Con Dock. This SNP point was established to monitor the presence of an oil slick from the two bulk fuel storage tanks that were located just west of the Boiler/Pump house complex. These tanks were removed several years ago and the soil at the site of the tanks was excavated and removed, which now makes this SNP location redundant. However, it is proposed to establish a new surface water quality monitoring point in this area, closer to the main mine lease, at the culvert under the road at the top of Garden Draw.

It is also, proposed to begin monitoring the groundwater flow in this area, as surface water flows are only observed in the spring. This will monitor the water quality on the east side of the main mine lease. A monitoring well has been installed at the east limit of Crank Lake (near the gatehouse), and another in Garden Draw. The well in the Garden Draw area is downstream of the well at the gatehouse, and thus also monitors groundwater that flows past the gatehouse, as well as the groundwater that flows from the Con Camp area and the site of the Rycon mine shaft (R57). These stations will be monitored on the same frequency as the other wells on the mine lease.

The water quality of groundwater that reports to the underground workings will continue to be monitored annually at the Robertson Shaft at the same time the water level in the underground workings is determined. The results of water quality monitoring and the level of the water in the Robertson Shaft will continue to be reported to the MVLWB in the annual SNP report.

The Closure Plan requires that all mine openings to surface be capped. The caps for the openings to surface at the Robertson headframe, the C-1 headframe, and the 204Q stope will be designed to allow long term water quality and water level monitoring. It is proposed to install secured manhole covers or locked steel covers in each of these concrete caps to allow monitoring to take place as the mine floods. The plan to monitor the water levels and the water quality in the mine is set out in the next section.

9.2 Post Closure (After Reclamation Period is Complete)

The post-closure monitoring program will commence in approximately five years or in 2010/2011 when reclamation activities are complete. This program will be reviewed every five years and a revised proposal presented to the Water Board, along with the rationale for continued sampling at the various stations established during the initial closure monitoring program. It is anticipated that some elements of the program will be scaled back over time, subject to prior approval from the MVLWB, and based on an acceptable application from MCML with rationale and justification. However, monitoring at the Water Treatment Plant and the SNP points associated with the discharge of treated effluent will continue until there is no longer a need to treat the effluent. Any changes to the elements of the program and/or the frequency of monitoring will be discussed with the MVLWB and approved before they are made. Post-closure monitoring requirements at the WTP will be defined in future Water Licenses.

The requirement for an annual geotechnical inspection/monitoring program will remain in place for at least 10 years. At that time a recommendation may be forwarded to the MVLWB to reduce this frequency to once every two years. The annual geotechnical inspection will continue to evaluate the geotechnical stability of the tailing dams and the success of vegetation growth on all reclaimed areas at the minesite. It will also include monitoring of the rock/boulder barriers, covers over the concrete caps on the mine openings to surface, engineered drainage channels, the spillway between Upper and Middle Pud and the waste rock cover systems on these areas, and the cover system on the hazardous waste sites.

The results of the geotechnical inspections will continue to be reported to the MVLWB. These inspections will note the need for maintenance during the post-closure period and an action plan, where required, will accompany the inspection report. The vegetation cover is intended to be self sustaining so it is anticipated that in time very little if any maintenance will be needed. This phase of monitoring will continue until the vegetation is determined to be self sustaining. Criteria to measure the success of vegetation are outlined in Section 6.5.1 of the Plan. This will be utilized to define when the vegetation can be classified as self sustaining. Post-closure monitoring will also include the rock covers on the 2 hazardous waste sites and the hazardous waste disposal site.

The monitoring program outlined above includes trigger components that will initiate ‘Action Plans’ to repair or report items that require attention or maintenance work. In respect to water quality, these trigger levels are based directly on the Water License/MMER limits. The monitoring programs will be managed by MCML and all data will be reported to and reviewed by the MCML Environmental Superintendent. The information will continue to be reported to the MVLWB.

The water quality monitoring data will trigger an initial action plan when a contaminant level reaches 75% of the Water License discharge limit. This initial trigger will require a report to the Mine Manager and to the MVLWB. This report will outline the event, a plan to correct the situation, and corrective actions that will be taken if required.

The corrective actions will be in the form of a preliminary 'Action Plan' that will be submitted for comment to the MVLWB within 30 days of the event. The plan will indicate that, if the water quality data shows the contaminant level moving to within 85% of the maximum permitted levels, the Action Plan will be implemented. Monthly reports on each event will be prepared by the Environmental Superintendent and submitted to the Mine Manager and the MVLWB. Monthly reports will continue to be submitted until the contaminant level has dropped below the initial trigger level.

The annual geotechnical inspections, and the associated Action Plans that are submitted as part of this program, will include "triggers" to identify deficiencies and propose remedial measures for issues other than water quality. The triggers will be based on sound engineering and/or environmental management practices (i.e. if rock cover on tailing is damaged a maintenance request would be triggered). These maintenance or remedial measures will be implemented once they have been reviewed and approved by the appropriate regulatory agencies. In addition, the minesite will continue to be periodically inspected by Officers from the various regulatory agencies and subject to any orders or directives that may be issued by these individuals to address any deficiencies that that are identified during these inspections.

Using the "Measures of Success for Vegetation Cover" as outlined in section 6.5.1 of the Plan, an action plan would be triggered that outlined the appropriate corrective measures if the vegetation did not meet the defined success criteria. MCML would then perform the required maintenance activity.

The minewater quality monitoring program will remain essentially the same, with the exception of frequency, which will increase as the level of flooding nears surface. Water quality monitoring will continue until such time as it is determined that the minewater presents no hazard to the environment. To allow for monitoring and sampling, openings will be installed in the concrete caps that will be placed on the Robertson Shaft, C-1 Shaft, and the 204Q Stope.

The Plan requires that MCML continue to monitor the water in the mine workings on an annual basis from the Robertson Shaft and/or C-1 Shaft, as the mine floods. MCML will monitor the minewater for both depth and water quality on a minimum frequency of once per year until water in the mine reaches a level within 300 m of surface. Under current projections of the mine flooding rate, the water level is expected to reach this level in a time frame of 5 to 7 years from the date of this report. This projected flooding rate will be revised on annual basis using the actual minewater depth data as monitored each year, and the minewater flooding model.

In addition, over the next two years, MCML will carry out a hydrogeological study of the mine flooding and related regional deep groundwater system to assist in understanding and confirming the predicted rate of mine flooding and the associated risks to the environment. Once the water level within the mine reaches 300 m from surface, the above hydrogeological study will be utilized to recalibrate the existing minewater flooding model, which can be found in Appendix 8 of the Plan.

As it is the deepest shaft, the water depth and quality in the underground mine workings will continue to be monitored on an annual basis using the Robertson shaft. As the minewater nears surface, this may shift to the C-1 Shaft. As stated above, this will be achieved through lockable openings in the concrete caps. Sampling is accomplished by lowering a specially designed water sampling device on an aircraft cable attached to a winch. Water depth is measured using a conductance or water sensor probe. Water quality is measured at a depth of approximately 3 meters below the flooded surface at the time of sampling. Results of this monitoring will continue to be reported to the MVLWB and the appropriate regulatory agencies in the annual SNP report.

The Robertson Shaft, C-1 Shaft, and 204Q Stope caps will be equipped with openings large enough to allow for a pump to be lowered as needed to control the water level in the underground mine. If required (based on water quality) water will be pumped from the mine to the Middle Pud TCA, from where it can be treated through the water treatment plant. When not in use, these openings will be secured with locking manhole covers.

When the minewater level reaches the 2300 level, or 700 meters below the ground surface, monitoring will either continue in the Robertson shaft, or shift to the C-1 shaft. This monitoring will continue to be performed in order to provide a clear understanding of the rate of mine flooding and quality of the minewater as the water level approaches surface.

At a minimum, over the next five or six years, MCML believes that the risk to the environment related to minewater release to surface waters should be classified as “low”. This risk rating will be confirmed by the annual monitoring of the flooding rate and minewater quality. Monitoring of the minewater level and quality will increase in frequency as the water level approaches within 300 meters of surface.

MCML believes that, as the water level in the mine reaches 300 meters from surface, the risk to the environment associated with the release of minewater to surface waters should be classified as “moderate,” with this being dependent on the minewater quality. At this stage monitoring of both the flooding rate and water quality will be increased to quarterly to ensure adequate response time should it be necessary to manage this water through pumping and treatment. At this point in time the gradient for groundwater flow will still be into the mine, however it is acknowledged that as the water level in the mine

increases, the potential risk to the environment associated with release of minewater to surface waters will increase, requiring additional monitoring. It is also anticipated that at this point in time, it will still be several years before the water floods to within 30 meters from surface, or to a level equal to the lake level in Yellowknife Bay.

The risk to the local environment related to minewater release to surface waters will be classified as "high" once the mine flooding level reaches 50 meters from surface. MCML will, through the related closure activities, reduce the potential for seepage of contaminated groundwater to the mine. Potential sources of metal contamination (arsenic), such as Con Pond, Negus Pond and the hazardous waste sites will be covered to reduce infiltration to the deep groundwater system to 2 - 3% of total annual precipitation. Further, seepage from the tailing containment areas will be reduced as these areas would be covered and vegetated, thus reducing the potential risk for contamination to the water that would be released to surface. However, MCML, will continue to rate the risk as 'high to the environment' and proposes implementation of an action plan consisting of the following measures once the flooding level reaches the 50 meter depth:

- At this point in time, the frequency of water level and water quality samples will be increased to monthly from the Robertson and/or C-1 shaft monitoring point. This increased frequency of water quality monitoring will provide the needed data to determine: a) if mine flooding is continuing or an equilibrium level has been reached; and b) if water quality meets the Water License discharge limits and is acceptable for direct release to the environment.

- If water quality does not meet Water License or MMER discharge limits, then pumps will be installed in the C-1 and/or Robertson Shaft caps and used to control the mine flooding level below 40 meters from surface. In this event, minewater will be pumped to the Middle Pud TCA for storage prior to treatment through the water treatment plant. The rate of pumping will be set to maintain the water level at this depth. Once ongoing water quality monitoring indicates that minewater meets Water License discharge limits for release without treatment, flooding of the underground mine will be allowed to continue.

- Water quality and water levels within the mine will continue to be monitored on a monthly basis as the minewater continues to rise. If water quality continues to meet the Water Licence discharge limits, the water will be allowed to reach a 'stable' level and to flow to surface through the discharge point installed at the 204Q stope cap. If water quality does not meet Water License discharge limits, then pumping and water treatment will be resumed and continued until water quality consistently achieves Water License discharge limits. During this period, the water level within the mine will be maintained at a depth of at least 10 meters below surface and maintained there by pumping and treating.

- Once Water License discharge limits have been achieved, the discharge of minewater to surface will be monitored by MCML on a monthly basis during periods of flow. This monitoring will continue for a period of five (5) years after the minewater reaches a "stable" level, to ensure that water quality continues to meet Water License discharge limits. Once it has been demonstrated that minewater discharge consistently meets Water License discharge limits, MCML will apply to the MVLWB to discontinue this monitoring activity.

9.3 Monitoring Surface Areas

During the reclamation implementation period, MCML will maintain a secure site and will not knowingly allow public access to the lease, for safety and liability reasons.

During the reclamation implementation period and whenever reclamation activity is being conducted on site, staff from either MCML or the contractor will control inadvertent access to the site. This will address public safety issues and ensure optimum conditions for initiating vegetation growth on the mine lease area. It is expected that the revegetation program will produce a similar, sparse vegetative growth that is typical of the Yellowknife area. As such, it will be sensitive to disturbance. Activities such as motorized vehicle traffic of any type will be restricted from all revegetated areas. Public use of these areas of the minesite during this period will be discouraged and prevented where possible.

Effects of Pumping and Re-flooding

MCML has evaluated the effects that pumping and re-flooding will have on the instability of the shallow underground mine workings that could potentially lead to localized subsidence. As the mine workings flood, two mechanisms can potentially occur that may have an adverse impact on stope stability:

1. The stresses in the wall and crown pillars change as water fills the stopes, potentially impacting the stability of the crown pillars; and,
2. Stopes that were filled with un-cemented backfill will come into contact with the rising water as the stopes fill. This saturation of the fill material may increase the release of soluble contaminants from the backfill. The rising water may lead to slumping of the backfill.

In 2004, MCML contracted URS to complete an "Engineering Risk Assessment and Risk Management Plan for the Flooding of the Underground Workings" at the Con Mine (URS, January 2006). A copy of this report has been previously submitted to the MVLWB under separate cover. One of the objectives in this study was to assess the potential failure modes and chemical stability issues.

From local historic evidence, URS determined that the Con Mine is considered to be relatively aseismic. However, rising water levels in the mine may trigger localized, and temporary, low-magnitude seismic incidents. Therefore, URS predicted that the likelihood of flooding induced seismicity occurring is considered to be moderate. Further, URS considered the potential for impacts to surface infrastructure or safety to be very low. The potential for deep collapse incidents migrating to the surface and causing damage is considered to be highly remote.

In assessing the risk from flooding induced rock collapse incidents, URS indicated that, in their opinion, there is a moderate likelihood that subsidence will occur in the deep workings. However, any failures would be localized and will self seal due to the bulking nature of the rock. Therefore, it is considered extremely unlikely that any such subsidence effects will have any effect upon the surface.

Stability Change due to Flooding of Backfilled Stopes

Many of the deep stopes at the Con Mine are reported to be backfilled. URS concluded that there is a moderate likelihood that a subsidence effect could be triggered by the washing of backfill from a stope. However, the potential for impacts to surface infrastructure or safety from this activity is considered to be very low.

URS reported that there are several surface stopes shown on the longitudinal sections of the Con Mine (Con Shear Zone). The mine plans indicate that fill was not used extensively in these near surface stopes. This suggests that mine backfill was not used to support existing crown pillars. Thus, URS concluded that any fill subsidence due to flooding is unlikely to substantially change the current stability.

The 204Q stope, which is close to surface, has been investigated and a plan to manage the crown pillar has been developed. There are also two shallow stopes under the Mill / Autoclave area. These will be investigated once the mill is demolished. A plan to close the stopes and the crown pillars will be developed at that time to minimize the risk from subsidence.

Commencing in 2004, MCML capped the Negus 114 Raise, Negus 120 Stope, and Negus 220 Raise, as well as the Rycon Shaft and the C-1 Vent Raise. The other openings to surface in this area will be capped in 2008. Thus, the collapse of these surface openings is no longer considered an issue.

In summary, MCML will, through both the annual inspections and other regular site inspections, visually monitor the minesite and check for any ground subsidence on the minesite, paying special attention to the areas along the strike line or trend line of the Con shear zone. If any subsidence is noted, MCML will initiate site specific investigations to

determine the cause of the movement and then develop and implement remedial measures to stabilize any subsidence. Such plans would call for backfilling any stope or installing concrete caps or similar best practice approaches. These assessments will be submitted to the MVLWB.

Long-Term End Use

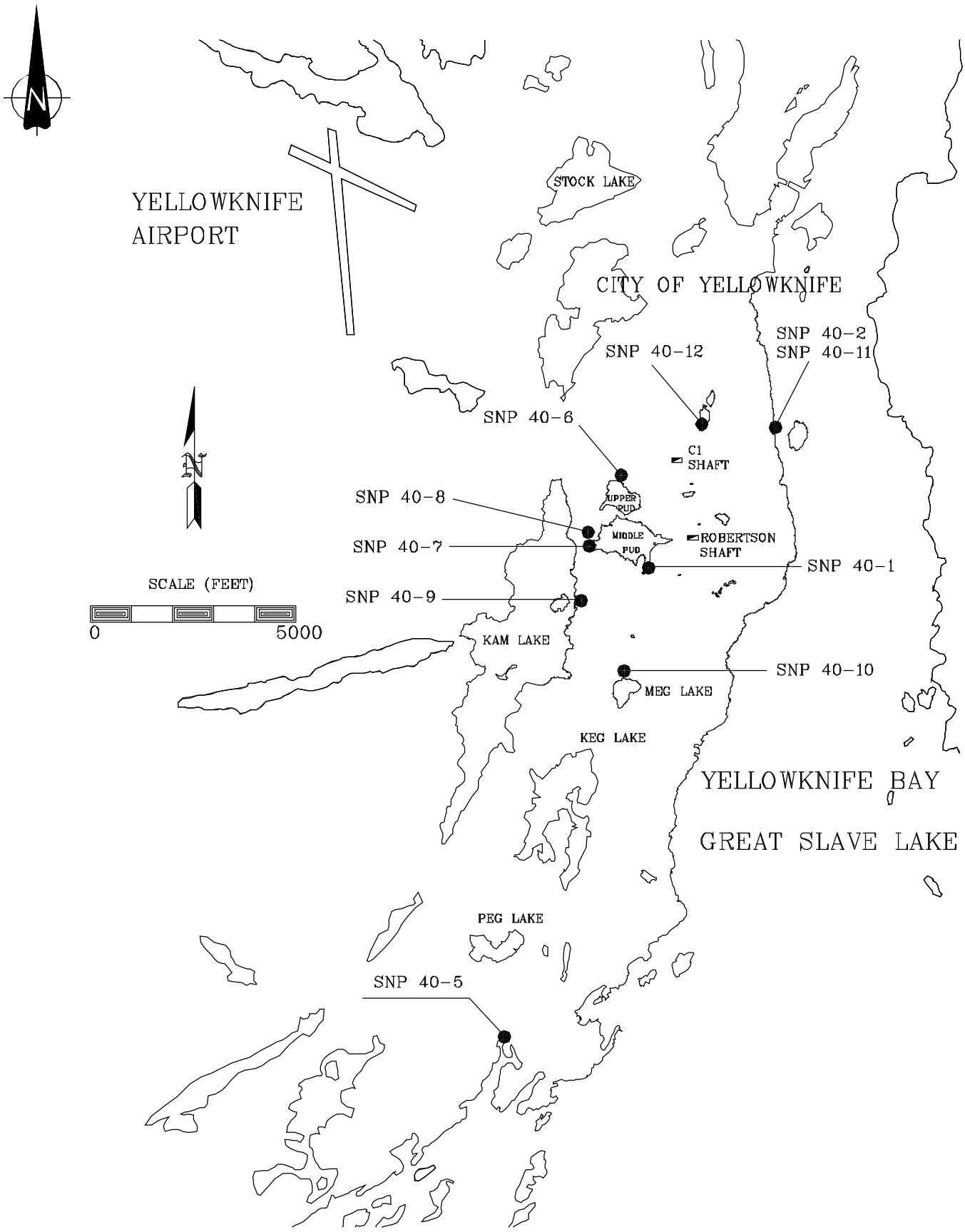
As the physical on-site reclamation work is completed, access to areas that have been subjected to little or no environmental impacts from mining operations will be made available for reuse subject to the approval of the land owner (GNWT). These will include the areas to the west of Upper and Middle Pud and to the west and south of Lower Pud.

Access to a number of areas will be restricted pending the establishment of viable vegetation growth. These areas will include all tailing containment areas and reclaimed roads, and will also include areas that have been excavated and/or capped and vegetated such as the mill/shop complex and the Robertson headframe/office complex.

Post-closure access to any areas potentially dangerous to human health and/or safety will be identified by appropriate signage and, predicated on site-specific circumstances, may be fenced or otherwise controlled in an acceptable manner (subject to concurrence from the land owner (GNWT). These areas will include the Con and Negus Ponds, and the hazardous waste disposal site that will be developed next to the Upper Pud TCA in the former calcine stockpile area.

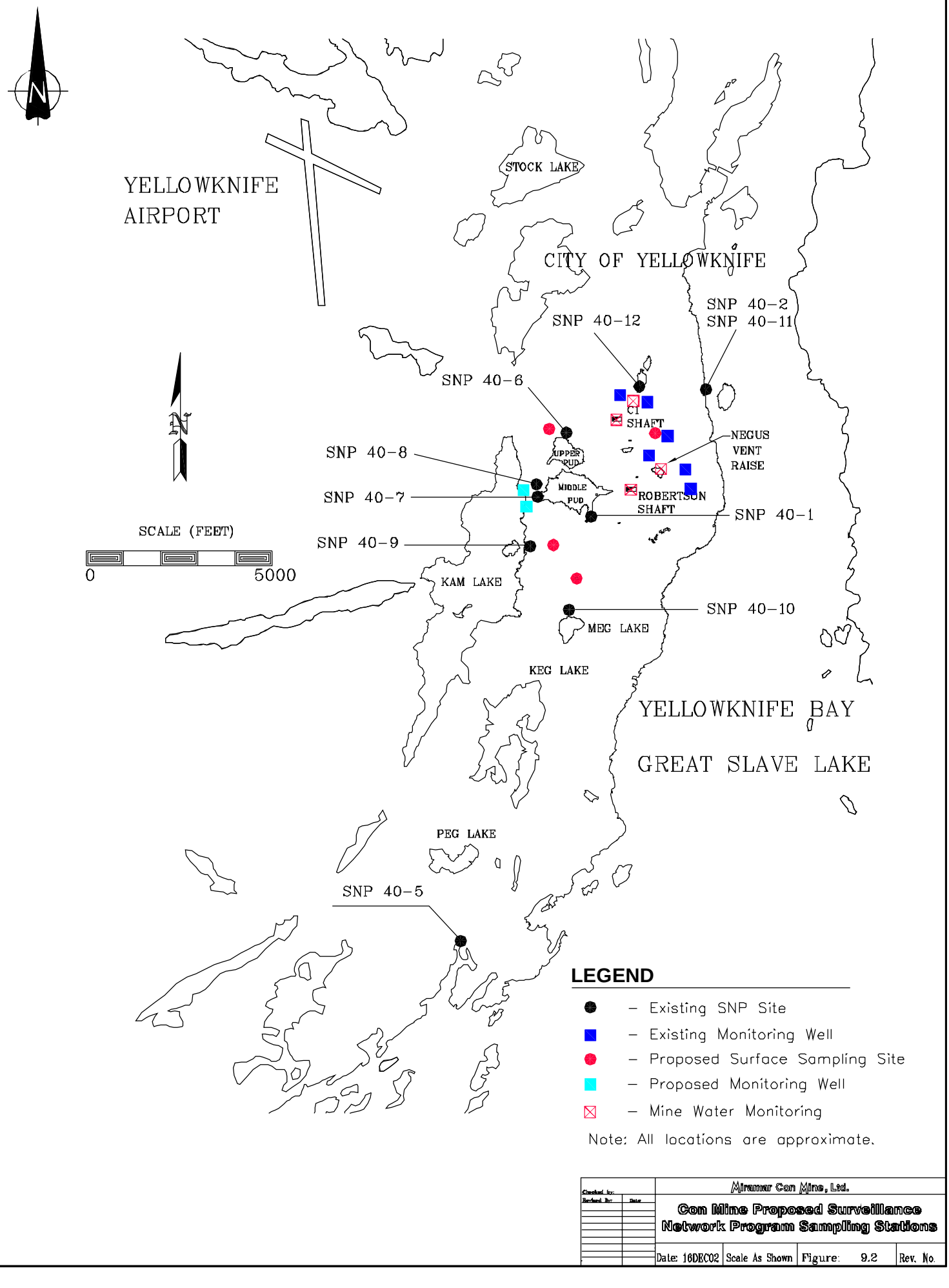
9.4 Cost Estimate

Reclamation of the minesite is scheduled to be completed in 2010. The cost to monitor the on-going work is included in the reclamation cost estimate under the heading of Post Closure Monitoring and Maintenance. This estimate is presented in Section 10 of this plan.



Checked by: / Revised By: / Date	Miramar Con Mine, Ltd.		
	Con Mine Surveillance Network Program Sampling Stations		
	Date: 16DEC02	Scale As Shown	Figure: 9.1	Rev. No.

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Miramar Con Mine, Ltd.

Con Mine Proposed Surveillance Network Program Sampling Stations

Date: 16DEC02 | Scale As Shown | Figure: 9.2 | Rev. No.

REVISION DATE: 05/10/3 2:59pm By: bdrozdiak CADD FILE: N:\Bur-Graphics\Projects\1400\2002\022-1471\Drafting\cad\MIRAMAR TITLES\P1471-102.dwg

10.0 COST ESTIMATE AND SCHEDULE

10.1 General Schedule

A summary-level implementation schedule for final reclamation of the Con Mine is provided in Figure 10.1. The Closure Plan schedule calls for a considerable amount of the reclamation activity to occur concurrently with the final processing of the calcines and arsenic sludges in the autoclave. Recovery and processing of this material has been the largest progressive reclamation project at the mine and has been ongoing for the past several years (scheduled for completion by September 2007).

The following is a list of the progressive reclamation projects complete at the end of 2006. Progressive reclamation activities included the following:

- Surface cleanup, grading, surface preparation, and seeding of the Neil Lake test plot;
- Removal of all large bulk storage fuel tanks;
- Removal of asbestos from the majority of buildings on site;
- Placement of approved concrete caps on Negus 351 raise, Negus 114 manway, Negus 120 raise, Negus 220 manway, Rycon R57 shaft, and C-1 Vent raise;
- Phase 1 to 3 of the final reclamation of the Con and Negus Ponds;
- Processing calcines from the Negus and Con ponds;
- Preparing arsenic sludges from the Negus and Con ponds for processing in 2007;
- Completion of the Crank Lake TCA surface cleanup;
- Decommissioning, dismantling and removal of 21 surplus buildings from the minesite and clean up of the foundation or underlying soils as needed;
- Sale, removal (to recycler), or disposal in on site non-hazardous landfill of a significant amount of scrap metal and other non-hazardous waste;
- Sale and removal of four large propane tanks from the minesite;
- Installation of ten groundwater monitoring wells, and monitoring thereof;
- Sampling and analyses of deep underground minewater in 2004 and 2006;
- Removal and reclamation of former haul road that intersected Taylor Road;
- Construction of a tailing cover test pad on the Upper Pud TCA, that was then vegetated as a demonstration test of the planned final tailing cover;
- Removal of contaminated soils from the south end of Rat Lake; and,
- Removal of all remaining Sodium Cyanide stored on site.

The attached closure schedule (Figure 10.1) calls for substantive completion of the remaining reclamation effort by September 2009. It is a continuation of the progressive reclamation activities and it is anticipated that all structures, with the exception of the Environmental Laboratory (ALS Laboratory) and the Water Treatment Plant, will be removed by late 2008, with final grading and seeding of the mine area to occur in late

2009. The critical path item on this schedule is completion of the processing of the remaining arsenic sludges by end of 2007. At that point, the blend plant will be taken out of service, followed by the mill and autoclave and the two openings to surface, which are under the mill, will then be capped and closed.

The Tailing Containment Areas will be drained and reclaimed during the period from 2007 to 2009. The Upper and Middle Pud basins will be capped and the Negus, Neil Lake and Lower Pud TCA's will be graded and seeded.

The details of the closure schedule are outlined on the attached chart Figure 10.1, which shows the plan and the proposed sequence of closure of the site. The sequence is subject to change based on the recommendations or directions of regulatory authorities.

10.2 Cost Estimate

The overall cost of reclaiming the Con Mine is estimated to be $12.5 million. This cost estimate was prepared using the RECLAIM model Version 4.0 (March 2001). The RECLAIM model was developed to estimate the cost of mine reclamation by the federal Department of Indian and Northern Affairs Canada (DIAND) for use by government agencies, mining companies, and others. The breakdown of the estimate is summarized by mine component in Table 10.1.

TABLE 10.1: Summary of Reclamation Cost Estimate for the Con Mine Presented by Mine Component (RECLAIM MODEL V4)

COMPONENT TYPE	COMPONENT NAME			TOTAL COST
UNDERGROUND MINE				$634,500
TAILINGS	Negus			$188,750
	Neil			$72,500
	Lower Pud			$223,000
	Crank			$63,665
	Upper Pud			$755,190
	Middle Pud			$981,820
BUILDINGS AND EQUIPMENT	Dock Area			$67,329
	Mill Area			$1,215,441
	Robertson Shaft			$773,985
CHEMICALS AND SOIL MANAGEMENT				$720,030
WATER MANAGEMENT				$383,000
MOBILIZATION/DEMOBILIZATION				$50,000
POST CLOSURE MONITORING AND MAINTENANCE			NPV	$1,630,878
	Post Closure Monitoring		$1,412,478	
	Post Closure Maintenance		$218,399	
	Discount %	#Years		
	3%	46		
POST-CLOSURE WATER TREATMENT			NPV	$2,408,779
	Ongoing Water Treatment Costs (Avg/Yr		$125,466	
	Discount %	#Years		
	3%	25		
SUBTOTAL				**$10,168,867**
PROJECT MANAGEMENT		10 % of subtotal		$1,016,887
ENGINEERING		3 % of subtotal		$305,066
CONTINGENCY		10 % of subtotal		$1,016,887
TOTAL ESTIMATED RECLAMATION COST				**$12,507,706**

The RECLAIM model includes the major components of a mine and is readily adapted to suit any mine configuration. An important feature of the model is a table of unit costs of common reclamation activities, which can be updated or customized to suit a specific site. The unit costs are based on experience from reclamation work conducted at northern mines.

The estimated $12.5 million reclamation cost for the Con Mine can be subdivided into two major components:

1. Demolition of the buildings and physical reclamation of the minesite and tailing containment areas is estimated at $6.6 million. This estimate includes allowances for administration (10% of the total estimated direct cost) and engineering (3% of the total estimated direct cost) of the reclamation effort, as well as a general contingency allowance (10% of the total estimated direct cost) for unplanned events or situations that may be encountered. The estimate without project management, engineering and contingency allowance is approximately $5.4 million.

2. Post closure monitoring (46 years) and water treatment (25 years) after the site has been physically reclaimed. This post-closure cost is estimated to be $5.9 million (Net Present Value) and covers a period of approximately 50 years. This estimate also includes allowances for administration (10%) and engineering (3%) of the closure effort, as well as a general contingency allowance (10%).

The Post-Closure cost assumes that the water treatment would continue as noted above to at least 2031 and post-closure monitoring/maintenance would continue to 2050. Thus, the above estimate has been stated as 2006 dollars with future costs discounted at a 'Net Present Value' using a 3% discount rate.

In addition to the quantities and unit costs of reclamation activities presented in the attached RECLAIM estimate, the following sub-sections present the rationale and supporting quantities of work for key items. The full model is attached for information in Appendix VI. (Appendix VI is confidential with limited release to MVLWB and INAC).

10.2.1 Underground Workings

The underground mine was closed out at the end of the mine life and allowed to start naturally flooding in November of 2003. Based on mine records, there are several raises and/or stopes that are presently open to surface. These will be capped with approved concrete cap structures using current best practices for the design of closure caps at closed mines in Canada. The major openings still to be capped are the 204Q stope, the C-1 shaft, the Robertson shaft, the Robertson vent raise and the Negus vent raise. Numerous smaller openings present on the minesite have already been capped in a planned sequence. To date seven of these openings have been capped and closed. An allowance of $634,000 has been provided to complete this phase of the work.

At closure of the underground workings all hazardous and petroleum waste materials were removed from the underground area and disposed of at licensed facilities, either in Yellowknife or in Alberta. It was assumed for cost purposes, that all equipment involved in the underground operations had no salvage value.

10.2.2 Hazardous Materials and Hydrocarbons

At the completion of mining operations a full hazardous material audit was performed. All chemicals, chemical wastes, and hydrocarbons were removed from the underground workings. Similarly, all chemicals, chemical wastes, and hydrocarbons will be removed from the mill complex, the Robertson shaft area (including associated warehouses), and the remainder of the site as each area of the operation is prepared for demolition and reclamation. A number of gauges (densitometers) that utilize Radioisotopes will be removed from the mill complex and sent to a licensed disposal company. Any other hazardous materials identified on site will be included in this program and disposed of as appropriate. None of this hazardous material will be disposed of on site. Decontamination of the remaining equipment on site is included in this estimate. An allowance of $35,000 is provided to cover this effort.

It is also anticipated that it will be necessary to treat some hydrocarbon-impacted soils on site. An allowance to bio-remediate petroleum contaminated soil is included in the reclamation estimate. It is assumed that some 5,000 m^3 of soil will be treated at an estimated cost of $75,000.

10.2.3 Tailing Containment Areas (TCA's)

Reclamation of the historic Negus, Neil Lake, Lower Pud and Crank Lake TCA's has commenced. However, for the purposes of this cost estimate, it has been assumed that the reclamation work in these areas has not yet started. This is a conservative approach for reclamation cost estimating purposes. The activities considered in the cost estimate

for the Lower Pud, Neil Lake, Negus and Crank Lake TCA's include contouring of the tailing to manage surface runoff and construction of engineered drainage channels across or adjacent to portions of these areas. Erosion protection in the channels, if needed, will be provided by waste rock riprap from the site. These areas will then be vegetated with native species of grasses and plants such as wild rose or similar alternatives. Initially, these areas will be vegetated with fast growing grasses to provide a vegetative carpet, following which the local plant species will be encouraged. An allowance of $547,000 has been provided to complete this phase of the work. This amount does not include the general allowance for project management, engineering or the 10% allowance for contingencies for this task.

The Upper and Middle Pud TCA's will be covered with a 50 to 60 cm layer (minimum of 50 cm) of mine waste rock or blasted rock (a 20 cm minus material is proposed). The rock will be spread after the ponds are allowed to drain and consolidate for a year to enable vehicular access and to minimize the potential for the rock to 'sink' into the tailing. The rock surface will be graded to drain all surface water to the Middle Pud basin, where a small clear water pond will be left in the southwest portion of the basin. Vegetation will then be established over the full area of the Upper Pud TCA and over the eastern portion of the Middle Pud TCA, allowing for the maintenance of a pond in southwest portion of the Middle Pud TCA.

An allowance is included in the cost estimate for contouring of the final tailing surface before the rock is placed to promote efficient surface runoff. The estimate assumes that some 5,000 m^3 of material will be utilized for the general grading of the Upper Pud TCA and some 10,000 m^3 for the Middle Pud TCA. The estimate also assumes that seeding and fertilizing will be conducted over three growing seasons. It also assumes that the downstream slopes of the dams will be vegetated. A soil amendment may be required for areas on top of the rock cover that do not vegetate after three years. The amendment, probably peat or a highly organic soil will be tilled into the areas where adequate vegetation cover was not established. It is estimated that up to 25% of the area may require such a soil amendment. An allowance of $1,737,000 has been provided to complete the closure activities for the Upper and Middle Pud TCA's. This amount does not include the general allowance for project management, engineering or the 10% allowance for contingencies for this task.

Middle Pud will include a clear water pond with a maximum depth of 10 to 15 m to collect drainage for water treatment. Engineered drainage channels that lead to the pond will be designed to manage a 200 year storm event. Where required, riprap will be placed in the channels for erosion protection. An estimate of some 600 m3 of 60 cm minus riprap is allowed for in the closure estimate.

MCML is confident in its expectations for successful revegetation of the Middle and Upper Pud TCA's and offers the following in support:

1. MCML has assumed in the closure plan that additional fertilizer and re-seeding will be required in subsequent years after the initial seed and fertilizer application to address areas where vegetation does not initially fully take. To cover this contingency MCML has built in additional dollars in its cost estimate to allow for some areas to be re-seeded and fertilized (and for potential use of irrigation or soil amendment in select problem areas). This shows in the estimate as increased surface area to be vegetated. In other words MCML took the actual area to be revegetated and increased this amount in the RECLAIM spreadsheet. For example in the RECLAIM spreadsheet we have included a total of 240 ha to be revegetated for the four historic TCAs however the actual surface area of these TCAs is only 65 ha. This provides an allowance for additional follow up work to be done to establish vegetation on all of the historic and recent TCAs.

2. MCML has committed to placement of islands of soil on top of the rock cover on the Middle and Upper Pud TCAs to ensure that there are areas distributed across the surface of these TCAs where vegetation has a higher probability of success in the initial years. This creates a significantly greater perimeter area from which vegetation can propagate onto the more nutrient deficient areas of rock cover. It would be preferable to place soil over all of the surface area but obtaining large volumes of soil in the Yellowknife area is difficult. The concept of creating "islands of vegetation" to increase propagation on reclaimed land is a technique developed in the Yukon.

3. MCML has included dollars under the allowance for post closure maintenance for ongoing maintenance of the vegetation on the tailing areas and has committed to additional fertilization, over seeding and use of irrigation in select areas as contingent measures within the plan.

4. MCML has run a test plot that gave confidence that a rock capped tailing surface can be successfully revegetated.

MCML is not planning that these areas will be vegetated to a "park or lawn" standard; however MCML is confident that with the proposed and costed measures MCML can establish a self-sustaining vegetative cover of greater than 50% cover by area over these TCAs over a five year period. This will provide the organic base for invasion of local plant species within a 10 year time frame. MCML is planning to include seed for available native plants within the initial seed mix.

10.2.4 Structures

The site reclamation includes demolition of approximately 9,000 m^2 of wood buildings, 7,000 m^2 of steel buildings and 1,200 m^2 of concrete buildings from the mine/mill complex. All demolition debris will be disposed of in the approved on-site non-hazardous landfill or in the approved hazardous waste disposal site if the residual arsenic level on the material is greater than 340 mg/kg after high pressure washing. Unit rates for building demolition include an allowance for related disposal costs.

Closure of the Robertson Shaft and Office Complex began in late 2005 with the removal of the old mine administration offices. The main headframe and infrastructure will be removed in 2008. This reclamation includes approximately 2,400 m^2 of predominantly steel structures and involves no asbestos. The 1,300 m^2 warehouse and shops facility immediately south of the shaft/office complex will remain in active use through the closure operations and will not be removed until site reclamation is near completion, in 2009. An allowance of $774,000 has been provided to remove the headframe and the associated buildings. This amount does not include the general allowance for project management, engineering or the 10% allowance for contingencies for this task.

Decommissioning of the 2,700 m^2 Blend Plant will take place in 2007 or early in 2008 following treatment of the last of the arsenic sludges and calcines. Dismantling of the structure will be preceded by a detailed wash down of the building and its structural components.

The C-1 Shaft and mill complex will be demolished once the last of the arsenic sludge is processed. The mill, autoclave complex is considered to be a highly impacted area. The closure plan allows for removal of up to 1.0 m or some 10,000 m^3 of impacted soil from under the mill after the structure is removed. After removal of soil, the site will be scarified, covered and revegetated. Vegetation will consist of a mixture of seed and fertilizer for an approximate area of 15 hectares. This program will be conducted in one growing season. An allowance of $1,215,000 has been provided to complete removal of the mill and associated buildings for this phase of the work. This amount does not include the general allowance for project management, engineering or the 10% allowance for contingencies for this task.

10.2.5 Water Management

Following completion of the reclamation phase of the Closure Plan (*i.e.*, by the fall of 2009), the water treatment plant will remain in operation to handle the annual precipitation and snowmelt that will collect in the Middle Pud TCA, and any minewater that needs to be treated once the mine floods to surface (anticipated in 2014 or 2015). The cost estimate for water treatment is based on the historic annual capacity of the

Water Treatment Plant and the projected costs for the treatment effort. The allowance for the water treatment during the reclamation phase of the closure plan includes treating surface water and water from the mine after 2015. The cost estimate for the effort is included in Section 10.3 – Post-Closure Cost Estimate.

10.2.6 Contaminated Soils

Site characterization has identified several areas that have been impacted by arsenic. Some of these areas have been impacted by the mine operation and remedial work will be required. These areas include the area south of the mill complex and the area north of the Robertson air vent shaft. The site roads will be removed once the road is no longer needed, and the road surface will be scarified and vegetated.

The arsenic impacted soils around the mill area and north of the Robertson headframe will be removed and disposed of in the on-site hazardous waste disposal site. Arsenic impacted soil around the TCA's will be excavated and moved to the on-site hazardous waste disposal site or covered and vegetated in the same manner as the TCA's. An allowance of $400,000 has been provided to complete disposal of the highly arsenic contaminated soils from the mine lease. This amount does not include the general allowance for project management, engineering or the 10% allowance for contingencies for this task.

Standard Operating Procedures for the handling and treatment of contaminated soils during the closure phase of the mine will be developed as part of the contracts tendered for disposal of the soils. The current Mine Health and Safety Standards will be used as a guide for the management staff and the workers who complete the work. The cost estimate for the required personal protective equipment includes safety boots, dust masks and other dermal protection. The plan also anticipates that standard baseline arsenic medical testing and monitoring will be required for all workers on the project.

10.2.7 Other Costs

Other costs that have been allowed include mobilization and demobilization of specialist contractors to Yellowknife.

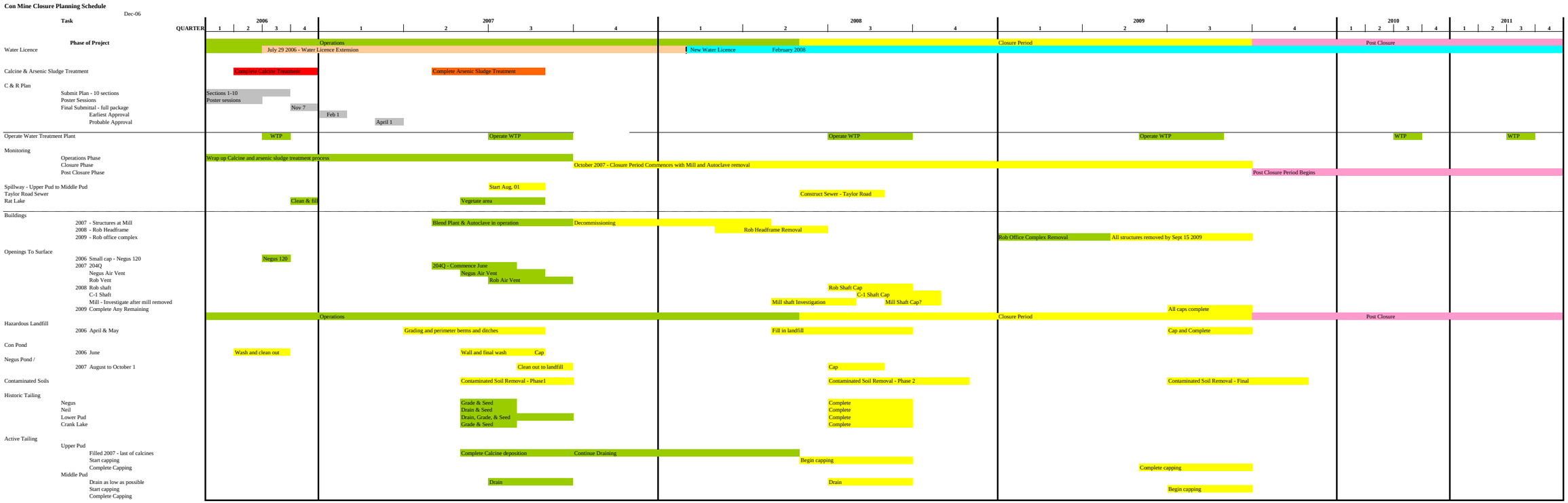
A project management cost, projected at 10% of the total direct cost, and a contingency reserve on the construction costs, also projected at 10% of the total cost, has been included in the closure cost estimate. There is also an allowance of 3% of the construction costs for engineering design, inspection and support that will be required throughout the project. An allowance of $2,338,000 has been provided to cover the above items.

10.3 Post Closure Cost Estimate

The Post–Closure period is estimated to last for at least 25 years with Post-Closure monitoring continuing for some 50 years. The actual period of time that Post-Closure monitoring and maintenance continues will depend on the quality of water collected and stored in Middle Pud, including minewater if necessary (minewater treatment is assumed to be required in the cost model), and the long term water treatment needs associated with managing this water. It is anticipated that the water quality in Middle Pud will improve with time and the monitoring needs will gradually reduce. It is also anticipated that the maintenance requirements on and around the property will gradually reduce. Thus, it is projected that post closure costs will decrease with time. The total allowance for the post closure care, monitoring and maintenance is $1,631,000 plus a contingency allowance of 10% of the estimate Net Present Value of the effort or $163,000. This estimate has been stated as 2006 dollars with future costs discounted at a 'Net Present Value' using a 3% discount rate.

The most important and largest component of the post closure costs is operation and maintenance of the water treatment plant. It is estimated that the water treatment plant will have to treat some 150,000 to 270,000 m^3 each year. This includes an allowance of some 120,000 m^3 for mine water that would be treated from 2014 to 2030 if necessary. (It should be noted that it is not known whether minewater will actually discharge to surface or require chemical treatment. This requirement has been added as contingent measure) It is also assumed the water treatment plant will have to be rebuilt in 2015 and that it will under go major maintenance efforts in 2010 and 2020. The average annual allowance for Post-Closure water treatment is $125,500 over a 46 year period which represents a cost (Net Present Value) of $2,409,000 for water treatment, for annual maintenance, and the a one time major rebuild of the of the water treatment plant (in approximately 2015).

Figure 10.1
Miramar Con Mine
Schedule for Closure Plan 2006



APPENDIX I

WATER LICENCE

NORTHWEST TERRITORIES WATER BOARD

Pursuant to the *Northwest Territories Waters Act* and Regulations the Northwest Territories Water Board, hereinafter referred to as the Board, hereby grants to

MIRAMAR CON MINE LTD.
(Licensee)

of P.O. Box 2000
YELLOWKNIFE, NORTHWEST TERRITORIES X1A 2M1
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water subject to the restrictions and conditions contained in the *Northwest Territories Waters Act* and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence Number	N1L2-0040 (Renewal)
Licence Type	"A"
Water Management Area	NORTHWEST TERRITORIES 01
Location	CON MINE WITHIN THE CITY OF YELLOWKNIFE, NORTHWEST TERRITORIES
Purpose	WATER USE AND WASTE DISPOSAL
Description	FOR A MINING AND MILLING UNDERTAKING
Quantity of Water Not To Be Exceeded	2,100,000 CUBIC METRES PER YEAR
Effective Date of Licence	July 30, 2000
Expiry Date of Licence	July 29, 2006

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions.

NORTHWEST TERRITORIES WATER BOARD

A. Chederay
Witness

Chairman

APPROVED BY

Minister of Indian Affairs and Northern Development

DOC004.TIF

PART A: SCOPE AND DEFINITIONS

1. Scope

a) This Licence entitles Miramar Con Mine Ltd. to use Water and dispose of Waste for a mining and milling operation and associated activities at the Con Mine, located in Yellowknife, Northwest Territories (approximate Latitude 62° 26' N. and Longitude 114° 23' W.);

b) This Licence is issued subject to the conditions contained herein with respect to the taking of Water and depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposit of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Northwest Territories Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform with such Regulations; and

c) Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of other Federal, Territorial, or Municipal legislation.

2. Definitions

In this Licence: **N1L2-0040**

"Acid / Alkaline Rock Drainage" means the production of acidic or alkaline leachate, seepage or drainage from underground workings, ore piles, waste rock tailings, and overburden that can lead to the release of metals to groundwater and surface water during the life of the mine and after mine closure;

"Act" means the *Northwest Territories Waters Act*;

"Analyst" means an Analyst designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"Average Concentration" means the moving average of any four consecutive analytical results submitted to the Board in accordance with the sampling and analysis requirements specified in the "Surveillance Network Program", the following is an example to illustrate the procedures for calculating the average:

Day 1	Sample #1	0.15
Day 2	Sample #2	0.12
Day 3	Sample #3	0.10
Day 4	Sample #4	0.18
	Moving Average = (0.15+0.12+0.10+0.18)/4 = 0.137	
Day 5	Sample #5	0.20
	Moving Average= (0.12+0.10+0.18+0.20)/4 = 0.150	
Day 6	Sample #6	0.16
	Moving Average= (0.10+0.18+0.20+0.16)/4 = 0.160;	

"Backfill" means tailings combined with a mixture of sand, cement or Water that is pumped underground and used to strengthen/support mined out areas;

"Board" means the Northwest Territories Water Board established under Section 10 of the *Northwest Territories Waters Act*, or any authority succeeding the Northwest Territories Water Board with respect to jurisdiction in regard to this Licence;

"Freeboard" means the vertical distance between the water line and the lowest elevation of the effective water containment crest on a dam or dyke's an upstream slope;

"Geotechnical Engineer" means a professional engineer registered with the Association of Professional Engineers, Geologists, and Geophysicists of the Northwest Territories and whose principal field of specialization is the design and construction of earthworks in a permafrost environment;

"Inspector" means an Inspector designated by the Minister under Section 35(1) of the *Northwest Territories Waters Act*;

"Licensee" means the holder of this Licence;

"Minewater" means groundwater or any water used in mining which is pumped or flows out of any underground workings or open pit;

"Minister" means the Minister of Indian Affairs and Northern Development;

"Progressive Reclamation" means those activities conducted during the operating period of the mine to modify and reclaim the land and Water to the satisfaction of the Board;

"RECLAIM" means the current version of a computer-based spreadsheet program, developed by Brodie Consulting Ltd., used to estimate mine reclamation costs;

"Regulations" mean Regulations proclaimed pursuant to Section 33 of the *Northwest Territories Waters Act*;

"Sewage" means all toilet wastes and greywater;

"**Sump**" means an excavation at the toe of a dam(s) intended to collect groundwater and seepage from the Tailings Containment Area;

"Tailings" mean material rejected from the mill after the recoverable valuable minerals have been extracted;

"Tailings Containment Area" consists of the Tailings containment basin(s) and the engineered structures designed to contain Tailings as described in the 1999 Tailings Dam Construction As-Built Documentation titled "Miramar Con Mine Ltd. - Construction Program to Raise Upper / Middle Pud Dams" completed by EBA Engineering Consultants and consist of drawings # 1-11 inclusive, drawings received and stamped by the NWT Water Board on January 5, 2000;

"Waste" means waste as defined by Section 2 of the *Northwest Territories Waters Act*;

"Waste Disposal Facilities" mean all facilities designated for the disposal of Waste;

"Waste Rock" means all unprocessed rock materials, except ore and Tailings, which are produced as a result of mining and milling operations;

"Waters" mean any Waters as defined by Section 2 of the *Northwest Territories Waters Act*;

"Water Supply Facilities" comprises the area and associated intake infrastructure as identified in Drawing Number Con 2133, entitled "C1 Rob Shaft and Arsenic Plant Lake Water Supply (existing)", revised June 6, 1986;

"Water Use" means a use of Water as defined by Section 2 of the *Northwest Territories Waters Act* and shall include freshwater from all sources and minewater; and

"Water Use Fee" means a fee for the use of Water as defined by Section 33 of the *Northwest Territories Waters Act*.

PART B: GENERAL CONDITIONS

1. The Water Use Fee shall be paid by the Licensee annually in advance of any Water use.

2. Pursuant to Section 17(1) of the *Act* and Section 12 of the Regulations, the Licensee shall have posted and shall maintain a security deposit according to the following schedule:

    a) within thirty (30) days of issuance of this Licence, an amount of $1,500,000; (One million, five hundred thousand dollars)

    b) on each subsequent anniversary of this Licence, an additional amount of $1,500,000 until $9,000,000 is available; and

    c) such further or other amounts, may be required by the Board based on annual estimates of current mine liability in accordance with Part H, Item 2 of this Licence.

    d) reductions to the security deposit may be granted by the Board based on annual estimates of current mine liability in accordance with Part H, Item 2 of this Licence.

3. The security deposit, which may include a Trust Fund, shall be maintained until such time as it is fully or in part refunded by the Minister pursuant to Section 17 of the *Act*. This clause shall survive the expiry of this Licence or renewals thereof and until full and final restoration has been completed to the satisfaction of the Minister. This security deposit shall be in a form acceptable to the Minister.

4. The Licensee shall file an annual report with the Board not later than March 31st of the year following the calendar year reported which shall contain the following information:

a) the monthly and annual quantities in cubic metres of Water pumped from Great Slave Lake;

b) the monthly and annual quantities in cubic metres of Water obtained from the City of Yellowknife;

c) the monthly and annual quantities in cubic metres of Minewater pumped from the mine;

d) the monthly and annual quantities in cubic metres of treated effluent discharged from the Tailings Containment Area;

e) the monthly and annual quantities measured in tonnes of arsenic sludges and calcine sludges that have been processed;

f) the monthly and annual quantities measured in tonnes of refractory ore milled, free-milling ore milled, the amounts of ore transported to the Miramar Con mine site from the Giant Mine site and other sources;

g) tabular summaries of all data generated under the "Surveillance Network Program";

h) a summary of any modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures;

i) a list of all unauthorized discharges;

j) revisions to the Contingency Plan;

k) revisions to the Abandonment and Restoration Plan;

l) revised annual updated estimate of the anticipated mine restoration liability, as required in Part H, Item 2;

m) revisions to the Water Use and Conservation Plans, as approved by the Board;

n) revisions to the operations manual for the Tailings Containment Area, as approved by the Board;

o) an annual summary of actions completed to date that are outlined in the Operations Manual for the Tailings Containment Area, as approved by the Board;

p) revisions to the Solid and Hazardous Waste Management Plan, as approved by the Board;

q) revisions to the Acid and Alkaline Rock Drainage and Geochemical Characterization Plan, as approved by the Board;

r) a summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year; and

s) any other details on Water Use or Waste disposal requested by the Board by November 1st of the year being reported.

5. The Licensee shall comply with the "Surveillance Network Program" annexed to this Licence, and any amendment to the said "Surveillance Network Program" as may be made from time to time, pursuant to the conditions of this Licence.

6. The "Surveillance Network Program" and compliance dates specified in the Licence may be modified at the discretion of the Board.

7. Meters, devices or other such methods used for measuring the volumes of Water used and Waste discharged shall be installed, operated, maintained and calibrated by the Licensee to the satisfaction of an Inspector.

8. The Licensee shall, within sixty (60) days of the issuance of this Licence, post and maintain the necessary signs identifying the stations of the "Surveillance Network Program". All postings shall be located and maintained to the satisfaction of an Inspector.

9. The Licensee shall ensure a copy of this Licence is maintained at the site of operation at all times.

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all Water for mining, milling and associated activities from Great Slave Lake using the Water Supply Facilities or as otherwise approved by the Board.

2. The Licensee shall obtain all Water for domestic uses from Great Slave Lake and/or the City of Yellowknife.

3. The annual quantity of Water used for all purposes shall not exceed 2,100,000 cubic metres.

4. The Water intake hose used on the Water pumps shall be equipped with a screen with a mesh size sufficient to ensure no entrainment of fish.

5. The Licensee shall submit to the Board for approval, by December 31, 2000, a report describing the methods for Water use reduction and conservation, including an implementation schedule for any Water conservation plans.

6. The Licensee shall implement the Water conservation plans, listed in Part C, Item 5, within six (6) months after the plan is approved by the Board.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall discharge all Minewater and Tailings into the Tailings Containment Area and/or underground as Backfill, or as otherwise approved by the Board.

2. The Licensee shall discharge all Sewage to the approved Tailings Containment Area or as otherwise approved by the Board.

3. The Tailings Containment Area shall be constructed, operated, and maintained to engineering standards such that:

   a) a Freeboard limit of 1.0 metre shall be maintained at all times, or as recommended by a Geotechnical Engineer and as approved by the Board;

   b) seepage from the Tailings Containment Area is minimized;

   c) any seepage that occurs is collected and immediately returned to the Tailings Containment Area;

   d) erosion of the constructed facilities is addressed immediately;

   e) the solids fraction of the mill Tailings shall be permanently contained within the Tailings Containment Area;

   f) weekly inspections of the dam(s), Tailings line(s), and Sumps shall be carried out and records of these inspections shall be kept for review upon the request of an Inspector. More frequent inspections shall be performed at the request of an Inspector; and

   g) an inspection of the Tailings Containment Area shall be carried out annually in July by a Geotechnical Engineer. The engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan to respond to the engineer's recommendations. The Licensee shall provide documentation and rationale of any decisions that deviate from the engineer's recommendations.

4. All Wastes discharged from the Tailings Containment area shall be directed to the water treatment facility and subsequently to the Meg-Keg-Peg Lakes system, as illustrated in Drawing Number 2796, dated June 1986, or as otherwise approved by the Board.

5. No Waste discharge, seepage or other flow from the Tailings Containment Area shall be permitted at any time to enter Kam Lake.

6. The Licensee shall provide at least five (5) days notice to an Inspector prior to the first proposed discharge of Waste from the Tailings Containment Area during each calendar year.

7. All Wastes discharged by the Licensee from the Tailings Containment Area, including discharge from the water treatment plant, shall meet the following effluent quality requirements:

PARAMETER	MAXIMUM AVERAGE CONCENTRATION	MAXIMUM CONCENTRATION OF ANY GRAB SAMPLE
Total Arsenic	0.50 mg/L	1.0 mg/L
Total Copper	0.30 mg/L	0.60 mg/L
Total Cyanide	0.80 mg/L	1.60 mg/L
Total Lead	0.20 mg/L	0.40 mg/L
Total Nickel	0.50 mg/L	1.0 mg/L
Total Zinc	0.20 mg/L	0.40 mg/L
Total Suspended Solids	20 mg/L	40 mg/L
Oil and Grease		5.00 mg/L

The Waste discharged shall have a pH between 6.0 and 9.5.

8. The Licensee shall, by July 31, 2001, submit to the Board for approval an operations manual for the Tailings Containment Area. The operations manual shall include, but not be limited to the following:

a) tailings deposition;

b) water balance;

c) flood control;

d) physical stability;

e) groundwater;

f) dust management;

g) contaminant mass balance and mobility;

h) wildlife protection;

i) site security including restriction of site access to the public;

j) monitoring;

k) regular visual inspections;

l) photographic records;

m) instrumentation; and

n) data evaluation.

9. If not approved by the Board, the manual referenced in Part D, Item 8 shall be revised and resubmitted within six (6) months of receiving notification of the Board's decision.

10. The Licensee shall implement the operations manual for the Tailings Containment Area, listed in Part D, Item 8, within six (6) months after the manual is approved by the Board.

11. An annual review, including a summary of actions completed to date, for the operations manual of the Tailings Containment Area shall be undertaken and included in the annual report submitted to the Board.

12. The Licensee shall process all arsenic sludges and calcine sludges by December 31, 2003. An annual update including the amount of arsenic and calcine sludges processed-to-date is to be included in the annual report submitted to the Board.

13. The Licensee shall, by April 30, 2001, submit to the Board for approval a Solid and Hazardous Waste Management Plan. A review of this plan shall be undertaken annually and any updates shall be included in the annual report submitted to the Board.

14. If not approved by the Board, the plan referenced in Part D, Item 13 shall be revised and resubmitted within six (6) months of receiving notification of the Board's decision.

15. The Licensee shall submit to the Board for approval by April 30, 2001, an Acid and Alkaline Rock Drainage and Geochemical Characterization Plan for managing non-neutral drainage and metal leaching. The Plan shall be in accordance with the Department of Indian Affairs and Northern Development's (DIAND) "Guidelines for Acid Rock Drainage Protection in the North, September 1992" and shall include, but not be limited to, the following:

    a) characterization of the rock types, geology and mineralogy of the rock types associated with mining and milling activities;

    b) representative sampling and testing of each rock unit;

    c) assessment of potential for acidic or alkaline drainage and for metal leaching from ore (stockpiles), waste rock and tailings located in both engineered and non-engineered structures; and

    d) description of predicted loadings and/or impact on receiving Water chemistry from each source.

PART E: CONDITIONS APPLYING TO CONSTRUCTION

1. Prior to construction of any new external dams, dykes or structures, including extensions to current containment structures that are intended to contain, withhold, divert or retain Water or Wastes, the Licensee shall ensure that such facilities are designed and constructed to engineering standards such that at a minimum, the current edition of the Canadian Dam Safety Association (CDSA) Guidelines are complied with, including but not limited to the submission of design drawings stamped by a Geotechnical Engineer which are to be submitted to the Board for approval.

2. As-built drawings and any changes from the original design, including rationale for the changes to any of the dams, dykes or structures referred to in Part E, Item 1 shall be stamped by a Geotechnical Engineer and submitted to the Board within ninety (90) days of completion of the facility(ies).

PART F: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may without written approval from the Board, carry out modifications to the Water Supply and Waste Disposal Facilities provided that such modifications are consistent with the terms of this Licence and the following requirements are met:

   a) the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to beginning the modifications;

   b) such modifications do not place the Licensee in contravention of either the Licence or the *Act*;

   c) the Board has not, during the sixty (60) days following notification of the proposed modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and

   d) the Board has not rejected the proposed modifications.

2. Modifications, for which all of the conditions referred to in Part F, Item 1 have not been met, may be carried out only with written approval from the Board.

3. The Licensee shall provide to the Board as-built plans and drawings of the modifications referred to in Part F, Item 1 within ninety (90) days of completion of the modifications.

PART G: CONDITIONS APPLYING TO CONTINGENCY PLANNING

1. The Licensee shall review the approved Contingency Plan annually and modify the Plan as necessary to reflect changes in operation and technology. Any proposed modifications shall be submitted to the Board for approval.

2. If, during the period of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is forseeable, the Licensee shall:

   a) employ the appropriate contingency plan;

b) report the incident immediately via the 24 Hour Spill Reporting Line (867) 920-8130; and

c) submit to an Inspector a detailed report on each occurrence not later than thirty (30) days after initially reporting the event.

PART H: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit an Abandonment and Restoration Plan that is satisfactory to the Board by January 31, 2001. The Abandonment and Restoration Plan must be in accordance with the Northwest Territories Water Board's "Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories, September 1990" and incorporating Progressive Reclamation. The Abandonment and Restoration Plan shall include, but not be limited to, the following:

   a) an implementation schedule for areas of reclamation to occur within the term of the Licence including, but not limited to Rat Lake and Negus Pond;

   b) outline and schedule of Progressive Reclamation studies;

   c) underground workings;

   d) buildings and equipment;

   e) arsenic and calcine sludge containment structures;

   f) arsenic and other contaminated soils using guidelines approved by the Board;

   g) Tailings Containment Area;

   h) chemicals and reagents;

   i) reclamation schedule;

   j) Water management structures; and

   k) water treatment, post-closure of the mine.

2. The Licensee shall provide the Board annually with an updated estimate of the anticipated mine restoration liability using RECLAIM, or some other method acceptable to the Board that incorporates site-specific activities and appropriate unit costs used to estimate mine reclamation costs. This shall include the expected liability at the end of the forthcoming year.

3. The Licensee shall revise the Plan referred to in Part H, Item 1, if not approved. The revised Plan shall be submitted to the Board for approval within six (6) months of receiving notification of the Board's decision.

4. Notwithstanding the time schedule referred to in the Abandonment and Restoration Plan, the Licensee shall carry out Progressive Reclamation of areas which are abandoned prior to closure of operations.

5. The Licensee shall submit to the Board for approval by April 30, 2002, a proposed Plan to investigate the cover options for the tailings including options other than revegetation, to ensure physical and chemical long-term stability. The plan should state the research questions to be answered, the methodology to be adopted, the duration of any studies, and provide a discussion as to how the results of the study might be utilized for on-going environmental management of the project. The proposed study shall include an implementation schedule.

6. The Licensee shall revise the Plan referred to in Part H, Item 5, if not approved. The revised Plan shall be submitted to the Board for approval within six (6) months of receiving notification of the Board's decision.

7. When the Plan, specified in Part H, Item 5, is approved, the Licensee shall complete the restoration work within the time schedule specified in the Plan, or as subsequently revised when approved by the Board.

8. The Licensee shall review the Abandonment and Restoration Plan annually and shall modify the Plan as necessary to reflect changes in operation, technology, and results of reclamation and/or other studies. The proposed modifications shall be submitted to the Board for approval.

9. Compliance with the Abandonment and Restoration Plan specified in this Licence does not limit the legal liability of the Licensee, other than liability arising from provisions of the Act and its Regulations.

NORTHWEST TERRITORIES WATER BOARD

Witness

Chairman

NORTHWEST TERRITORIES WATER BOARD

LICENSEE: MIRAMAR CON MINE LTD.

LICENCE NUMBER: N1L2-0040

EFFECTIVE DATE OF LICENCE: July 30, 2000
EFFECTIVE DATE OF

SURVEILLANCE NETWORK PROGRAM: July 30, 2000

SURVEILLANCE NETWORK PROGRAM

A. Location of Surveillance Stations

Station Number	Description
40-1	Treated effluent from the Tailings Containment Area.
40-2	Freshwater intake at the Yellowknife Bay Pumphouse. This station is an amalgamation of Station Numbers 40-2 and 1187-1.
40-3	Arsenic Reclamation Plant cooling water discharge at end of pipe (formerly Station Number 1187-2).
40-3A	Point of discharge, where the Arsenic Reclamation Plant cooling water enters Great Slave Lake.
40-4	Waste from the Arsenic Reclamation Plant directed to the mill, Tailings Containment Area or Con pond (formerly Station Number 1187-3).
40-5	Outflow of the Meg-Keg-Peg Lakes System to Great Slave Lake.
40-6	Taylor Road Dam pumping station.

40-7	Drainage pathway below Dam 2 and Dam 2-North of the TCA and before Kam Lake.
40-8	Drainage pathway below Dam 1 of the TCA and before Kam Lake.
40-9	Drainage pathway between Lower Pud basin and Kam Lake.
40-10	Drainage from Lower Pud basin before it enters Meg Lake.
40-11	Con Dock area near the location of previous Bunker C oil spill.
40-12	South end of Rat Lake.

B. Sampling and Analysis Requirements

1. During periods of effluent discharge to the Meg-Keg-Peg Lakes System, twenty-four (24) hour composite samples shall be collected daily at Station Number 40-1 and analyzed for the following parameters:

pH	Total Copper
Total Suspended Solids	Total Cyanide
Total Arsenic	

2. If the twenty-four (24) hour sampler fails during periods of effluent discharge to the Meg-Keg-Peg Lakes System, grab samples shall be collected manually, four (4) times per sampling day, and combined as a composite sample for analysis as specified in Part B, Item 1 above.

3. During periods of effluent discharge to the Meg-Keg-Peg Lakes system a sample shall be collected once per month at Station Number 40-1 and analyzed for the following parameters:

Total Ammonia	Total Phosphorous
Mercury	Cyanide

Arsenic (Total and Dissolved)	Total Dissolved Solids
Conductivity	Alkalinity
Turbidity	Oil and Grease
Total Kjeldahl Nitrogen	Nitrite and Nitrate

ICP Metals Scan including but not limited to the following Total and Dissolved elements:

Cadmium	Chromium	Copper
Manganese	Nickel	Lead
Iron	Zinc	

Major Ions including but not limited to the following:

Chloride	Sodium	Calcium
Hardness	Sulfate	Potassium
Magnesium	Sulfide	

4. During periods of open Water, a sample shall be collected once per month at Station Number 40-5 and 40-10 and analyzed for the following parameters:

Total Coliform	Faecal Coliform
Total Ammonia	Total Phosphorous
Mercury	Cyanide
Arsenic (Total and Dissolved)	Total Dissolved Solids
Conductivity	Alkalinity
Turbidity	Oil and Grease
Total Kjeldahl Nitrogen	Nitrite and Nitrate

ICP Metals Scan including but not limited to the following Total and Dissolved elements:

Cadmium	Chromium	Copper
Manganese	Nickel	Lead
Iron	Zinc	

Major Ions including but not limited to the following:

Chloride	Sodium	Calcium
Hardness	Sulfate	Potassium
Magnesium	Sulfide	

5. During periods of open Water, a visible inspection for any oil sheen shall be conducted once per week at Station Number 40-11.

6. During periods of open Water, a sample shall be collected once per month at Station Number 40-12 and analyzed for the following parameters:

   Total Arsenic

   ICP Metals Scan including but not limited to the following Total and Dissolved elements:

Cadmium	Chromium	Copper
Manganese	Nickel	Lead
Iron	Zinc	

7. Effluent at Station Numbers 40-1 and 40-5 shall be sampled twice each year at Spring break up and before freeze-up in the Fall, and the samples will be provided to the Environmental Protection Branch of Environment Canada for the purpose of performing a static "pass/fail" bioassay for both rainbow trout and Daphnia spp. (per Environment Canada's Environmental Protection Series Biological Test Methods).

8. Seepage, as specified in Part D, Item 5 of the Licence, shall be sampled weekly during periods of accumulation and analyzed for the following parameters:

   Total Arsenic
   Total Copper
   Total Cyanide

9. Prior to and during pumping Water from the north side of Taylor Road Dam to Kam Lake, Water at Station Number 40-6 shall be sampled and analyzed for the following parameters:

   Total Arsenic
   Total Copper
   Total Cyanide

10. Prior to pumping Water from Station Number 40-6, results of the analyses showing that effluent quality limits in Part D, Item 7 of the Licence are being met shall be provided to an Inspector.

11. Water at Station Numbers 40-7, 40-8 and 40-9 shall be sampled twice monthly during periods of flow, and analyzed for the following parameters:

    pH
    Total Suspended Solids
    Total Arsenic
    Total Copper
    Total Cyanide

12. All sampling, sampling preservation, and analysis shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of Water and Wastewater," or by such other methods approved by an Analyst.

13. All analyses shall be performed in a laboratory approved by an Analyst.

14. The Licensee shall annually review the approved quality assurance/quality control plan and modify the plan as necessary. Proposed modifications shall be submitted to an Analyst for approval.

C. Flow Measurement Requirements

1. The monthly quantity of Water pumped from Great Slave Lake shall be measured and recorded in cubic metres.

2. The monthly quantity of Water obtained from the City of Yellowknife for domestic purposes shall be measured and recorded in cubic metres.

3. The monthly quantity of Minewater pumped from the mine shall be measured and recorded in cubic metres.

4. The daily quantity of treated effluent discharged from the Tailings Containment Area shall be measured and recorded in cubic metres.

D. Other Requirements

1. The periods when effluent from the Water Treatment Plant is re-circulated to the Tailings Containment Area shall be recorded.

2. The following items shall be measured in tonnes and recorded monthly:

   a) refractory ore milled;
   b) free-milling ore milled; and

c) total amount of Giant ore and total amounts of any other ore that is transported to the Miramar Con mine site.

E. Reports

1. The Licensee shall, within thirty (30) days following the month being reported, submit to the Board all the data and information required by the "Surveillance Network Program" including the results of the approved Quality Assurance program. These reports shall contain all required data and information in an electronic and printed format acceptable to the Board.

NORTHWEST TERRITORIES WATER BOARD

Witness

Chairman

APPENDIX II

MMER GUIDELINES

CANADA

OFFICE CONSOLIDATION

CODIFICATION ADMINISTRATIVE

Metal Mining Effluent Regulations

Règlement sur les effluents des mines de métaux

SOR/2002-222

DORS/2002-222

October 2006

Octobre 2006

WARNING NOTE

Users of this office consolidation are reminded that it is prepared for convenience of reference only and that, as such, it has no official sanction.

AVERTISSEMENT

La présente codification administrative n'est préparée que pour la commodité du lecteur et n'a aucune valeur officielle.

Her Excellency the Governor General in Council, on the recommendation of the Minister of Fisheries and Oceans, pursuant to subsections 34(2), 36(5) and 38(9) of the *Fisheries Act*, hereby makes the annexed *Metal Mining Effluent Regulations*.

Sur recommandation du ministre des Pêches et des Océans et en vertu des paragraphes 34(2), 36(5) et 38(9) de la *Loi sur les pêches*, Son Excellence la Gouverneure générale en conseil prend le *Règlement sur les effluents des mines de métaux*, ci-après.

METAL MINING EFFLUENT REGULATIONS

PART 1

GENERAL

INTERPRETATION

1. (1) The following definitions apply in these Regulations.

"Act" means the *Fisheries Act*. (*Loi*)

"acute lethality test" means the test to determine the acute lethality of effluent to rainbow trout as set out in Reference Method EPS 1/RM/13. (*essai de détermination de la létalité aiguë*)

"acutely lethal effluent" means an effluent at 100% concentration that kills more than 50% of the rainbow trout subjected to it over a 96-hour period when tested in accordance with the acute lethality test. (*effluent à létalité aiguë*)

"authorization officer" means the holder of the title that is set out in column 2 of Schedule 1 for a province that is set out in column 1 where a mine or recognized closed mine is located. (*agent d'autorisation*)

"commercial operation", in respect of a mine, means an average rate of production equal to or greater than 10% of the design-rated capacity of the mine over a period of 90 consecutive days. (*exploitation commerciale*)

"composite sample" means

(*a*) a quantity of effluent consisting of not less than three equal volumes or three volumes proportionate to flow that have been collected at approximately equal time intervals over a sampling period of not less than seven hours and not more than 24 hours; or

(*b*) a quantity of effluent collected continuously at a constant rate or at a rate proportionate to the rate of flow of the effluent over a sampling period of not less than seven hours and not more than 24 hours. (*échantillon composite*)

"Daphnia magna monitoring test" means the test to determine the acute lethality of effluent to *Daphnia magna* as

RÈGLEMENT SUR LES EFFLUENTS DES MINES DE MÉTAUX

PARTIE I

DISPOSITIONS GÉNÉRALES

DÉFINITIONS ET INTERPRÉTATION

1. (1) Les définitions qui suivent s'appliquent au présent règlement.

« agent d'autorisation » Le titulaire du poste indiqué à la colonne 2 de l'annexe 1, à l'égard d'une province mentionnée à la colonne 1 où est située une mine ou une mine fermée reconnue. (*authorization officer*)

« autorisation transitoire » Autorisation provisoire délivrée par l'agent d'autorisation en application de l'article 35. (*transitional authorization*)

« chantier » Toutes les terres et tous les ouvrages qui sont ou ont été utilisés dans le cadre d'activités d'extraction ou de préparation du minerai, notamment :

a) les mines à ciel ouvert, les mines souterraines, les aires de lixiviation en tas, les aires d'extraction par solution, les bâtiments, les aires de stockage du minerai et les tas de stériles;

b) les dépôts de résidus miniers, les lagunes et les bassins de traitement;

c) les zones déboisées ou perturbées adjacentes aux terres et ouvrages qui ne sont pas visées aux alinéas *a*) ou *b*). (*operations area*)

« concentration moyenne mensuelle » La valeur moyenne des concentrations mesurées dans les échantillons composites ou instantanés prélevés de chaque point de rejet final chaque mois où il y a rejet de substances nocives. (*monthly mean concentration*)

« dépôt de résidus miniers »[Abrogée, DORS/2006-239, art. 1]

« eau de drainage superficiel » Les eaux de ruissellement de surface contaminées par des substances nocives du fait qu'elles coulent sur un chantier ou en proviennent. (*surface drainage*)

« échantillon composite »

set out in Reference Method EPS 1/RM/14. (*essai de suivi avec biœssais sur la Daphnia magna*)

"deleterious substance" means a substance prescribed under section 3 except as otherwise prescribed by these Regulations. (*substance nocive*)

"effluent" means an effluent — mine water effluent, milling facility effluent, tailings impoundment area effluent, treatment pond effluent, treatment facility effluent other than effluent from a sewage treatment facility, seepage and surface drainage — that contains a deleterious substance. (*effluent*)

"final discharge point", in respect of an effluent, means an identifiable discharge point of a mine beyond which the operator of the mine no longer exercises control over the quality of the effluent. (*point de rejet final*)

"grab sample" means a quantity of undiluted effluent collected at a time prescribed by these Regulations. (*échantillon instantané*)

"milling" means any of the following activities for the purpose of producing a metal or metal concentrate:

(*a*) crushing or grinding ore; or

(*b*) processing uranium ore or uranium enriched solution. (*préparation du minerai*)

"milling facility effluent" means tailing slurries, heap leaching effluent, solution mining effluent and all other effluent deposited from a milling facility. (*effluent d'installations de préparation du minerai*)

"mine" means mining or milling facilities that are designed or used to produce a metal, a metal concentrate or an ore from which a metal or metal concentrate may be produced or any facilities, including smelters, pelletizing plants, sintering plants, refineries and acid plants, where any effluent from the facility is combined with the effluent from mining or milling. (*mine*)

"mine under development" means a mine where the construction of an open pit or underground mine has started. (*mine en développement*)

"mine water effluent" means, in respect of mining activities, water that is pumped from or flows out of any underground works, solution chambers or open pits. (*effluent d'eau de mine*)

a) Soit le volume d'effluent composé d'au moins trois parties égales ou de trois parties proportionnelles au débit, prélevées à intervalles sensiblement égaux, pendant une période d'échantillonnage d'au moins sept heures et d'au plus vingt-quatre heures;

b) soit le volume d'effluent prélevé de façon continue à un débit constant ou à un débit proportionnel à celui de l'effluent, pendant une période d'échantillonnage d'au moins sept heures et d'au plus vingt-quatre heures. (*composite sample*)

« échantillon instantané » Volume d'effluent non dilué prélevé à un moment prévu par le présent règlement. (*grab sample*)

« effluent » Effluent — effluent d'eau de mine, effluent d'installations de préparation du minerai, effluent de dépôts de résidus miniers, effluent de bassins de traitement, effluent d'installations de traitement, à l'exclusion de l'effluent d'installations de traitement d'eaux résiduaires, eaux d'exfiltration et eaux de drainage superficiel — qui contient une substance nocive. (*effluent*)

« effluent à létalité aiguë » Effluent en une concentration de 100 % qui, au cours de l'essai de détermination de la létalité aiguë, tue plus de 50 % des truites arc-en-ciel qui y sont soumises durant une période de quatre-vingt-seize heures. (*acutely lethal effluent*)

« effluent d'eau de mine » Dans le cadre d'activités minières, l'eau pompée d'ouvrages souterrains, de compartiments d'extraction par solution ou de mines à ciel ouvert ou l'eau s'écoulant de ceux-ci. (*mine water effluent*)

« effluent d'installations de préparation du minerai » Boues de stériles, effluent des lixiviats de terrils, effluent de l'extraction par solution et tout autre effluent rejeté à partir d'une installation de préparation du minerai. (*milling facility effluent*)

« essai de détermination de la létalité aiguë » L'essai visant à déterminer la létalité aiguë d'effluents chez la truite arc-en-ciel selon la méthode de référence SPE 1/RM/13. (*acute lethality test*)

« essai de suivi avec biœssais sur la Daphnia magna » L'essai visant à déterminer la létalité aiguë d'effluents chez la *Daphnia magna* selon la méthode de référence SPE 1/RM/14. (*Daphnia magna monitoring test*)

"monthly mean concentration" means the average value of the concentrations measured in all composite or grab samples collected from each final discharge point during each month when a deleterious substance is deposited. (*concentration moyenne mensuelle*)

"new mine" means a mine that begins commercial operation on or after the date of registration of these Regulations. (*nouvelle mine*)

"operations area" means all the land and works that are used or have been used in conjunction with mining or milling activity, including

(*a*) open pits, underground mines, heap leaching areas, solution mines, buildings, ore storage areas and waste rock dumps;

(*b*) tailings impoundment areas, lagoons and treatment ponds; and

(*c*) cleared or disturbed areas that are adjacent to the land and works that are not included in paragraph (*a*) or (*b*). (*chantier*)

"operator" means the person who operates, has control or custody of or is in charge of a mine or recognized closed mine. (*exploitant*)

"placer mining" means a mining operation that extracts minerals or metals from stream sediments by gravity or magnetic separation. (*exploitation des placers*)

"recognized closed mine" means a mine referred to in section 32 for which the owner or operator has satisfied the requirements of subsection 32(1). (*mine fermée reconnue*)

"Reference Method EPS 1/RM/13" means *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout* (Reference Method EPS 1/RM/13), July 1990, published by the Department of the Environment, as amended in December 2000, and as may be further amended from time to time. (*méthode de référence SPE 1/RM/13*)

"Reference Method EPS 1/RM/14" means *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna* (Reference Method EPS 1/RM/14), July 1990, published by the Department of the Environment, as amended in December 2000, and as may be further amended from time to time. (*méthode de référence SPE 1/RM/14*)

« exploitant » Personne qui exploite une mine ou une mine fermée reconnue, qui en a le contrôle ou la garde, ou qui en est responsable. (*operator*)

« exploitation commerciale » Le taux de production moyen d'une mine qui, au cours d'une période de quatre-vingt-dix jours consécutifs, est égal ou supérieur à 10 % de la capacité nominale de la mine. (*commercial operation*)

« exploitation des placers » Exploitation minière où le minerai ou les métaux sont extraits de sédiments de cours d'eau par gravité ou par séparation magnétique. (*placer mining*)

« Loi » La *Loi sur les pêches*. (*Act*)

« méthode de référence SPE 1/RM/13 » La publication intitulée *Méthode d'essai biologique : méthode de référence pour la détermination de la létalité aiguë d'effluents chez la truite arc-en-ciel* (Méthode de référence SPE 1/RM/13), publiée en juillet 1990 par le ministère de l'Environnement, dans sa version modifiée en décembre 2000 et avec ses modifications successives. (*Reference Method EPS 1/RM/13*)

« méthode de référence SPE 1/RM/14 » La publication intitulée *Méthode d'essai biologique : méthode de référence pour la détermination de la létalité aiguë d'effluents chez Daphnia magna* (Méthode de référence SPE 1/RM/14), publiée en juillet 1990 par le ministère de l'Environnement, dans sa version modifiée en décembre 2000 et avec ses modifications successives. (*Reference Method EPS 1/RM/14*)

« mine » Installations d'extraction minière ou installations de préparation du minerai qui sont conçues ou utilisées pour produire un métal, un concentré de métal ou un minerai à partir duquel un métal ou un concentré de métal peut être produit, ou toute installation, telles les fonderies, usines de bouletage, usines de frittage, affineries et usines d'acide, dont l'effluent est combiné aux effluents provenant de l'extraction minière ou de la préparation du minerai. (*mine*)

« mine en développement » Mine où a débuté la construction d'une mine à ciel ouvert ou d'une mine souterraine. (*mine under development*)

"reopened mine" means a mine that resumes commercial operation on or after the date of registration of these Regulations. (*mine remise en exploitation*)

"surface drainage" means all surface run-off contaminated by a deleterious substance as a result of flowing over, through or out of an operations area. (*eau de drainage superficiel*)

"tailings impoundment area"[Repealed, SOR/2006-239, s. 1]

"total suspended solids" means all solid matter that is retained on a 1.5 micron pore filter paper when the effluent is tested in compliance with the analytical requirements set out in Schedule 3. (*total des solides en suspension*)

"transitional authorization" means a temporary authorization issued by an authorization officer in accordance with section 35. (*autorisation transitoire*)

(2) Where the word "mine" is used in sections 2 to 39, it includes a mine, a mine under development, a new mine and a reopened mine but does not refer to a recognized closed mine.

SOR/2006-239, s. 1.

APPLICATION

2. (1) These Regulations apply in respect of mines and recognized closed mines that

(*a*) at any time after these Regulations are registered, exceed an effluent flow rate of 50 m^3 per day, based on

« mine fermée reconnue » Mine visée à l'article 32 dont le propriétaire ou l'exploitant a satisfait aux exigences du paragraphe 32(1). (*recognized closed mine*)

« mine remise en exploitation » Mine dont l'exploitation commerciale reprend à la date d'enregistrement du présent règlement ou après celle-ci. (*reopened mine*)

« nouvelle mine » Mine dont l'exploitation commerciale commence à la date d'enregistrement du présent règlement ou après celle-ci. (*new mine*)

« point de rejet final » Le point de rejet de l'effluent d'une mine qui est repérable et au-delà duquel l'exploitant de la mine n'agit plus quant à la qualité de l'effluent. (*final discharge point*)

« préparation du minerai » Les activités ci-après effectuées en vue de la production d'un métal ou d'un concentré de métal :

a) le concassage et le broyage d'un minerai;

b) le traitement du minerai d'uranium et de solutions uranifères. (*milling*)

« rejet » Est assimilée au rejet l'immersion au sens du paragraphe 34(1) de la Loi. (*French version only*)

« substance nocive » Toute substance désignée aux termes de l'article 3, sauf disposition contraire du présent règlement. (*deleterious substance*)

« total des solides en suspension » Toutes les matières solides retenues sur un papier filtre aux pores de 1,5 micron lorsque l'effluent est soumis à un essai qui satisfait aux exigences analytiques prévues à l'annexe 3. (*total suspended solids*)

(2) Dans les articles 2 à 39, sont assimilés à une mine une mine en développement, une nouvelle mine et une mine remise en exploitation, mais non une mine fermée reconnue.

DORS/2006-239, art. 1.

CHAMP D'APPLICATION

2. (1) Le présent règlement s'applique aux mines et aux mines fermées reconnues qui présentent les caractéristiques suivantes :

a) après l'enregistrement du présent règlement, elles ont, à un moment quelconque, un débit d'effluent

effluent deposited from all the final discharge points of the mine; and

(*b*) deposit a deleterious substance in any water or place referred to in subsection 36(3) of the Act.

(2) Despite subsection (1), these Regulations do not apply in respect of mines that stopped commercial operation before the registration of these Regulations, unless they are reopened after the registration of these Regulations, or in respect of placer mining operations.

DELETERIOUS SUBSTANCES

3. For the purpose of these Regulations, the substances set out in column 1 of Schedule 4 and any acutely lethal effluent are prescribed as deleterious substances.

AUTHORITY TO DEPOSIT

4. (1) Subject to subsection (2), the owner or operator of a mine may deposit, or permit the deposit of, an effluent that contains a deleterious substance in any water or place referred to in subsection 36(3) of the Act if a transitional authorization permits the deposit or if

(*a*) the concentration of the deleterious substance in the effluent does not exceed the authorized limits set out in Schedule 4;

(*b*) the pH of the effluent is equal to or greater than 6.0 but is not greater than 9.5; and

(*c*) the deleterious substance is not an acutely lethal effluent.

(2) The authority in subsection (1) is conditional

(*a*) in the case of a transitional authorization that permits the deposit, on the owner or operator complying with section 36; and

(*b*) in the other case, on the owner or operator complying with sections 6 to 27.

AUTHORITY TO DEPOSIT IN TAILINGS IMPOUNDMENT AREAS

5. (1) Despite section 4, the owner or operator of a mine may deposit or permit the deposit of waste rock or an effluent that contains any concentration of a deleterious substance and that is of any pH into a tailings impoundment area that is either

supérieur à 50 m^3 par jour, déterminé d'après les rejets d'effluent à partir de tous leurs points de rejet final;

b) elles rejettent une substance nocive dans les eaux ou les lieux visés au paragraphe 36(3) de la Loi.

(2) Malgré le paragraphe (1), le présent règlement ne s'applique ni aux exploitations des placers ni aux mines dont l'exploitation commerciale a pris fin avant l'enregistrement du présent règlement à moins qu'elles ne soient remises en exploitation après cet enregistrement.

SUBSTANCES NOCIVES

3. Pour l'application du présent règlement, sont des substances nocives l'effluent à létalité aiguë et toute substance mentionnée à la colonne 1 de l'annexe 4.

REJET AUTORISÉ

4. (1) Sous réserve du paragraphe (2), le propriétaire ou l'exploitant d'une mine peut rejeter — ou permettre que soit rejeté — un effluent contenant des substances nocives dans les eaux ou les lieux visés au paragraphe 36(3) de la Loi si une autorisation transitoire le permet ou si les conditions suivantes sont réunies :

a) la concentration des substances nocives dans l'effluent ne dépasse pas les limites permises prévues à l'annexe 4;

b) le pH de l'effluent est égal ou supérieur à 6,0 mais ne dépasse pas 9,5;

c) la substance nocive n'est pas un effluent à létalité aiguë.

(2) Le propriétaire ou l'exploitant ne peut se prévaloir du droit que lui confère le paragraphe (1) que s'il satisfait aux exigences prévues :

a) à l'article 36, dans le cas où une autorisation transitoire permet le rejet;

b) aux articles 6 à 27, dans l'autre cas.

AUTORISATION DE REJETER DANS UN DÉPÔT DE RÉSIDUS MINIERS

5. (1) Malgré l'article 4, le propriétaire ou l'exploitant d'une mine peut rejeter — ou permettre que soient rejetés — des stériles ou un effluent, quel que soit le pH de l'effluent ou sa concentration en substances nocives, dans l'un ou l'autre des dépôts de résidus miniers suivants :

(*a*) a water or place set out in Schedule 2; or

(*b*) a disposal area that is confined by anthropogenic or natural structures or by both, other than a disposal area that is, or is part of, a natural water body that is frequented by fish.

(2) The authority in subsection (1) is conditional on the owner or operator complying with sections 7 to 28.

SOR/2006-239, s. 2.

a) les eaux et lieux mentionnés à l'annexe 2;

b) toute aire de décharge circonscrite par une formation naturelle ou un ouvrage artificiel, ou les deux, à l'exclusion d'une aire de décharge qui est un plan d'eau naturel où vivent des poissons ou qui en fait partie.

(2) Le propriétaire ou l'exploitant ne peut se prévaloir du droit que lui confère le paragraphe (1) que s'il satisfait aux exigences prévues aux articles 7 à 28.

DORS/2006-239, art. 2.

PART 2

CONDITIONS GOVERNING AUTHORITY TO DEPOSIT

DIVISION 1

GENERAL

Prohibition on Diluting Effluent

6. The owner or operator of a mine shall not combine effluent with water or any other effluent for the purpose of diluting effluent before it is deposited.

Environmental Effects Monitoring

7. (1) The owner or operator of a mine shall conduct environmental effects monitoring studies of the potential effects of effluent on the fish population, on fish tissue and on the benthic invertebrate community in accordance with the requirements and within the periods set out in Schedule 5.

(2) The owner or operator shall record the results of the studies and submit the reports and required information to the authorization officer as set out in Schedule 5.

(3) The studies shall be performed using documented and validated methods, and their results interpreted and reported on in accordance with generally accepted standards of good scientific practice at the time that the studies are performed.

SOR/2006-239, s. 3.

Identifying Information

8. (1) The owner or operator of a mine shall submit in writing to the authorization officer the information referred to in subsection (2) not later than 60 days after the day on which one or both of the following occur:

PARTIE 2

CONDITIONS RÉGISSANT L'AUTORISATION DE REJETER

SECTION 1

DISPOSITIONS GÉNÉRALES

Interdiction de diluer

6. Il est interdit au propriétaire ou à l'exploitant d'une mine de combiner un effluent avec de l'eau ou avec tout autre effluent dans le but de le diluer avant son rejet.

Études de suivi des effets sur l'environnement

7. (1) Le propriétaire ou l'exploitant d'une mine mène des études de suivi des effets possibles des effluents sur la population de poissons, sur les tissus de poissons et sur la communauté d'invertébrés benthiques selon les exigences et dans les délais prévus à l'annexe 5.

(2) Il consigne dans un registre les résultats des études et présente les rapports et les renseignements exigés à l'agent d'autorisation selon les exigences prévues à l'annexe 5.

(3) Les études sont réalisées selon des méthodes éprouvées et validées et leurs résultats évalués et présentés conformément aux normes généralement reconnues régissant les bonnes pratiques scientifiques au moment de l'étude.

DORS/2006-239, art. 3.

Renseignements d'identification

8. (1) Le propriétaire ou l'exploitant d'une mine présente par écrit à l'agent d'autorisation les renseignements mentionnés au paragraphe (2) :

(*a*) the mine becomes subject to these Regulations; and

(*b*) ownership of the mine is transferred.

(2) The information that shall be submitted is the name and address of

(*a*) both the owner and the operator of the mine; and

(*b*) any parent company of the owner and the operator.

(3) The owner or operator shall submit in writing to the authorization officer any change in the information not later than 60 days after the change occurs.

Final Discharge Points

9. The owner or operator of a mine shall identify each final discharge point and submit in writing to the authorization officer, not later than 60 days after the day on which the mine becomes subject to these Regulations, the following information:

(*a*) plans, specifications and a general description of each final discharge point together with its location by latitude and longitude, in degrees, minutes and seconds;

(*b*) a description of how each final discharge point is designed and maintained in respect of the deposit of deleterious substances; and

(*c*) the name of the receiving body of water, if there is a name.

SOR/2006-239, s. 4.

10. (1) The owner or operator of a mine shall submit in writing to the authorization officer the information required by section 9, for

(*a*) any final discharge point that is identified by an inspector, and that was not identified as required by section 9, within 30 days after the discharge point is identified; and

(*b*) each new final discharge point, at least 60 days before depositing effluent from that new final discharge point.

(2) The owner or operator shall submit in writing to the authorization officer the information on any proposed

a) dans les soixante jours suivant la date à laquelle la mine devient assujettie au présent règlement;

b) dans les soixante jours suivant le transfert de la propriété de la mine.

(2) Les renseignements à présenter sont :

a) les nom et adresse du propriétaire et de l'exploitant;

b) les nom et adresse de toute société mère du propriétaire et de l'exploitant.

(3) Le propriétaire ou l'exploitant présente par écrit à l'agent d'autorisation des précisions sur tout changement des renseignements dans les soixante jours suivant le changement.

Points de rejet final

9. Le propriétaire ou l'exploitant d'une mine détermine chaque point de rejet final et fournit par écrit à l'agent d'autorisation, dans les soixante jours suivant la date à laquelle la mine devient assujettie au présent règlement, les renseignements suivants :

a) les plans, les spécifications et une description générale de chaque point de rejet final, ainsi que la latitude et la longitude de son emplacement, exprimées en degrés, minutes et secondes;

b) la façon dont chacun des points de rejet final est conçu et entretenu en ce qui a trait au rejet de substances nocives;

c) le nom du milieu aquatique récepteur, si ce nom existe.

DORS/2006-239, art. 4.

10. (1) Le propriétaire ou l'exploitant d'une mine présente par écrit à l'agent d'autorisation les renseignements visés à l'article 9 relativement à :

a) tous les points de rejet final que désigne l'inspecteur et qui n'ont pas été déterminés en application de l'article 9, dans les trente jours suivant leur désignation;

b) tout nouveau point de rejet final, au moins soixante jours avant qu'un effluent en soit rejeté.

(2) Il présente par écrit à l'agent d'autorisation des précisions sur toute modification proposée d'un point de

change to a final discharge point at least 60 days before the change is to be made.

Monitoring Equipment Information

11. The owner or operator of a mine shall keep records relating to effluent monitoring equipment that contain

(*a*) a description of the equipment and, if applicable, the manufacturer's specifications and the year and model number of the equipment; and

(*b*) the results of the calibration tests of the equipment.

DIVISION 2

EFFLUENT MONITORING CONDITIONS

Deleterious Substance and pH Testing

12. (1) Subject to subsection (3), the owner or operator of a mine shall, not less than once per week and at least 24 hours apart, collect from each final discharge point a grab sample or composite sample of effluent and, without delay, record the pH and concentrations of the deleterious substances set out in column 1 of Schedule 4.

(2) Testing conducted under subsection (1) shall comply with the analytical requirements set out in Schedule 3 and shall be done in accordance with generally accepted standards of good scientific practice at the time of the sampling using documented and validated methods.

(3) The owner or operator is not required to collect samples for the purpose of recording the concentrations of cyanide set out as item 3 of Schedule 4 if that substance is not used as a process reagent within the operations area.

SOR/2006-239, s. 5.

13. (1) Despite section 12 and subject to subsection (3), the owner or operator of a mine may reduce the frequency of testing of effluent collected from a final discharge point for a deleterious substance that is set out in any of items 1 to 6, in column 1, of Schedule 4 to not less than once in each calendar quarter if that substance's monthly mean concentration in the effluent collected from

rejet final au moins soixante jours avant que la modification soit apportée.

Renseignements sur l'équipement de surveillance

11. Le propriétaire ou l'exploitant d'une mine tient un registre concernant l'équipement de surveillance des effluents et y consigne :

a) la description de l'équipement et, le cas échéant, les spécifications du fabricant ainsi que l'année et le numéro du modèle de l'équipement;

b) les résultats des essais d'étalonnage de l'équipement.

SECTION 2

CONDITIONS PORTANT SUR LE SUIVI DE L'EFFLUENT

Essais concernant le pH et les substances nocives

12. (1) Sous réserve du paragraphe (3), le propriétaire ou l'exploitant d'une mine prélève, au moins une fois par semaine et à au moins vingt-quatre heures d'intervalle, à partir de chaque point de rejet final, un échantillon instantané ou un échantillon composite d'effluent et enregistre sans délai le pH et les concentrations des substances nocives énumérées à la colonne 1 de l'annexe 4.

(2) Les essais effectués en application du paragraphe (1) doivent satisfaire aux exigences analytiques prévues à l'annexe 3 et doivent être effectués conformément aux normes généralement reconnues régissant les bonnes pratiques scientifiques au moment de l'échantillonnage et selon des méthodes éprouvées et validées.

(3) Le propriétaire ou l'exploitant d'une mine n'a pas à prélever d'échantillon afin d'enregistrer la concentration de cyanure figurant à l'article 3 de l'annexe 4, si cette substance n'est pas utilisée comme réactif de procédé sur le chantier.

DORS/2006-239, art. 5.

13. (1) Malgré l'article 12 et sous réserve du paragraphe (3), le propriétaire ou l'exploitant d'une mine peut réduire la fréquence des essais de l'effluent prélevé à partir d'un point de rejet final, dans le cas d'une substance nocive figurant à l'un des articles 1 à 6 de l'annexe 4, dans la colonne 1, à au moins une fois par trimestre civil, si la concentration moyenne mensuelle de la substance dans

that final discharge point is less than 10% of the value set out in column 2 of that Schedule for the 12 months immediately preceding the most recent test.

(2) Despite section 12 and subject to subsection (3), the owner or operator of a mine, other than an uranium mine, may reduce the frequency of testing for Radium 226 set out as item 8 of Schedule 4 to not less than once in each calendar quarter if that substance's concentration in the effluent is less than 0.037 Bq/L in 10 consecutive tests conducted under section 12.

(3) The owner or operator shall increase the frequency of testing to that prescribed in section 12 for a deleterious substance that is set out in any of items 1 to 6 or 8 of Schedule 4 if the substance's monthly mean concentration is equal to or greater than 10% of the value set out in column 2 of these items.

(4) The owner or operator must notify the authorization officer, in writing, at least 30 days in advance, of a reduction in the frequency of testing.

SOR/2006-239, s. 6.

l'effluent prélevé à ce point de rejet final est inférieure à 10 % de la valeur établie à la colonne 2 de cette annexe durant les douze mois précédant le dernier essai.

(2) Malgré l'article 12 et sous réserve du paragraphe (3), le propriétaire ou l'exploitant d'une mine, autre qu'une mine d'uranium, peut réduire la fréquence des essais, dans le cas du radium 226 figurant à l'article 8 de l'annexe 4, à au moins une fois par trimestre civil, si la concentration de la substance dans l'effluent est inférieure à 0,037 Bq/L dans dix essais consécutifs effectués selon l'article 12.

(3) Il porte la fréquence des essais à celle prévue à l'article 12 pour une substance nocive figurant à l'un des articles 1 à 6 ou 8 de l'annexe 4, dans la colonne 1, si la concentration de cette substance est égale ou supérieure à 10 % de la valeur établie à la colonne 2.

(4) Il avise par écrit l'agent d'autorisation de la réduction de la fréquence des essais, au moins trente jours avant celle-ci.

DORS/2006-239, art. 6.

Acute Lethality Testing

14. (1) Subject to subsection (1.1) and section 15, the owner or operator of a mine shall conduct an acute lethality test, in accordance with the requirements and procedures specified in Reference Method EPS 1/RM/13,

(*a*) once a month, in accordance with the procedure set out in section 5 or 6 of that document, on a grab sample that was collected from each final discharge point; and

(*b*) without delay, in accordance with the procedure set out in section 6 of that document, on a sample taken from the place where the deposit occurred if the deposit occurs out of the normal course of events.

(1.1) The owner or operator who is required to conduct an acute lethality test under paragraph (1)(*b*) is not required to conduct that test if they notify an inspector, or a person referred to in paragraph 29(*a*), that the deposit is an acutely lethal effluent.

(2) For the purposes of paragraph (1)(*a*),

(*a*) the owner or operator shall select and record the sampling date not less than 30 days in advance of collecting the grab sample;

Essai de détermination de la létalité aiguë

14. (1) Sous réserve du paragraphe (1.1) et de l'article 15, le propriétaire ou l'exploitant d'une mine effectue un essai de détermination de la létalité aiguë conformément à la méthode de référence SPE 1/RM/13 :

a) une fois par mois, selon les modes opératoires visés aux sections 5 ou 6 de ce document, sur un échantillon instantané prélevé à partir de chaque point de rejet final;

b) si le rejet est irrégulier, sans délai, selon le mode opératoire visé à la section 6 de ce document sur un échantillon prélevé sur les lieux du rejet.

(1.1) Le propriétaire ou l'exploitant qui est tenu d'effectuer l'essai de détermination de la létalité aiguë en application de l'alinéa (1)*b*) n'a pas à le faire s'il avise sans délai l'inspecteur ou l'une des autorité désignées à l'alinéa 29*a*) que le rejet est un effluent à létalité aiguë.

(2) Pour l'application de l'alinéa (1)*a*) :

a) le propriétaire ou l'exploitant choisit et enregistre, au moins trente jours à l'avance, la date de l'échantillonnage;

(*b*) the operator shall collect the sample on the selected day except if, owing to unforeseen circumstances, the operator cannot sample on that day, in which case, they shall do so as soon as possible after that day; and

(*c*) the operator shall collect the grab samples not less than 15 days apart.

(3) When collecting a grab sample of effluent for the purpose of subsection (1), the owner or operator shall collect a sufficient volume of effluent to enable the owner or operator to comply with paragraph 15(1)(*a*).

SOR/2006-239, s. 7.

Increased Frequency of Acute Lethality Testing

15. (1) If a sample of effluent is determined to be acutely lethal when tested under paragraph 14(1)(*a*), the owner or operator of a mine shall

(*a*) without delay, conduct the effluent characterization set out in subsection 4(1) of Schedule 5 on the aliquot of each grab sample collected under paragraph 14(1)(*a*) and record the concentrations of the deleterious substances set out in column 1 of Schedule 4;

(*b*) collect, from the final discharge point from which the sample was determined to be acutely lethal, a grab sample twice a month and, without delay, conduct an acute lethality test on each grab sample in accordance with the procedure set out in section 6 of Reference Method EPS 1/RM/13 and, if the sample is determined to be acutely lethal, then conduct the effluent characterization set out in subsection 4(1) of Schedule 5 and record the concentrations of the deleterious substances set out in column 1 of Schedule 4; and

(*c*) collect the grab samples not less than seven days apart.

(2) The owner or operator may resume sampling and testing at the frequency prescribed in section 14 if the effluent is determined not to be acutely lethal in three consecutive tests conducted under paragraph (1)(*b*).

SOR/2006-239, s. 8.

b) l'exploitant prélève l'échantillon ce jour-là ou, si des circonstances imprévues empêchent le prélèvement de l'échantillon, le plus tôt possible après ce jour;

c) l'exploitant prélève les échantillons instantanés à au moins quinze jours d'intervalle.

(3) Lors du prélèvement des échantillons instantanés en application du paragraphe (1), il prélève un volume d'effluent suffisant pour lui permettre de se conformer à l'alinéa 15(1)*a*).

DORS/2006-239, art. 7.

Fréquence accrue des essais de détermination de la létalité aiguë

15. (1) S'il est établi qu'un échantillon d'effluent présente une létalité aiguë selon l'essai prévu à l'alinéa 14(1)*a*), le propriétaire ou l'exploitant d'une mine :

a) effectue sans délai la caractérisation de l'effluent conformément au paragraphe 4(1) de l'annexe 5 sur une portion aliquote de chaque échantillon instantané prélevé en application de l'alinéa 14(1)*a*) et enregistre les concentrations des substances nocives énumérées à la colonne 1 de l'annexe 4;

b) deux fois par mois, prélève un échantillon instantané à partir du point de rejet final d'où l'échantillon d'effluent qui présente une létalité aiguë a été prélevé, effectue sans délai sur chacun de ces échantillons un essai de détermination de la létalité aiguë selon le mode opératoire prévu à la section 6 de la méthode de référence SPE 1/RM/13 et, s'il est établi que l'échantillon présente une létalité aiguë selon cet essai, effectue la caractérisation de l'effluent conformément au paragraphe 4(1) de l'annexe 5 et enregistre les concentrations des substances nocives énumérées à la colonne 1 de l'annexe 4;

c) prélève les échantillons instantanés à au moins sept jours d'intervalle.

(2) Il peut recommencer à effectuer l'échantillonnage et les essais à la fréquence fixée à l'article 14 si l'effluent ne présente pas de létalité aiguë dans trois essais consécutifs effectués selon l'alinéa (1)*b*).

DORS/2006-239, art. 8.

Reduced Frequency of Acute Lethality Testing

16. (1) The owner or operator of a mine may reduce the frequency of conducting acute lethality tests prescribed in paragraph 14(1)(*a*) to once in each calendar quarter if the effluent is determined not to be acutely lethal over a period of 12 consecutive months.

(2) For the purpose of determining whether effluent is acutely lethal in the 12-month period referred to in subsection (1), the owner or operator shall use the results of the acute lethality tests conducted under paragraph 14(1)(*a*).

(3) Despite subsection (2), for the purpose of determining whether effluent is acutely lethal in the 12-month period referred to in subsection (1), the owner or operator may also use acute lethality data collected during twelve consecutive months prior to the date of registration of these Regulations, if the owner or operator submits a report to the authorization officer that indicates that the data

(*a*) meets the quality assurance requirements of Reference Method EPS 1/RM/13;

(*b*) relates to effluent generated after the start of commercial operation by the mine; and

(*c*) was collected not more than 36 months before the registration of these Regulations.

(4) The owner or operator who reduces the frequency of conducting acute lethality testing under subsection (1) shall

(*a*) select and record the sampling date not less than 30 days in advance of collecting the grab samples; and

(*b*) collect the grab samples not less than 45 days apart.

(5) If a grab sample is determined to be acutely lethal while the testing is proceeding in accordance with subsection (1), the owner or operator shall increase the frequency and conduct the testing as prescribed in section 15.

Fréquence réduite des essais de détermination de la létalité aiguë

16. (1) Le propriétaire ou l'exploitant d'une mine peut réduire à une fois par trimestre civil la fréquence des essais de détermination de la létalité aiguë prévue à l'alinéa 14(1)*a*) s'il est établi que l'effluent ne présente pas de létalité aiguë pendant douze mois consécutifs.

(2) Pour déterminer la létalité aiguë de l'effluent pendant la période de douze mois prévue au paragraphe (1), le propriétaire ou l'exploitant se fonde sur les résultats obtenus aux termes de l'alinéa 14(1)*a*).

(3) Malgré le paragraphe (2), pour déterminer la létalité aiguë de l'effluent pendant la période de douze mois prévue au paragraphe (1), le propriétaire ou l'exploitant peut utiliser les données d'essai de détermination de la létalité aiguë recueillies pendant toute période de douze mois consécutifs précédant l'enregistrement du présent règlement, s'il présente un rapport à l'agent d'autorisation indiquant ce qui suit :

a) les données satisfont aux exigences de qualité prévues par la méthode de référence SPE 1/RM/13;

b) elles se rapportent à l'effluent émanant de la mine après le début de son exploitation commerciale;

c) elles ont été recueillies au cours des trente-six mois précédant l'enregistrement du présent règlement.

(4) Le propriétaire ou l'exploitant qui réduit la fréquence des essais en application du paragraphe (1) prend les mesures suivantes :

a) il choisit et enregistre, au moins trente jours à l'avance, la date de l'échantillonnage;

b) il prélève les échantillons instantanés à au moins quarante-cinq jours d'intervalle.

(5) S'il est établi qu'un échantillon instantané d'effluent présente une létalité aiguë pendant que les essais sont effectués conformément au paragraphe (1), le propriétaire ou l'exploitant porte la fréquence des essais à celle prévue à l'article 15 et effectue les essais conformément à cet article.

Daphnia magna Monitoring Tests

17. (1) The owner or operator of a mine shall conduct *Daphnia magna* monitoring tests in accordance with the procedure set out in section 5 or 6 of Reference Method EPS 1/RM/14 at the same time that the acute lethality tests are conducted under section 14, 15 or 16 of these Regulations.

(2) The owner or operator shall conduct *Daphnia magna* monitoring tests on the aliquots of each effluent sample collected for the acute lethality tests.

Obligation to Record All Test Results

18. The owner or operator of a mine shall record without delay the information specified by section 8.1 of Reference Method EPS 1/RM/13 and by section 8.1 of Reference Method EPS 1/RM/14 for all acute lethality and *Daphnia magna* monitoring tests that are conducted to monitor deposits from final discharge points.

Volume of Effluent

19. (1) The owner or operator of a mine shall record, in cubic metres, the total monthly volume of effluent deposited from each final discharge point for each month during which there was a deposit.

(2) The total monthly volume of effluent deposited shall be either

(*a*) determined on the basis of the average of the flow rates, expressed in cubic metres per day, measured and calculated as follows:

(i) by measuring the flow rate at the same time as samples are collected under section 12,

(ii) by calculating the average monthly flow rate by adding the flow rate measurements taken during the month and dividing the total by the number of times the flow rate was measured, and

(iii) by multiplying the average monthly flow rate by the number of days during the month that effluent was deposited; or

(*b*) determined by using a monitoring system that provides a continuous measure of the volume of effluent released.

Essai de suivi avec biœssais sur la Daphnia magna

17. (1) Le propriétaire ou l'exploitant d'une mine qui fait des essais de détermination de la létalité aiguë en application des articles 14, 15 ou 16 effectue au même moment des essais de suivi avec biœssais sur la *Daphnia magna* selon les modes opératoires prévus aux sections 5 ou 6 de la méthode de référence SPE 1/RM/14.

(2) Il effectue chaque essai de suivi sur des portions aliquotes de chaque échantillon d'effluent prélevé pour les essais de détermination de la létalité aiguë.

Enregistrement des renseignements

18. Le propriétaire ou l'exploitant d'une mine enregistre sans délai les données visées au paragraphe 8.1 de la méthode de référence SPE 1/RM/13 et au paragraphe 8.1 de la méthode de référence SPE 1/RM/14 pour tous les essais de détermination de la létalité aiguë et tous les essais de suivi avec biœssais sur la *Daphnia magna* effectués dans le cadre du suivi des rejets provenant de points de rejet final.

Volume d'effluent

19. (1) Le propriétaire ou l'exploitant d'une mine enregistre, en mètres cubes, le volume mensuel total d'effluent rejeté à partir de chaque point de rejet final, pour chaque mois au cours duquel un effluent a été rejeté.

(2) Le volume mensuel total d'effluent rejeté est :

a) soit fondé sur la moyenne des débits, exprimée en mètres cubes par jour, auquel cas il est déterminé de la façon suivante :

(i) le débit est mesuré au moment où les échantillons sont prélevés en application de l'article 12,

(ii) la moyenne mensuelle des débits est calculée par la division du total des mesures de débit enregistrées au cours du mois par le nombre de mesures prises,

(iii) la moyenne mensuelle des débits est multipliée par le nombre de jours où l'effluent a été rejeté;

b) soit déterminé à l'aide d'un système à mesure continue.

(3) The owner or operator shall

(*a*) measure the flow rate or volume of effluent deposited by using a monitoring system that is accurate to within 15% of measured flow rate or volume; and

(*b*) calibrate the monitoring system not less than once in each year and record the results.

SOR/2006-239, s. 9.

Calculation of Monthly Mean Concentration and Loading

19.1 (1) With respect to deleterious substances contained in effluent deposited from each final discharge point, the owner or operator of a mine shall, for each month during which there was a deposit, record the monthly mean concentration

(*a*) in mg/L for deleterious substances referred to in items 1 to 7, in column 1, of Schedule 4; or

(*b*) in Bq/L for a deleterious substance referred to in item 8, in column 1, of that Schedule.

(2) If the analytical result from any test conducted under section 12 or 13 is less than the method detection limit used for that test, the test result shall be considered to be equal to one half of the detection limit used for the purpose of calculating the monthly mean concentration.

SOR/2006-239, s. 9.

20. (1) With respect to deleterious substances contained in effluent deposited from each final discharge point, the owner or operator of a mine shall, for each month and for each calendar quarter during which there was a deposit, record the loading

(*a*) in kg for deleterious substances referred to in items 1 to 7, in column 1, of Schedule 4; or

(*b*) in MBq for a deleterious substance referred to in item 8, in column 1, of that Schedule.

(2) The owner or operator shall determine the loading for each month using the following formula:

$$ML = C \times V / 1{,}000$$

where

(3) Le propriétaire ou l'exploitant mesure le volume ou le débit d'effluent rejeté en tenant compte des exigences suivantes :

a) il utilise à cette fin un système de surveillance donnant des mesures exactes à 15 % près;

b) il étalonne le système de surveillance au moins une fois par année et enregistre les résultats.

DORS/2006-239, art. 9.

Calcul de la concentration moyenne mensuelle et de la charge

19.1 (1) À l'égard des substances nocives se trouvant dans l'effluent rejeté à partir de chaque point de rejet final, le propriétaire ou l'exploitant d'une mine enregistre, pour chaque mois au cours duquel un effluent a été rejeté :

a) la concentration moyenne mensuelle en mg/L des substances nocives énumérées aux articles 1 à 7 de l'annexe 4, dans la colonne 1;

b) la concentration moyenne mensuelle en Bq/L de la substance figurant à l'article 8 de la même annexe, dans la colonne 1.

(2) Si le résultat analytique de tout essai effectué en application des articles 12 ou 13 est inférieur à la limite de détection de la méthode utilisée pour l'essai, il est considéré comme égal à la moitié de la limite de détection de la méthode utilisée pour le calcul de la concentration moyenne mensuelle.

DORS/2006-239, art. 9.

20. (1) À l'égard des substances nocives se trouvant dans l'effluent rejeté à partir de chaque point de rejet final, le propriétaire ou l'exploitant d'une mine enregistre, pour chaque mois et pour chaque trimestre civil au cours duquel un effluent a été rejeté :

a) la charge en kg des substances nocives énumérées aux articles 1 à 7 de l'annexe 4, dans la colonne 1;

b) la charge en MBq de la substance figurant à l'article 8 de la même annexe, dans la colonne 1.

(2) Il détermine la charge pour chaque mois civil selon la formule suivante :

$$CM = C \times V / 1\ 000$$

où :

ML is the loading for a month;
C is the monthly mean concentration of the deleterious substance, recorded under section 19.1; and
V is the total monthly volume of effluent deposited from each final discharge point, recorded under section 19.

(3) The owner or operator shall determine the loading for each calendar quarter using the following formula:

$$QL = C \times V / 1{,}000$$

where
QL is the loading for a calendar quarter;
C is the mean of the monthly mean concentrations of the deleterious substance for that calendar quarter, recorded under section 19.1; and
V is the total volume of effluent deposited from each final discharge point during that calendar quarter, based on the sum of the total monthly volumes of effluent deposited from each final discharge point, recorded under section 19.

SOR/2006-239, s. 9.

CM représente la charge pour un mois;
C la concentration moyenne mensuelle de la substance nocive enregistrée en application de l'article 19.1;
V le volume total d'effluent rejeté à partir de chaque point de rejet final au cours du mois et enregistré en application de l'article 19.

(3) Il détermine la charge pour le trimestre civil selon la formule suivante :

$$CT = C \times V / 1\ 000$$

où :
CT représente la charge pour un trimestre;
C la moyenne des concentrations moyennes mensuelles de la substance nocive enregistrées au cours du trimestre en application de l'article 19.1;
V le volume total d'effluent rejeté à partir de chaque point de rejet final au cours du trimestre, fondé sur la somme des volumes mensuels d'effluent rejeté à partir de chaque point de rejet final et enregistrés en application de l'article 19.

DORS/2006-239, art. 9.

Reporting Monitoring Results

21. (1) The owner or operator of a mine shall submit to the authorization officer an effluent monitoring report for all tests and monitoring conducted during each calendar quarter not later than 45 days after the end of the quarter.

(2) Subject to subsection (3), the effluent monitoring report shall include

(*a*) the information specified by section 8.1 of Reference Method EPS 1/RM/13 and by section 8.1 of Reference Method EPS 1/RM/14 as required by section 18;

(*b*) the concentration and monthly mean concentration of each deleterious substance set out in column 1 of Schedule 4 that is contained in effluent samples collected under subsection 12(1) and the concentrations of such deleterious substances contained in effluent samples collected under subsection 13(1) or (2);

(*c*) the pH of the effluent samples as required by subsection 12(1);

(*d*) whether a composite or grab sample collection method was used for each effluent sample as required by subsection 12(1);

Rapports sur les résultats de suivi

21. (1) Le propriétaire ou l'exploitant d'une mine présente à l'agent d'autorisation un rapport sur le suivi de l'effluent pour tout essai ou mesure de suivi effectué au cours de chaque trimestre civil, dans les quarante-cinq jours suivant la fin du trimestre.

(2) Sous réserve du paragraphe (3), le rapport comporte ce qui suit :

a) les données visées à la section 8.1 de la méthode de référence SPE 1/RM/13 et à la section 8.1 de la méthode de référence SPE 1/RM/14, qu'exige l'article 18;

b) la concentration et la concentration moyenne mensuelle des substances nocives énumérées à la colonne 1 de l'annexe 4 se trouvant dans les échantillons d'effluent prélevés en application du paragraphe 12(1) de même que la concentration de ces substances nocives dans les échantillons d'effluent prélevés en application des paragraphes 13(1) ou (2);

c) le pH des échantillons, exigé par le paragraphe 12(1);

d) pour chaque échantillon d'effluent prélevé en application du paragraphe 12(1), s'il s'agit d'un échantillon composite ou instantané;

(*d.1*) for each month of the calendar quarter, the number of days that effluent was deposited;

(*e*) the total volume of effluent deposited during each month of the reporting quarter as recorded under section 19;

(*f*) the mass loading of the deleterious substances set out in column 1 of Schedule 4 as recorded under section 20; and

(*g*) the results of the effluent characterization conducted under paragraph 15(1)(*a*).

(3) If no effluent is deposited in a calendar quarter, the report shall only include a statement to that effect.

SOR/2006-239, s. 10.

22. The owner or operator of a mine shall submit to the authorization officer, not later than March 31 in each year, a report summarizing the effluent monitoring results for the previous calendar year including the information set out in Schedule 6 and in the form set out in that Schedule.

SOR/2006-239, s. 11.

23. Each report referred to in sections 7, 21 and 22 shall be submitted electronically in the format provided by the federal Department of the Environment, but the report shall be submitted in writing if

(*a*) no such format has been provided; or

(*b*) it is, owing to circumstances beyond the control of either the owner or the operator, impracticable to submit the report electronically in the format provided.

SOR/2006-239, s. 11.

24. (1) The owner or operator of a mine shall notify an inspector without delay if the results of the effluent monitoring tests conducted under section 12 or 13, paragraph 14(1)(*a*) or section 15 or 16 indicate that

(*a*) the limits set out in Schedule 4 are being or have been exceeded;

(*b*) the pH of the effluent is less than 6.0 or greater than 9.5; or

(*c*) an effluent is acutely lethal.

d.1) pour chaque mois du trimestre civil, le nombre de jours où il y a eu rejet d'effluent;

e) le volume total d'effluent rejeté pour chaque mois du trimestre, enregistré en application de l'article 19;

f) la charge des substances nocives énumérées à la colonne 1 de l'annexe 4 enregistrée en application de l'article 20;

g) les résultats des essais de caractérisation de l'effluent effectués conformément à l'alinéa 15(1)*a*).

(3) Si au cours d'un trimestre civil aucun effluent n'a été rejeté, le rapport ne comporte qu'une mention à cet effet.

DORS/2006-239, art. 10.

22. Le propriétaire ou l'exploitant d'une mine présente à l'agent d'autorisation, au plus tard le 31 mars de chaque année, un rapport résumant les résultats du suivi de l'effluent pour l'année civile précédente et comportant les renseignements prévus à l'annexe 6, en la forme qui y est prévue.

DORS/2006-239, art. 11.

23. Les rapports visés aux articles 7, 21 et 22 sont présentés sous forme électronique selon le modèle fourni par le ministère de l'Environnement du Canada. Ils sont toutefois présentés par écrit dans l'un ou l'autre des cas suivants :

a) aucun modèle n'est fourni;

b) il est pratiquement impossible, pour des raisons indépendantes de la volonté du propriétaire ou de l'exploitant, selon le cas, de les présenter sous forme électronique selon le modèle fourni.

DORS/2006-239, art. 11.

24. (1) Le propriétaire ou l'exploitant d'une mine avise sans délai l'inspecteur si les résultats des essais de suivi de l'effluent effectués en application des articles 12 ou 13, de l'alinéa 14(1)*a*) ou des articles 15 ou 16 montrent que :

a) les limites prévues à l'annexe 4 sont ou ont été dépassées;

b) le pH de l'effluent est inférieur à 6,0 ou supérieur à 9,5;

(2) The owner or operator shall provide a written report of the test results to the inspector within 30 days after the tests have been completed.

(3) Subsections (1) and (2) do not apply to the owner or operator of a mine with a valid transitional authorization.

SOR/2006-239, s. 12.

Relief

25. (1) Any time period specified for collecting samples of effluent referred to in this Division may be extended if

(*a*) unforeseen circumstances cause safety concerns or access problems and render the collection of samples of effluent impracticable; and

(*b*) the owner or operator of a mine notifies an inspector, without delay, of the circumstances and indicates when they expect to be able to collect the samples.

(2) The owner or operator shall collect the samples of effluent without delay when the circumstances permit.

SOR/2006-239, s. 13.

DIVISION 3

NOTICE, RECORDS AND OTHER DOCUMENTS

End of Commercial Operation Notice

26. (1) The owner or operator of a mine shall notify the authorization officer in writing of the day on which the mine has stopped commercial operation not later than 90 days after the end of commercial operation.

(2) The owner or operator shall notify the authorization officer in writing without delay if the mine returns to commercial operation.

Records, Books of Account or Other Documents

27. Subject to subsection 32(4), the owner or operator of a mine shall keep all records, books of account or other documents required by these Regulations at the mine's lo-

c) l'effluent est un effluent à létalité aiguë.

(2) Il présente à l'inspecteur un rapport écrit des résultats des essais dans les trente jours suivant la fin de ceux-ci.

(3) Les paragraphes (1) et (2) ne s'appliquent pas au propriétaire ou à l'exploitant d'une mine ayant une autorisation transitoire valide.

DORS/2006-239, art. 12.

Dispense

25. (1) Les délais prévus dans la présente section à l'égard du prélèvement des échantillons d'effluent peuvent être prorogés si les conditions suivantes sont réunies :

a) des circonstances imprévues provoquent des problèmes de sécurité ou d'accessibilité et rendent le prélèvement d'échantillons d'effluent pratiquement impossible;

b) le propriétaire ou l'exploitant d'une mine a avisé l'inspecteur sans délai des circonstances et lui a indiqué le moment où il croit pouvoir procéder au prélèvement des échantillons.

(2) Le propriétaire ou l'exploitant prélève les échantillons d'effluent sans délai dès que les circonstances le permettent.

DORS/2006-239, art. 13.

SECTION 3

AVIS, REGISTRES ET AUTRES DOCUMENTS

Avis de la fin de l'exploitation commerciale

26. (1) Le propriétaire ou l'exploitant d'une mine avise l'agent d'autorisation par écrit de la date où l'exploitation commerciale de la mine a cessé, dans les quatre-vingt-dix jours suivant la cessation.

(2) Il avise l'agent d'autorisation, par écrit et sans délai, de la reprise de l'exploitation commerciale.

Registres, livres comptables ou autres documents

27. Sous réserve du paragraphe 32(4), le propriétaire ou l'exploitant d'une mine conserve tous les registres, livres comptables ou autres documents exigés par le

cation for a period of not less than five years, beginning on the day they are made.

DIVISION 4

TAILINGS IMPOUNDMENT AREAS

Compensation Plan

27.1 (1) The owner or operator of a mine shall submit to the Minister for approval a compensation plan and obtain the Minister's approval of that plan before depositing a deleterious substance into a tailings impoundment area that is added to Schedule 2 after the coming into force of this section.

(2) The purpose of the compensation plan is to offset for the loss of fish habitat resulting from the deposit of a deleterious substance into the tailings impoundment area.

(3) The compensation plan shall contain the following elements:

(*a*) a description of the location of the tailings impoundment area and the fish habitat affected by the deposit;

(*b*) a quantitative impact assessment of the deposit on the fish habitat;

(*c*) a description of the measures to be taken to offset the loss of fish habitat caused by the deposit;

(*d*) a description of the measures to be taken during the planning and implementation of the compensation plan to mitigate any potential adverse effect on the fish habitat that could result from the plan's implementation;

(*e*) a description of measures to be taken to monitor the plan's implementation;

(*f*) a description of the measures to be taken to verify the extent to which the plan's purpose has been achieved;

(*g*) a description of the time schedule for the plan's implementation, which time schedule shall provide for achievement of the plan's purpose within a reasonable time; and

(*h*) an estimate of the cost of implementing each element of the plan.

(4) The owner or operator shall submit with the compensation plan an irrevocable letter of credit to cover the

présent règlement à l'emplacement de la mine pendant au moins cinq ans à compter de leur établissement.

SECTION 4

DÉPÔTS DE RÉSIDUS MINIERS

Plan compensatoire

27.1 (1) Le propriétaire ou l'exploitant d'une mine présente au ministre un plan compensatoire pour approbation et doit obtenir celle-ci avant de rejeter des substances nocives dans tout dépôt de résidus miniers qui est ajouté à l'annexe 2 après l'entrée en vigueur du présent article.

(2) Le plan compensatoire a pour objectif de contrebalancer la perte d'habitat du poisson consécutive au rejet de substances nocives dans le dépôt de résidus miniers.

(3) Le plan compensatoire comporte des dispositions portant sur les éléments suivants :

a) une description de l'emplacement du dépôt de résidus miniers et de l'habitat du poisson atteint par le rejet de substances nocives;

b) l'analyse quantitative de l'incidence du rejet sur l'habitat du poisson;

c) les mesures visant à contrebalancer la perte d'habitat du poisson;

d) les mesures envisagées durant la planification et la mise en œuvre du plan pour atténuer les effets défavorables sur l'habitat du poisson qui pourraient résulter de la mise en œuvre du plan;

e) les mesures de surveillance de la mise en œuvre du plan;

f) les mécanismes visant à établir dans quelle mesure les objectifs du plan ont été atteints;

g) le délai pour la mise en œuvre du plan, lequel délai permet l'atteinte des objectifs prévus dans un délai raisonnable;

h) l'estimation du coût de mise en œuvre de chacun des éléments du plan.

(4) Le propriétaire ou l'exploitant présente, avec le plan compensatoire, une lettre de crédit irrévocable couvrant

plan's implementation costs, which letter of credit shall be payable upon demand on the declining balance of the implementation costs.

(5) The Minister shall approve the compensation plan if it meets the requirements of subsections (2) and (3) and the owner or operator has complied with subsection (4).

(6) The owner or operator shall ensure that the compensation plan approved by the Minister is implemented.

(7) If the measures referred to in paragraph (3)(*f*) reveal that the compensation plan's purpose is not being achieved, the owner or operator shall inform the Minister and, as soon as possible in the circumstances, identify and implement all necessary remedial measures.

SOR/2006-239, s. 14.

les coûts de mise en œuvre du plan et payable sur demande à l'égard du coût des éléments du plan qui n'ont pas été mis en œuvre.

(5) Le ministre approuve le plan compensatoire si les exigences des paragraphes (2) et (3) ont été remplies et si le propriétaire ou l'exploitant s'est conformé aux exigences du paragraphe (4).

(6) Le propriétaire ou l'exploitant veille à ce que le plan compensatoire soit mis en œuvre.

(7) Si les mécanismes visés à l'alinéa (3)*f*) révèlent que les objectifs n'ont pas été atteints, le propriétaire ou l'exploitant en informe le ministre et, le plus tôt possible dans les circonstances, détermine et prend les mesures correctives nécessaires à l'atteinte des objectifs.

DORS/2006-239, art. 14.

Deposits from Tailings Impoundment Areas

28. (1) The owner or operator of a mine shall deposit effluent from a tailings impoundment area only through a final discharge point that is monitored and reported on in accordance with the requirements of these Regulations.

(2) The owner or operator of a mine shall comply with section 6 and the conditions prescribed in paragraphs 4(1)(*a*) to (*c*) for all effluent that exits a tailing impoundment area.

Rejets à partir de dépôts de résidus miniers

28. (1) Le propriétaire ou l'exploitant d'une mine ne rejette l'effluent provenant d'un dépôt de résidus miniers qu'à un point de rejet final faisant l'objet d'un suivi et de rapports conformément aux exigences du présent règlement.

(2) Il remplit les conditions prévues aux alinéas 4(1)*a*) à *c*) et se conforme à l'article 6 lorsqu'il rejette un tel effluent.

PART 3

DEPOSITS OUT OF THE NORMAL COURSE OF EVENTS

Prescribed Persons

[SOR/2006-239, s. 15(E)]

29. For the purpose of subsection 38(4) of the Act, the following persons are prescribed:

(*a*) the persons providing 24-hour emergency telephone service provided by the office set out in column 2 of Schedule 6.1 for the province, set out in column 1, where the mine is located; and

(*b*) the person occupying the position set out in column 3 of that Schedule, for the province, set out in column 1, where the mine is located.

SOR/2006-239, s. 16.

PARTIE 3

REJETS IRRÉGULIERS

Autorités désignées

[DORS/2006-239, art. 15(A)]

29. Pour l'application du paragraphe 38(4) de la Loi, les autorités sont les suivantes :

a) le personnel du service téléphonique d'urgence de vingt-quatre heures fourni par les secteurs énumérés à la colonne 2 de l'annexe 6.1, selon la province, mentionnée à la colonne 1, où la mine est située;

b) la personne qui occupe le poste mentionné à la colonne 3 de cette annexe, selon la province, mentionnée à la colonne 1, où la mine est située.

DORS/2006-239, art. 16.

EMERGENCY RESPONSE PLAN

30. (1) The owner or operator of a mine shall prepare an emergency response plan that describes the measures to be taken in respect of a deleterious substance within the meaning of subsection 34(1) of the Act to prevent any deposit out of the normal course of events of such a substance or to mitigate the effects of such a deposit.

(2) The emergency response plan shall include the following elements:

(*a*) the identification of any deposit out of the normal course of events that can reasonably be expected to occur at the mine and that can reasonably be expected to result in damage or danger to fish habitat or fish or the use by man of fish, and the identification of the damage or danger;

(*b*) a description of the measures to be used to prevent, prepare for and respond to a deposit identified under paragraph (*a*);

(*c*) a list of the individuals who are to implement the plan in the event of a deposit out of the normal course of events, and a description of their roles and responsibilities;

(*d*) the identification of the emergency response training required for each of the individuals listed under paragraph (*c*);

(*e*) a list of the emergency response equipment included as part of the plan, and the equipment's location; and

(*f*) alerting and notification procedures including the measures to be taken to notify members of the public who may be adversely affected by a deposit identified under paragraph (*a*).

(3) The owner or operator shall complete the emergency response plan and have it available for inspection no later than 60 days after the mine becomes subject to this section.

(4) The owner or operator shall update and test the emergency response plan at least once each year to ensure that the plan continues to meet the requirements of subsection (2).

(5) If a mine has not been subject to the requirements of this section for more than one year, a new emergency response plan shall be prepared and completed no later

PLAN D'INTERVENTION D'URGENCE

30. (1) Le propriétaire ou l'exploitant d'une mine dresse un plan d'intervention d'urgence qui énonce, à l'égard d'une substance nocive au sens du paragraphe 34(1) de la Loi, les mesures à prendre pour prévenir tout rejet irrégulier d'une telle substance ou pour en atténuer les effets.

(2) Le plan d'intervention d'urgence comporte en outre les éléments suivants :

a) la mention de tout rejet irrégulier qui est susceptible de se produire à la mine et d'entraîner des risques réels de dommage pour le poisson ou son habitat ou pour l'utilisation par l'homme du poisson, ainsi que le détail de ces risques ou dommages;

b) le détail des mesures préventives, de préparation et d'intervention à l'égard du rejet irrégulier mentionné au titre de l'alinéa *a*);

c) la liste des personnes chargées de mettre à exécution le plan en cas de rejet irrégulier ainsi qu'une description de leurs rôles et responsabilités;

d) la mention de la formation en intervention d'urgence exigée des personnes visées à l'alinéa *c*);

e) la liste de l'équipement d'intervention d'urgence prévu dans le plan et l'emplacement de cet équipement;

f) les procédures d'alerte et de notification, notamment les mesures prévues pour avertir les membres du public auxquels le rejet irrégulier mentionné au titre de l'alinéa *a*) pourrait causer un préjudice.

(3) Le propriétaire ou l'exploitant termine le plan d'intervention d'urgence, lequel doit être disponible pour inspection, dans les soixante jours suivant la date à laquelle la mine devient assujettie au présent article.

(4) Il tient à jour et met à l'essai le plan d'intervention d'urgence au moins une fois par année afin de veiller à ce que celui-ci satisfasse aux exigences du paragraphe (2).

(5) Si la mine n'a pas été assujettie au présent article pendant plus d'un an, un nouveau plan d'intervention

than 60 days after the day on which the mine again becomes subject to this section.

SOR/2006-239, s. 16.

d'urgence est dressé — et doit être terminé — dans les soixante jours suivant la date à laquelle elle le redevient.

DORS/2006-239, art. 16.

REPORTING

31. (1) Any person required by subsection 38(4) of the Act to report the occurrence of a deposit out of the normal course of events of a deleterious substance within the meaning of subsection 34(1) of the Act, or to report if there is a serious and imminent danger of such a deposit, shall without delay report the occurrence or danger to an inspector, or to a person referred to in paragraph 29(*a*), and shall, if a deposit has occurred, submit a written report to the inspector, or the person referred to in paragraph 29(*b*), as soon as possible in the circumstances and in any event not later than 30 days after the deposit occurred.

RAPPORT

31. (1) Toute personne tenue de faire rapport aux termes du paragraphe 38(4) de la Loi, d'un rejet irrégulier — effectif, ou fort probable et imminent — d'une substance nocive au sens du paragraphe 34(1) de la Loi en avise sans délai l'inspecteur ou l'une des autorités désignées à l'alinéa 29*a*) et, s'agissant d'un rejet effectif, présente un rapport écrit à l'inspecteur ou à la personne désignée à l'alinéa 29*b*) le plus tôt possible dans les circonstances, mais au plus tard trente jours après la date du rejet.

(2) The written report shall contain

(*a*) the name, description and concentration of the deleterious substance deposited;

(*b*) the estimated quantity of the deposit and how the estimate was achieved;

(*c*) the quantity of any deleterious substance that was deposited at a place other than through a final discharge point and the identification of that place;

(*d*) the quantity of any deleterious substance that was deposited through a final discharge point and the identification of that discharge point;

(*e*) the name of the receiving body of water, if there is a name and, if not, the location by latitude and longitude, in degrees, minutes and seconds, where the deleterious substance entered the receiving body of water;

(*f*) the results of the acute lethality test conducted under paragraph 14(1)(*b*);

(*g*) a statement that an acute lethality test was not conducted but that notification was given under subsection 14(1.1), as the case may be; and

(*h*) the circumstances of the deposit, the measures that were taken to mitigate the effects of the deposit and, if the emergency response plan was implemented, details concerning its implementation.

SOR/2006-239, s. 17.

(2) Le rapport comporte :

a) le nom, la description et la concentration de la substance nocive rejetée;

b) la quantité estimative du rejet ainsi que la méthode d'estimation utilisée;

c) la quantité de toute substance nocive qui a été rejetée à partir d'un lieu autre qu'un point de rejet final, et la mention de ce lieu;

d) la quantité de toute substance nocive qui a été rejetée à partir d'un point de rejet final, et la mention de celui-ci;

e) le nom du milieu aquatique récepteur, si ce nom existe et, si ce nom n'existe pas, la latitude et la longitude, exprimées en degrés, minutes et secondes, du point de pénétration de la substance nocive dans le milieu aquatique;

f) les résultats de l'essai de détermination de la létalité aiguë effectué en application de l'alinéa 14(1)*b*);

g) une attestation que l'essai de détermination de la létalité aiguë n'a pas été effectué mais qu'un avis a été donné en application du paragraphe 14(1.1), le cas échéant;

h) les circonstances du rejet, les mesures d'atténuation prises et, si le plan d'intervention d'urgence a été mis en œuvre, le détail de son application.

DORS/2006-239, art. 17.

PART 4

RECOGNIZED CLOSED MINES

Requirements

32. (1) An owner or operator who intends to close a mine shall

(*a*) provide written notice of that intention to the authorization officer;

(*b*) maintain the mine's rate of production at less than 10% of its design rated capacity for a continuous period of three years starting on the day that the written notice is received by the authorization officer; and

(*c*) conduct a biological monitoring study during the three-year period referred to in paragraph (*b*) in accordance with Division 3 of Part 2 of Schedule 5.

(2) If the owner or operator has complied with all of the requirements set out in paragraphs (1)(*a*) to (*c*), the mine becomes a recognized closed mine after the expiry of the three-year period referred to in subsection (1).

(3) The owner or operator shall notify the authorization officer in writing at least 60 days before reopening the recognized closed mine.

(4) The owner or operator referred to in this section shall keep at any place in Canada all records, books of account or other documents required by these Regulations for a period of not less than five years beginning on the day they are made, and shall notify the authorization officer in writing of their location.

SOR/2006-239, s. 18.

Identifying Information

33. (1) The owner or operator of a recognized closed mine shall submit in writing to the authorization officer the information referred to in subsection (2) not later than 60 days after the day on which

(*a*) the recognized closed mine becomes subject to these Regulations; or

(*b*) ownership of the recognized closed mine is transferred.

(2) The information that shall be submitted is the name and address of

PARTIE 4

MINES FERMÉES RECONNUES

Exigences

32. (1) Le propriétaire ou l'exploitant qui souhaite fermer sa mine :

a) en avise l'agent d'autorisation par écrit;

b) maintient la mine, durant une période continue de trois ans commençant à la date de réception de l'avis, à un taux de production inférieur à 10 % de sa capacité nominale;

c) effectue, durant la période prévue à l'alinéa *b*), une étude de suivi biologique conformément à la section 3 de la partie 2 de l'annexe 5.

(2) La mine devient une mine fermée reconnue à l'expiration de la période de trois ans prévue au paragraphe (1) si le propriétaire ou l'exploitant s'est conformé aux exigences visées aux alinéas (1)*a*) à *c*).

(3) Le propriétaire ou l'exploitant avise par écrit l'agent d'autorisation de la réouverture de la mine fermée reconnue au moins soixante jours avant la réouverture.

(4) Le propriétaire ou l'exploitant visé par le présent article conserve n'importe où au Canada tous les registres, livres comptables ou autres documents exigés par le présent règlement pendant au moins cinq ans à compter de leur établissement et avise l'agent d'autorisation par écrit du lieu où ils se trouvent.

DORS/2006-239, art. 18.

Renseignements d'identification

33. (1) Le propriétaire ou l'exploitant d'une mine fermée reconnue présente par écrit à l'agent d'autorisation les renseignements mentionnés au paragraphe (2) :

a) dans les soixante jours suivant la date à laquelle la mine fermée reconnue devient assujettie au présent règlement;

b) dans les soixante jours suivant le transfert de propriété de la mine fermée reconnue.

(2) Les renseignements à présenter sont :

a) les nom et adresse du propriétaire et de l'exploitant;

(*a*) both the owner and the operator of the recognized closed mine; and

(*b*) any parent company of the owner or the operator.

(3) The owner or operator shall notify the authorization officer of any change in the information not later than 60 days after the change occurs.

b) les nom et adresse de toute société mère du propriétaire ou de l'exploitant.

(3) Le propriétaire ou l'exploitant avise l'agent d'autorisation de tout changement des renseignements dans les soixante jours suivant le changement.

PART 5

TRANSITIONAL AUTHORIZATIONS

Application for Transitional Authorization

34. (1) The owner or operator of a mine may apply to an authorization officer for a transitional authorization that permits the deposit of

(*a*) an acutely lethal effluent, unless another law of the jurisdiction where the mine is located requires that the mine produce a non-acutely lethal effluent;

(*b*) an effluent containing any concentration of a deleterious substance that is set out in any of items 1 to 8 of Schedule 4, unless another law of the jurisdiction where the mine is located requires that the mine produce an effluent containing the deleterious substance in a concentration that is equal to or less than the limits set out in Schedule 4; and

(*c*) an effluent of any pH, unless another law of the jurisdiction where the mine is located requires that the mine produce an effluent with a pH equal to or greater than 6.0 but not greater than 9.5.

(2) Despite paragraph (1)(*a*), the owner or operator may apply for a transitional authorization to deposit acutely lethal effluent only if the mine produced such an effluent at any time during the 12-month period preceding the application.

(3) The owner or operator of a mine may apply to an authorization officer for a transitional authorization that permits only the deposit of an effluent containing any concentration of total suspended solids, but may not apply if another law of the jurisdiction where the mine is located requires that the mine produce an effluent containing total suspended solids in a concentration equal to or less than the limits set out in Schedule 4 or if, during the 12-month

PARTIE 5

AUTORISATIONS TRANSITOIRES

Demande d'autorisation transitoire

34. (1) Le propriétaire ou l'exploitant d'une mine peut présenter à l'agent d'autorisation une demande visant une autorisation transitoire permettant le rejet de l'un ou l'autre des effluents suivants :

a) un effluent à létalité aiguë, sauf si une autre loi de l'autorité législative du territoire où est située la mine exige que celle-ci produise un effluent à létalité non aiguë;

b) un effluent contenant toute substance nocive figurant à l'un des articles 1 à 8 de l'annexe 4, quelle que soit sa concentration, sauf si une autre loi de l'autorité législative du territoire où est située la mine exige que celle-ci produise un effluent contenant la substance en une concentration égale ou inférieure aux limites établies à l'annexe 4;

c) un effluent, quel que soit son pH, sauf si une autre loi de l'autorité législative du territoire où est située la mine exige que celle-ci produise un effluent dont le pH est égal ou supérieur à 6,0 mais ne dépasse pas 9,5.

(2) Malgré l'alinéa (1)*a*), il ne peut présenter une demande visant une autorisation transitoire permettant le rejet d'un effluent à létalité aiguë que si, à un moment quelconque au cours des douze mois précédant la demande, la mine a rejeté un tel effluent.

(3) Le propriétaire ou l'exploitant d'une mine peut présenter à l'agent d'autorisation une demande visant une autorisation transitoire permettant le rejet d'un effluent contenant toute concentration du total des solides en suspension. Il ne peut toutefois le faire si une autre loi de l'autorité législative du territoire où est située la mine exige que celle-ci produise un effluent contenant le total des solides en suspension en une concentration égale ou

period preceding the application, the results of two consecutive effluent monitoring tests conducted under sections 12 to 16 indicate that

(*a*) the concentration in the effluent of any of the deleterious substances referred to in any of items 1 to 6 or 8 of Schedule 4 exceeded the applicable authorized limits set out in that Schedule;

(*b*) the pH of the effluent was less than 6.0 or greater than 9.5; or

(*c*) the effluent was acutely lethal.

(4) The owner or operator referred to in subsection (1) shall submit an application for a transitional authorization not later than three months after these Regulations are registered and shall submit with the application,

(*a*) the information required by Part 1 of Schedule 7 including, for the 12-month period preceding the application

(i) the monthly mean concentrations of the deleterious substances set out in column 1 of Schedule 4 that are contained in the effluent,

(ii) whether the effluent is acutely lethal, and

(iii) the pH of the effluent;

(*b*) a description of the facilities and procedures that are necessary to deposit an effluent that complies with paragraphs 4(1)(*a*) to (*c*);

(*c*) a proposed schedule for the construction of the facilities and implementation of the procedures; and

(*d*) a signed statement of certification as set out in Part 2 of Schedule 7.

(5) The owner or operator referred to in subsection (3) shall submit an application for a transitional authorization not earlier than 24 months and not later than 27 months after these Regulations are registered and shall submit with the application

(*a*) the information required by Part 1 of Schedule 7 including, for the 12-month period preceding the application,

inférieure aux limites établies à l'annexe 4 ou si, au cours des douze mois précédant la demande, les résultats de deux essais consécutifs de suivi de l'effluent effectués en application des articles 12 à 16 ont montré que :

a) soit la concentration dans l'effluent de toute substance nocive figurant à l'un des articles 1 à 6 et 8 de l'annexe 4 a dépassé les limites permises prévues à cette annexe;

b) soit le pH de l'effluent était inférieur à 6,0 ou supérieur à 9,5;

c) soit l'effluent était un effluent à létalité aiguë.

(4) Le propriétaire ou l'exploitant visé au paragraphe (1) présente la demande d'autorisation transitoire dans les trois mois suivant l'enregistrement du présent règlement et soumet avec sa demande :

a) les renseignements prévus à la partie 1 de l'annexe 7, notamment, à l'égard des douze mois précédant la demande :

(i) la concentration moyenne mensuelle des substances nocives énumérées à la colonne 1 de l'annexe 4 se trouvant dans l'effluent,

(ii) s'il s'agit ou non d'un effluent à létalité aiguë,

(iii) le pH de l'effluent;

b) la liste des installations et pratiques qui sont nécessaires pour que l'effluent rejeté soit conforme aux conditions prévues aux alinéas 4(1)*a*) à *c*);

c) un projet de calendrier de construction des installations et de mise en œuvre des pratiques;

d) l'attestation prévue à la partie 2 de l'annexe 7.

(5) Le propriétaire ou l'exploitant visé au paragraphe (3) présente la demande d'autorisation transitoire au plus tôt vingt-quatre mois après la date de l'enregistrement du présent règlement mais au plus tard vingt-sept mois après cette date et soumet avec sa demande :

a) les renseignements prévus à la partie 1 de l'annexe 7, notamment, à l'égard des douze mois précédant la demande :

(i) the monthly mean concentrations of the deleterious substances set out in column 1 of Schedule 4 that are contained in the effluent,

(ii) whether the effluent is acutely lethal, and

(iii) the pH of the effluent;

(*b*) a description of the facilities and procedures that are necessary to deposit an effluent that complies with the concentrations referred to in item 7 of Schedule 4;

(*c*) a proposed schedule for the construction of the facilities and implementation of the procedures;

(*d*) a signed statement of certification as set out in Part 2 of Schedule 7; and

(*e*) a statement of certification signed by the owner, the operator or their duly authorized representative indicating that there is no feasible alternative to the transitional authorization, based on documented engineering evidence.

SOR/2006-239, s. 19(F).

(i) la concentration moyenne mensuelle des substances nocives énumérées à la colonne 1 de l'annexe 4 se trouvant dans l'effluent,

(ii) s'il s'agit ou non d'un effluent à létalité aiguë,

(iii) le pH de l'effluent;

b) la liste des installations et pratiques qui sont nécessaires pour que l'effluent rejeté soit conforme aux limites permises prévues à l'article 7 de l'annexe 4;

c) un projet de calendrier de construction des installations et de mise en œuvre des pratiques;

d) l'attestation prévue à la partie 2 de l'annexe 7;

e) une attestation signée par le propriétaire, l'exploitant ou leur représentant dûment autorisé précisant qu'il n'existe aucune autre solution sur la base de preuves techniques.

DORS/2006-239, art. 19(F).

Issuance of Transitional Authorization

35. (1) An authorization officer shall issue to the owner or operator of a mine a transitional authorization, if

(*a*) the owner or operator is entitled to make the application under subsections 34(1) to (3) and has complied with subsection 34(4) or (5), as applicable; and

(*b*) any construction of facilities and the implementation of the procedures described by the owner or operator under paragraph 34(4)(*b*) or (5)(*b*), as applicable will result in the deposit of an effluent that complies with the requirements prescribed in paragraphs 4(1)(*a*) to (*c*).

(2) The authorization officer shall issue a transitional authorization in the form set out in Schedule 8 and provide in the authorization

(*a*) for the deposit of acutely lethal effluent, the information required by Part 1 of Schedule 8; and

(*b*) for the deposit of effluent that contains a deleterious substance set out in column 1 of Schedule 4, the information required by Part 2 of Schedule 8, including the maximum concentration of the deleterious substances

Délivrance des autorisations transitoires

35. (1) L'agent d'autorisation délivre une autorisation transitoire au propriétaire ou à l'exploitant d'une mine aux conditions suivantes :

a) le propriétaire ou l'exploitant a le droit de faire une telle demande aux termes des paragraphes 34(1), (2) et (3) et il s'est conformé aux paragraphes 34(4) ou (5), selon le cas;

b) les installations et les pratiques proposées par le propriétaire ou l'exploitant aux termes des alinéas 34(4)*b*) ou (5)*b*) rendront le rejet de l'effluent conforme aux conditions prévues aux alinéas 4(1)*a*) à *c*).

(2) L'agent d'autorisation délivre l'autorisation transitoire en la forme prévue à l'annexe 8 et y inscrit :

a) si elle vise le rejet d'un effluent à létalité aiguë, les renseignements prévus à la partie 1 de l'annexe 8;

b) si elle vise le rejet d'un effluent contenant des substances nocives énumérées à la colonne 1 de l'annexe 4, les renseignements prévus à la partie 2 de l'annexe 8, notamment la concentration maximale des substances nocives et la plage du pH de l'effluent déterminées selon cette annexe.

and the pH range of the effluent the determination of which are specified in that Schedule.

(3) Authorization officers shall maintain a public record of all transitional authorizations issued for mines located in the province where they perform their functions.

TRANSITIONAL AUTHORIZATION OBLIGATIONS

36. An owner or operator of a mine who has been issued a transitional authorization

(*a*) shall comply with sections 6 to 27 and, if the mine is depositing effluent into a tailings impoundment area, subsection 28(1);

(*b*) shall start the construction of the facilities and implement the procedures referred to in paragraph 34(4)(*b*) or (5)(*b*), as applicable, in a timely manner;

(*c*) shall report to the authorization officer, without delay, any change in the information provided under subsection 34(4) or (5);

(*d*) shall not deposit effluent that contains a deleterious substance set out in column 1 of Schedule 4 that exceeds the maximum concentration that is specified in the transitional authorization or has a pH that is outside the pH range specified in the transitional authorization; and

(*e*) shall not deposit effluent that is acutely lethal unless authorized to do so in the transitional authorization.

TRANSITIONAL AUTHORIZATION REPORTING

37. (1) The owner or operator of a mine with a valid transitional authorization shall notify an inspector without delay if

(*a*) an effluent that contains a deleterious substance set out in column 1 of Schedule 4 exceeds the concentration or is outside the pH range that is specified in the transitional authorization; or

(*b*) an acutely lethal effluent is being or has been deposited, unless the deposit of acutely lethal effluent is authorized in the transitional authorization.

(2) The owner or operator shall provide to the inspector a written report of any test results which identified that the effluent contains a deleterious substance or is acutely

(3) L'agent d'autorisation tient un registre public de toutes les autorisations transitoires délivrées à l'égard des mines situées dans la province où il exerce ses fonctions.

EXIGENCES RELATIVES AUX AUTORISATIONS TRANSITOIRES

36. Le propriétaire ou l'exploitant d'une mine à qui une autorisation transitoire a été délivrée doit satisfaire aux exigences suivantes :

a) il doit se conformer aux articles 6 à 27 et, si la mine rejette ses effluents dans un dépôt de résidus miniers, au paragraphe 28(1);

b) il commence la construction des installations et met en œuvre les pratiques visées aux alinéas 34(4)*b*) ou (5)*b*) dans les meilleurs délais;

c) il signale à l'agent d'autorisation, sans délai, toute modification des renseignements soumis en application des paragraphes 34(4) ou (5);

d) il ne rejette pas un effluent contenant des substances nocives énumérées à la colonne 1 de l'annexe 4 en une concentration supérieure à celle indiquée dans l'autorisation transitoire ou un effluent ayant un pH en dehors de la plage de pH indiquée dans l'autorisation transitoire;

e) il ne rejette un effluent à létalité aiguë que si l'autorisation transitoire le permet.

RAPPORT

37. (1) Le propriétaire ou l'exploitant d'une mine ayant une autorisation transitoire valide informe l'inspecteur sans délai :

a) que la concentration dans l'effluent de toute substance nocive figurant à la colonne 1 de l'annexe 4 est supérieure à celle indiquée dans l'autorisation transitoire ou qu'un effluent a un pH en dehors de la plage de pH indiquée dans l'autorisation transitoire;

b) qu'un effluent à létalité aiguë non couvert par l'autorisation transitoire a été ou est rejeté.

(2) Il présente à l'inspecteur un rapport écrit faisant état du résultat de tout essai ayant servi à détecter les sub-

lethal under subsection (1) within 30 days after the tests have been completed.

REVOCATION OF TRANSITIONAL AUTHORIZATIONS

38. An authorization officer may revoke a transitional authorization if

(*a*) the information provided by the owner or operator of a mine to support the application for the transitional authorization is false or incomplete; or

(*b*) the owner or operator has failed to comply with any requirement prescribed in sections 36 and 37.

EXPIRY OF TRANSITIONAL AUTHORIZATIONS

39. (1) Subject to subsection (2), transitional authorizations expire 30 months after the day on which these Regulations are registered.

(2) Transitional authorizations referred to in subsection 34(3) expire 60 months after the day on which these Regulations are registered.

PART 6

REPEALS AND COMING INTO FORCE

REPEALS

40. The *Alice Arm Tailings Deposit Regulations*[1] are repealed.

41. The *Metal Mining Liquid Effluent Regulations*[2] are repealed.

COMING INTO FORCE

42. (1) Subject to subsection (2), these Regulations come into force on the day on which they are registered.

(2) Sections 3 to 33 and 36 to 39 and 41 come into force six months after the day on which these Regulations are registered.

[1] SOR/79-345

[2] C.R.C., c. 819

stances nocives ou l'effluent à létalité aiguë visés au paragraphe (1) dans les trente jours suivant la fin de l'essai.

RÉVOCATION D'UNE AUTORISATION TRANSITOIRE

38. L'agent d'autorisation peut révoquer une autorisation transitoire si :

a) soit les renseignements fournis par le propriétaire ou l'exploitant d'une mine à l'appui de sa demande d'autorisation transitoire sont faux ou incomplets;

b) soit le propriétaire ou l'exploitant n'a pas satisfait à l'une ou l'autre des exigences prévues aux articles 36 et 37.

EXPIRATION DE L'AUTORISATION TRANSITOIRE

39. (1) Sous réserve du paragraphe (2), les autorisations transitoires expirent trente mois après la date d'enregistrement du présent règlement.

(2) Les autorisations transitoires visées au paragraphe 34(3) expirent soixante mois après la date d'enregistrement du présent règlement.

PARTIE 6

ABROGATIONS ET ENTRÉE EN VIGUEUR

ABROGATIONS

40. Le Règlement sur les rejets de stériles dans le bras Alice[1] est abrogé.

41. Le Règlement sur les effluents liquides des mines de métaux[2] est abrogé.

ENTRÉE EN VIGUEUR

42. (1) Sous réserve du paragraphe (2), le présent règlement entre en vigueur à la date de son enregistrement.

(2) Les articles 3 à 33 et 36 à 39 et 41 entrent en vigueur six mois après l'enregistrement du présent règlement.

[1] DORS/79-435

[2] C.R.C., ch. 819

SCHEDULE 1
(Subsection 1(1))

AUTHORIZATION OFFICERS

Item	Column 1 Province	Column 2 Title
1.	Ontario	Director, Environmental Protection Operations Division — Ontario Environment Canada
2.	Quebec	Director, Environmental Protection Operations Division — Quebec Environment Canada
3.	Nova Scotia	Director, Environmental Protection Operations Division — Atlantic Environment Canada
4.	New Brunswick	Director, Environmental Protection Operations Division — Atlantic Environment Canada
5.	Manitoba	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada
6.	British Columbia	Director, Environmental Protection Operations Division — Pacific and Yukon Environment Canada
7.	Prince Edward Island	Director, Environmental Protection Operations Division — Atlantic Environment Canada
8.	Saskatchewan	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada
9.	Alberta	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada
10.	Newfoundland and Labrador	Director, Environmental Protection Operations Division — Atlantic Environment Canada
11.	Yukon Territory	Director, Environmental Protection Operations Division — Pacific and Yukon Environment Canada
12.	Northwest Territories	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada
13.	Nunavut	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada

SOR/2006-239, s. 20.

ANNEXE 1
(paragraphe 1(1))

AGENTS D'AUTORISATION

Article	Colonne 1 Province	Colonne 2 Poste
1.	Ontario	Directeur, Division des activités de protection de l'environnement — Ontario Environnement Canada
2.	Québec	Directeur, Division des activités de protection de l'environnement — Québec Environnement Canada
3.	Nouvelle-Écosse	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
4.	Nouveau-Brunswick	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
5.	Manitoba	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada
6.	Colombie-Britannique	Directeur, Division des activités de protection de l'environnement — Pacifique et Yukon Environnement Canada
7.	Île-du-Prince-Édouard	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
8.	Saskatchewan	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada
9.	Alberta	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada
10.	Terre-Neuve-et-Labrador	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
11.	Yukon	Directeur, Division des activités de protection de l'environnement — Pacifique et Yukon Environnement Canada
12.	Territoires du Nord-Ouest	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada
13.	Nunavut	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada

DORS/2006-239, art. 20.

SCHEDULE 2
(Subsections 5(1) and 27.1(1))
(TAILINGS IMPOUNDMENT AREAS)

Item	Column 1 Water or Place	Column 2 Description
1.	Anderson Lake, Manitoba	Anderson Lake located at 54° 51′ north latitude and 100° 0′ west longitude near the town of Snow Lake, Manitoba. More precisely, the area bounded by (*a*) the contour of elevation around Anderson Lake at the 285-m level, and (*b*) the control dam built at the east end of Anderson Lake.
2.	Garrow Lake, Nunavut	Garrow Lake located at 75° 23′ north latitude and 97° 48′ west longitude near the south end of Little Cornwallis Island, Nunavut.
3.	South Kemess Creek, British Columbia	That part of South Kemess Creek being within the watershed of that tributary of South Kemess Creek (*a*) extending eastwards and upstream from the centre of a tailings dam constructed at 57° 1′ north latitude and 126° 41′ west longitude, and (*b*) below the crest of the dam at an elevation of 1515 m.
4.	Albino Lake, British Columbia	Albino Lake located at 56° 39.4′ north latitude and 130° 29.4′ west longitude near the Eskay Creek Mine in British Columbia. More precisely, the area bounded by (*a*) the contour of elevation around Albino Lake at the 1040-m level, and (*b*) the outlet of Albino Lake.
5.	Tom MacKay Lake, British Columbia	Tom MacKay Lake located at 56° 39′ north latitude and 130° 34′ west longitude near the Eskay Creek Mine in British Columbia. More precisely, the area bounded by (*a*) the contour of elevation around Tom MacKay Lake at the 1078-m level, and (*b*) the outlet of Tom MacKay Lake.
6.	Trout Pond, Newfoundland and Labrador	Trout Pond located at 48° 39′ 0.81882″ north latitude and 56° 29′ 19.704984″ west longitude in west-central Newfoundland. More precisely, the area bounded by (*a*) the contour of elevation around Trout Pond at the 270 m level, and (*b*) the outlet of Trout Pond.

ANNEXE 2
(paragraphes 5(1) et 27.1(1))
DÉPÔTS DE RÉSIDUS MINIERS

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
1.	Lac Anderson, Manitoba	Le lac Anderson, situé par 54°51′ de latitude N. et 100°0′ de longitude O., près de la ville de Snow Lake, au Manitoba. Plus précisément, le lieu délimité par : *a*) la courbe de niveau à 285 m autour du lac Anderson; *b*) le barrage de régulation à l'extrémité est du lac Anderson.
2.	Lac Garrow, Nunavut	Le lac Garrow, situé par 75° 23′ de latitude N. et 97° 48′ de longitude O., près de l'extrémité sud de la petite île Cornwallis, au Nunavut.
3.	Ruisseau South Kemess, Colombie-Britannique	La partie du ruisseau South Kemess située dans le bassin hydrographique du tributaire du ruisseau South Kemess : *a*) qui s'étend vers l'est et en amont du centre d'un barrage de retenue des stériles situé par 57°1′ de latitude N. et 126°41′ de longitude O.; *b*) qui se trouve en dessous de la crête du barrage, à une altitude de 1515 m.
4.	Lac Albino, Colombie-Britannique	Le lac Albino, situé par 56°39,4′ de latitude N. et 130°29,4′ de longitude O., près de la mine Eskay Creek, en Colombie-Britannique. Plus précisément, la région délimitée par : *a*) la courbe de niveau à 1040 m autour du lac Albino; *b*) la décharge du lac Albino.
5.	Lac Tom MacKay, Colombie-Britannique	Le lac Tom MacKay, situé par 56°39′ de latitude N. et 130°34′ de longitude O., près de la mine Eskay Creek, en Colombie-Britannique. Plus précisément, la région délimitée par : *a*) la courbe de niveau à 1078 m autour du lac Tom MacKay; *b*) la décharge du lac Tom Mackay.
6.	Trout Pond, Terre-Neuve-et-Labrador	L'étang Trout Pond, situé par 48° 39′ 0,818 82″ de latitude N. et 56° 29′ 19,704 984″ de longitude O., dans la partie centrale ouest de Terre-Neuve et, plus précisément, la région délimitée par : *a*) la courbe de niveau à 270 m autour de l'étang Trout Pond; *b*) la décharge de l'étang Trout Pond.

Item	Column 1 Water or Place	Column 2 Description
7.	The headwater pond of a tributary to Gill's Pond Brook, Newfoundland and Labrador	The headwater pond of a tributary to Gill's Pond Brook, located at 48° 38′ 29.599584″ north latitude and 56° 30′ 15.560676″ west longitude in west-central Newfoundland. More precisely, the area bounded by (*a*) the contour of elevation around the pond at the 260 m level, and (*b*) the outlet of the pond.

SOR/2006-239, ss. 21 to 23.

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
7.	L'étang d'amont d'un tributaire du ruisseau Gill, Terre-Neuve-et-Labrador	L'étang d'amont d'un tributaire du ruisseau Gill, situé par 48° 38′ 29,599 584″ de latitude N. et 56° 30′ 15,560 676″ de longitude O., dans la partie centrale ouest de Terre-Neuve et, plus précisément, la région délimitée par : *a*) la courbe de niveau à 260 m autour de l'étang; *b*) la décharge de l'étang.

DORS/2006-239, art. 21 à 23.

SCHEDULE 3

(Subsections 1(1), 12(2) and 20(5))

ANALYTICAL REQUIREMENTS FOR METAL MINING EFFLUENT

Item	Column 1 Deleterious Substance/ pH	Column 2 Precision[1]	Column 3 Accuracy[2]	Column 4 Method Detection Limit (MDL)
1.	Arsenic	10%	100 ± 10%	0.010 mg/L
2.	Copper	10%	100 ± 10%	0.010 mg/L
3.	Cyanide	10%	100 ± 10%	0.010 mg/L
4.	Lead	10%	100 ± 10%	0.030 mg/L
5.	Nickel	10%	100 ± 10%	0.020 mg/L
6.	Zinc	10%	100 ± 10%	0.010 mg/L
7.	Total Suspended Solids	15%	100 ± 15%	2.000 mg/L
8.	Radium 226	10%	100 ± 10%	0.01 Bq/L
9.	pH	0.1 pH unit	0.1 pH unit	Not Applicable

[1] Relative standard deviation at concentrations 10 times above the MDL.

[2] Analyte recovery at concentrations above 10 times the MDL.

SOR/2006-239, s. 24.

ANNEXE 3

(paragraphes 1(1), 12(2) et 20(5))

EXIGENCES ANALYTIQUES POUR LES EFFLUENTS DES MINES DE MÉTAUX

Article	Colonne 1 Substance nocive/pH	Colonne 2 Précision[1]	Colonne 3 Exactitude[2]	Colonne 4 Limite de détection de la méthode (LDM)
1.	Arsenic	10 %	100 ± 10 %	0,010 mg/L
2.	Cuivre	10 %	100 ± 10 %	0,010 mg/L
3.	Cyanure	10 %	100 ± 10 %	0,010 mg/L
4.	Plomb	10 %	100 ± 10 %	0,030 mg/L
5.	Nickel	10 %	100 ± 10 %	0,020 mg/L
6.	Zinc	10 %	100 ± 10 %	0,010 mg/L
7.	Total des solides en suspension	15 %	100 ± 15 %	2,000 mg/L
8.	Radium 226	10 %	100 ± 10 %	0,01 Bq/L
9.	pH	0,1 unité pH	0,1 unité pH	Sans objet

[1] Écart-type relatif à des concentrations dix fois supérieures à la LDM.

[2] Récupération de l'analyte à des concentrations de plus de dix fois la LDM.

DORS/2006-239, art. 24.

SCHEDULE 4

(Section 3, paragraph 4(1)(a), subsections 12(1) and (3), section 13, subsections 15(1), 19.1(1) and 20(1), paragraphs 21(2)(b) and (f), 24(1)(a) and 34(1)(b), subsection 34(3), paragraphs 34(4)(a) and (5)(a) and (b), 35(2)(b), 36(d) and 37(1)(a) and Schedules 5 and 7)

AUTHORIZED LIMITS OF DELETERIOUS SUBSTANCES

Item	Column 1 Deleterious Substance	Column 2 Maximum Authorized Monthly Mean Concentration	Column 3 Maximum Authorized Concentration in a Composite Sample	Column 4 Maximum Authorized Concentration in a Grab Sample
1.	Arsenic	0.50 mg/L	0.75 mg/L	1.00 mg/L
2.	Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
3.	Cyanide	1.00 mg/L	1.50 mg/L	2.00 mg/L
4.	Lead	0.20 mg/L	0.30 mg/L	0.40 mg/L
5.	Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
6.	Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
7.	Total Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
8.	Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L

NOTE: All concentrations are total values.

SOR/2006-239, s. 25.

ANNEXE 4

(article 3, alinéa 4(1)a), paragraphes 12(1) et (3), article 13, paragraphes 15(1), 19.1(1) et 20(1), alinéas 21(2)b) et f), 24(1)a) et 34(1)b), paragraphe 34(3), alinéas 34(4) a) et (5)a) et b), 35(2)b), 36d) et 37(1)a) et annexes 5 et 7)

LIMITES PERMISES POUR CERTAINES SUBSTANCES NOCIVES

Article	Colonne 1 Substance nocive	Colonne 2 Concentration moyenne mensuelle maximale permise	Colonne 3 Concentration maximale permise dans un échantillon composite	Colonne 4 Concentration maximale permise dans un échantillon instantané
1.	Arsenic	0,50 mg/L	0,75 mg/L	1,00 mg/L
2.	Cuivre	0,30 mg/L	0,45 mg/L	0,60 mg/L
3.	Cyanure	1,00 mg/L	1,50 mg/L	2,00 mg/L
4.	Plomb	0,20 mg/L	0,30 mg/L	0,40 mg/L
5.	Nickel	0,50 mg/L	0,75 mg/L	1,00 mg/L
6.	Zinc	0,50 mg/L	0,75 mg/L	1,00 mg/L
7.	Total des solides en suspension	15,00 mg/L	22,50 mg/L	30,00 mg/L
8.	Radium 226	0,37 Bq/L	0,74 Bq/L	1,11 Bq/L

NOTE : Toutes les concentrations sont des valeurs totales.

DORS/2006-239, art. 25.

SCHEDULE 5

(Section 7, subsection 15(1) and paragraph 32(1)(c))

ENVIRONMENTAL EFFECTS MONITORING STUDIES

INTERPRETATION

1. The following definitions apply in this Schedule.

"effect on fish tissue" means measurements of total mercury that exceed 0.45 µg/g wet weight in fish tissue taken in an exposure area and that are statistically different from the measurements of total mercury in fish tissue taken in a reference area. (*effet sur les tissus de poissons*)

"effect on the benthic invertebrate community" means a statistical difference between data referred to in subparagraph 16(*a*)(iii) from a study respecting the benthic invertebrate community conducted in

(*a*) an exposure area and a reference area; or

(*b*) sampling areas within an exposure area where there are gradually decreasing effluent concentrations. (*effet sur la communauté d'invertébrés benthiques*)

"effect on the fish population" means a statistical difference between data relating to the indicators referred to in subparagraph 16(*a*)(i) from a study respecting fish population conducted in

(*a*) an exposure area and a reference area; or

(*b*) sampling areas within an exposure area where there are gradually decreasing effluent concentrations. (*effet sur la population de poissons*)

"exposure area" means all fish habitat and waters frequented by fish that are exposed to effluent. (*zone exposée*)

"fish" means fish as defined in section 2 of the *Fisheries Act* but does not include parts of fish, parts of shellfish, parts of crustaceans or parts of marine animals. (*poisson*)

"reference area" means water frequented by fish that is not exposed to effluent and that has fish habitat that, as far as practicable, is most similar to that of the exposure area. (*zone de référence*)

ANNEXE 5

(article 7, paragraphe 15(1) et alinéa 32(1)c))

ÉTUDES DE SUIVI DES EFFETS SUR L'ENVIRONNEMENT

DÉFINITIONS

1. Les définitions qui suivent s'appliquent à la présente annexe.

« effet sur la communauté d'invertébrés benthiques » Différence statistique entre les données visées au sous-alinéa 16*a*)(iii) d'une étude sur la communauté d'invertébrés benthiques effectuée :

a) soit dans la zone exposée et dans la zone de référence;

b) soit dans les zones d'échantillonnage de la zone exposée qui présentent un gradient décroissant de concentration d'effluent. (*effect on the benthic invertebrate community*)

« effet sur la population de poissons » Différence statistique entre les données portant sur les indicateurs visés au sous-alinéa 16*a*)(i) d'une étude sur la population de poissons effectuée :

a) soit dans la zone exposée et dans la zone de référence;

b) soit dans les zones d'échantillonnage de la zone exposée qui présentent un gradient décroissant de concentration d'effluent. (*effect on the fish population*)

« effet sur les tissus de poissons » Mesures de mercure total dans les tissus de poissons prises dans la zone exposée qui sont supérieures à 0,45 µg/g (poids humide) et qui présentent une différence statistique par rapport aux mesures de mercure total dans les tissus de poissons prises dans la zone de référence. (*effect on fish tissue*)

« poisson » S'entend au sens de l'article 2 de la *Loi sur les pêches*, à l'exclusion des parties de poissons, de mollusques, de crustacés et d'animaux marins. (*fish*)

« zone d'échantillonnage » Partie de la zone de référence ou de la zone exposée où les échantillons représentatifs sont prélevés. (*sampling area*)

« zone de référence » Les eaux où vivent des poissons et où se trouve un habitat du poisson, qui ne sont pas exposées à un effluent et qui présentent, dans la mesure

"sampling area" means the area within a reference or exposure area where representative samples are collected. (*zone d'échantillonnage*)

2. Environmental effects monitoring studies consist of the effluent and water quality monitoring studies set out in Part 1, and the biological monitoring studies set out in Part 2, of this Schedule.

PART 1

EFFLUENT AND WATER QUALITY MONITORING STUDIES

Required Studies

3. Effluent and water quality monitoring studies consist of effluent characterization, sublethal toxicity testing and water quality monitoring.

Effluent Characterization

4. (1) Effluent characterization is conducted by analysing a sample of effluent and recording the hardness and alkalinity of the sample and the concentrations, in total values, of the following:

(*a*) aluminum;

(*b*) cadmium;

(*c*) iron;

(*d*) subject to subsection (3), mercury;

(*e*) molybdenum;

(*f*) ammonia; and

(*g*) nitrate.

(2) The effluent characterization shall be conducted four times per calendar year and not less than one month apart, on aliquots of effluent sample collected under sections 12 and 13 of these Regulations, with the first characterization to be conducted on an aliquot of effluent sample collected not later than six months after the day on which the mine becomes subject to section 7 of these Regulations.

(3) The recording of the concentration of total mercury in effluent referred to in paragraph (1)(*d*) may be

du possible, les caractéristiques les plus semblables à celles de la zone exposée. (*reference area*)

« zone exposée » Les eaux où vivent des poissons et l'habitat du poisson qui sont exposés à un effluent. (*exposure area*)

2. Les études de suivi des effets sur l'environnement se composent des études de suivi de l'effluent et de la qualité de l'eau prévues à la partie 1 et des études de suivi biologique prévues à la partie 2.

PARTIE 1

ÉTUDES DE SUIVI DE L'EFFLUENT ET DE LA QUALITÉ DE L'EAU

Composition des études

3. Les études de suivi de l'effluent et de la qualité de l'eau se composent de la caractérisation de l'effluent, des essais de toxicité sublétale et du suivi de la qualité de l'eau.

Caractérisation de l'effluent

4. (1) La caractérisation de l'effluent s'effectue par analyse d'un échantillon d'effluent et enregistrement de son alcalinité et de sa dureté et des concentrations, exprimées en valeurs totales, des substances suivantes :

a) l'aluminium;

b) le cadmium;

c) le fer;

d) sous réserve du paragraphe (3), le mercure;

e) le molybdène;

f) l'ammoniac;

g) le nitrate.

(2) La caractérisation de l'effluent est effectuée quatre fois par année civile et à au moins un mois d'intervalle, sur une portion aliquote de l'échantillon d'effluent prélevé en application des articles 12 et 13 du présent règlement, la première caractérisation se faisant sur une portion aliquote d'un échantillon prélevé au plus tard six mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement.

(3) La concentration en mercure total n'a plus à être enregistrée aux termes de l'alinéa (1)*d*) si la concentra-

discontinued if that concentration is less than 0.10 µg/L in 12 consecutive samples collected under subsection (2).

(4) Quality assurance and quality control measures shall be implemented that will ensure the accuracy of the effluent characterization data.

SUBLETHAL TOXICITY TESTING

5. (1) Sublethal toxicity testing shall be conducted by following the applicable methods referred to in subsections (3) and (4) and recording the results for

(*a*) a fish species, an invertebrate species, a plant species and an algal species, in the case of effluent deposited into fresh waters; and

(*b*) a fish species, an invertebrate species and an algal species, in the case of effluent deposited into marine or estuarine waters.

(2) The sublethal toxicity tests shall be conducted on the aliquots of effluent sample collected in accordance with subsection 4(2) from the mine's final discharge point that has potentially the most adverse environmental impact on the environment, taking into account the mass loadings of the deleterious substances set out in column 1 of Schedule 4 as determined under subsection 20(2) of these Regulations and the manner in which the effluent mixes within the exposure area.

(3) The sublethal toxicity tests under paragraph (1)(*a*) shall be conducted using the following test methodologies, as amended from time to time, as applicable to each species:

(*a*) in the case of a fish species,

(i) *Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnows* (Report EPS 1/RM/22), February 1992, published by the Department of the Environment, or

(ii) *Biological Test Method: Toxicity Tests Using Early Life Stages of Salmonid Fish (Rainbow Trout)* (Reference Method EPS 1/RM/28), July 1998, published by the Department of the Environment;

(*b*) in the case of an invertebrate species, *Biological Test Method: Test of Reproduction and Survival Using*

tion de mercure total de douze échantillons consécutifs prélevés selon le paragraphe (2) est inférieure à 0,10 µg/L.

(4) Des mesures d'assurance de la qualité et de contrôle de la qualité sont prises pour garantir l'exactitude des données visant la caractérisation de l'effluent.

ESSAIS DE TOXICITÉ SUBLÉTALE

5. (1) Les essais de toxicité sublétale sont effectués en conformité avec les méthodes applicables prévues aux paragraphes (3) et (4) et par enregistrement des résultats portant sur :

a) une espèce de poissons, d'invertébré, de plante et d'algue, lorsque l'effluent est rejeté dans l'eau douce;

b) une espèce de poissons, d'invertébré et d'algue, lorsque l'effluent est rejeté dans l'eau de mer ou l'eau d'estuaire.

(2) Les essais de toxicité sublétale sont effectués sur une portion aliquote d'un échantillon d'effluent prélevé en application du paragraphe 4(2) au point de rejet final de la mine ayant le plus grand risque de répercussions néfastes sur l'environnement, compte tenu de la charge des substances nocives visées à la colonne 1 de l'annexe 4 déterminée conformément au paragraphe 20(2) du présent règlement et de la façon dont l'effluent se mélange dans la zone exposée.

(3) Les essais de toxicité sublétale visés à l'alinéa (1)*a*) sont effectués conformément aux méthodes ci-après, avec leurs modifications successives, et selon les espèces en cause :

a) dans le cas d'une espèce de poissons :

(i) soit la *Méthode d'essai biologique : essai de croissance et de survie sur des larves de tête-de-boule* (Rapport SPE 1/RM/22), publiée en février 1992 par le ministère de l'Environnement,

(ii) soit la *Méthode d'essai biologique : essais toxicologiques sur des salmonidés (truite arc-en-ciel) aux premiers stades de leur cycle biologique* (Méthode de référence SPE 1/RM/28), publiée en juillet 1998 par le ministère de l'Environnement;

b) dans le cas d'une espèce d'invertébré, la *Méthode d'essai biologique : essai de reproduction et de survie*

the Cladoceran Ceriodaphnia dubia (Report EPS 1/RM/21), February 1992, published by the Department of the Environment;

(*c*) in the case of a plant species, *Biological Test Method: Test for Measuring the Inhibition of Growth Using the Freshwater Macrophyte, Lemna minor* (Reference Method EPS 1/RM/37), March 1999, published by the Department of the Environment; and

(*d*) in the case of an algal species,

(i) *Biological Test Method: Growth Inhibition Test Using Freshwater Alga Selenastrum capricornutum* (Report EPS 1/RM/25), November 1992, published by the Department of the Environment, or

(ii) *Détermination de l'inhibition de la croissance chez l'algue Selenastrum capricornutum* (Reference Method MA 500-S.cap.2.0), September 1997, published by the Centre d'expertise en analyse environnementale du Québec.

(4) The sublethal toxicity tests under paragraph (1)(*b*) shall be conducted using the following test methodologies, as amended from time to time, as applicable to each species:

(*a*) *Biological Test Method: Fertilization Assay Using Echinoids (Sea Urchins and Sand Dollars)* (Report EPS 1/RM/27), December 1992, published by the Department of the Environment;

(*b*) *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms* (Third Edition) (Reference Method EPA/821/R-02/014), October 2002, published by the U.S. Environmental Protection Agency; and

(*c*) *Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms* (First Edition) (Reference Method EPA/600/R-95-136), August 1995, published by the U.S. Environmental Protection Agency.

6. (1) Subject to subsection (2), the sublethal toxicity tests under section 5 shall be conducted two times each

sur le cladocère Ceriodaphnia dubia (Rapport SPE 1/RM/21), publiée en février 1992 par le ministère de l'Environnement;

c) dans le cas d'une espèce de plante, la *Méthode d'essai biologique : essai de mesure de l'inhibition de la croissance de la plante macroscopique dulcicole, Lemna minor* (Méthode de référence SPE 1/RM/37), publiée en mars 1999 par le ministère de l'Environnement;

d) dans le cas d'une espèce d'algue :

(i) soit la *Méthode d'essai biologique : essai d'inhibition de la croissance de l'algue d'eau douce Selenastrum capricornutum* (Rapport SPE 1/RM/25), publiée en novembre 1992 par le ministère de l'Environnement,

(ii) soit la méthode intitulée *Détermination de la toxicité Inhibition de la croissance chez l'algue Selenastrum capricornutum* (Méthode de référence MA 500-S.cap.2.0), publiée en septembre 1997 par le Centre d'expertise en analyse environnementale du Québec.

(4) Les essais de toxicité sublétale visés à l'alinéa (1)*b*) sont effectués conformément aux méthodes ci-après, avec leurs modifications successives, et selon les espèces en cause :

a) la *Méthode d'essai biologique : essai sur la fécondation chez les échinides (oursins verts et oursins plats)* (Rapport SPE/1/RM/27), publiée en décembre 1992 par le ministère de l'Environnement;

b) la méthode intitulée *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms* (Third Edition) (Méthode de référence EPA/821/R-02/014), publiée en octobre 2002 par l'Environmental Protection Agency des États-Unis;

c) la méthode intitulée *Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms* (First Edition) (Méthode de référence EPA/600/R-95-136), publiée en août 1995 par l'Environmental Protection Agency des États-Unis.

6. (1) Sous réserve du paragraphe (2), les essais de toxicité sublétale visés à l'article 5 sont effectués deux

calendar year for three years and once each year after the third year, with the first testing to occur on an effluent sample collected not later than six months after the mine becomes subject to section 7 of these Regulations.

(2) Sublethal toxicity testing may be conducted once each calendar year, if the results of six sublethal toxicity tests conducted after December 31, 1997, on a fish species, an invertebrate species and either an aquatic plant species or an algal species are submitted to the authorization officer not later than six months after the mine becomes subject to section 7 of these Regulations.

WATER QUALITY MONITORING

7. (1) Water quality monitoring is conducted by

(*a*) collecting samples of water from

(i) the exposure area surrounding the point of entry of effluent into water from each final discharge point and from the related reference areas, and

(ii) the sampling areas that are selected under paragraphs 12(*b*) and 13(*a*);

(*b*) recording the temperature of the water and the dissolved oxygen concentration in the water in the exposure and reference areas where the samples are collected;

(*c*) recording the concentration of the substances set out in paragraphs 4(1)(*a*) to (*g*) and,

(i) in the case of effluent that is deposited into fresh water, recording the pH, hardness and alkalinity of the water samples,

(ii) in the case of effluent that is deposited into estuarine waters, recording the pH, hardness, alkalinity and salinity of the water samples, and

(iii) in the case of effluent that is deposited into marine waters, recording the salinity of the water samples;

(*d*) recording the concentration of the deleterious substances set out in column 1 of Schedule 4, but not recording the concentrations of cyanide, set out in item 3 of that Schedule, if that substance is not used as a process reagent within the operations area; and

fois par année civile pendant trois ans et, par la suite, une fois par année, le premier essai se faisant sur un échantillon d'effluent prélevé au plus tard six mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement.

(2) Les essais de toxicité sublétale peuvent être effectués une fois par année civile si les résultats de six essais de toxicité sublétale effectués après le 31 décembre 1997 sur une espèce de poisson et une espèce d'invertébré et une espèce de plante aquatique ou d'algue sont présentés à l'agent d'autorisation au plus tard six mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement.

SUIVI DE LA QUALITÉ DE L'EAU

7. (1) Le suivi de la qualité de l'eau s'effectue :

a) par prélèvement d'échantillons d'eau :

(i) dans la zone exposée entourant l'endroit où l'effluent rejeté par chaque point de rejet final se mélange à l'eau, et dans les zones de référence connexes,

(ii) dans les zones d'échantillonnage choisies aux termes des alinéas 12*b*) et 13*a*);

b) par enregistrement de la température de l'eau et de la concentration d'oxygène dissous dans l'eau des zones exposées et des zones de référence où les échantillons sont prélevés;

c) par enregistrement de la concentration des substances énumérées aux alinéas 4(1)*a*) à *g*) et :

(i) dans le cas où l'effluent est rejeté dans l'eau douce, par enregistrement du pH, de la dureté et de l'alcalinité des échantillons d'eau,

(ii) dans le cas où il est rejeté dans l'eau d'estuaire, par enregistrement du pH, de la dureté, de l'alcalinité et de la salinité des échantillons d'eau,

(iii) dans le cas où il est rejeté dans l'eau de mer, par enregistrement de la salinité des échantillons d'eau;

d) par enregistrement de la concentration des substances nocives énumérées à la colonne 1 de l'annexe 4, la concentration de cyanure n'étant enregistrée que

(*e*) implementing quality assurance and quality control measures that will ensure the accuracy of water quality monitoring data.

(2) The water quality monitoring shall be conducted, starting not later than six months after the day on which the mine becomes subject to section 7 of these Regulations,

(*a*) four times per calendar year and not less than one month apart on the samples of water collected, while the mine is depositing effluent, from the areas referred to in subparagraph (1)(*a*)(i); and

(*b*) at the same time that the biological monitoring studies are conducted on samples of water collected in the areas referred to in subparagraph (1)(*a*)(ii).

EFFLUENT AND WATER QUALITY MONITORING REPORT

8. A report on the effluent and water quality monitoring studies conducted during a calendar year under sections 4 to 7 shall be submitted to the authorization officer not later than March 31 of the following year, and shall include

(*a*) the dates on which each sample was collected for effluent characterization, sublethal toxicity testing and water quality monitoring;

(*b*) the locations of the final discharge points from which samples were collected for effluent characterization;

(*c*) the location of the final discharge point from which samples were collected for sublethal toxicity testing and the data on which the selection of the final discharge point was made in compliance with subsection 5(2);

(*d*) the latitude and longitude of sampling areas for water quality monitoring, in degrees, minutes and seconds, and a description that is sufficient to identify the location of the sampling areas;

(*e*) the results of effluent characterization, sublethal toxicity testing and water quality monitoring;

si cette substance, figurant à l'article 3 de cette annexe, est utilisée comme réactif de procédé sur le chantier;

e) par la prise des mesures d'assurance de la qualité et de contrôle de la qualité pour garantir l'exactitude des données visant le suivi de la qualité de l'eau.

(2) Le suivi de la qualité de l'eau est effectué à la fréquence prévue aux alinéas *a*) et *b*), le premier se faisant au plus tard six mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement :

a) quatre fois par année civile et à au moins un mois d'intervalle sur les échantillons d'eau prélevés lorsque la mine rejette l'effluent dans les zones visées au sous-alinéa (1)*a*)(i);

b) en même temps que les études de suivi biologique, sur les échantillons d'eau prélevés dans les zones visées au sous-alinéa (1)*a*)(ii).

RAPPORT DES ÉTUDES DE SUIVI DE L'EFFLUENT ET DE LA QUALITÉ DE L'EAU

8. Un rapport des études de suivi de l'effluent et de la qualité de l'eau effectuées au cours d'une année civile en application des articles 4 à 7 est présenté à l'agent d'autorisation au plus tard le 31 mars de l'année suivante et comporte les renseignements suivants :

a) les dates de prélèvement des échantillons pour la caractérisation de l'effluent, les essais de toxicité sublétale et le suivi de la qualité de l'eau;

b) l'emplacement des points de rejet final où les échantillons ont été prélevés pour la caractérisation de l'effluent;

c) l'emplacement du point de rejet final où les échantillons ont été prélevés pour les essais de toxicité sublétale et les données qui ont servi à le sélectionner conformément au paragraphe 5(2);

d) la latitude et la longitude des zones d'échantillonnage utilisées pour le suivi de la qualité de l'eau, exprimées en degrés, minutes et secondes, et une description qui permet de reconnaître l'emplacement de ces zones;

e) les résultats de la caractérisation de l'effluent, des essais de toxicité sublétale et du suivi de la qualité de l'eau;

(*f*) the methodologies used to conduct effluent characterization and water quality monitoring, and the related method detection limits; and

(*g*) a description of quality assurance and quality control measures that were implemented and the data related to the implementation of those measures.

f) les méthodes utilisées pour la caractérisation de l'effluent et le suivi de la qualité de l'eau, ainsi que les limites de détection de celles-ci;

g) les précisions voulues sur les mesures d'assurance de la qualité et de contrôle de la qualité qui ont été prises ainsi que les données associées à leur mise en œuvre.

PART 2

BIOLOGICAL MONITORING STUDIES

Required Studies

9. Biological monitoring studies consist of

(*a*) a site characterization;

(*b*) a study respecting the fish population, if the concentration of effluent in the exposure area is greater than 1% in the area located within 250 m of a final discharge point;

(*c*) a study respecting fish tissue, if during effluent characterization conducted under paragraph 4(1)(*d*) a concentration of total mercury in the effluent is identified that is equal to or greater than 0.10 µg/L; and

(*d*) a study respecting benthic invertebrate community.

PARTIE 2

ÉTUDES DE SUIVI BIOLOGIQUE

Composition des études

9. Les études de suivi biologique se composent :

a) de la caractérisation du site;

b) d'une étude sur la population de poissons dans le cas où la concentration de l'effluent dans la zone exposée est supérieure à 1 % en deçà de 250 m d'un point de rejet final;

c) d'une étude sur les tissus de poissons si une concentration de mercure total égale ou supérieure à 0,10 µg/L a été relevée lors de la caractérisation de l'effluent aux termes de l'alinéa 4(1)*d*);

d) d'une étude sur la communauté d'invertébrés benthiques.

DIVISION 1

THE FIRST BIOLOGICAL MONITORING STUDIES

First Study Design

10. Prior to the conduct of the biological monitoring studies, a study design shall be submitted in accordance with section 14 that contains

(*a*) a site characterization that includes the information required by section 11;

(*b*) a description of how the study respecting the fish population will be conducted, if such a study is required under paragraph 9(*b*), that includes

(i) the information referred to in paragraphs 12(*a*) to (*d*), and

(ii) how the study will provide the information necessary to determine if the effluent has an effect on the fish population;

SECTION 1

PREMIÈRES ÉTUDES DE SUIVI BIOLOGIQUE

Premier plan d'étude

10. Avant que soient effectuées les études de suivi biologique, un plan d'étude est présenté conformément à l'article 14 et comporte les éléments suivants :

a) la caractérisation du site comportant les renseignements prévus à l'article 11;

b) les précisions voulues sur le déroulement de l'étude sur la population de poissons, si une telle étude est exigée en vertu de l'alinéa 9*b*), notamment :

(i) les renseignements prévus aux alinéas 12*a*) à *d*),

(ii) la façon dont l'étude fournira les renseignements permettant de déterminer si l'effluent a un effet sur la population de poissons;

(*c*) a description of how the study respecting fish tissue will be conducted, if that study is required under paragraph 9(*c*), that includes

(i) the information referred to in paragraphs 12(*a*) to (*d*), and

(ii) how the study will provide the information necessary to determine if the effluent has an effect on fish tissue;

(*d*) a description of how the study respecting the benthic invertebrate community will be conducted that includes

(i) the information referred to in paragraphs 13(*a*) to (*d*), and

(ii) how the study will provide the information necessary to determine if the effluent has an effect on the benthic invertebrate community;

(*e*) the dates and times that the samples will be collected for the biological monitoring;

(*f*) a description of the quality assurance and quality control measures that will be implemented to ensure the validity of the data that is collected; and

(*g*) a summary of the results of any biological monitoring studies that were submitted under subparagraph 14(*b*)(iii).

11. A site characterization shall include the following information:

(*a*) a description of the manner in which the effluent mixes within the exposure area, including an estimate of the concentration of effluent in water at 250 m from each final discharge point;

(*b*) a description of the reference and exposure areas where the biological monitoring studies will be conducted that includes information on the geological, hydrological, oceanographical, limnological, chemical and biological features of those areas;

(*c*) the type of production process used by the mine, and the environmental protection practices in place at the mine;

(*d*) a summary of any federal, provincial or other laws applicable to the mine in respect of effluent and environmental monitoring;

c) les précisions voulues sur le déroulement de l'étude sur les tissus de poissons, si une telle étude est exigée en vertu de l'alinéa 9*c*), notamment :

(i) les renseignements prévus aux alinéas 12*a*) à *d*),

(ii) la façon dont l'étude fournira les renseignements permettant de déterminer si l'effluent a un effet sur les tissus de poissons;

d) les précisions voulues sur le déroulement de l'étude sur la communauté d'invertébrés benthiques, notamment :

(i) les renseignements prévus aux alinéas 13*a*) à *d*),

(ii) la façon dont l'étude fournira les renseignements permettant de déterminer si l'effluent a un effet sur la communauté d'invertébrés benthiques;

e) les date et heure de prélèvement de tous les échantillons;

f) les précisions voulues sur les mesures d'assurance de la qualité et de contrôle de la qualité qui seront prises pour garantir la validité des données recueillies;

g) un sommaire des résultats de toutes études de suivi biologique présentés aux termes du sous-alinéa 14*b*)(iii).

11. La caractérisation du site comporte les renseignements suivants :

a) une description de la façon dont l'effluent se mélange dans la zone exposée, y compris une estimation de la concentration de l'effluent à 250 m de chacun des points de rejet final;

b) une description des zones de référence et des zones exposées où les études de suivi biologique seront effectuées, y compris les renseignements sur les caractéristiques géologiques, hydrologiques, océanographiques, limnologiques, chimiques et biologiques de ces zones;

c) le type de procédé de production utilisé par la mine et les pratiques de protection de l'environnement appliquées à la mine;

(*e*) a description of any anthropogenic, natural or other factors that are not related to the effluent under study and that may reasonably be expected to contribute to any observed effect; and

(*f*) any additional information relevant to the site characterization.

12. The information respecting the fish population and fish tissue studies shall include a description of and the scientific rationale for

(*a*) the fish species selected, taking into account the abundance of the species most exposed to effluent;

(*b*) the sampling areas selected;

(*c*) the sample size selected; and

(*d*) the field and laboratory methodologies selected.

13. The information respecting the benthic invertebrate community studies shall include a description of and the scientific rationale for

(*a*) the sampling areas selected, taking into account the benthic invertebrate diversity and the area most exposed to effluent;

(*b*) the sample size selected;

(*c*) the sampling season selected; and

(*d*) the field and laboratory methodologies selected.

Submission of the First Study Design

14. The first study design shall be submitted to the authorization officer not later than

(*a*) 12 months after the day on which the mine becomes subject to section 7 of these Regulations; or

(*b*) 24 months after the day on which the mine becomes subject to section 7 of these Regulations if

(i) biological monitoring studies are completed before the mine becomes subject to section 7 of these Regulations,

d) un sommaire des exigences législatives fédérales, provinciales ou autres visant la mine et portant sur le suivi de l'effluent et de l'environnement;

e) les facteurs anthropiques, naturels ou autres non liés à l'effluent étudié, mais dont on peut raisonnablement s'attendre à ce qu'ils contribuent à tout effet observé;

f) tout renseignement supplémentaire propre à la caractérisation du site.

12. Les renseignements concernant l'étude sur la population de poissons et l'étude sur les tissus de poissons comprennent, motifs scientifiques à l'appui, les éléments suivants :

a) les espèces de poissons choisies, compte tenu de l'abondance des espèces les plus exposées à l'effluent;

b) les zones d'échantillonnage choisies;

c) la taille des échantillons choisie;

d) les méthodes sur le terrain et en laboratoire qui ont été choisies.

13. Les renseignements concernant les études sur la communauté d'invertébrés benthiques comprennent, motifs scientifiques à l'appui, les éléments suivants :

a) les zones d'échantillonnage choisies, compte tenu de la diversité des invertébrés benthiques et de la zone la plus exposée à l'effluent;

b) la taille des échantillons choisie;

c) la période d'échantillonnage choisie;

d) les méthodes sur le terrain et en laboratoire qui ont été choisies.

Présentation du premier plan d'étude

14. Le premier plan d'étude est présenté à l'agent d'autorisation :

a) soit au plus tard douze mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement;

b) soit au plus tard vingt-quatre mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement si les conditions suivantes sont réunies :

(ii) the biological monitoring studies referred to in subparagraph (i) determine whether the effluent was causing an effect on fish population, fish tissue or the benthic invertebrate community, and

(iii) the results of the biological monitoring studies are submitted to the authorization officer along with a report that contains scientific data to support the results not later than 12 months after the day on which the mine becomes subject to section 7 of these Regulations.

Conducting the First Biological Monitoring Studies

15. (1) Subject to subsection (2), the first biological monitoring studies shall start not sooner than six months after the day on which a study design is submitted under section 14, and shall be conducted in accordance with that study design.

(2) If it is impossible to follow the study design because of unusual circumstances, the owner or operator may deviate from the study design but shall inform the authorization officer without delay of those circumstances and of how the study was or will be conducted.

Assessment of Data Collected from Studies

16. The data collected during the biological monitoring studies shall be used

(*a*) to calculate the mean, the median, the standard deviation, the standard error and the minimum and maximum values in the sampling areas for

(i) in the case of a fish population survey, indicators of growth, reproduction, condition and survival that include, where practicable, the length, total body weight and age of the fish, the weight of its liver or hepatopancreas and, if the fish are sexually mature, the egg size, fecundity and gonad weight of the fish,

(ii) in the case of the fish tissue analyses, the concentration of total mercury wet weight in the fish tissue, and

(iii) in the case of a benthic invertebrate community survey, the total benthic invertebrate density, the evenness index, the taxa richness and the similarity index and, if the survey is conducted in an area

(i) les études de suivi biologique ont été faites avant cette date,

(ii) les études indiquent si l'effluent produit un effet sur les populations de poissons, sur les tissus de poissons ou sur la communauté d'invertébrés benthiques,

(iii) les résultats des études sont présentés à l'agent d'autorisation au plus tard douze mois suivant cette date et sont accompagnés d'un rapport comportant les données scientifiques justificatives.

Délais pour effectuer les premières études de suivi biologique

15. (1) Sous réserve du paragraphe (2), les premières études de suivi biologique débutent au plus tôt six mois suivant la date à laquelle le plan d'étude a été présenté en application de l'article 14 et sont effectuées conformément à ce plan.

(2) Le propriétaire ou l'exploitant n'a pas à suivre le plan d'étude si des circonstances inhabituelles l'en empêchent, auquel cas il en avise sans délai l'agent d'autorisation et l'informe des modifications à apporter aux modalités du déroulement de l'étude.

Évaluation des données des études

16. Les données des études de suivi biologique doivent être utilisées :

a) pour calculer la moyenne, la médiane, l'écart-type, l'erreur-type ainsi que les valeurs minimales et maximales dans la zone d'échantillonnage quant aux éléments suivants :

(i) dans le cas de l'étude sur la population de poissons, les indicateurs de la croissance des poissons, de leur reproduction, de leur condition et de leur survie qui comprennent, dans la mesure du possible, la longueur, le poids corporel total, l'âge, le poids du foie ou de l'hépatopancréas et, si les poissons ont atteint la maturité sexuelle, la taille des œufs, le taux de fécondité et le poids des gonades,

(ii) dans le cas de l'étude sur les tissus de poissons, la concentration de mercure total (poids humide) dans les tissus,

where it is possible to sample sediment, the total organic carbon content of sediment and the particle size distribution of sediment; and

(*b*) to identify the sex of the fish sampled and the presence of any lesions, tumours, parasites or other abnormalities;

(*c*) to conduct an analysis of the results of the calculations under paragraph (*a*) and information identified under paragraph (*b*) to determine if there is a statistical difference between the sampling areas; and

(*d*) to conduct a statistical analysis of the results of the calculations under paragraph (*a*) to estimate the probability of correctly detecting an effect of a pre-defined size and the degree of confidence that can be placed in the calculations.

First Interpretative Report

17. The first biological monitoring studies conducted under section 15 shall be followed by an interpretative report that contains the following information:

(*a*) a description of any deviation from the study design that occurred while the biological monitoring studies were being conducted and any impact that the deviation had on the studies;

(*b*) the latitude and longitude of sampling areas in degrees, minutes and seconds and a description of the sampling areas sufficient to identify the location of the sampling areas;

(*c*) the dates and times when samples were collected;

(*d*) the sample sizes;

(*e*) the results of the data assessment made under section 16 and any supporting raw data;

(*f*) based on the results referred to in paragraph (*e*), the identification of any effect on

(i) the fish population,

(ii) fish tissue, and

(iii) dans le cas de l'étude sur la communauté d'invertébrés benthiques, la densité totale des invertébrés benthiques, l'indice de régularité, la richesse des taxons et l'indice de similitude et, si des sédiments peuvent être prélevés à l'endroit où s'effectue l'étude, la teneur en carbone organique total des sédiments et la distribution granulométrique de ceux-ci;

b) pour déterminer le sexe des poissons pris et la présence de lésions, de tumeurs, de parasites et autres anomalies;

c) pour effectuer une analyse des résultats des calculs effectués en application de l'alinéa *a*) et de l'information déterminée au titre de l'alinéa *b*) qui indique s'il existe une différence statistique entre les zones d'échantillonnage;

d) pour effectuer une analyse statistique des résultats des calculs effectués en application de l'alinéa *a*) qui indique la probabilité de détection correcte d'un effet d'une ampleur prédéterminée ainsi que le degré de confiance pouvant être accordé aux calculs.

Premier rapport d'interprétation

17. Les premières études de suivi biologique effectuées en application de l'article 15 sont suivies d'un rapport d'interprétation qui comporte les éléments suivants :

a) les écarts par rapport au plan d'étude qui se sont produits durant les études et l'incidence de ces écarts sur les études;

b) la latitude et la longitude des zones d'échantillonnage, exprimées en degrés, en minutes et en secondes, et une description qui permet de reconnaître l'emplacement de ces zones;

c) les dates et heures de prélèvement des échantillons;

d) la taille des échantillons;

e) les résultats de l'évaluation des données effectuée en application de l'article 16 et les données brutes justificatives;

f) selon les résultats visés à l'alinéa *e*), l'indication :

(i) de tout effet sur la population de poissons,

(iii) the benthic invertebrate community;

(*g*) a comparison of the results referred to in paragraph (*f*) and the results of the sublethal toxicity testing reported under paragraph 8(*e*) to determine if there is a correlation;

(*h*) the conclusions of the biological monitoring studies, taking into account

(i) the results of any previous biological monitoring studies submitted under paragraph 14(*b*),

(ii) the presence of anthropogenic, natural or other factors that are not related to the effluent under study and that may reasonably be expected to contribute to any observed effect,

(iii) the results of the statistical analysis conducted under paragraphs 16(*c*) and (*d*), and

(iv) a description of quality assurance or quality control measures that were implemented and the data related to the implementation of those measures;

(*i*) a description of how the results will impact the study design for subsequent biological monitoring studies; and

(*j*) the date when the next biological monitoring study will be conducted.

18. The first interpretative report shall be submitted

(*a*) not later than 30 months after the date the mine becomes subject to section 7 of these Regulations, if the study design was submitted under paragraph 14(*a*); or

(*b*) not later than 42 months after the date the mine becomes subject to section 7 of these Regulations, if the study design was submitted under paragraph 14(*b*).

DIVISION 2

SUBSEQUENT BIOLOGICAL MONITORING STUDIES

Subsequent Study Designs

19. (1) Subject to subsection (2), the study design for a second and any subsequent biological monitoring study

(ii) de tout effet sur les tissus de poissons,

(iii) de tout effet sur la communauté d'invertébrés benthiques;

g) une comparaison des résultats visés à l'alinéa *f*) et des résultats des essais de toxicité sublétale visés à l'alinéa 8*e*) pour indiquer s'il existe une corrélation;

h) les conclusions des études de suivi biologique compte tenu des éléments suivants :

(i) les résultats de toute étude de suivi biologique antérieure présentée en application de l'alinéa 14*b*),

(ii) la présence de facteurs anthropiques, naturels ou autres non liés à l'effluent à l'étude et dont on peut raisonnablement s'attendre à ce qu'ils contribuent à tout effet observé,

(iii) les résultats de l'analyse statistique effectuée au titre des alinéas 16*c*) et *d*),

(iv) les précisions voulues sur les mesures d'assurance de la qualité et de contrôle de la qualité qui ont été prises ainsi que les données associées à leur mise en œuvre;

i) l'incidence des résultats sur le plan d'étude des études de suivi biologique subséquentes;

j) la date de la prochaine étude de suivi biologique.

18. Le premier rapport d'interprétation est présenté :

a) soit au plus tard trente mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement, dans le cas où le plan d'étude a été présenté en application de l'alinéa 14*a*);

b) soit au plus tard quarante-deux mois suivant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement, dans le cas où le plan d'étude a été présenté en application de l'alinéa 14*b*).

SECTION 2

ÉTUDES DE SUIVI BIOLOGIQUE SUBSÉQUENTES

Plans des études subséquents

19. (1) Sous réserve du paragraphe (2), le plan de la deuxième étude de suivi biologique et de toute étude de

shall be submitted to the authorization officer at least six months before a second or subsequent biological monitoring study is conducted, and shall include

(*a*) a summary of the information referred to in paragraph 10(*a*) and, where applicable, a detailed description of any changes to that information since the submission of the most recent study design;

(*b*) the information referred to in paragraphs 10(*b*) to (*f*);

(*c*) a summary of the results of any previous biological monitoring studies that were conducted after the coming into force of section 7 of these Regulations respecting the fish population, fish tissue analyses and the benthic invertebrate community; and

(*d*) if the results of the two previous biological monitoring studies indicate a similar type of effect on the fish population, on fish tissue or on the benthic invertebrate community, a description of one or more additional sampling areas within the exposure area that shall be used to assess the magnitude and geographic extent of the effect.

(2) If the results of the previous biological monitoring study indicate the magnitude and geographic extent of an effect on the fish population, on fish tissue or on the benthic invertebrate community, the study design shall include the information required by paragraph (1)(*c*) and a detailed description of what field and laboratory studies will be used to determine the cause of the effect.

Conduct of Subsequent Biological Monitoring Studies

20. (1) Subject to subsection (2), the second and any subsequent monitoring studies shall be conducted in accordance with the study design submitted under section 19.

(2) If unusual circumstances make it impossible to follow the study design, the owner or operator must inform the authorization officer without delay.

suivi biologique subséquente est présenté à l'agent d'autorisation au moins six mois avant le début de l'étude et comporte :

a) un sommaire des renseignements prévus à l'alinéa 10*a*) ainsi qu'une description détaillée des modifications apportées depuis la soumission de la dernière étude de suivi biologique, le cas échéant;

b) les renseignements prévus aux alinéas 10*b*) à *f*);

c) un sommaire des résultats de toute étude de suivi biologique sur la population de poissons, sur les tissus de poissons et sur la communauté d'invertébrés benthiques qui a été effectuée après l'entrée en vigueur de l'article 7 du présent règlement;

d) la description d'une ou de plusieurs zones d'échantillonnage supplémentaires dans la zone exposée qui doivent être ajoutées pour permettre la détermination de l'ampleur et de la portée géographique de l'effet, si les résultats des deux dernières études de suivi biologique indiquent un effet semblable sur la population de poissons, sur les tissus de poissons ou sur la communauté d'invertébrés benthiques.

(2) Si les résultats de la dernière étude de suivi biologique indiquent l'ampleur et la portée géographique de l'effet sur la population de poissons, sur les tissus de poissons ou sur la communauté d'invertébrés benthiques, le plan d'étude comporte les renseignements prévus à l'alinéa (1)*c*) ainsi que les précisions voulues sur les études sur le terrain et les études en laboratoire qui seront effectuées pour déterminer la cause de l'effet.

Déroulement des études de suivi biologique subséquentes

20. (1) Sous réserve du paragraphe (2), la deuxième étude de suivi biologique et toute étude de suivi biologique subséquente sont effectuées conformément au plan d'étude présenté en application de l'article 19.

(2) Si des circonstances inhabituelles font qu'il est impossible de se conformer au plan d'étude, le propriétaire ou l'exploitant en informe sans délai l'agent d'autorisation.

Content of Subsequent Interpretative Reports

21. (1) Subject to subsection (2), the second and subsequent biological monitoring studies conducted under section 20 shall be followed by an interpretative report that contains

(*a*) the information referred to in paragraphs 17(*a*) to (*j*); and

(*b*) if the study design that was submitted under subsection 19(1) contains information referred to in paragraph 19(1)(*d*), the magnitude and geographic extent of the effect referred to in that paragraph.

(2) If the study design was submitted under subsection 19(2), the interpretative report shall contain only the cause of the effect referred to in that subsection and, if the cause was not determined, an explanation of why and a description of any steps that must be taken in the next study to determine that cause.

Submission of the Subsequent Interpretative Reports

22. (1) Subject to subsection (2), the interpretative report of the second and any subsequent biological monitoring studies shall be submitted to an authorization officer not later than 36 months after the day on which the interpretative report of the previous biological monitoring study was required to be submitted.

(2) The interpretative report of the second and subsequently conducted biological monitoring studies shall be submitted

(*a*) not later than 24 months after the day on which the interpretative report of the previous study was required to be submitted, if the results of the previous study indicate an effect on fish populations, on fish tissue and on the benthic invertebrate community;

(*b*) not later than 72 months after the day on which the interpretative report of the previous study was required to be submitted, if the results of the previous two consecutive biological monitoring studies indicate no effect on fish populations, on fish tissue and on the benthic invertebrate community; or

(*c*) not later than 24 months after the day on which the interpretative report of the previous study was required to be submitted, if the results of the previous two con-

Rapports d'interprétation subséquents

21. (1) Sous réserve du paragraphe (2), la deuxième étude de suivi biologique et toute étude de suivi biologique subséquente effectuées en application de l'article 20 sont suivies d'un rapport d'interprétation qui comporte les éléments suivants :

a) les renseignements visés aux alinéas 17*a*) à *j*);

b) si le plan d'étude présenté en application du paragraphe 19(1) comporte les renseignements visés à l'alinéa 19(1)*d*), l'ampleur et la portée géographique de l'effet visé à cet alinéa.

(2) Si le plan d'étude est présenté en application du paragraphe 19(2), le rapport d'interprétation ne comporte que la cause de l'effet visé à ce paragraphe et, si la cause n'a pas été déterminée, les raisons de l'échec ainsi que les mesures à prendre pour déterminer cette cause lors de la prochaine étude.

Fréquence de la présentation des rapports d'interprétation

22. (1) Sous réserve du paragraphe (2), le rapport d'interprétation de la deuxième étude de suivi biologique et de toute étude de suivi biologique subséquente est présentée à l'agent d'autorisation au plus tard trente-six mois suivant la date limite de présentation du rapport d'interprétation de la dernière étude de suivi biologique.

(2) Le rapport d'interprétation de la deuxième étude de suivi biologique et celui de toute étude subséquente sont présentés :

a) soit au plus tard vingt-quatre mois suivant la date limite de présentation du rapport d'interprétation de la dernière étude si les résultats de cette étude indiquent un effet sur la population de poissons, sur les tissus de poissons et sur la communauté d'invertébrés benthiques;

b) soit au plus tard soixante-douze mois suivant la date limite de présentation du rapport d'interprétation de la dernière étude si les résultats des deux dernières études consécutives n'indiquent aucun effet sur la population de poissons, sur les tissus de poissons et sur la communauté d'invertébrés benthiques;

c) soit au plus tard vingt-quatre mois suivant la date limite de présentation du rapport d'interprétation de la

secutive biological monitoring studies indicate an effect on fish populations, on fish tissue or on the benthic invertebrate community, and if the magnitude or geographic extent of the effect or cause of the effect is not known.

(3) For the purposes of subsection (2), if an owner or operator of a mine is not required to conduct a study on the fish population or on fish tissue under paragraph 9(*b*) or (*c*), the effluent is considered to have no effect on the fish population or on fish tissue respectively.

DIVISION 3

FINAL BIOLOGICAL MONITORING STUDY PRIOR TO CLOSING MINE

Final Study Design

23. (1) If an owner or operator of a mine has provided to the authorization officer a notice to close a mine under subsection 32(1) of these Regulations, a study design shall be submitted to the authorization officer, not later than six months after providing the notice, and shall include

(*a*) if study design is submitted for the first time, the information referred to in paragraph 10(*a*) and, in all other cases, a summary of the information referred to in paragraph 10(*a*) and, where applicable, a detailed description of any changes to that information since the submission of the most recent study design;

(*b*) the information referred to in paragraphs 10(*b*) to (*f*);

(*c*) a summary of the results of any previous biological monitoring studies that were conducted after the date of registration of these Regulations respecting the fish population, fish tissue and the benthic invertebrate community; and

(*d*) if the results of the two previous biological monitoring studies indicate that there is an effect on the fish population, on fish tissue or on the benthic invertebrate community, a description of one or more additional sampling areas within the exposure area, which additional sampling areas shall be used to assess the magnitude and geographic extent of the effect.

dernière étude si les résultats des deux dernières études consécutives indiquent un effet sur la population de poissons, sur les tissus de poissons ou sur la communauté d'invertébrés benthiques et que l'ampleur ou la portée géographique de l'effet ou sa cause sont inconnus.

(3) Pour l'application du paragraphe (2), si une étude sur la population de poissons ou une étude sur les tissus de poissons n'a pas à être faite en application des alinéas 9*b*) ou *c*), il est considéré que l'effluent n'a pas d'effet sur cette population ou sur ces tissus.

SECTION 3

ÉTUDE DE SUIVI BIOLOGIQUE FINALE AVANT LA FERMETURE D'UNE MINE

Plan de l'étude finale

23. (1) Lorsque le propriétaire ou l'exploitant d'une mine a présenté à l'agent d'autorisation un avis de fermeture de sa mine en application du paragraphe 32(1) du présent règlement, le plan d'étude est présenté à l'agent d'autorisation au plus tard six mois suivant la date de présentation de l'avis et comporte :

a) s'il s'agit du premier plan d'étude, les renseignements prévus à l'alinéa 10*a*) et, dans les autres cas, un sommaire des renseignements prévus à l'alinéa 10*a*) ainsi qu'une description détaillée des modifications apportées depuis la soumission de la dernière étude de suivi biologique, le cas échéant;

b) les renseignements prévus aux alinéas 10*b*) à *f*);

c) un sommaire des résultats de toute étude de suivi biologique antérieure effectuée après la date d'enregistrement du présent règlement et portant sur la population de poissons, les tissus de poissons et la communauté d'invertébrés benthiques;

d) la description d'une ou plusieurs zones d'échantillonnage supplémentaires dans la zone exposée qui doivent être ajoutées pour permettre la détermination de l'ampleur et de la portée géographique de l'effet, si les résultats des deux dernières études de suivi biologique indiquent un effet sur la population de poissons, sur les tissus de poissons ou sur la communauté d'invertébrés benthiques.

(2) If the results of the previous biological monitoring studies indicate the magnitude and geographic extent of an effect on fish population, on fish tissue or on the benthic invertebrate community, the study design shall include the information required by paragraph (1)(*c*) and a detailed description of what field and laboratory studies will be used to determine the cause of the effect.

Conduct of Final Biological Monitoring Studies

24. (1) Subject to subsection (2), the final monitoring studies shall be conducted in accordance with the study design submitted under section 23 not sooner than six months after the day on which the final study design has been submitted.

(2) If unusual circumstances make it impossible to follow the study design, the owner or operator must inform the authorization officer without delay.

Content of Final Interpretative Report

25. The final biological monitoring studies conducted under section 24 shall be followed by an interpretative report that contains

(*a*) the information referred to in paragraphs 17(*a*) to (*h*);

(*b*) if the study design that was submitted under subsection 23(1) contains the information referred to in paragraph 23(1)(*d*), the magnitude and geographic extent of the effect referred to in that paragraph; and

(*c*) if the study design was submitted under subsection 23(2), the cause of the effect referred to in that subsection.

Submission of the Final Interpretative Report

26. The final interpretative report shall be submitted to the authorization officer not later than 36 months after the day on which the notice to close the mine was provided under subsection 32(1) of these Regulations.

SOR/2006-239, ss. 26 to 33, 34(F).

(2) Si les résultats de la dernière étude de suivi biologique indiquent l'ampleur et la portée géographique de l'effet sur la population de poissons, sur les tissus de poissons ou sur la communauté d'invertébrés benthiques, le plan d'étude comporte les renseignements prévus à l'alinéa (1)*c*) ainsi que les précisions voulues sur les études sur le terrain et sur les études en laboratoire qui seront effectuées pour déterminer la cause de l'effet.

Déroulement de l'étude de suivi biologique finale

24. (1) Sous réserve du paragraphe (2), l'étude de suivi biologique finale est effectuée conformément au plan d'étude présenté en application de l'article 23 au plus tôt six mois après la soumission du plan.

(2) Si des circonstances inhabituelles font qu'il est impossible de se conformer au plan d'étude, le propriétaire ou l'exploitant en informe sans délai l'agent d'autorisation.

Rapport d'interprétation final

25. L'étude de suivi biologique finale effectuée en application de l'article 24 est suivie par un rapport d'interprétation qui comporte les éléments suivants :

a) les renseignements visés aux alinéas 17*a*) à *h*);

b) si le plan d'étude a été présenté en application du paragraphe 23(1) et comporte les renseignements visés à l'alinéa 23(1)*d*), l'ampleur et la portée géographique de l'effet visé à cet alinéa;

c) si le plan d'étude a été présenté en application du paragraphe 23(2), la cause de l'effet visé à ce paragraphe.

Présentation du rapport d'interprétation final

26. Le rapport d'interprétation final est présenté à l'agent d'autorisation au plus tard trente-six mois suivant la date de remise de l'avis de fermeture de la mine en application du paragraphe 32(1) du présent règlement.

DORS/2006-239, art. 26 à 33, 34(F).

SCHEDULE 6
(Section 22)

ANNUAL REPORT SUMMARIZING EFFLUENT MONITORING RESULTS

PART 1

IDENTIFYING INFORMATION

1. Name of the mine

2. Address of the mine

3. Name of the operator of the mine

4. Operator's telephone number and e-mail address, if any

5. Reporting period

6. Date of report

PART 2

TEST RESULTS RESPECTING EACH FINAL DISCHARGE POINT

1. Complete the following table with the monthly mean concentration for the deleterious substances set out in the table for each final discharge point and identify the location of the final discharge point.

2. Any measurement not taken because there was no deposit from the final discharge point shall be identified by the letters "NDEP" (No Deposit).

3. Any measurement not taken because no measurement was required in accordance with the conditions set out in section 12 or 13 of the *Metal Mining Effluent Regulations* shall be identified by the letters "NMR" (No Measurement Required).

ANNEXE 6
(article 22)

RAPPORT ANNUEL RÉSUMANT LES RÉSULTATS DU SUIVI DE L'EFFLUENT

PARTIE 1

RENSEIGNEMENTS IDENTIFICATOIRES

1. Nom de la mine

2. Adresse de la mine

3. Nom de l'exploitant de la mine

4. Numéro de téléphone de l'exploitant et adresse électronique, le cas échéant

5. Période visée

6. Date du rapport

PARTIE 2

RÉSULTATS DES ESSAIS À CHACUN DES POINTS DE REJET FINAL

1. Remplir le tableau suivant pour chaque point de rejet final, identifier son emplacement et indiquer la moyenne mensuelle de la concentration des substances nocives.

2. S'il n'y a pas eu de résultats parce qu'il n'y avait pas de rejet à partir du point de rejet final, inscrire « A.R. » (aucun rejet).

3. S'il n'y a pas eu de mesure parce que l'article 12 ou 13 du *Règlement sur le effluents des mines de métaux* n'en exigeait aucune, inscrire « A.M.E. » (aucune mesure exigée).

Location of final discharge point:											
Month	As (mg/L)	Cu (mg/L)	CN (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	TSS (mg/L)	Ra 226 (Bq/L)	Lowest pH	Highest pH	Effluent Volume (m^3)
Jan.											
Feb.											
Mar.											
Apr.											
May											
June											
July											
Aug.											
Sept.											
Oct.											
Nov.											
Dec.											

Emplacement du point de rejet final :											
Mois	As (mg/L)	Cu (mg/L)	CN (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	TSS (mg/L)	Ra 226 (Bq/L)	pH le plus bas	pH le plus haut	Volume d'effluent (m^3)
Janv.											
Févr.											
Mars											
Avr.											
Mai											
Juin											
Juill.											
Août											
Sept.											
Oct.											
Nov.											
Déc.											

PART 3

RESULTS OF ACUTE LETHALITY TESTS AND *DAPHNIA MAGNA* MONITORING TESTS

Location of final discharge point:		
Date Sample Collected	Results for Rainbow Trout Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)	Results for *Daphnia magna* Monitoring Tests (mean percentage mortality in 100% effluent test concentration)

PARTIE 3

RÉSULTATS DES ESSAIS DE DÉTERMINATION DE LA LÉTALITÉ AIGUË ET DES ESSAIS DE SUIVI AVEC BIOESSAIS SUR LA *DAPHNIA MAGNA*

Emplacement du point de rejet final :		
Date du prélèvement de l'échantillon	Résultats des essais de détermination de la létalité aiguë sur la truite arc-en-ciel (pourcentage moyen de mortalité dans l'effluent non dilué)	Résultats des essais de suivi avec bioessais sur la *Daphnia magna* (pourcentage moyen de mortalité dans l'effluent non dilué)

PART 4

NON-COMPLIANCE INFORMATION

1. If the results of the effluent monitoring tests indicate that the limits set out in Schedule 4 were exceeded, indicate the cause(s) of that non-compliance and remedial measures planned or implemented.

2. Indicate remedial measures planned or implemented in response to the failure of rainbow trout acute lethality tests.

SOR/2006-239, s. 35.

PARTIE 4

RENSEIGNEMENTS SUR LA NON-CONFORMITÉ

1. Si les résultats des essais de suivi de l'effluent montrent que les limites prévues à l'annexe 4 ont été dépassées, en indiquer les causes ainsi que les mesures correctives projetées ou prises.

2. Indiquer les mesures correctives projetées ou prises en cas de résultats non conformes des essais de détermination de la létalité aiguë sur la truite arc-en-ciel .

DORS/2006-239, art. 35.

SCHEDULE 6.1
(Section 29)

PRESCRIBED PERSONS FOR NOTIFICATION AND REPORTING

Item	Column 1 Province	Column 2 Office	Column 3 Position
1.	Ontario	Environmental Protection Operations Division — Ontario Environment Canada	Director, Environmental Protection Operations Division — Ontario Environment Canada
2.	Quebec	Environmental Protection Operations Division — Quebec Environment Canada	Director, Environmental Protection Operations Division — Quebec Environment Canada
3.	Nova Scotia	Maritimes Regional Office Canadian Coast Guard Fisheries and Oceans Canada	Director, Environmental Protection Operations Division — Atlantic Environment Canada
4.	New Brunswick	Maritimes Regional Office Canadian Coast Guard Fisheries and Oceans Canada	Director, Environmental Protection Operations Division — Atlantic Environment Canada
5.	Manitoba	Manitoba Section Environmental Protection Operations Division — Prairie and Northern Environment Canada	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada
6.	British Columbia	Environmental Protection Operations Division — Pacific and Yukon Environment Canada	Director, Environmental Protection Operations Division — Pacific and Yukon Environment Canada
7.	Prince Edward Island	Maritimes Regional Office Canadian Coast Guard Fisheries and Oceans Canada	Director, Environmental Protection Operations Division — Atlantic Environment Canada Environment Canada
8.	Saskatchewan	Compliance and Field Services Branch Saskatchewan Environment	Executive Director, Compliance and Field Services Branch Saskatchewan Environment

ANNEXE 6.1
(article 29)

LISTE DES AUTORITÉS AUX FINS D'AVIS ET DE RAPPORTS ÉCRITS

Article	Colonne 1 Province	Colonne 2 Secteur	Colonne 3 Poste
1.	Ontario	Division des activités de protection de l'environnement — Ontario Environnement Canada	Directeur, Division des activités de protection de l'environnement — Ontario Environnement Canada
2.	Québec	Division des activités de protection de l'environnement — Québec Environnement Canada	Directeur, Division des activités de protection de l'environnement — Québec Environnement Canada
3.	Nouvelle-Écosse	Bureau régional des Maritimes Garde côtière canadienne Pêches et Océans Canada	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
4.	Nouveau-Brunswick	Bureau régional des Maritimes Garde côtière canadienne Pêches et Océans Canada	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
5.	Manitoba	Section du Manitoba Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada
6.	Colombie-Britannique	Division des activités de protection de l'environnement — Pacifique et Yukon Environnement Canada	Directeur, Division des activités de protection de l'environnement — Pacifique et Yukon Environnement Canada
7.	Île-du-Prince-Édouard	Bureau régional des Maritimes Garde côtière canadienne Pêches et Océans Canada	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
8.	Saskatchewan	Compliance and Field Services Branch	Executive Director, Compliance and

Item	Column 1 Province	Column 2 Office	Column 3 Position
9.	Alberta	Enforcement and Monitoring Branch Alberta Environment	Director, Enforcement and Monitoring Branch Alberta Environment
10.	Newfoundland and Labrador	Newfoundland and Labrador Regional Office Canadian Coast Guard Fisheries and Oceans Canada	Director, Environmental Protection Operations Division — Atlantic Environment Canada
11.	Yukon	Environmental Programs Branch Department of the Environment Government of Yukon	Director, Environmental Protection Operations Division — Pacific and Yukon Environment Canada
12.	Northwest Territories	Northern Section Environmental Protection Operations Division — Prairie and Northern Environment Canada	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada
13.	Nunavut	Northern Section Environmental Protection Operations Division — Prairie and Northern Environment Canada	Director, Environmental Protection Operations Division — Prairie and Northern Environment Canada

SOR/2006-239, s. 35.

Article	Colonne 1 Province	Colonne 2 Secteur	Colonne 3 Poste
		Saskatchewan Environment	Field Services Branch Saskatchewan Environment
9.	Alberta	Enforcement and Monitoring Branch Alberta Environment	Director, Enforcement and Monitoring Branch Alberta Environment
10.	Terre-Neuve et Labrador	Bureau régional de Terre-Neuve-et-Labrador Garde côtière canadienne Pêches et Océans Canada	Directeur, Division des activités de protection de l'environnement — Atlantique Environnement Canada
11.	Yukon	Division des programmes environnementaux Ministère de l'Environnement Gouvernement du Yukon	Directeur, Division des activités de protection de l'environnement — Pacifique et Yukon Environnement Canada
12.	Territoires du Nord-Ouest	Section du Nord Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada
13.	Nunavut	Section du Nord Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada	Directeur, Division des activités de protection de l'environnement — Prairies et Nord Environnement Canada

DORS/2006-239, art. 35.

SCHEDULE 7

(Paragraphs 34(4)(a) and (d) and (5)(a) and (d))

PART 1

INFORMATION TO BE INCLUDED IN AN APPLICATION FOR A TRANSITIONAL AUTHORIZATION

1. The name, address and telephone number of the applicant.

2. The name, position title, telephone number, facsimile number and E-mail address of a contact person.

3. The name, mailing address and geographic location of the mine.

4. A general description of the mining operation with details of the parts of the operation for which the application is made.

5. A site plan showing the location of the main mining and milling facilities, the effluent treatment facilities and all the final discharge points.

6. All available pH data and data related to the monthly mean concentrations of the deleterious substances set out in column 1 of Schedule 4 in the effluent for which the application is made for the one-year period immediately preceding the date of application.

7. The effluent flow rate at each final discharge point.

8. The available results of all acute lethality tests related to the effluent for which the application is made for the one-year period immediately preceding the date of application.

9. Plans, specifications and other information on the design and capability of the effluent treatment process in place at the mine on the date of application.

10. Based on the best available information at the time of application, a description of the facilities and procedures that are necessary to produce a non-acutely lethal effluent that complies with the authorized limits of the substances set out in column 1 of Schedule 4.

11. A proposed schedule for the construction of the facilities and implementation of the procedures.

12. The details of any effluent monitoring results related to fish, fish habitat or the human use of fish that are known to the operator.

ANNEXE 7

(alinéas 34(4)a) et d) et (5)a) et d))

PARTIE 1

RENSEIGNEMENTS DEVANT FIGURER DANS LA DEMANDE D'AUTORISATION TRANSITOIRE

1. Les nom, adresse et numéro de téléphone du demandeur.

2. Les nom, fonction, numéros de téléphone et de télécopieur et l'adresse électronique d'une personne-ressource.

3. Les nom, adresse postale et emplacement géographique de la mine.

4. Une description générale de l'exploitation minière, avec des précisions sur les éléments de l'exploitation qui sont visés par la demande.

5. Un plan du site indiquant l'emplacement des principales installations d'extraction et de préparation du minerai, des installations de traitement de l'effluent et de tout point de rejet final.

6. Toutes les données disponibles sur le pH et celles portant sur les concentrations mensuelles moyennes des substances nocives énumérées à la colonne 1 de l'annexe 4 dans l'effluent visé par la demande pour la période d'un an précédant la date de la demande.

7. Le débit de l'effluent à chaque point de rejet final.

8. Les résultats disponibles de tous les essais de détermination de la létalité aiguë de l'effluent visé par la demande pour la période d'un an précédant la date de la demande.

9. Les plans, les spécifications et tous autres renseignements sur la conception et la capacité du procédé de traitement de l'effluent en place à la mine à la date de la demande.

10. Selon les meilleures données connues au moment de la demande, une description des installations et des pratiques nécessaires pour produire un effluent à létalité non aiguë qui respecte les limites permises pour les substances énumérées à la colonne 1 de l'annexe 4.

11. Un projet de calendrier de construction des installations et de mise en œuvre des pratiques.

13. A signed statement indicating whether there is a law in the jurisdiction where the mine is located, and the identification of that law, that requires the mine to produce

(*a*) a non-acutely lethal effluent;

(*b*) an effluent containing a deleterious substance in a concentration that is equal to or less than the limits set out in Schedule 4; or

(*c*) an effluent with a pH equal to or greater than 6.0 but not greater than 9.5.

14. Any further information that is required to support the application.

PART 2

STATEMENT OF CERTIFICATION

I certify that the information provided under Part 1 of Schedule 7 to the *Metal Mining Effluent Regulations* was prepared by persons with sufficient knowledge to evaluate the information. I further certify, based on my reasonable inquiry of the persons responsible for making the determination, that the information submitted is true, accurate and complete.

Date:_____ Signature : _____
(operator, owner or their authorized representative)

_____
(Position title)

SOR/2006-239, s. 36(F).

12. Le détail de tous les résultats du suivi de l'effluent se rapportant au poisson, à son habitat ou à l'utilisation du poisson par l'homme, qui sont connus de l'exploitant.

13. Une déclaration signée qui fait mention de toute loi de l'autorité législative du territoire où est située la mine exigeant la production par la mine d'un effluent qui possède les caractéristiques suivantes :

a) il présente une létalité non aiguë;

b) toute substance nocive qu'il contient a une concentration égale ou inférieure aux limites établies à l'annexe 4;

c) son pH est égal ou supérieur à 6,0 mais ne dépasse pas 9,5;

14. Tous les autres renseignements nécessaires à l'appui de la demande.

PARTIE 2

ATTESTATION

J'atteste que les renseignements soumis en application de la partie 1 de l'annexe 7 du *Règlement sur les effluents de mines de métaux* ont été établis par des personnes qui possèdent les connaissances suffisantes pour les évaluer. J'atteste, en outre, à la lumière d'une enquête raisonnable que j'ai effectuée sur les personnes responsables de cette détermination, que les renseignements fournis sont véridiques, exacts et complets.

Date : _____ Signature : _____
(propriétaire, exploitant ou leur représentant autorisé)

_____
(fonction)

DORS/2006-239, art. 36(F).

SCHEDULE 8
(Subsection 35(2))

(PART 1)

TRANSITIONAL AUTHORIZATION FOR ACUTELY LETHAL EFFLUENT

(Name and address of the owner and operator of the mine)

Owner: _____ Operator: _____

_____ _____

_____ _____

_____ _____

(Name and address of the mine)

_____

_____

_____

is (are)hereby authorized as of (*date*) _____ to deposit acutely lethal effluent until (*date*) _____ for effluent from (*identify final discharge point*)

_____

IMPORTANT: Please refer to sections 6 to 27 and subsection 28(1) of the *Metal Mining Effluent Regulations* (MMER) for conditions governing the authority to deposit. In addition, please note that this authorization may be revoked under section 38 of those Regulations.

Authorization Officer: (*Signature*): _____
(*Name*): _____
(*Position*): _____
(*Date*): _____

ANNEXE 8
(paragraphe 35(2))

PARTIE 1

AUTORISATION TRANSITOIRE VISANT UN EFFLUENT À LÉTALITÉ AIGUË

(Nom et adresse du propriétaire et de l'exploitant de la mine)

Propriétaire : _____ Exploitant : _____

_____ _____

_____ _____

_____ _____

(Nom et adresse de la mine)

_____

_____

_____

est (sont) autorisé(s), à compter du (*date*) _____, à rejeter un effluent à létalité aiguë jusqu'au (*date*) _____ en ce qui concerne l'effluent provenant de (*préciser le point de rejet final*)

_____

IMPORTANT : Prière de consulter les articles 6 à 27 et le paragraphe 28(1) du *Règlement sur les effluents des mines de métaux* pour les conditions régissant l'autorisation de rejeter. Veuillez également prendre note que l'autorisation peut être révoquée en vertu de l'article 38 de ce règlement.

Agent d'autorisation (*Signature*) : _____
(*Nom*) : _____
(*Fonction*) : _____
(*Date*) : _____

PART 2

TRANSITIONAL AUTHORIZATION FOR DELETERIOUS SUBSTANCES

(Name and address of the owner and operator of the mine)

Owner: _____ Operator: _____

_____ _____

_____ _____

_____ _____

(Name and address of the mine)

_____

_____

_____

is (are) hereby authorized as of (*date*) _____ to deposit the deleterious substances specified below until (*date*) _____ for effluent from (*identify final discharge point*)

_____

Deleterious Substance	Maximum Authorized Monthly Mean Concentration[1]	Maximum Authorized Concentration in a Composite Sample[2]	Maximum Authorized Concentration in a Grab Sample[3]
Arsenic			
Copper			
Cyanide			
Lead			
Nickel			
Zinc			
Radium 226			
Total Suspended Solids			

Authorized Effluent pH Range[4]: _____

IMPORTANT: Please refer to sections 6 to 27 and subsection 28(1) of the *Metal Mining Effluent Regulations* for conditions governing the authority to deposit. In addition, please note that this authorization may be revoked under section 38 of those Regulations.

PARTIE 2

AUTORISATION TRANSITOIRE VISANT DES SUBSTANCES NOCIVES

(Nom et adresse du propriétaire et de l'exploitant de la mine)

Propriétaire : _____ Exploitant : _____

_____ _____

_____ _____

_____ _____

(Nom et adresse de la mine)

_____

_____

_____

est (sont) autorisé(s), à compter du (*date*) _____, à rejeter les substances nocives ci-après jusqu'au (*date*) _____ en ce qui concerne l'effluent provenant de (*préciser le point de rejet final*)

_____

Substance nocive	Concentration moyenne mensuelle maximale permise[1]	Concentration maximale permise dans un échantillon composite[2]	Concentration maximale permise dans un échantillon instantané[3]
Arsenic			
Cuivre			
Cyanure			
Plomb			
Nickel			
Zinc			
Radium 226			
Total des solides en suspension			

Plage permise pour le pH[4] de l'effluent : _____

IMPORTANT : Prière de consulter les articles 6 à 27 et le paragraphe 28(1) du *Règlement sur les effluents des mines de métaux* pour les conditions régissant l'autorisation de rejeter. Veuillez également prendre note que l'autorisation peut être révoquée en vertu de l'article 38 de ce règlement.

Authorization Officer: (*Signature*): _____
(*Name*): _____
(*Position*): _____
(*Date*): _____

[1] The maximum monthly mean concentration of the deleterious substance in effluent is the greater of the maximum monthly mean concentration of the substance recorded during the 12-month period preceding the date of the application for the transitional authorization and the authorized monthly mean concentration set out in column 2 of Schedule 4. The maximum monthly mean concentration for a substance may not exceed the concentration required by the jurisdiction where the mine is located, if applicable.

[2] The maximum authorized concentration of the deleterious substance in each composite sample collected is equal to 1.5 times the maximum authorized monthly mean concentration.

[3] The maximum authorized concentration of the deleterious substance in each grab sample collected is equal to 2.0 times the maximum authorized monthly mean concentration.

[4] The lower limit of the authorized pH range is equal to the lowest pH recorded during the 12-month period preceding the date of the application for the transitional authorization or 6.0, whichever is less. The upper limit of the authorized pH range is equal to the highest pH recorded during the 12-month period preceding the date of the application or 9.5, whichever is greater.

Agent d'autorisation (*Signature*) : _____
(*Nom*) : _____
(*Fonction*) : _____
(*Date*) : _____

[1] La concentration moyenne mensuelle maximale d'une substance nocive dans un effluent représente soit la concentration moyenne mensuelle maximale enregistrée au cours des douze mois précédant la date de la demande, soit la concentration moyenne mensuelle permise prévue à la colonne 2 de l'annexe 4, selon la plus élevée de ces concentrations. Cependant, la concentration moyenne mensuelle maximale ne peut pas dépasser la concentration fixée par l'autorité législative du territoire où est situé la mine, le cas échéant.

[2] La concentration maximale permise d'une substance nocive dans un échantillon composite est égale au produit de 1,5 par la concentration moyenne mensuelle maximale permise de la substance.

[3] La concentration maximale permise d'une substance nocive dans un échantillon instantané est égale au produit de 2,0 par la concentration moyenne mensuelle maximale permise de la substance.

[4] Le niveau inférieur de la plage permise pour le pH est égal à soit le pH le plus bas enregistré au cours des douze mois précédant la date de la demande, soit une valeur de 6,0, selon la plus basse de ces valeurs. Le niveau supérieur de la plage permise pour le pH est égal à soit le pH le plus élevé enregistré au cours des douze mois précédant la date de la demande, soit une valeur de 9,5, selon la plus élevée de ces valeurs.

APPENDIX III

LETTERS FROM INTERESTED PARTIES

YELLOWKNIFE, Northwest Ter
May 3rd, 1949

In consideration of the sum of Two Thousand ($2,000.00) Dollars, receipt whereof I hereby acknowledg I hereby bargain and sell to -

O. L. Stanton,
Oscar Bancks, and
John Anderson Thomson,

my theatre building situated on the property of the Consolidated Mining & Smelting Company of Canada Limited Yellowknife, in the Northwest Territories.

The following items are included in the sale:

(a) A Furnace
(b) Benches
(c) Small stove, presently situated in upstairs Projection Room.
(d) Lighting Fixtures.

The following items are not included in the s

(a) All rubber matting.
(b) All projection equipment.
(c) Leather cushions on benches.

I agree to execute a Bill of Sale in the usua form and to execute any documents which may be necessar transfer effectively all my rights in and to the land o which the said building is situated. My rights are tho a sub-licencee and I agree to execute such documents as be required by the Consolidated Mining & Smelting Compa Canada Limited to transfer effectively the said sub-lic to the persons shown above.

It is understood and agreed that on the reque writing of the persons shown above, I will execute the documents referred to above in favour of any nominee th name.

I covenant that there are no encumbrances or of any kind against the said building or any of the cha being sold therewith.

IN WITNESS WHEREOF I have set my hand at Yell in the Northwest Territories, this 3rd day of May, 1949

SIGNED, SEALED and DELIVERED in the Presence of

R. C. Atkinson

September 26, 2003

Dear John Stard,

We are writing this letter as a follow-up to our meeting with you on Tuesday September 23, 2003. As we explained in that meeting, we are concerned about the future of our home at #19 Lakeview Rd. Our preference would be that Miramar release the portion of land that our home is situated upon. We understand that the company is considering this for the other family homes located in the Con and Rycon trailer courts. Built in the 50's, our house is a permanent structure, as opposed to a trailer, and would be impossible to move. To the best of our knowledge the building does not pose any environmental risks such as asbestos siding, and we are prepared to have it inspected to ensure that no surprises exist.

If Miramar is not prepared to separate our lot from the greater lease, we ask that we may be allowed to continue living in our home for as long as Miramar does hold the lease to the land. We realize that water and electricity are to be cut off in the near future. We are self-sufficient for the most part, and do not expect Miramar to continue providing these services to us. We understand that eventually, Miramar must remove all buildings on the property as part of their reclamation obligation to bring the site back to industrial standards. This has been our home for the last 14 years, all we ask is that our house is closer to one of the last buildings removed, as opposed to one of the first. We appreciate your consideration and advice in this matter, and look forward to hearing from you. If you have any questions we can be reached at 873 4434.

Sincerely,

Liesbeth van Blarikom

Steve Robertson

cc: Gord van Tighem, Mayor of Yellowknife
Brian Austin, Director of Lands Administration

Yellowknife Funeral Services
Bill Skentos, 32 Trails End Yellowknife, NT X1A 1A4
Phone (867) 444 – 5100 Fax (867) 920 - 7943

RON: AS PER OUR PREVIOUS CONVERSATION. THIS COMPANY IS VERY INTERESTED SHOULD THE THEATER GROUP NOT STEP UP WITH SOMETH CONCRETE VERY SOON. PLEASE FOLLOW-UP WITH THEM & ANY COMMITMENTS WE NEED WITH THEM OR OTHERS SO THIS MAITE THANKS SCOTT

Miramar Con Mine Ltd
Superintendent of Human Resources
Yellowknife, NT

November 5, 2004

Dear Scott,

We have previously spoken about the Con Rec Hall. I indicated that I was interested in taking ownership of the building in question. This letter is a formal application stating that I wish to use the Con Rec Hall for my funeral business. I intend to store funeral caskets and the company's hearse in the hall.

In order to lease or purchase the land, I would need to obtain the necessary legal documents from the Federal Government. If my application is approved and I take ownership of the building, I would keep the building in place, bring it to code and operate my business from this location.

In the event that my application is not approved, I would then be ready to remove the building and restore the lot to its natural state. I would bear all of the costs for such an undertaking.

I would like to meet with you at your convenience, please feel free to contact me if you have any questions.

Sincerely Yours,

Bill Skentos
Funeral Director

This message was sent with high importance.

Connell, Ron

From: Connell, Ron **Sent:** Fri 2/11/2005 8:47 AM
To: snowbank20@theedge.ca
Cc:
Subject: Rec Hall at Con Mine
Attachments:

Ben:

I have not received a letter from you. Are you still interested in the old Rec Hall? If not, we have a firm offer from a local funeral director who wishes to convert the property into a funeral home. He has the financial backing to move forward with the project and Miramar is prepared to accept the proposal.

Please let me know ASAP.

Thanks,

Ron

Connell, Ron

From: Stringer, Scott **Sent:** Tue 3/8/2005 10:30 AM
To: Connell, Ron
Cc:
Subject: RE: Former Recreation Hall at Con Mine
Attachments:

Thanks Ron,

We should ensure they fully understand that they are also resuming total responsibility and liability for remediation costs as well as demolition costs.

-----Original Message-----
From: Connell, Ron
Sent: Tuesday, March 08, 2005 9:01 AM
To: snowbank20@theedge.ca
Cc: Stringer, Scott
Subject: Former Recreation Hall at Con Mine

Attention: Ben Nind

Please be advised that Miramar Con Mine Ltd. has still not received any form of commitment from the "Stuck in a Snowbank Theater Society" in respect to the former Con Mine Recreation Hall.

As per a resolution recently passed by the City of Yellowknife, we require a letter of notification that your group is prepared to assume responsibility for "the need to provide vehicular access, water, sewer, power services and life safety needs" for the building. At some point in time the group will also have to negotiate title for the property and begin paying taxes to the City.

Please advise us in writing as to whether or not your group is still interested, as soon as possible, as we do have other groups that have expressed interest in assuming ownership of this building.

Regards,

Ron

You replied on 3/21/2005 11:42 AM.

Connell, Ron

From: snowbank20@theedge.ca [snowbank20@theedge.ca] **Sent:** Sat 3/19/2005 4:30 PM
To: Connell, Ron
Cc:
Subject: Re: Former Recreation Hall at Con Mine
Attachments:

Ron:

I sent the letter to you expressing our interest at the time for the Con Rec Hall.

After a recent consideration, we have decided to let the building pass to another group at this time because we are not able to interest other cooperating parties who would have been able to make this a viable project. Therefore, it is with regret that we have to pass the building on.

Our thanks to you for taking us into consideration up until this time.

Sincerely,

Ben Nind
Stuck in a Snowbank Theatre

----- Original Message -----
From: "Connell, Ron" <rconnell@miramaryk.com>
Date: Tuesday, March 8, 2005 9:01 am
Subject: Former Recreation Hall at Con Mine

> Attention: Ben Nind
>
> Please be advised that Miramar Con Mine Ltd. has still not
> received any form of commitment from the "Stuck in a Snowbank
> Theater Society" in respect to the former Con Mine Recreation Hall.
>
> As per a resolution recently passed by the City of Yellowknife, we
> require a letter of notification that your group is prepared to
> assume responsibility for "the need to provide vehicular access,
> water, sewer, power services and life safety needs" for the
> building. At some point in time the group will also have to
> negotiate title for the property and begin paying taxes to the City.
>
> Please advise us in writing as to whether or not your group is
> still interested, as soon as possible, as we do have other groups
> that have expressed interest in assuming ownership of this building.
>
> Regards,
>
> Ron
>

MIRAMAR CON MINE, LTD.
P.O. BOX 2000
YELLOWKNIFE, NT
X1A 2M1

Ron Connell
Environmental Superintendent
Phone: (867) 766-5317
Fax: (867) 920-4238
E-mail: rconnell@miramaryk.com

April 26, 2005

Yellowknife Funeral Services
32 Trails End
Yellowknife, NT X1A 1A4

Attention: Bill Skentos, Director

Re: Recreation Hall at Con Mine

Dear Mr. Skentos:

Please be advised that the "Stuck in a Snowbank" Theater Group has formally withdrawn their interest in the above captioned building. Your correspondence of November 05, 2004 indicates that you wish to pursue lease or ownership of this structure. Miramar Con Mine Ltd. invites you to pursue this course of action, however it must be understood that there are a number of conditions that it is necessary to meet, as well as a significant undertaking on your part in order to do so. The various conditions and undertakings are set out below:

- As this is a residential area, it must be understood that a crematorium is not permitted at this facility.
- The parking area north of the building is not included as part of the package.
- Any costs associated with negotiations for, or procurement of the necessary legal documents required to obtain lease or ownership of the structure are to be paid by Yellowknife Funeral Services.
- Any changes or renovations to the structure are to be undertaken at the cost of Yellowknife Funeral Services.
- The following liabilities are to be assumed by the new owners of the structure:
    - Installation and supply of hydro power services
    - Installation and supply of potable water services
    - Installation and supply of sewage services
    - Installation and supply of heating services
    - Installation of Fire Protection services
    - Installation of "life safety needs" for the building
    - Building and Public Liability Insurance
    - Property taxes
    - Any other taxes and/or permits associated with the facility
    - Maintenance of a vehicular access road to the building

If you intend to proceed with this acquisition, it is essential that you provide all parties with written confirmation that you personally, or Yellowknife Funeral Services, accepts all liability and responsibility for the structure. This includes the liability and responsibility for site remediation in the event that your business application is not approved, or that you subsequently decide not to go ahead with this undertaking. It must be understood that you would then be responsible for removal of the building and restoration of the lot to its natural state.

As per a resolution recently passed by the City of Yellowknife, at your earliest convenience we require a letter of notification that your company has a continued interest in this structure, and is willing to undertake the responsibilities outlined above.

Yours truly,



Ron Connell
Environmental Superintendent – Yellowknife Operations

Distribution:
Scott Stringer, General Manager – Northern Operations
Dave Devana, Acting Administrator – City of Yellowknife

Denroche Associates
Barristers, Solicitors & Notaries

Professional Chambers
P.O. Box 2910
5107 - 53rd Street
Yellowknife, Northwest Territories
X1A 2R2

Telephone: (867) 920-4151
Facsimile: (867) 920-4252

Alan C. Denroche, B.A. (Hons.), LLB.
Louis M. Walsh, B.A., LLB.
Martha Temple, Student At Law

mail@DenrocheLaw.ca
www.DenrocheLaw.ca

May 19, 2005

Miramar Con Mine, Ltd.
PO Box 2000
Yellowknife, NT X1A 2M1

Attention: **Mr. Ron Connell**
Environmental Superintendent, Yellowknife Operations

Dear Sir:

Re: **Basile (Bill) Skentos;**
Lease or Purchase of Recreation Hall at Con Mine
Our File: 18 097/ACD

We act for Mr. Basile (Bill) Skentos, principal of Yellowknife Funeral Services Ltd. As requested in your letter of April 26, 2005, we confirm that our client remains very interested in the purchase and/or lease of the Con Recreation Hall. It is our understanding that this will necessitate either:

1. a sub-Lease between Mr. Skentos and Miramar Con Mine, Ltd. for the property and that such a sub-Lease would require the consent of Municipal and Community Affairs; or

2. the surrender of that portion of your Lease in respect of the subject property and my client entering into a direct lease agreement.

It appears that a sub-lease would likely be the most expedient but we would ask for your thoughts in this regard in order that my client can follow up with the appropriate parties. If Miramar Con Mine, Ltd. would be agreeable to entering into a sub-Lease (which would contain the terms set forth in your letter of April 26, we would ask if you have a format of a sub-Lease that you would prefer to use. We would also need to know what other terms (such as rent) you would be seeking.

We look forward to hearing from you at your earliest opportunity and thank you for your consideration of our proposal. Please do not hesitate to contact the writer or Mr. Bill Skentos directly (444 – 5100) should you have any questions or wish to set up a meeting to discuss the logistics.

We remain yours truly,

DENROCHE & ASSOCIATES

Alan C. Denroche
ACD/adl

cc: Mr. **Bill Skentos**

City of Yellowknife
Attention: Mr. **Max Hall**
City Administrator

MIRAMAR CON MINE, LTD.
P.O. BOX 2000
YELLOWKNIFE, NT
X1A 2M1

Ron Connell
Environmental Superintendent
Phone: (867) 766-5317
Fax: (867) 920-4238
E-mail: rconnell@miramaryk.com

June 06, 2005

Yellowknife Funeral Services
32 Trails End
Yellowknife, NT X1A 1A4

Attention: Bill Skentos, Director

Re: Recreation Hall at Con Mine

Dear Mr. Skentos:

We are in receipt of correspondence from your Solicitor, Denroche Associates, dated May 19, 2005. Item 1. of this document makes reference to a sub-lease between YK Funeral Services and Con Mine.

Please be advised that Miramar Con Mine Ltd. (MCML) has no interest in sub-leasing this property. However, MCML is prepared to surrender that portion of their lease on the subject property should you be successful in entering into a direct lease agreement with MACA.

Yours truly,

Ron Connell
Environmental Superintendent – Yellowknife Operations

Distribution:
Scott Stringer, General Manager – Northern Operations
Dave Devana, Acting Administrator – City of Yellowknife

Yellowknife Funeral Services Ltd.
P.O. Box 115
Yellowknife, NT X1A 2N1
Phone (837) 444-5100 Fax (867)920-7943

19 July 2005

Brian Austin, Director
Lands Administration
Municipal & Community Affairs
G.N.W.T.
P.O. Box 1320
Yellowknife, NT X1A 2L9

Dear Sir:

Re: Application for Commissioner's Land - Con Rec Hall

Enclosed please find my application for the lease of Commissioner's Land on which the Con Rec Hall is currently located.

The purpose for this application is to provide Yellowknife and area residents with a much-needed service and facility, that of a funeral home. In your assessment of my application, please consider the following:

- There are approximately 30 deaths a year in Yellowknife. This number may be expected to rise as the city grows, more people retire here and the population ages.
- Although there are three funeral services available (as well as the option of not using a service), there is no funeral home where friends and family may pay their respects to the deceased and express condolences to the family.
- All three funeral service businesses currently operate from Stanton Hospital. The hospital should not be expected to provide facilities for businesses, nor is it appropriate for such business to be conducted in a place which cannot offer the privacy and facilities for the family of the deceased to make the necessary decisions.
- Upon approval of the lease of the land, Yellowknife Funeral Services Ltd. will undertake extensive renovations of the existing building to include a morgue and preparation facilities, private meeting rooms and business offices, viewing rooms, and a non-denominational chapel. The facility is intended to address the emotional, spiritual and decision-making needs of bereaved families in a manner that is professional, private and respectful.

.../2

- A facility of this size will accommodate storage of caskets, grave markers and other supplies. This will benefit those making funeral arrangements in several ways:
    - They will be able to actually see the products, rather than having to make a decision based on a catalogue photograph.
    - Products will be available immediately, rather than having to be ordered and shipped from Edmonton.
    - It will be possible to obtain products at significantly reduced prices, which savings will be passed on to the purchaser. At present, funeral supplies (especially grave markers) are often so prohibitively expensive that many families are forced to forego the memorial they would wish to erect for their loved ones.

- The Con Rec Hall building has been largely unused for several years now, and there are no other proposed uses for the property.

- Con Mine has already agreed to the sale of the building to Yellowknife Funeral Services Ltd. for the purpose of a funeral home (see letter from enclosed).

- The sale agreement for the building includes environmental remediation of the property on which it is located. Yellowknife Funeral Services Ltd. will undertake the environmental remediation of the property whether or not the land lease application is approved.

- In addition to employment generated by the building renovation and environmental remediation of the property, the funeral home would create several permanent part-time employment positions:
    - Funeral Director
    - Embalmer
    - Office Manager
    - Carver (for head stones/grave markers)

- There is also potential to eventually build caskets locally, again providing employment and cost-savings for Yellowknifers.

Please contact me at 444-5100 if you require clarification on any of these points or more information on any aspect of my application.

I look forward to hearing from you in the near future.

Yours sincerely,

Basile (Bill) Skentos

c.c. Alan Denroche, Denroche & Associates
Max Hall, Yellowknife City Administrator

City of
Yellowknife

August 4, 2005 File: Lease No. 8660

Yellowknife Funeral Services Ltd.
P.O. Box 115
Yellowknife, NT X1A 2N1

Attention: Basile Skentos

Dear Sir:

Re: **Application to Lease Con Rec Hall, Head Lease No. 8660.**

Thank you for your application dated July 19, 2005 to acquire a leasehold interest on a portion of Lease No. 8660, known as the Con Rec Hall.

Please be advised that the City is making a greater land application to MACA, GNWT, to acquire a larger portion of this area. Once MACA has made a decision, the City will advise you of the outcome.

If the City is turned down under the greater application, the City's process will begin at the Committee level to acquire the land you have identified, and if supported, will then proceed to correspond with Miramar Con Mine Ltd. to relinquish a portion of their Lease No. 8660 which the Con Rec Hall is located. From there, the City will make a formal application to MACA for that portion you require. Please note that any costs associated with this application with be the responsibility of Yellowknife Funeral Services.

If you should have any questions regarding this matter, please contact the undersigned at 920-5672.

Sincerely,

Angela Crant

Angela Crant
Resource Officer
Planning & Lands Division
AC

P.O. Box 580
Yellowknife, NT
X1A 2N4
Tel: (867) 920-5600
Fax: (867) 920-5649

Yellowknife Funeral Services Ltd.
P.O. Box 115
Yellowknife, NT X1A 2N1
Phone (867) 444-5100 Fax (867) 920-7943

25 October 2006

Scott Stringer, General Manager – Operations
Miramar Con Mine, Ltd.
P.O. Box 2000
Yellowknife, NT X1A 2M1

Dear Scott,

Re: Con Mine Recreation Hall Project

This is to advise you that I am still interested in proceeding with the project as per our discussions and correspondence commencing 26 April 2005 on the subject. After speaking with Mr. Connell, I am now aware of the reasons why undertaking this transaction is such a lengthy process.

I would like to assure you that I am still committed to the project as described in previous letters and my application for lease of the land, and am awaiting further response from the City of Yellowknife.

In the meantime, if it is not too much of an inconvenience for Miramar Con, I would like the opportunity to visit the building in order to pre-plan the renovations that would be required for my purposes. This would enable me to develop a business plan and budget, so that I can proceed without delay once the lease application is approved. If this is feasible, please have someone contact me at 444-5100 to arrange a mutually convenient date and time.

Thank you for your assistance.

Yours sincerely,

Basile (Bill) Skentos

c.c. Ron Connell, Environmental Superintendent – Yellowknife Operations, Miramar
Angela Crant, Planning & Lands Division, City of Yellowknife

APPENDIX IV

SUMMARY OF MINE FLOODING MONITORING

Pearl Liske

From: Lisa Hurley [lhurley@mvlwb.com]
Sent: Monday, September 11, 2006 10:55 AM
To: permits@mvlwb.com
Cc: 'Meg McCluskie'
Subject: FW: Minewater Level in Robertson Shaft at Con Mine

File: N1L2-0040

-----Original Message-----
From: Connell, Ron [mailto:rconnell@miramaryk.com]
Sent: Friday, September 08, 2006 11:46 AM
To: Hurley Lisa (LHurley@MVLWB.com)
Cc: Spencer Paula (spencerp@inac.gc.ca); chouinardr@inac-ainc.gc.ca; Stringer, Scott; Keating, Douglas; Connell, Larry; JHull@Golder.com
Subject: Minewater Level in Robertson Shaft at Con Mine

Lisa:

We have finally succeeded in our efforts to determine the level of flooding in the Robertson Shaft at Con Mine.

Using 5,000' of 1/8" aircraft cable we lowered a water sensor and made contact at ~4,700'. This also confirms the level of flooding previously indicated by shorting out of the telephone system in the mine. We will be able to repeat this test in 2007 to provide an additional data point.

Using a simplified calculation, this is the level of flooding after 34 months, therefore the mine will take minimum of 11.8 years to flood to surface. This coincides with the model prepared by Bob Hauser and Mike Borden in 2002, in which they predict that the mine will take 10.85 years to flood (8.5 years plus 2.35 for the voids in backfill and waste rock).

Over the next few months I will revisit this model and do a detailed calculation based on the projected volume of each level of the mine, but I am confident that we have at least 7 more years before the mine floods to surface.

We will now attempt to lower the water sampling device that we used for the tests in 2004. Assuming that we are successful, I will send out samples of the minewater for analysis and distribute the result when they become available.

Cheers,

Ron

Pearl Liske

From: Lisa Hurley [lhurley@mvlwb.com]
Sent: Wednesday, April 05, 2006 10:38 AM
To: 'MVLWB Permit'
Subject: FW: Underground Flooding Volumes



voids.xls (19 KB)

File: N1L2-0040

Handout from MCARWG Meeting #19

-----Original Message-----
From: Connell, Ron [mailto:rconnell@miramaryk.com]
Sent: Tuesday, February 21, 2006 3:04 PM
To: chouinardr@inac-ainc.gc.ca
Cc: Colleen_roche@gov.nt.ca; LHurley@MVLWB.com; JHull@Golder.com
Subject: Underground Flooding Volumes

Rebecca/Colleen:

As requested, I have attached an electronic copy of the summary spreadsheet I gave you at today's meeting.

I must caution you that there are a 'number of assumptions' associated with this report.

To begin with, both Bob Hauser and Mike Borden made it clear that this was a "best guess" of the void space underground based on mine records from 1970 to 1998. No records exist for the period from 1938 to 1970, so these volumes are 'estimated', and are presumably 'significantly' lower than the actual volumes. There is no consideration for mining that took place between 1998 and 2003. In addition, as I note at the bottom of the spreadsheet, no void space was considered for water entrained in backfilled tailing or waste rock. In addition, it is not possible to backfill to the top of a void or stope.

Further to the above, and much more significant, is the annual flooding rate of 400,000 cubic meters per year that is used / assumed in the calculation. This number was roughly based on the number of cubic meters of minewater pumped to surface each year. The actual average rate of pumping was 30,000 cubic meters per month, or 360,000 per year, however this included fresh water that was pumped into the mine with backfill, for drilling, and for washing down the active mine faces, among other uses. Minewater could not be used for these purposes as it was too salty. This fresh water makes up a significant portion of the water that was pumped to surface as minewater.

In my estimation, today's inflow of water into the underground workings is probably around 200,000 cubic meters per year. This volume or amount of water will be reduced as we continue to cap off the various openings to surface. In addition, as the mine fills, the hydraulic gradient will be continually be reduced as each level reaches static equilibrium. Once the minewater reaches the 'discharge' elevation, which is assumed to be the 204Q opening to Rat Lake, the hydraulic gradient, or head, will be small or only the difference between the highest point of land on the minesite (hill at C-1 Mill complex and/or Tin Can Hill), and the surface elevation of Rat Lake. This will drastically reduce the flow of water into the underground workings, and confine the inflow to surface water and near surface groundwater systems. Because of the physical configuration of the mine workings, there should be no or only limited "flow" of water from one area or level of the mine to another. In addition, the "Shield Brine" which is encountered at depth in the mine is about four times heavier than surface water due to the salt content. Therefore this water (salt water) will remain at the lower levels of the underground workings.

Please pass this information on to Christoff Wells, as he will need to know

this in order to appreciate the situation we are dealing with. If it would assist with the review, I can arrange a conference call with the modeller and Hydrogeologist from Golder that have been working on this project for the past several years, to assist in your evaluation.

Thanks,

Ron

Estimate of Voids to Flood on Closure

			Removed (cubic feet)	Replaced (cubic feet)
Robertson Shaft - 6240' x 10' x 25'	cubic feet	1,560,000	1,560,000	
C1/B3/C2 Shafts - 6000' x 6' x 18'	cubic feet	648,000	648,000	
Negus Shaft/Negus Winze - 3000' x 6' x 18'	cubic feet	324,000	324,000	
Rycon Shaft & misc - 1000' x 6' x 10'	cubic feet	324,000	324,000	
Ore Milled	tons	12,000,000		
Ore Milled	cubic feet	134,400,000	134,400,000	
Dev feet - at 15 tons / foot	feet	800,000		
Dev tons produced @ 9' x 9' size	tons	5,785,714		
Dev waste tons produced @ 75% dev in waste	tons	4,339,286		
Dev waste hoisted @ 50% used as fill	tons	2,169,643		
Dev waste hoisted @ 50% used as fill	cubic feet	24,300,000	24,300,000	
Backfill sent u/g	tons	3,000,000		
Backfill sent u/g	cubic feet	42,000,000		42,000,000
Total - Removed & Returned	cubic feet		161,556,000	42,000,000
Net volume to flood	cubic feet	119,556,000		
Net volume to flood	cubic meters	3,385,896		
Time to flood @ 400,000 cubic meters/year	years	8.5		
			Removed (cubic meters)	**Replaced (cubic meters)**
Robertson Shaft - 6240' x 10' x 25'	cubic meters	44,174	44,174	
C1/B3/C2 Shafts - 6000' x 6' x 18'	cubic meters	18,349	18,349	
Negus Shaft/Negus Winze - 3000' x 6' x 18'	cubic meters	9,175	9,175	
Rycon Shaft & misc - 1000' x 6' x 10'	cubic meters	9,175	9,175	
Ore Milled	tons	12,000,000		
Ore Milled	cubic meters	3,805,784	3,805,784	
Dev feet - at 15 tons / foot	feet	800,000		
Dev tons produced @ 9' x 9' size	tons	5,785,714		
Dev waste tons produced @ 75% dev in waste	tons	4,339,286		
Dev waste hoisted @ 50% used as fill	tons	2,169,643		
Dev waste hoisted @ 50% used as fill	cubic meters	688,099	688,099	
Backfill sent u/g	tons	3,000,000		
Backfill sent u/g	cubic meters	1,189,307		1,189,307
Total - Removed & Returned	cubic meters		4,574,756	1,189,307
Net volume to flood	cubic meters	**3,385,449**		
Time to flood @ 400,000 cubic meters/year	years	**8.5**		

4/5/2006

Estimate of Voids to Flood on Closure

Note: In this model no consideration has been made for void spaces in backfill or waste fill. (Add 938,703 m^3/400,000 = 2.35 years.)

APPENDIX V

TAILING COVER MODEL

Golder Associates Ltd.

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Burnaby, British Columbia, Canada V5C 6C6
Telephone (604) 296-4200
Fax (604) 298-5253

E/06/1294
August 1, 2006 05-1413-016 / 5500

Miramar Con Mine Ltd.
Box 2000
Yellowknife, NT
X1A 2M1

Attention: Ron Connell
Environmental Superintendent

**RE: PRELIMINARY STUDY ON TAILING COVER SYSTEM
UPPER AND MIDDLE PUD TAILING CONTAINMENT AREAS
FINAL CLOSURE AND RECLAMATION PLAN
CON MINE, YELLOWKNIFE, NT**

Dear Ron:

Golder Associates has completed a preliminary evaluation of the granular / mine waste rock cover system that is proposed for the Upper and Middle Pud Tailing Containment Areas (TCAs). The cover system design is being developed as part of the closure planning process for Con Mine. This document is in support of the Miramar Con Mine Final Closure and Reclamation Plan which is being prepared for the Mackenzie Valley Land and Water Board.

The gravel or mine waste rock soil cover proposed for the Upper and Middle Pud TCAs is to consist of a layer of mine waste rock or 100 to 125 mm minus silty gravel. The gravel layer would be developed to a thickness of between 50 cm and 1.0 m. This study is to determine the most efficient cover thickness based on the design criteria established for the tailing cover system for the Upper and Middle Pud TCAs. The cover system is to be designed to limit seepage into the tailing in the Upper and Middle Pud basins to less than 10 to 12% of the total annual average precipitation. The cover system or layer

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would be graded at 1% to 2% towards the Middle Pud clear water pond in order to direct all surface runoff flows to the pond 'quickly'. In the Upper Pud area, this final grading on the gravel surface would be towards the spillway between the Upper and Middle Pud TCAs. The spillway would be constructed at or near Dam C. The Middle Pud tailing surface would be graded to drain from the east side or east arm of the TCA to the main pond in the west portion of the Middle Pud basin. The gravel cover would be extended to the edge of the Middle Pud pond. Construction at the pond edge may require a short section of a thicker cover to compensate for the softer tailing at the pond's edge.

1.0 STUDY PROGRAM

Samples of the granular material to be used for the cover layer were obtained from 2 sites in the area of the parking lot north of the Robertson Headframe. The samples were shipped to a laboratory for standard geotechnical testing to determine the material properties for the cover design. The testing to characterize the material included specific gravity, saturated hydraulic conductivity, and bulk density tests.

The results of the laboratory testing program were used to model the soil water characteristic curve (SWCC) of the material, and to develop a numerical model aimed at estimating the infiltration through the proposed cover system with different configurations and under different climate conditions.

A description of the present work, as well as suggestions for the best configuration of the cover system at Con Mine, is presented below.

2.0 LABORATORY TESTING PROGRAM

The samples (SA1 from the east side of the parking lot and SA2 from the west side of the parking lot) were tested for grain size, saturated hydraulic conductivity, specific gravity, water content, and bulk density. The results of this test work were used to determine the soil water characteristic curve for the materials. The curve was numerically estimated using SoilVision (SoilVision System Ltd) software. The hydraulic and volume-mass properties of the two samples are presented on Table 1.

Table 1: Volume Mass and Hydraulic Conductivity
Potential Cover Material for Con Mine

Property	SA1	SA2
Saturated hydraulic conductivity (cm/s)	4.5×10^{-2}	6.1×10^{-2}
Porosity (n)	0.45	0.47
Specific Gravity (g/cm^3)	2.92	2.94
Bulk density (kg/m^3)	1600.0	1590.0
Gravimetric water content (%)	0.8	3.3

The results of the testwork indicate that both samples have a high porosity and a high hydraulic conductivity, which reflects the coarse gradation of the gravel. However, the high hygroscopic water content of SA2 indicates that this sample contains more fines and would retain more water as a cover material than SA1.

The grain size distribution of the materials is shown in Figure 1. The test results indicate that both samples are coarse gravels with over 70% gravel sizes. SA2 in fact has a higher fines content (about 14%) and is thus expected to perform better for cover purposes because this fine fraction. The fines will tend to hold water longer, allowing more time for evaporation to take place and thus decrease infiltration or seepage through the cover system.

3.0 NUMERICAL MODELING

Numerical modeling was carried out for several different cover system configurations using the one-dimensional finite element model SoilCover (Unsaturated Soils Group, 2000). The model was used to predict and compare the amount of water that infiltrated through or seeped out the base of the 'proposed cover'. The model assumed that the materials tested (SA1 and SA2) are generally representative of the materials to be used for the cover system.

The weather data used was based on data from the Yellowknife airport and covers a 20 year return period. The model was run for a 'typical' year and a 'wet' year. In addition, the effect of varying the cover thickness and existence of vegetation were also simulated. The respective climate, material, cover thickness and vegetation parameters used in the models are presented in Table 2.

The simulations span a period of 184 days from May 1 to October 31 when it is assumed the average daily temperature is above 0°C. Input data was obtained from different sources:

- Weather data from the website of the Meteorological Service of Canada, using the Yellowknife A weather station;
- Cover material properties obtained from the laboratory testing program and estimated soil water characteristic curves; and,
- Tailing properties from previous studies at Con Mine.

Table 2: Climatic and Vegetative Parameters used in the Modeling.

Case	Reference Year	Rainfall / snow melt (mm)	Cover Thickness (m)	Vegetation Condition
Typical year	1996/97	285.9	0.5 0.75 1.0	No Poor Good
Wet year	1987/88	386.5	0.5 0.75 1.0	No Poor Good

The runoff season associated with the snow melt period was assumed to occur from May 1 to May 31 of a given year, and it was assumed that the ground at the time was not frozen, so the water could infiltrate into the ground during this period (this is a conservative assumption). It was also assumed for this effort that the snow pack accumulates from October 31 to May 1, and that up to 35% of the snow disappears over the course of the winter (sublimation). The vegetation was modeled with the growing season occurring during the simulated period, and the maximum root depth was 30 cm (*i.e.*, low shrubs or ground plants and no trees).

3.1 Summary of Results

A review of the semi-arid Yellowknife climatic conditions suggests that the cover system at the mine will function under unsaturated conditions. Thus, it is important to understand the relationship that exists between water content and matric suction in the material proposed for the cover. Based on the laboratory information presented above, the soil water characteristic curve (SWCC) of both samples was numerically estimated

and the results are shown in Figure 2. The estimated SWCC showed that SA2 has a higher capacity for water storage and should retain water longer than SA1, as a consequence of the higher fines content in SA2. Thus, from the laboratory testing program and estimated SWCC, it is anticipated that the material represented by sample SA2 would be the most effective for construction of the cover system.

The model was run as follows: year (typical or wet), material type (SA1 or SA2), cover thickness (0.5 m to 1.0 m), and vegetation status (no vegetation, and poor vegetation cover or good vegetation cover).

The simulations for the 'typical year' are presented on Figure 3 and indicate that increasing the cover thickness from 0.5 m to 1.0 m gradually reduces the infiltration out the base of the cover system. Modeling has shown that above the 1 m thickness (models run for 1.2 m and 1.5 m thick cover shown for typical year), the reduction in seepage out the base of the cover is minor for increasing thickness of cover. The modeling does show that the increase in silt content or fines (SA2) has a greater impact on reducing seepage out the base of the cover layer than increasing the thickness. As noted on Figure 3, the seepage out the base of the cover layer with the siltier material (SA2 as compared to SA1) for a 0.75 m thick cover, goes from 8% to 2.5% of total precipitation (22 mm to 7.5 mm - assumes no vegetation cover).

The results of the modeling for a 'wet year' are presented on Figure 4. The results show that for a cover 0.75 m thick, constructed with a material similar to SA2, the actual volume of water seeping from the base of the cover system has increased, from 7 mm of water equivalent during typical years, to 14 mm of water equivalent. The percentage of seepage from the base of the cover has remained consistent at approximately 3 to 4 % of the total precipitation (precipitation for wet year assumes a 386.5 mm of equivalent water). Thus, the cover system as presented would satisfy the design criteria for seepage from the base of the cover layer in a wet year.

It can be noticed from Figures 3 and 4 that for all cases simulated, the seepage from the base of the cover was higher for material represented by SA1. The higher fines content in SA2 plays an important role in the cover performance by holding water longer and allowing time for evaporation to take place.

This model assumes that the snow melt is allowed to infiltrate, thus the vegetation is less effective in reducing seepage from the cover base. The reason for this is that most of the water in the model infiltrates during the snow melt period, when no evaporation or evapo-transpiration is taking place to draw water from the cover. This is shown on Figure 5, which presents the pattern of seepage from the base of the proposed cover or infiltration into the tailing using the SA2 material and cover thickness of 0.75 m.

4.0 PRELIMINARY COVER LAYER CONFIGURATION

Based on the results of the laboratory testing program and model simulations described above, it is proposed that the gravel for the cover system for the Upper and Middle Pud TCAs consist of material similar to SA2, or would be a well graded gravel with at least 15% fines. The cover thickness should be at least 0.75 m, and the average seepage from the base of the cover is expected to be less than 10 % of the total annual precipitation.

This preliminary evaluation has indicated that the material represented by SA2 should be selected for cover purposes. It is suggested that a test pad or plot with gravel that has at least 15% fines and a thickness of at least 0.75 m be constructed and instrumented to allow a monitoring of at least one year. The information gathered from the test plot would be used to calibrate this seepage model and confirm the configuration of the cover system to be installed on the Upper and Middle Pud Tailing Containment Areas.

Yours very truly

GOLDER ASSOCIATES LTD.

REGISTERED PROFESSIONAL ENGINEER
J. A. HULL
LICENSEE
N.W.T.

Fernando F. Junqueira, PhD.
Geologist, Geotechnical Specialist.

John Hull, P.Eng.
Principal

FFJ/JAH/cm
Attachments

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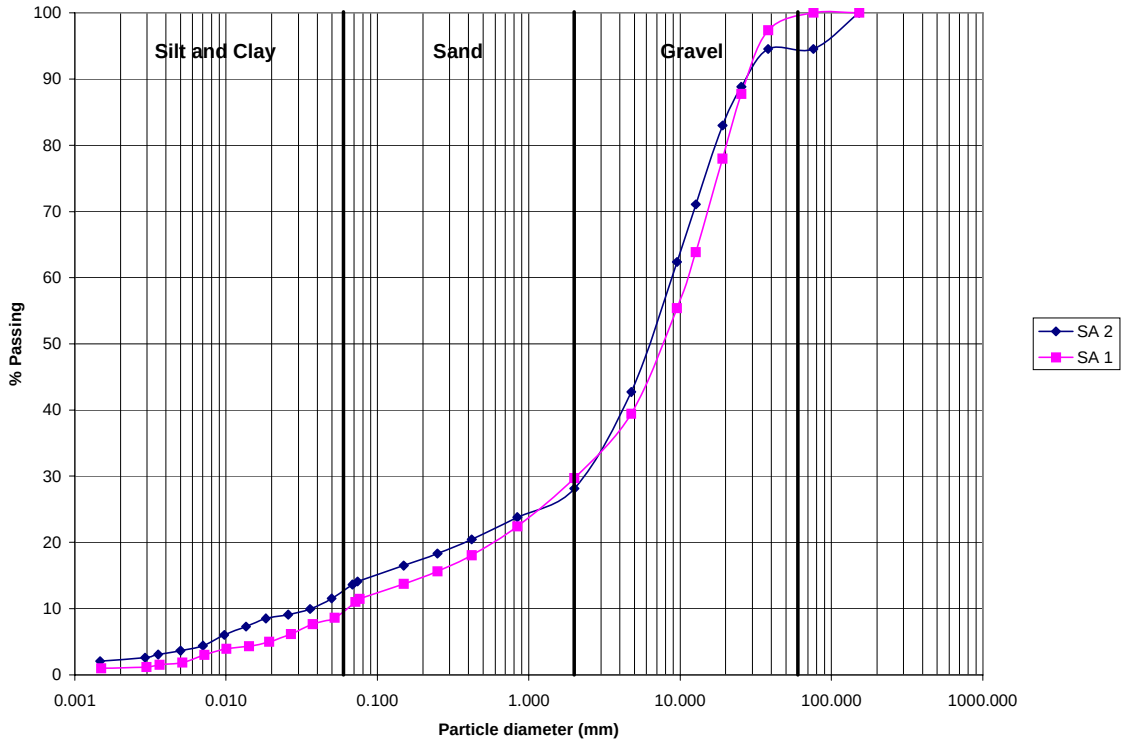


Figure 1: Grain size distribution of samples SA1 and SA2.

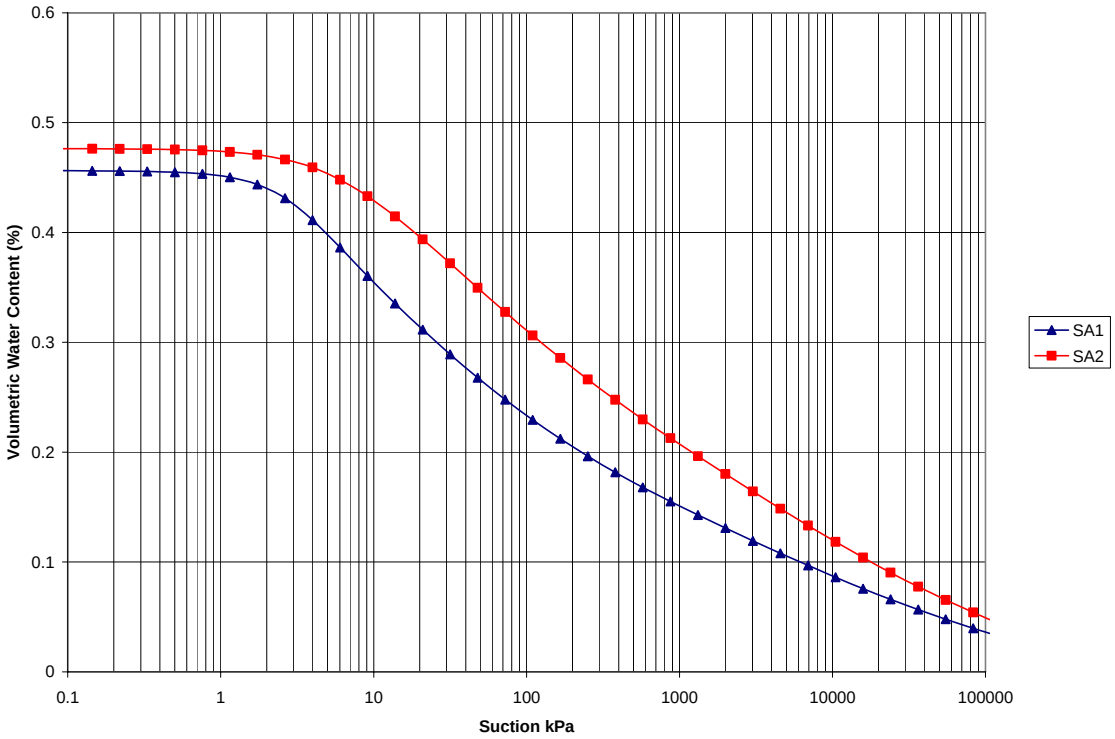


Figure 2: Soil Water Characteristic Curves

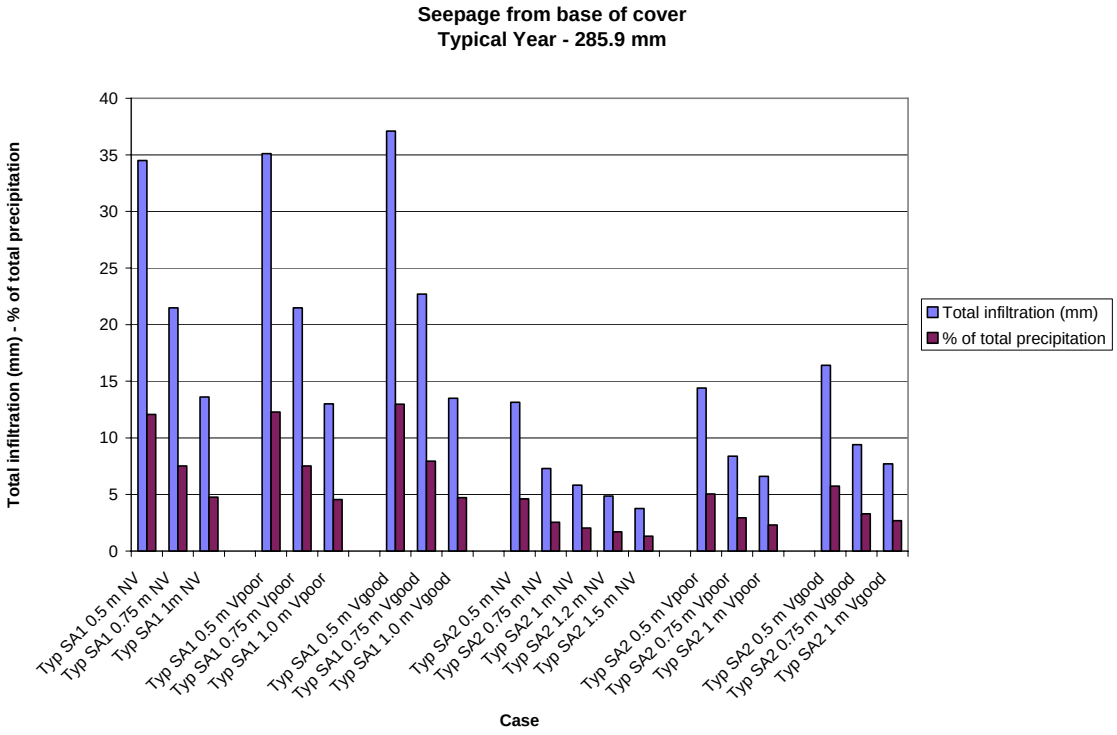


Figure 3: Seepage from Base of Cover System Typical Year (285.9 mm water equivalent)

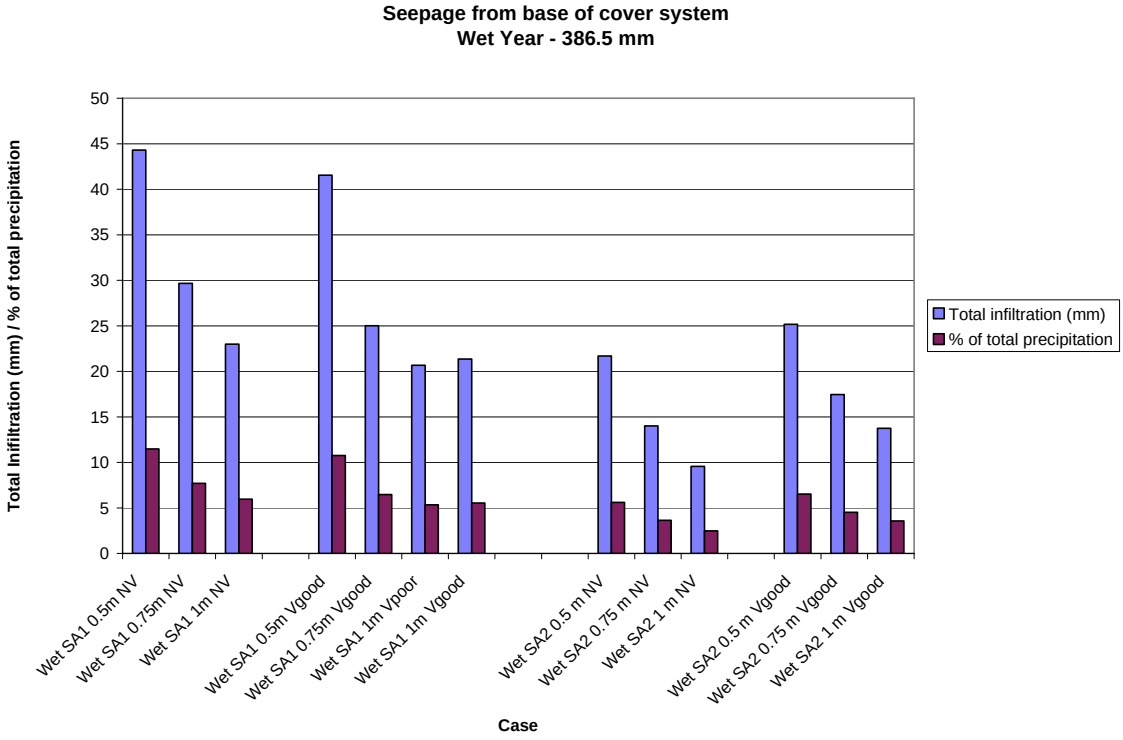


Figure 4: Seepage from Base of Cover System Wet Year (385.4 mm water equivalent)

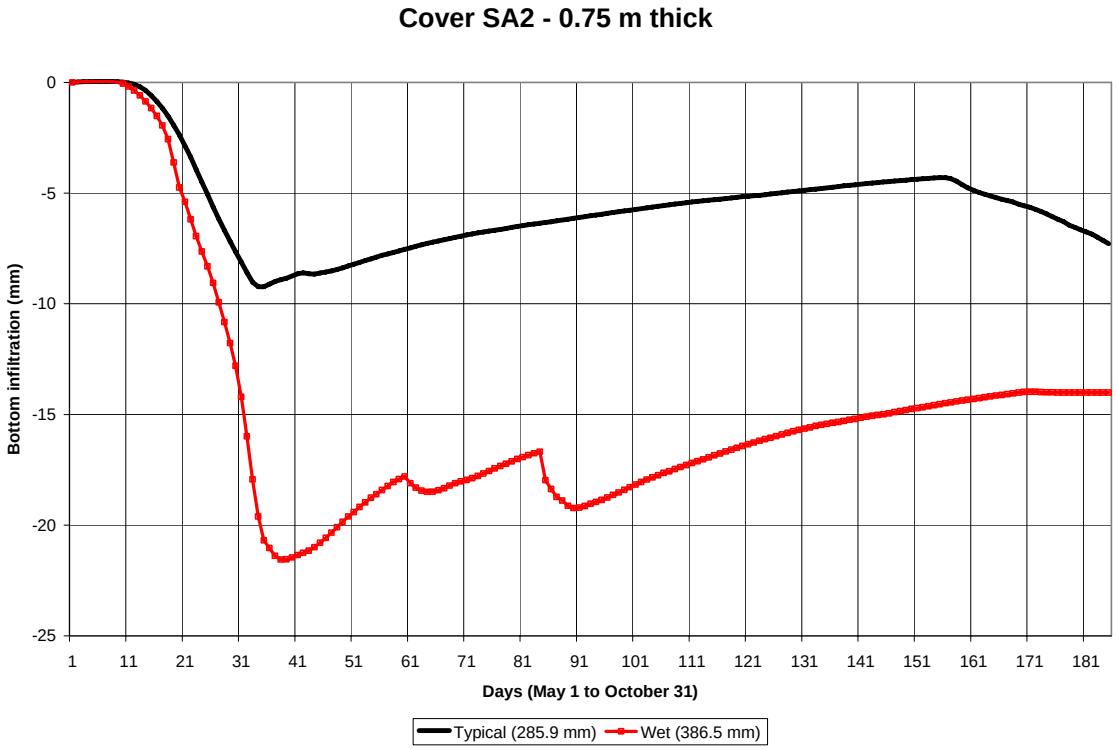


Figure 5: Pattern of Bottom Infiltration Typical and Wet years Considering 0.75 m of SA2 as Cover Material.

APPENDIX VI

RECLAIM COST MODEL

CONFIDENTIAL
(Provided under separate cover to the MVLWB.)