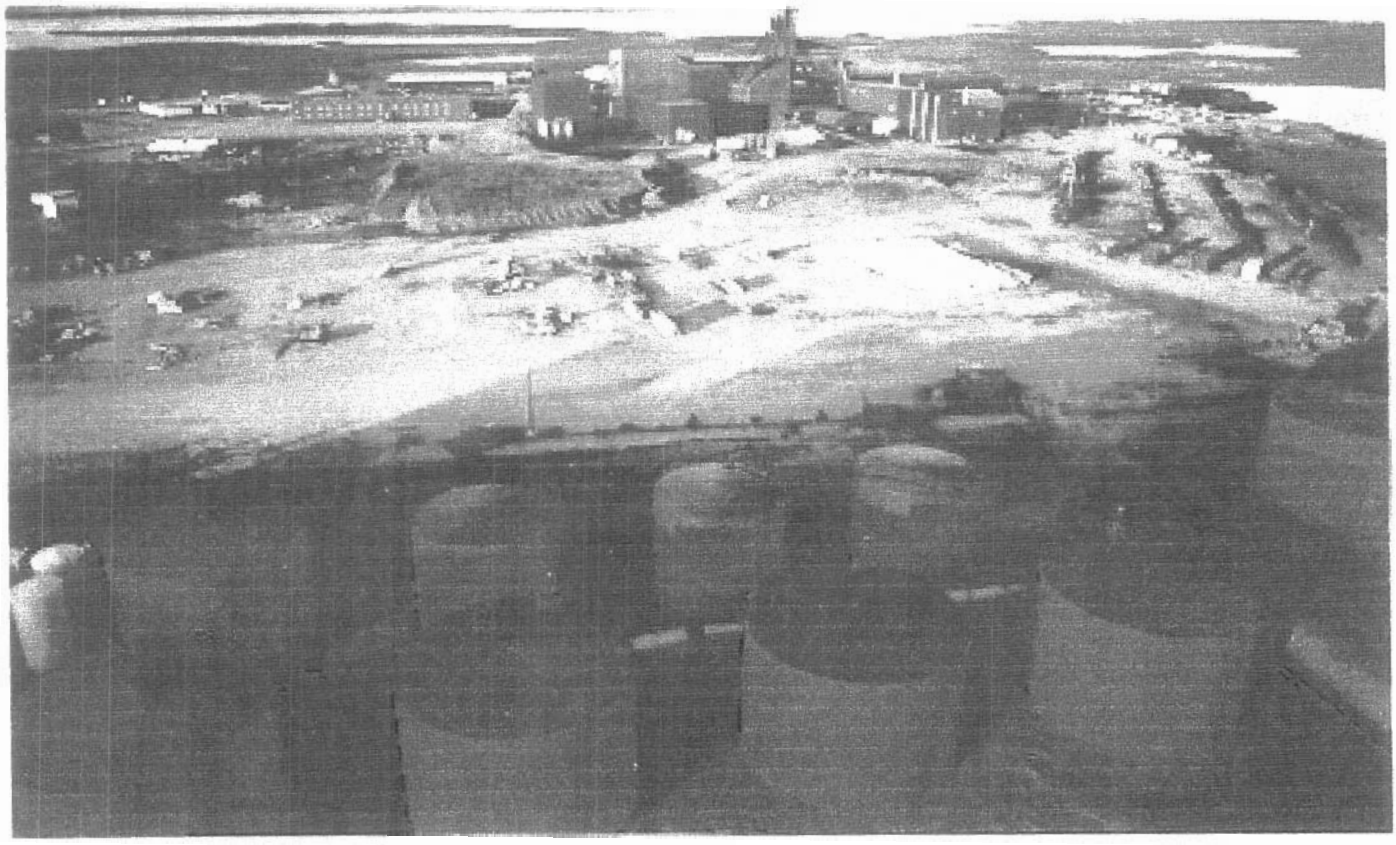
Appendix 10

- **Lupin Operation General Information, Echo Bay Mines Ltd., October 1996.**

ECHO BAY MINES LTD.

LUPIN OPERATION

GENERAL INFORMATION



OCTOBER 1996

HISTORY

Port Radium

The history of Echo Bay Mines Ltd. began in 1964 at Port Radium, on the shores of Great Bear Lake in the Northwest Territories, located about 26 miles south of the Arctic Circle. Port Radium itself came into existence in the early 1930's when pitchblende was discovered there, and the ore was mined by Eldorado Nuclear Ltd., initially for it's radium content and then for uranium, until 1961 when the orebody was mined out. Legend has it that the uranium used in the first atomic bombs was mined at Port Radium.

Echo Bay Mines was formed by a group of investors in the early 1960's who leased the former Eldorado property and an adjoining Cominco property which was known to have silver and copper ore within it's boundaries. The Eldorado facilities were resurrected, and the mining of silver from the new Echo Bay Mine on the Cominco lease commenced in 1964. By 1976, the silver ore reserves from the initial site were depleted and the old Eldorado Mine was re-opened and mined for it's silver and copper ore. During these combined mining periods (19 years) until closure in 1982, mill production amounted to 35.5 million troy ounces of silver and 10 million pounds of copper. After the close of production in 1982, an equipment salvage and site restoration program was initiated. At the completion of this program in 1985, the Port Radium mine site had been returned to it's original natural condition.

Lupin

The Lupin gold deposit was discovered in 1960 as a result of reconnaissance sampling and mapping programs conducted by Canadian Nickel Company Limited, a subsidiary of Inco Limited. Lupin is situated on the west shore of Contwoyto Lake in the Northwest Territories, 400 kilometers (250 miles) northeast of Yellowknife and 80 kilometers (50 miles) south of the Arctic Circle. Between 1961 and 1964 Canadian Nickel Company Limited conducted exploration in the Lupin area which included geological mapping, geophysical surveying, trenching, stripping and channel sampling. In February 1979, Echo Bay obtained an option on the Lupin property from Inco and proceeded with an underground exploration program in 1979 and 1980. The exploration program included driving a decline at -15% grade to the 110 meter level and conducting extensive diamond drilling down to the 200 meter level, as well as a single deep hole to the 470 meter level. Geological information obtained from this program indicated enough ore reserves to provide for 6 years production, based on the potential of developing in excess of two million tons of ore, with a mill designed to process 1,000 tons per day (average 950 tpd). The single deep hole to the 470 level indicated a continuation of ore at depth and the potential to significantly extend the mine life.

In August 1980, the decision was made to proceed with development and construction of the Lupin Mine, which would mine, mill and refine the ore into gold bullion.

Construction

In the summer of 1980, prior to a production commitment, a 5,000 foot gravel landing strip capable of handling a C130 Hercules was prepared. Plant design was based on being able to airfreight all the components to site. Mine site construction started in August 1980 and was completed on schedule in March 1982 when pre-production commissioning began.

During the 20 months of construction, the Hercules aircraft made some 1,100 flights, carrying 25 tons of construction material each time. This included all the contained machinery and construction equipment, 2,200 tons of structural steel and the cement required to mix 9,500 cubic yards of concrete. The floor area of the main complex was 100,000 square feet. During peak periods, the construction crews numbered up to 400 people.

The transportation of personnel to site was accomplished with a Convair 640, which also carried a total of 7 million pounds of supplies such as perishables and repair parts during construction.

Engineering, procurement and construction management of the surface facilities was contracted to Bechtel Canada Limited, while the contract for mine development and underground construction was awarded to J.S. Redpath Limited. The operations were constructed and commissioned for a total cost of $135 million.

Expansion

During 1983, a construction program was completed to expand the capacity of the mill from the original nominal 1,000 tons per day to a new nominal capacity of 1,200 tons per day. This construction included the installation of a rod mill in the grinding circuit, an additional 1,000 ton fine ore storage bin, additional filters, and a maintenance bay extension. These additions increased the plant floor area to 120,000 square feet. Construction was completed in October 1983, at a cost of $5.5 million.

From 1983 to 1993, the mine plant has completed a number of other expansions and operational changes to increase milling capacity to a nominal 2,300 tons per day. These included two separate shaft deepenings to the present depth of 1210 meters below surface.

Since bringing Lupin into production, Echo Bay has added three other currently operating gold mines : two open pit mines in Nevada (Round Mountain and McCoy/Cove), and one underground operation in Washington (Kettle River). Echo Bay is actively exploring for more gold deposits in the Lupin area and around the world.

Ulu

The Ulu project was purchased from BHP Minerals in November 1995, for US$ 10 million. The claims are located approximately 124 km north of Lupin, or 171 km by winter road. The resource contained in the main zones total 1.9 million tons, at an estimated grade of 0.321 ounces per ton, for a total of over 600,000 ounces of gold. The deposit will be developed as a satellite to the Lupin Operation, with ore delivered to Lupin for processing over a winter road.

Underground exploration and development is being undertaken during 1996 and 1997. This program will delineate the deposit and prepare the initial stoping areas for production. A 750 ton per day underground open stoping mine is planned, with ore deliveries to Lupin over a winter road planned for 1998. The project employs approximately 30 people during the exploration stage, and will eventually employ 60 while in production.

An Inuit Impact and Benefits Agreement was negotiated between Echo Bay and the Kitikmeot Inuit Association, and signed on September 17, 1996. This agreement establishes the framework for providing employment, training and other economic benefits to the First Nations people in the West Kitikmeot Region of Nunavut. This agreement is the first of its kind signed under the Nunavut Land Claims Agreement.

GENERAL DESCRIPTION

Introduction

The Lupin Mine began production in 1982. On April 28, 1993, a major milestone was reached when the mine poured it's 2,000,000th troy ounce of gold. Approximately 2,000 tons of ore are processed daily to recover almost 200,000 ounces of gold annually. Lupin ranks among North America's largest gold producers. Reserves, as of December 31, 1994, were 2.28 million tonnes of proven and probable ore at a grade of 9.90 grams of gold per tonne, (2.52 million tons at 0.289 oz/ton) and contain 728,000 ounces of gold.

The site plan, after page 7, will assist you with your orientation of the Lupin Mine site.

Other than the transportation requirement for materials and supplies necessary to sustain the workforce and operations, the Lupin site is completely self-contained and relatively compact. It is comprised of two principal clusters of buildings. One is the residential complex which consists of accommodations, kitchen, and recreation center. The other is the industrial complex which houses the milling and maintainance areas as well as the headframe, hoisthouse, powerhouse, warehouse and offices.

Production

Lupin is a highly mechanized, trackless operation using modern techniques and equipment to produce ore from a number of locations simultaneously. The mining method employed in the upper-level ore zones is a sub-level retreat longhole open stoping technique. Two-boom development drill jumbos and 6 yard scooptrams are used in development and production in the Center Zone. The same method is used in the narrower West Zone, but single-boom Micromatic drill jumbos and 2 yard scooptrams are used in development to ensure that the excavations are kept only as wide as the ore zone itself. In the lower portions of the mine, a longhole stope and pillar method, with integrated waste fill, is used. Mining methods are being converted to a sublevel retreat under consolidated fill technique since the commissioning of the new paste fill plant in the fall of 1994. Almost all production will be from this new method by the end of 1995.

Transportation

In 1975, Echo Bay established its Aviation Department by operating a DC-3 leased from Eldorado Nuclear. The success of this led in 1976 to the purchase of a Convair 640 with freight door.

With an option on the Lupin property, exploration was undertaken to determine whether a producing mine was feasible. It was at this point that Echo Bay's previous experience in northern aviation proved invaluable. The only viable means of moving materials and personnel to this isolated Arctic site was by air and the only aircraft capable, due to the size and weight restrictions, was the Lockheed C130 Hercules. A Hercules, previously used on the James Bay hydro-electric project, was leased in early 1980. This aircraft and its crews amassed an enviable safety record that is untouched by any aviation-associated company, delivering this $135 million project without incident and enabling the company to start up the plant on schedule. Since the completion of the mine construction and the start-up of the ice road in 1983, the requirement for a heavy haul Hercules aircraft to fly on a continuous basis no longer existed. However, the ongoing requirement to move freight and passengers remained but exceeded the capability of the Convair 640. To meet these changing transportation requirements, a Boeing 727 aircraft was purchased and placed into service. Between April and late December each year, the only access to Lupin is by air. Echo Bay uses the 727 to fly personnel and priority freight to Lupin on a three times a week schedule, with alternate Friday service to and from Yellowknife.

Local charter outfits provide Twin Otter service to move personnel and freight to Lupin and Kugluktuk. We use our own Twin Otter to service Coppermine, the winter road camps in winter and the exploration projects in the summer.

In January, 1983, Echo Bay Mines constructed an ice road from Yellowknife to Lupin, a distance of approximately 665 kilometers (415 miles) of which 75% is over frozen lakes. Two maintenance camps, one located at Lockhart Lake and the other at Lac de Gras, serve as base camps for the road maintenance crews and rest stops for the truckers on their 24 hour journey from Yellowknife to Lupin. The winter road season is approximately 12 weeks long, from early January through mid-March. Construction of the road takes about three weeks, leaving 9 weeks to move a years supply of freight and fuel up to the mi site. In 1996, almost 31 million pounds of freig.. (including cement) and over 22 million litres of fuel were trucked to Lupin over the Winter Road.

Residential Facilities

Echo Bay has constructed a residential complex which provides a comfortable home away from home. After an addition of 32 single rooms built in 1994, the camp now has the capacity to house a total of 444 people. Approximately 132 rooms are available for single occupancy with integrated bathroom/shower facilities. Most of the remaining rooms are single occupancy as well, but are designed so that two rooms share a bathroom/ shower. A new kitchen complex and additional office space was added in 1993. Recreation facilities include a sauna, whirlpool, racquetball/squash court, weight room, library, 3 T.V. rooms, a lounge/pool room and a gymnasium with provisions for basketball, volleyball, badminton and indoor soccer. There is a baseball diamond for summer use.

An occupational health nurse, as well as safety personnel, are present on site at all times. On the rare occasion when personnel require further medical attention, they are flown either to Yellowknife or Edmonton depending on the circumstances.

Site and Services

Ancillary to the two main complexes are a variety of materials storage facilities, the largest being the fuel tank farm. Erected in this containment area are 2-360,000 gallon tanks, 9-350,000 gallon tanks, 3-187,000 gallon tanks, and 20-18,000 gallon tanks, for a total capacity of 4.8 million gallons. A large storage building provides shelter for the cement used with mine backfill and another large storage area contains the mill reagent and grinding media. There are a number of annex buildings that house a carpenters shop, concrete batch plant and miscellaneous storage and maintenance areas.

A pump house, equipped with 3 - 3 stage Byron Jackson vertical turbine pumps (1 is standby), is situated on the shore of Contwoyto Lake to supply fresh water to the complex via an insulated 6 inch diameter pipeline.

Mill tailings and effluent are pumped in slurry form through an 8 inch diameter insulated and heat-traced pipeline to the tails containment area located some 5.5 miles south of the mine site.

The airstrip adjacent to the mine site has been extended a number of times since its original construction and is now 6,300 feet long and equipped with lighting and VOR/DME navigational aids. A weather observation station and radio operator complement the operation of this facility.

Power Generation

Lupin's diesel engine operated powerhouse generates over 72 million kilowatt-hours per year and consumes over 18 million liters (4,140,000 gallons) of P40 fuel oil to generate this power.

The total installed generator capacity is 18.5 megawatts in the main powerhouse. This is provided by 3 Ruston RK 12-cylinder, 4-stroke, water cooled diesel generators, capable of producing 1.8 megawatts each, by 4 General Motors EMD 645E4B 20-cylinder, 2-stroke, water cooled diesel generators which can produce 2.6 megawatts each, and an EMD 710 G4B 16-cylinder rated at 3.0 megawatts. In addition 1.5 megawatts can be produced in emergency situations by utilizing 3 Caterpillar D398 12-cylinder, 4-stroke, water cooled diesel generators located in a separate building.

As fuel is an expensive commodity at Lupin, efficient utilization must be achieved. One way that this is accomplished is by harnessing all the waste heat possible during the power generation cycle. This is achieved by passing the hot lubricating oil, jacket water and exhaust gases produced by the generators through three separate heat exchangers. A mixture of 50% glycol and 50% water is continually circulated through the heat exchangers. This solution absorbs the conductive waste heat and the heated liquid is then pumped throughout the minesite. In places where heat is required, the water-glycol solution is piped off either through unit heaters, simple baseboard (convection type) heaters, or liquid-air heat exchangers. The fresh air supply to underground, offices, accomodations, kitchen facilities, and domestic hot water are all heated by means of the waste heat recovery system.

The output from the powerhouse is continuously monitored and controlled, and intensive scheduled maintenance is carried out to ensure that the diesel generators operate at their peak efficiency. Due to these measures, the Lupin powerhouse generates power at a cost of around $0.12 per kilowatt (including freight costs for the fuel), with fuel consumption of 18.00 kilowatts per gallon (Imperial) of fuel oil.

Organization

Lupin employs approximately 440 permanent personnel, 290 of whom are on site at any one time. During the summer months there are additional temporary employees at Lupin. Most employees work on a 2-weeks in/2-weeks out or 1 week in/1 week out. Some staff members work Monday to Friday, every third week Monday to Wednesday. All work shifts are 12 hours long, generally from 6 a.m.to 6 p.m., except on plane days for the arriving and departing crews. Employees travel to work on company aircraft from Edmonton (Boeing 727), and Yellowknife, Coppermine and Kugluktuk (Twin Otter).

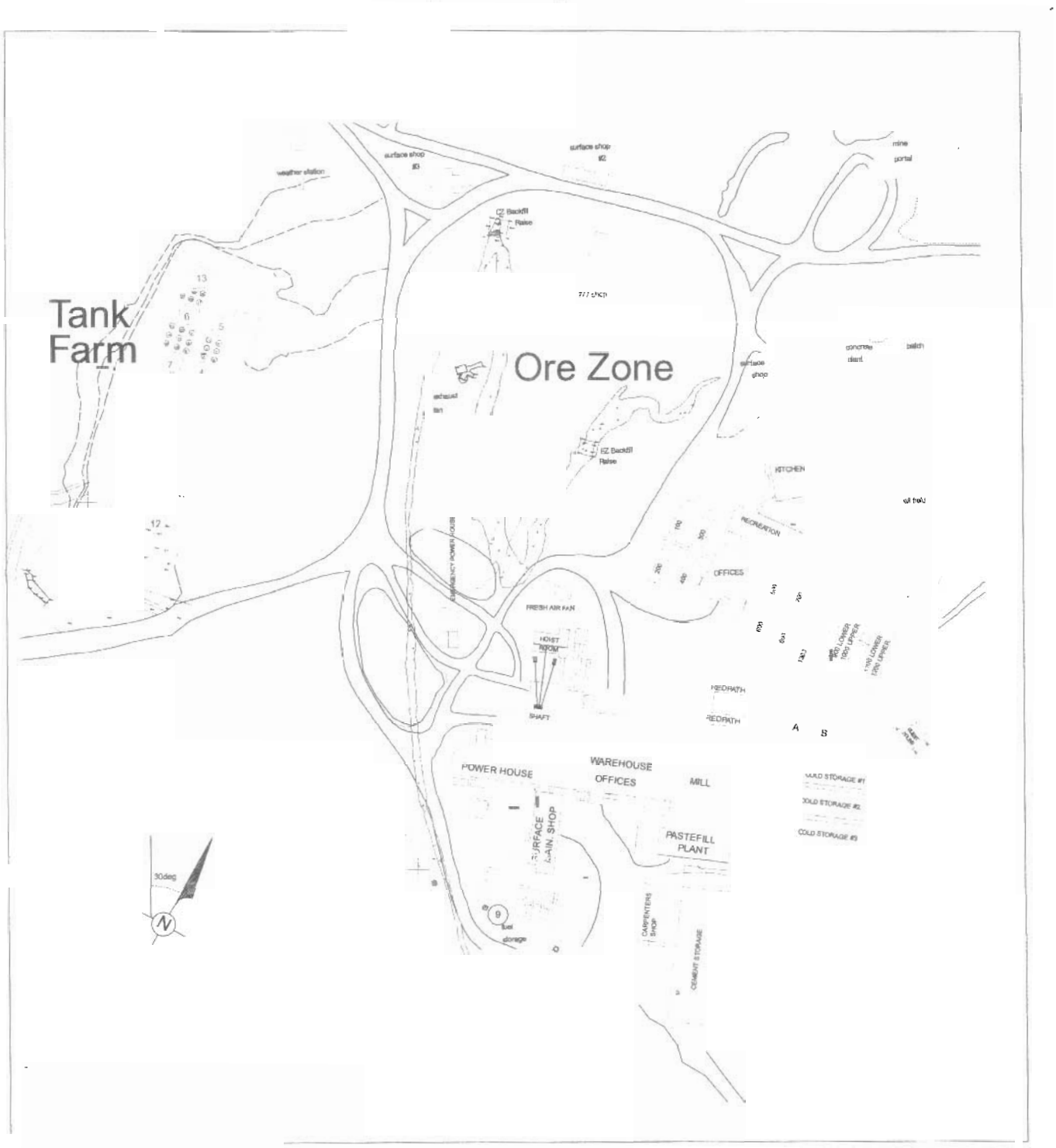
There are two main operating departments: Mine and Mill, with the following support groups:

- Loss Control
- Surface Services
- Engineering
- Stationary Rebuild
- Human Resources
- Projects
- Warehouse
- Mill Maintenance
- Carpentry
- Electrical
- Powerhouse
- Geology
- Accounting
- Purchasing
- Assay Lab
- Environmental
- Administration & Management
- Surface Mobile Maintenance
- Underground Mobile Maintenance

Also on site at any time are a number of contractors, the most prominent being National Catering which provides the catering and housekeeping services. The only other day to day activities which are contracted out are underground nd surface diamond drilling.

ECHO BAY MINES LTD.

Lupin Operation

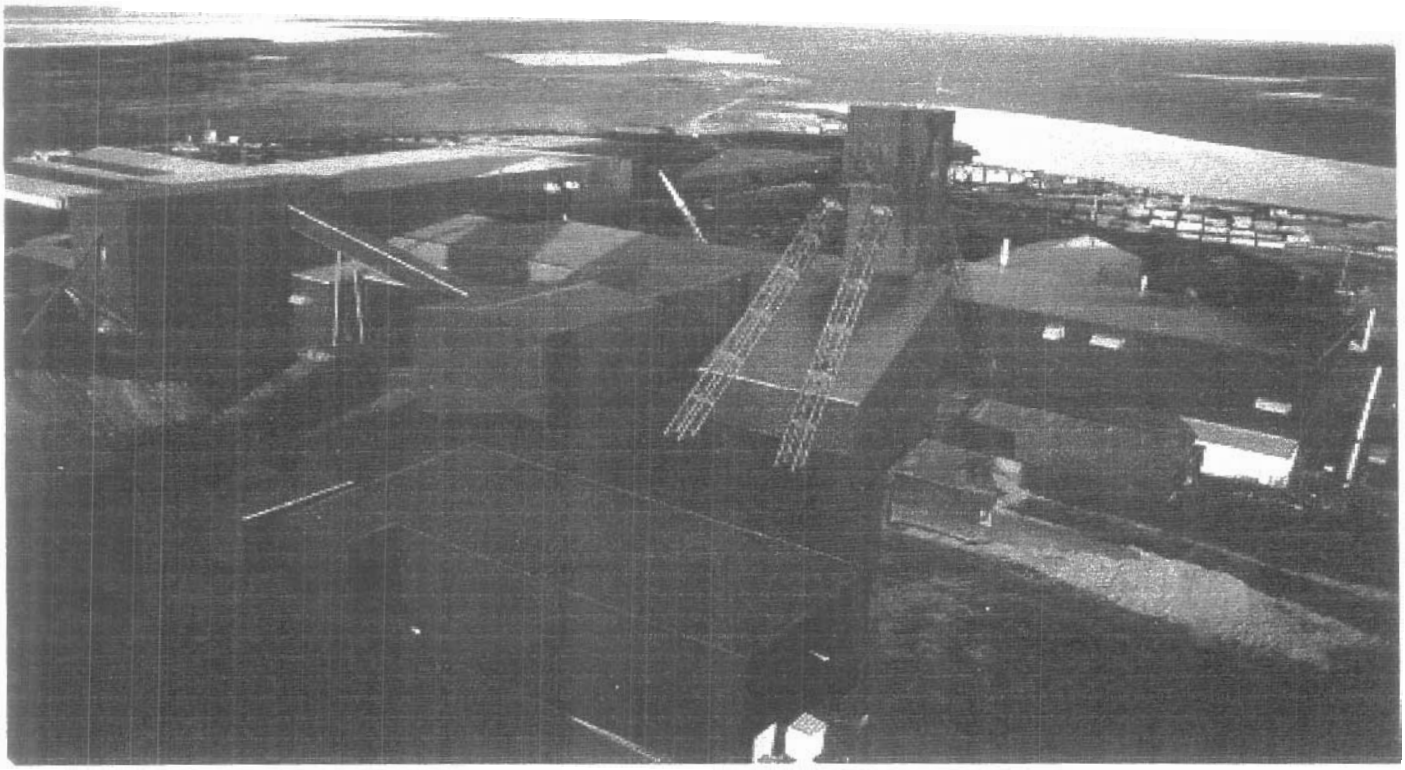


Site Plan

ECHO BAY MINES LTD.

LUPIN OPERATION

TECHNICAL DESCRIPTION



OCTOBER 1996

MINE

Introduction

The Lupin Mine began production in 1982 at 850 tons per day and has evolved to a current production rate of 2,000 tons per day. At this mining rate, workings advance rapidly in depth, creating the need for frequent advancement and upgrading of infrastructures.

The mine is accessed by a 3 compartment shaft (4 compartments below 250m level) and by a ramp from surface. The mining methods are highly mechanized and completely trackless, relying on diesel powered rubber tired equipment (LHD's, trucks) and electric-hydraulic drilling equipment. Most current mining activities take place below 800 meters (2,600 feet) depth. Only remnant support and crown pillars remain above that level north of shaft, although there is still mining potential in the West Zone south of the shaft.

General Geology

Gold mineralization at Lupin is confined to a folded and metamorphosed iron formation and the mineralization may be termed "stratabound". The Iron Formation horizons consist of both silicate facies and sulphide facies metamorphosed to an amphibolite + quartz rich rock. Regional deformation of the Iron Formation horizon along with associated quartzites and fine-grained sediments has resulted in steeply dipping strata and tight folds. At the mine, the gold bearing Iron Formation appears on plan as a Z-shaped structure made up of three zones: the West Zone, Center Zone and East Zone. The West and Center Zones dip steeply to the east at 75 - 90 degrees, while the East Zone dips at 75 - 90 degrees to the west. Total strike length of the three zones is in excess of 900 meters and the zones are confirmed at a depth of 1800 meters below surface.

Gold is found primarily with sulphide rich Iron Formation and the minerology of the ore at Lupin consists of amphibole, quartz, occasionally garnet, pyrrhotite, arsenopyrite, minor pyrite and trace chalcopyrite. Also found in minor amounts are scheelite, apatite, epidote, calcite, tourmaline, and some arsenides (notably loellingite). The gold is fine grained; generally less than 100 microns in diameter, and is associated mainly with pyrrhotite and arsenopyrite. Although not common, visable gold has been reported and, when found, is usually in close proximity to quartz veining.

As of December 31, 1994, proven plus probable reserves from surface to the 1240 meter level totalled 2.28 million tonnes at a grade of 9.90 gm/tonne (2.52 million tons @ 0.289 oz/ton).

Underground Transportation and Materials Handling

Main Shaft

Shaft sinking began in 1982, to an original depth of 369 meters below the surface collar. The shaft has been extended three times since then - to the 705 meter level, to the 945 meter level, and in 1991 to the prsent shaft bottom at the 1210 meter level. The 2-drum ASEA production hoist, originally installed in 1987, was upgraded to 1720 HP in 1992. This allowed 10 ton capacity skips to be hoisted in the two hoisting compartments. Hoisting speed was increased in 1993 to the present rate of 1825 feet per minute.

The Lupin Mine is served by one 3-compartment shaft from surface to the 250m level. The shaft continues as a 4-compartment shaft from 250m level to 1210m level. The third compartment below the 250m level was a sinking compartment. The fourth is the manway and service compartment.

To address projected shortfalls in capacity and to augment the long term servicability of the mine, in 1992 the third shaft compartment was converted to a service cage compartment with a new service hoist installed at surface. Emergency egress from the mine is provided by emergency power to the service hoist (or via ramp).

Ramp

An access ramp extends from suface to the 1240m level. For the most part, the ramp is located under the plunging South Nose of the orebody. It is an inclined (15%) closed spiral 5mW x 3.5mH between 87m level and 1130m level except between 650m level and 890m level, where it is a figure eight spiral. From surface to 87m level it consists of several long straight sections.

Technical Data - Shaft

Size

- Three compartment from surface to 250 level: 2 production, 1 cage
- Four compartment from 250 level to bottom: 2 production, 1 cage, 1 services
- 2.74 meters X 7.24 meters (9' 0" X 23' 9") rock opening
- 2.44 m X 6.94 m (8' 0" X 22' 9") outside steel set dimensions. Steel sets 4.57m (15 feet) apart.

Depth	- 1210 meters
No. Levels	- 12
Cage Hoist	- G.L. Tiley
Cage Hoist Size	- 2.32 meter diameter X 1.71 meter face, Single drum
Cage Hoist Motor	- 500 HP, 850 RPM, D.C.
Cage	- GL&V double deck
Cage Tare	- 1.36 tonnes (3000 lbs)
Cage Capacity	- 2.19 tonnes (personnel) - 2.72 tonnes (material)
Cage Speed	- 6.09 m/s (1200 fpm) up; 5.2 m/s (1025 fpm) down.
Cage Rope Diam.	- 25.4mm (1 inch)
Guides Size	- 5.5 inches X 7.5 inches, B.C. Douglas Fir
Skip Hoist	- ASEA Brown Bovari HTVD -Double Drum
Skip Hoist Size	- 3.048 meters X 1.975 meters
Skip Hoist Motor	- 2 - 860 HP ASEA Type DMG
Skips	- GL&V Bottom Dump
Skip Tare	- 4.68 tonnes (10,300 lbs)
Skip Capacity	- 9.06 tonnes (20,000 lbs)
Skip Speed	- 9.27 m/s (1825 fpm)
Skip Rope Diam.	- 38.1mm (1.5 inch)
Guides Size	- 5.5 inches X 7.5 inches, B.C. Douglas Fir

The ramp provides for movement of men, equipment and materials within the mine and allows efficient deployment of resources as required. It is essential to the highly mechanized mining methods being used.

Ore and Waste System

There are three ore and waste handling systems in place. The upper system serves the mine above the 250m level. This area is mined out except for the pillars (Crown, Sill, South Nose) and a small part of the East Zone. The second system serves the mine between the 250m and 570m levels. There are ore and waste pass dumps on each main haulage level down to the 570m level. A third system is developed to service the mine between the 1130m level and the 650m level. Almost all of current production goes through this third system.

The upper ore and waste passes feed a 36" x 48" double toggle Birdsboro Buchanen jaw crusher below the 250m level. Separate ore and waste bins below the crusher feed into the loading pocket (#1LP) on the 315m level.

The second system feeds an identical crusher which feeds a 220m long conveyor on the 650m level. This conveyor carries the crusher product to ore and waste bins near the shaft. These bins feed into the shaft via a loading pocket (LP#3) at the 710m level.

The third system originally included ore and waste passes to a crusher near the South Nose of the Center Zone on the 1130m level. Because of ground failures in these passes, they have been replaced with a new ore pass from which material is trucked on 1110m level to feed the crusher. Crusher product is conveyed via inclined conveyor to the 1105m level at the shaft station where it is dumped into an ore or waste bin which feeds into the shaft via the #5LP (1150m level loading pocket).

Mining Methods and Equipment

The mining methods in use at Lupin are highly mechanized, making use of diesel scooptrams, haulage trucks, and electric-hydraulic drilling equipment. Mine productivity rates of about 40 tons per manshift are achieved in producing 2,000 tons per day. The Center Zone produces 60% of this daily requirement, and the West Zone provides the remaining 40%.

DEVELOPMENT

The majority of lateral and ramp development is accomplished using electric-hydraulic jumbo drills. Standard drift sizes are as follows:

Ramp	- 5.0m wide X 3.5m high, -15% grade
Access Drifts	- 4.6m wide X 3.4m high
CZ Ore Drifts	- 4.0m wide X 3.5m high
WZ Ore Drifts	- 2.0m wide (minimum) X 3.2m high
Haulage Drifts	- 4.6m wide X 3.4m high
Drawpoints	- 4.0m wide X 3.4m high

A fleet of 4 Tamrock Maximatics, 1 Tamrock Minimatic and 5 Tamrock Micromatics is used for drift development.

Stope slot raises (1.5m X 1.5m) and millhole raises (1.5m X 1.5m) are driven conventionally using stopers. A raiseborer was used to drive a series of ventilation (3.0m diam) and ore/waste pass (2.1m diam) raises from the 650 level to 1130 level. Alimak raise climbers are also used to drive ore and waste pass raises, typically 2.4m X 2.4m (8 ft X 8 ft) in cross section.

Muck removal in the large size headings is done with a fleet of 6 Wagner, 3 JCI and 1 Toro 6 cu.yd. diesel scooptrams. Five 26-ton Wagner haul trucks are used for long tramming distances. The small West Zone headings are mucked using a fleet of 5 Wagner 2 cu.yd. scoops.

PRODUCTION

Mining at Lupin began with sublevel longhole open stoping in the Center and East Zones. All of the mining in these zones above 810m (2660 ft) depth has been done by this method. No ore has been developed in the East Zone below the 330m depth.

The West Zone is narrower than the Center and East Zones. It was first mined by shrinkage, and then by a "Raise Platform Mining" method which involved raising and breasting with Alimak raise climbers. This was replaced with sublevel longhole open stoping similar to the Center Zone but utilizing much smaller equipment.

As mining progresses to greater depths and the accumulated volume of excavation increases, the rock stresses increase and ground control becomes an increasing concern. Methods have been changed to integrate backfill into the mining cycle. A "bottom-up" sublevel stoping method was adopted for mining above the 1130m level. This has not provided satisfactory dilution control and has high associated waste development costs. Mining is now being converted to a "sub-level retreat under consolidated fill" (SRUCF) approach which involves mining 30 to 40m (100 to 130 ft) high by 10m (30 ft) long panels along strike (see illustration) and backfilling them prior to mining the adjacent panel or the panel below.

DRILLING

A Center Zone stope, which varies from 4 to 12 meters wide, is developed by drifting in the ore zone on 20 meter vertical intervals (on average). Back assaying and ore definition diamond drilling on 5 meter centers provide the information to generate ore and mining limit contours and the ore reserve block model. The ore drifts are then slashed to the design limits of the ore. Longhole drilling in the Center Zone is carried out by a three Tamrock Solo drills, which drill parallel rings of 64mm (2.5 inch) diameter blastholes from one sublevel down to the next. The drill rings are a maximum of 1.5 meters apart and the toe spacing within a ring is a maximum of 1.8 meters apart.

The West Zone (2 to 4 meters wide) is similarly developed, but because of the narrow width, slashing is not usually required. Back sampling for ore reserve definition is done at 2.5 meter intervals along the strike of the ore drift. Production drilling is carried out by Tamrock MicroSolos, drilling 10 meter long upholes and downholes from each level. The holes are 25mm (2 inch) diameter and are drilled in a 3 hole : 2 hole pattern, with each ring separated by 0.75 meters and maximum toe spacing of 1.5 meters. Vertical intervals have been reduced to an average 15m for SRUCF methods in the West Zone.

BLASTING

Individual stope blasts are typically in the range of 4000 to 8000 tons in the Center Zone, and about 1,000 tons in the West Zone. The holes are loaded with ANFO blasting agent, primed with nitroglycerin based high explosive, and detonated by millisecond delay electric caps. Production blasts are initiated from a safe location underground. Blasting frequency is variable, depending on the availability of muck in the stopes. All stope blasts are fired at the end of day shift. Average powder factors are 0.45 kg/ton (1 lb/ton) for the Center Zone and 0.87 kg/ton (1.9 lb/ton) for the West Zone. This is higher than in other mines using similar methods because the ore strength is very high. (450 MPa unconfined compressive strength in samples.)

MUCKING

At the bottom of each stoping block in the upper levels of the mine (above 810m level), a haulage drift has been developed parallel to, and about 15 meters away from, the ore zone. Because of the dip and configuration of the orebody, the Center Zone haulages are developed in the footwall and the West Zone haulages are situated in the hanging wall. Drawpoints, at about 15 meter intervals along strike, are driven from the haulage drift into the ore zone. Stopes in the lower portions of the mine were designed smaller, both in height and strike length. For this reason, it was necessary to drive haulage drifts every 20 vertical meters - dramatically increasing the amount of waste drifting required to develop a stope block. To cut down on this waste development, drawpoints are driven every 40 meters along strike and much of the production mucking is done by remotely controlled scooptrams. When conversion to the SRUCF method is complete, all mucking will be done from the stope brow or by remote and waste haulages will be eliminated.

The broken ore is mucked using 6 cu.yd. scooptrams, which can carry approximately 8 tons in each bucket load. The ore is hauled to a grizzly equipped with a rockbreaker which covers the orepass to ensure no oversize material is dumped into the

Underground Mine Services

orepass.

Average daily stope mucking tonnages are 1200 tons from Center Zone and 750 tons from West Zone.

GROUND SUPPORT

With increased mining depths and increasing volumes of mined out voids, stress in the rock is increasing. Thre has been a progressive increase in ground support requirements over time. Until 1987, only local roofbolting was done in problem areas. In that year, systematic roofbolting in the ramp was initiated (below the 410m level). This has evolved to where standard practice between 650m level and 1130m level is to roofbolt all backs, using grouted rebar in haulage ways and ramps, and to wall bolt in all waste developments.

Cable bolting and dywidag bolting of stope walls from ore sub-drifts was initiated in 1990. With increased stresses, it is anticipated that cable bolting of all stope backs may become necessary as mining progresses.

BACKFILL

After numerous methods were considered, consolidated paste fill was selected as the backfill material. This involves taking the filter cake from the second stage filters in the mill (tailings), conveying it to the paste plant where it is mixed in a pan mixer with cement and water to create the paste. This is pumped to the shaft utilizing a positive placement pump. Once delivered to the shaft, it flows by gravity through the fill line to the working place. The system has a design capacity of 120 short tons per hour.

The paste backfill plant was commissioned in October 1994, and is key to the SRUCF mining method.

VENTILATION

Fresh air is supplied to the underground workings by a 1000 HP, 84 inch diameter Joy axivane fan, with a rated capacity of 300,000 CFM at 12.5 inches water gauge static pressure. A similar sized Joy fan, rated at 250,000 CFM at 11.7 inches water gauge static pressure, exhausts contaminated air to surface. Both fans are located on surface.

To distribute the fresh air on the levels, 42 inch diameter 75 HP axial flow fans have been installed in the concrete vent bulkheads. The air drawn out of the vent raise is delivered to the working faces through 42 inch fabric vent tubing. Where development faces are situated a long distance from the vent raise, 50 HP booster fans are added to the distribution system.

The intake airflow is directed over a series of heating coils located at the top of the fresh air raise on surface. When the temperature of the intake air becomes too low, heat is supplied to the heating coils by means of the powerhouse waste heat recovery system. At extremely low outside air temperatures, this waste heat supply is supplemented by heat generated by diesel fired boilers.

WATER SUPPLY, DRAINAGE AND PUMPING

Lupin is a relatively dry mine, having an average water inflow of between 12 to 25 U.S. gallons per minute. Most of this water seeps into the workings below the permafrost level, 500 meters below surface.

Brine is used above the 490 m level for drilling. Water is collected at the 250m level and pumped to surface. Water is provided on demand from surface to the 490m level for distribution between there and the 650m level.

Clear water from a double ramp sump (dirty water side, clean water side) near the 1130m level crusher station is transferred to the 1105m level where vertical turbine pumps stage lift the water to the 890m level.

The main dewatering system consists of 4 main sumps, each with 2 pumps (1 operating, 1 stand-by). The lowest sump, located on 1105 level, consists of 2 Peerless vertical turbine pumps mounted over the clear water side of a double ramp sump. Each 40 HP pump is rated at 100 U.S gpm and operates under a head of 240 meters. A similar set-up exists at the next higher installation, on the 890 level. The 650 meter level main sump is equiped with 2 - 5 HP vertically hung Sala transfer pumps, discharging to a clean water sump behind a concrete dam. This clear water sump is equipped with 2 - 250 HP horizontally mounted multi-stage Mather & Platt pumps, rated at 300 U.S gpm under a 400 meter head. The final main sump in the discharge system is located on the 250 meter level, where a 6000 gallon tank supplies 2 - 200 HP multi-stage Mather & Platt pumps, rated at 400 U.S. gpm. The discharge line is 6 inch diameter in the shaft, 4 inch diameter through the plant and 6 inch diameter on surface. Mine water is discharged to the upper sewage lagoon.

COMPRESSED AIR

Because most of the drilling at Lupin is done using electric-hydraulic equipment the demand for compressed air is relatively low. It is still used for raise driving (pneumatic stopers) and for miscellaneous jackleg work. Compressed air is provided to the mine via a shaft pipeline by two Ingersoll Rand 2500 cfm Rotary Compressors.

UNDERGROUND POWER SUPPLY

Power is provided to the mine at 4,160 volts via three shaft feeders to the 650 meter level. Below 650, two feeders continue down the shaft and the third continues to depth via the main ramp.

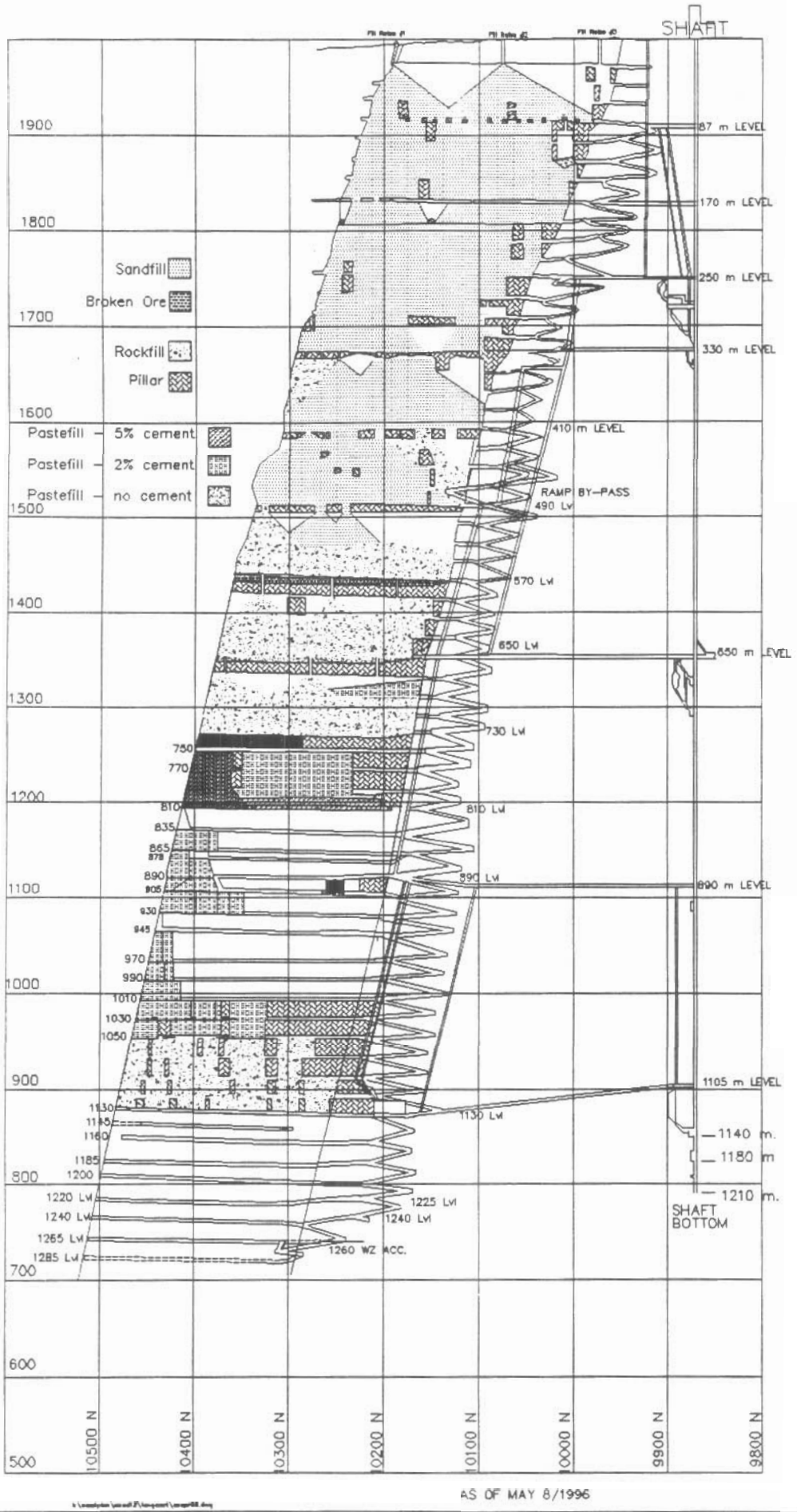
UNDERGROUND MOBILE EQUIPMENT MAINTENANCE

The main underground repair shop is located on the 650 meter level. A staff of 32 underground mobile mainteinance personnel does the preventive maintenance and major overhauling of the 66 units in the underground mobile machinery fleet. There are dedicated crews for preventive maintenance and for breakdown repair. Besides the main shop area, separate bays are available for steam cleaning, lubrication, mechanical / electrical / welding inspections, tire and wheel maintenance, and painting. Pneumatic drill repairs are also done underground. Hydraulic drill bit sharpening and drill repairs are done on surface.

SURFACE MATERIAL HANDLING

Waste or ore for stockpiling is removed from the surface bin using a Cat 769 Haul Truck. Loaders and dozers are used in maintaining dumps and rehandling ore from stockpile to feed the mill. This equipment forms part of the surface mobile fleet.

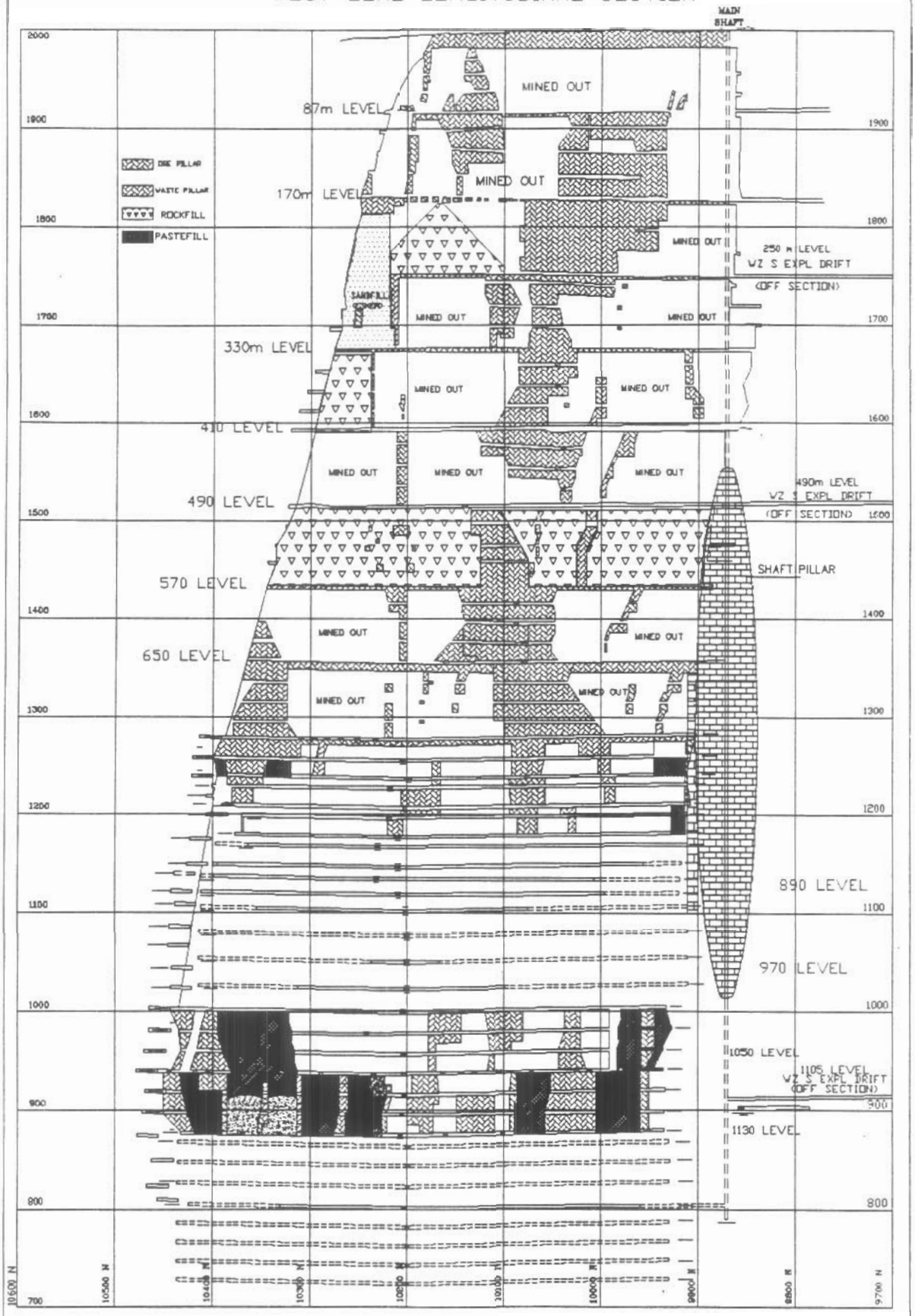
LUPIN MINE



AS OF MAY 8/1996

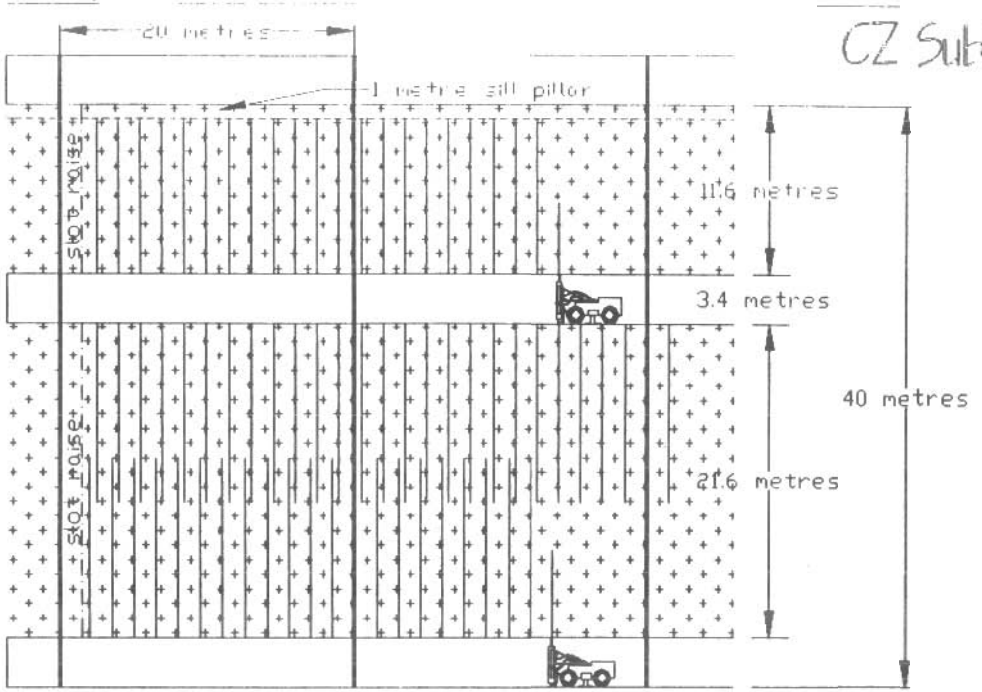
LUPIN MINE

WEST ZONE LONGITUDINAL SECTION



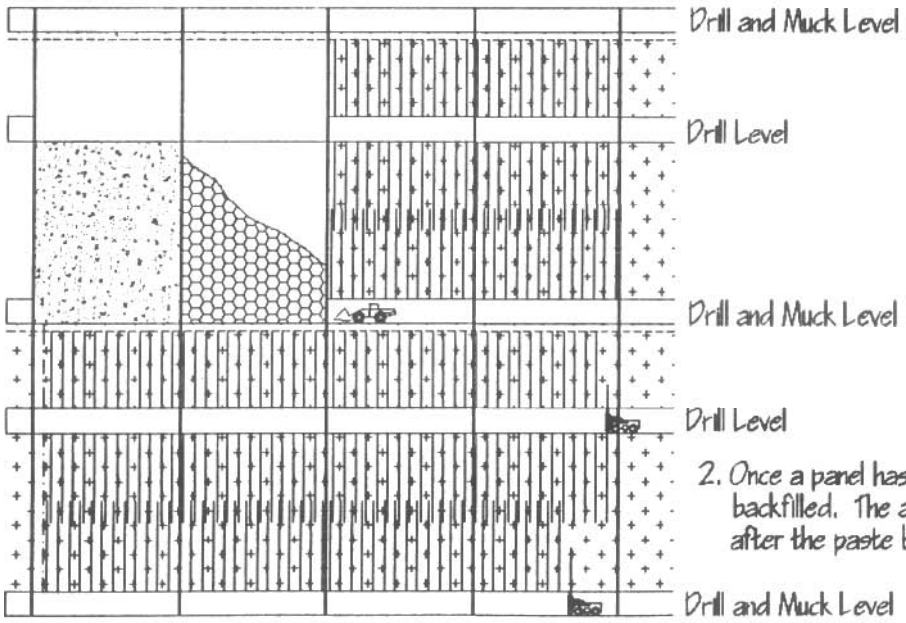
STOPE & DRIFT ADVANCE AS OF MAY 8/1996

CZ Sublevel Retreat Under Consolidated Fill



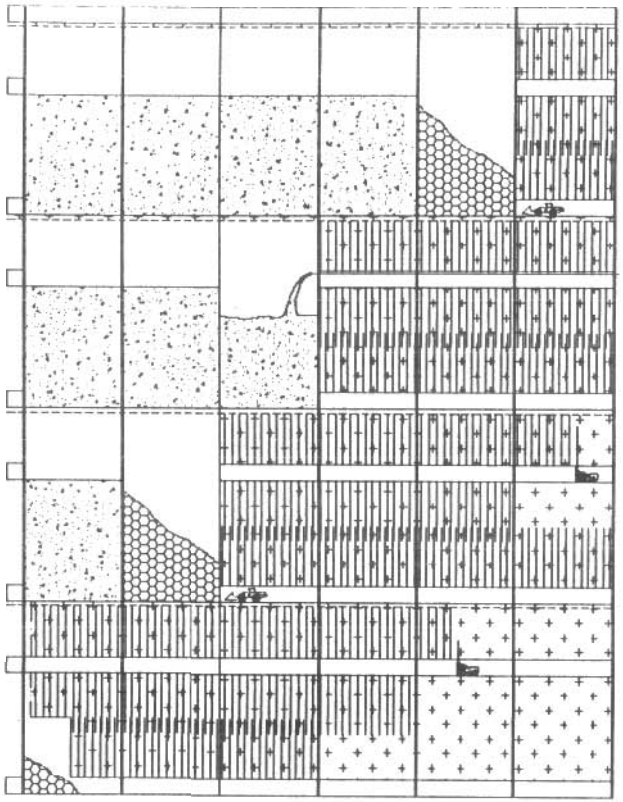
1. Panels of dimensions 20 metres long by 40 metres high are drilled, using both up and downholes.

SCALE 1:500



2. Once a panel has been mined out, it is backfilled. The adjacent panel can then be mined after the paste backfill has hardened.

SCALE 1:1000



3. Mining may then proceed in a top-down sub-level retreat fashion as is illustrated above.

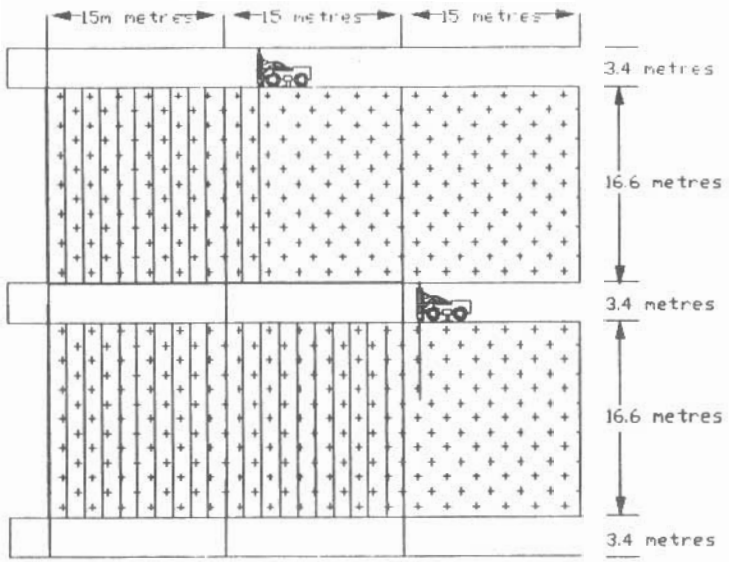
SCALE 1:1500

LEGEND:

- Blasted Ore
- Insitu Ore
- Paste Backfill

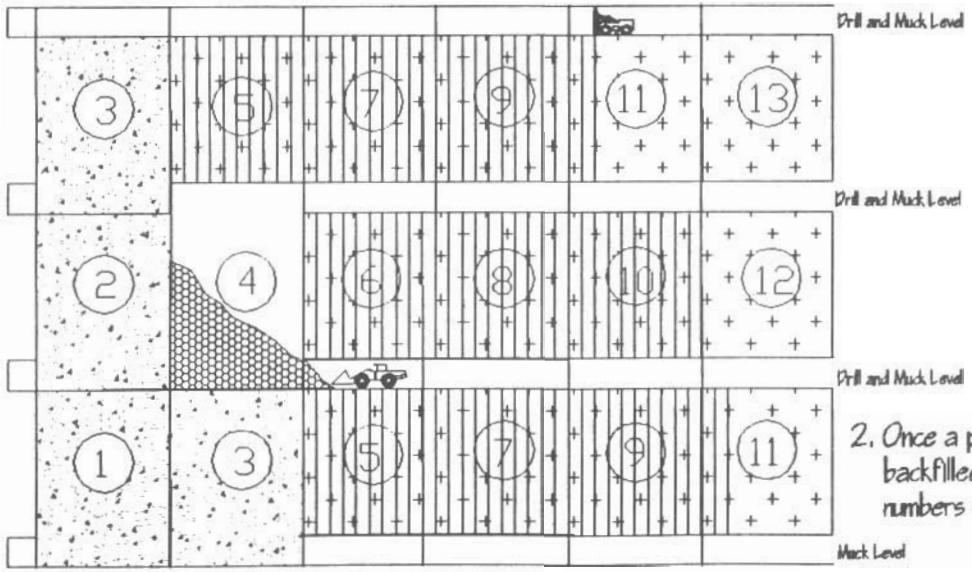
ECHO BAY MINES LTD. LUPIN N.W.T.	
SUBJECT: CZ SRUCF	
DATE: NOV 24/95	DRAWN: DJW
SCALE: AS NOTED	No.

Sublevel Retreat Over Consolidated Fill



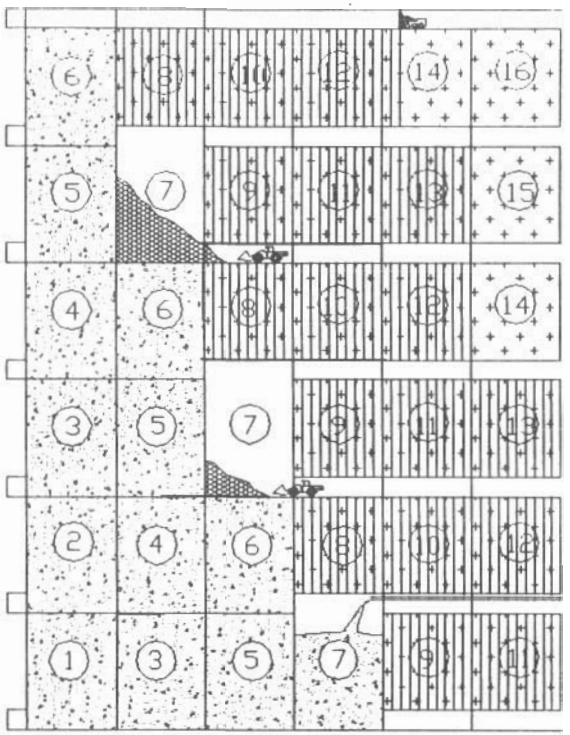
1. Panels of dimensions 15 metres long by 20 metres high are drilled off with downholes.

SCALE 1:750



2. Once a panel has been mined out, it is backfilled with paste fill. The circled numbers give the required mining sequence.

SCALE 1:1000



3. Mining proceeds in a bottom up fashion.

SCALE 1:1500

LEGEND:

- Blasted Ore
- Insitu Ore
- Paste Backfill

ECHO BAY MINES LTD. LUPIN N.W.T.	
SUBJECT: SROCF	
DATE:	DRAWN:
SCALE:	No.

Underground Transportation and Materials Handling

Main Shaft

Shaft sinking began in 1982, to an original depth of 369 meters below the surface collar. The shaft has been extended three times since then - to the 705 meter level, to the 945 meter level, and in 1991 to the prsent shaft bottom at the 1210 meter level. The 2-drum ASEA production hoist, originally installed in 1987, was upgraded to 1720 HP in 1992. This allowed 10 ton capacity skips to be hoisted in the two hoisting compartments. Hoisting speed was increased in 1993 to the present rate of 1825 feet per minute.

The Lupin Mine is served by one 3-compartment shaft from surface to the 250m level. The shaft continues as a 4-compartment shaft from 250m level to 1210m level. The third compartment below the 250m level was a sinking compartment. The fourth is the manway and service compartment.

To address projected shortfalls in capacity and to augment the long term servicability of the mine, in 1992 the third shaft compartment was converted to a service cage compartment with a new service hoist installed at surface. Emergency egress from the mine is provided by emergency power to the service hoist (or via ramp).

Ramp

An access ramp extends from suface to the 1240m level. For the most part, the ramp is located under the plunging South Nose of the orebody. It is an inclined (15%) closed spiral 5mW x 3.5mH between 87m level and 1130m level except between 650m level and 890m level, where it is a figure eight spiral. From surface to 87m level it consists of several long straight sections.

Technical Data - Shaft

Size

- Three compartment from surface to 250 level: 2 production, 1 cage
- Four compartment from 250 level to bottom: 2 production, 1 cage, 1 services
- 2.74 meters X 7.24 meters (9' 0" X 23' 9") rock opening
- 2.44 m X 6.94 m (8' 0" X 22' 9") outside steel set dimensions. Steel sets 4.57m (15 feet) apart.

Depth	- 1210 meters
No. Levels	- 12
Cage Hoist	- G.L. Tiley
Cage Hoist Size	- 2.32 meter diameter X 1.71 meter face, Single drum
Cage Hoist Motor	- 500 HP, 850 RPM, D.C.
Cage	- GL&V double deck
Cage Tare	- 1.36 tonnes (3000 lbs)
Cage Capacity	- 2.19 tonnes (personnel) - 2.72 tonnes (material)
Cage Speed	- 6.09 m/s (1200 fpm) up; 5.2 m/s (1025 fpm) down.
Cage Rope Diam.	- 25.4mm (1 inch)
Guides Size	- 5.5 inches X 7.5 inches, B.C. Douglas Fir
Skip Hoist	- ASEA Brown Bovari HTVD -Double Drum
Skip Hoist Size	- 3.048 meters X 1.975 meters
Skip Hoist Motor	- 2 - 860 HP ASEA Type DMG
Skips	- GL&V Bottom Dump
Skip Tare	- 4.68 tonnes (10,300 lbs)
Skip Capacity	- 9.06 tonnes (20,000 lbs)
Skip Speed	- 9.27 m/s (1825 fpm)
Skip Rope Diam.	- 38.1mm (1.5 inch)
Guides Size	- 5.5 inches X 7.5 inches, B.C. Douglas Fir

The ramp provides for movement of men, equipment and materials within the mine and allows efficient deployment of resources as required. It is essential to the highly mechanized mining methods being used.

FILTRATION

A two stage filtration system separates dissolved gold from the waste solids of the cyanide thickener underflow. Each stage consists of four 8 foot diameter by 14 foot long vacuum drum filters. In the first stage, the cyanidation thickeners underflow slurry contacts the outside of the filter unit and the solution is drawn through the filter while the filter cake is washed with barren solution. The solution is returned to the cyanidation thickener or pumped to pre-aeration as dilution water. The filter cake passes through a repulper to second stage. The second stage filter cake is washed with either barren, fresh, or recycle water and the solution is again returned to the cyanidation thickener. The filter cake is repulped with plant recycle water and flows by gravity to the tailings disposal pump box.

RECOVERY

The pregnant solution from the cyanidation thickener overflow is clarified and de-aerated, precipitated and refined to obtain dore bullion in a conventional Merill-Crowe System. Three pressure clarifiers remove suspended solids from the solution, then the oxygen is removed prior to precipitation in a de-aeration or Crowe tower. Zinc dust is added to the clarified de-aerated solution and the precipitated gold is collected in precipitation presses. The now barren solution is bled to tailings and recirculated throughout the plant. Once the filter press becomes loaded with precipitate, the feed is transferred to the other presses and the loaded press is emptied. After being mixed with suitable fluxes, the precipitate is smelted in the bullion furnace to produce dore buillion and slag. The slag is returned to the mill to be reprocessed. The bullion contains approximately 85% gold and 12% silver, the balance being base metals. It is forwarded to either the Royal Canadian Mint or Johnson Matthey for refining into marketable gold and silver bullion.

TAILINGS DISPOSAL

Tailings are pumped from the mill to a site 5 km to the south. Tailings are first dumped into a solids retention cell, where the solids settle and the tailings solution drains or permeates through a dam into Pond No. 1. In Pond No. 1, cyanide undergoes natural degradation due to sunlight, air and agitation provided by wind. Each summer, water from Pond No. 1 is simultaneously siphoned into pond No. 2 and injecte with ferric-sulphate in order to precipitate arsen. All other contaminants such as heavy metals (Cu, Fe, Ni, Pb, Zn) also degrade naturally. Pond No. 2 basically provides more retention time for the above process to take place. The following summer and prior to new transfer from Pond 1, (once the N.W.T. water license criteria are met) water from Pond No. 2 is discharged into the environment and eventually reaches Contwoyto Lake.

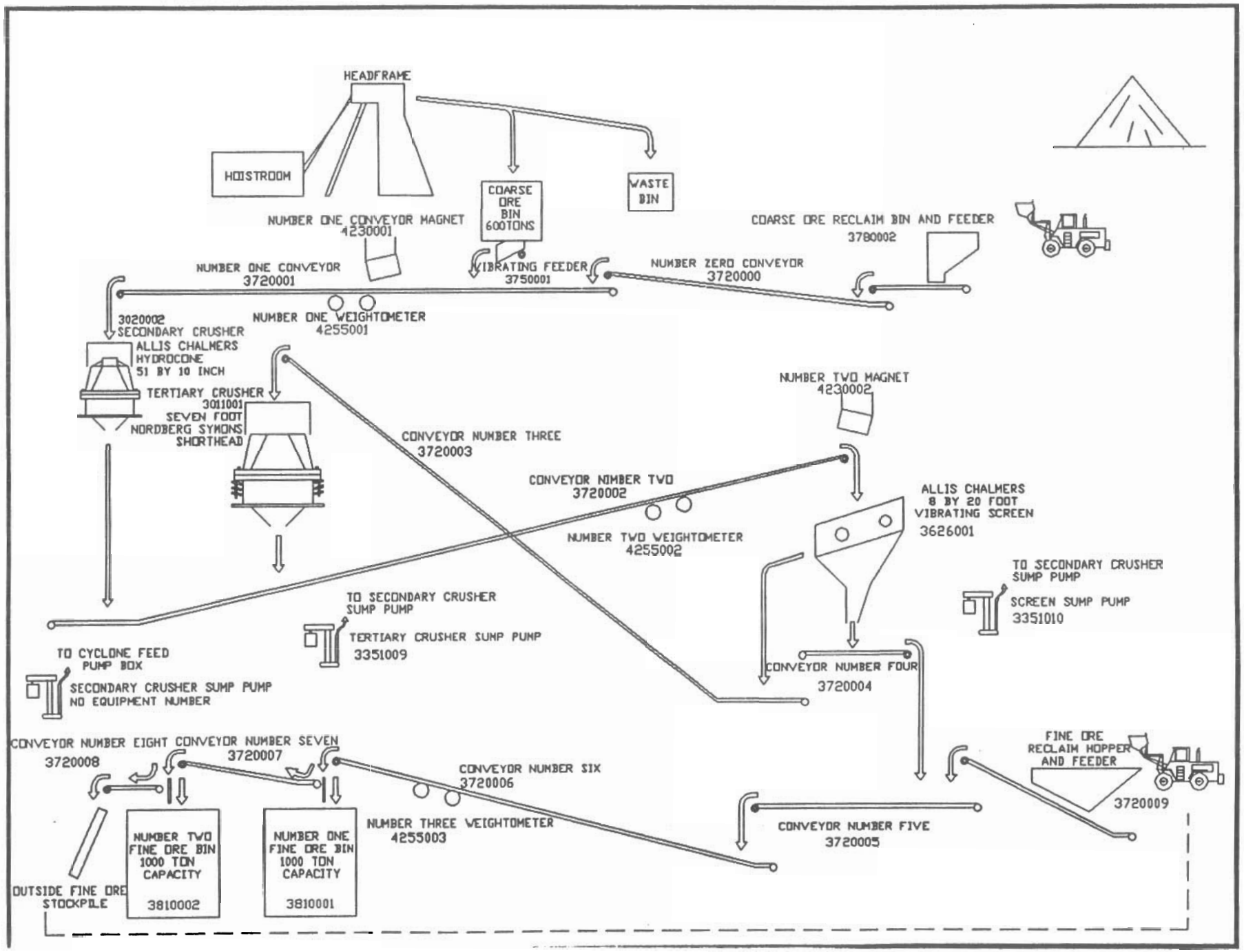
The 440 ha tailings disposal area is adequate for the needs of Lupin in the foreseeable future. As the mine takes more tailings for backfill, the demand for tailings space will be significantly reduced.

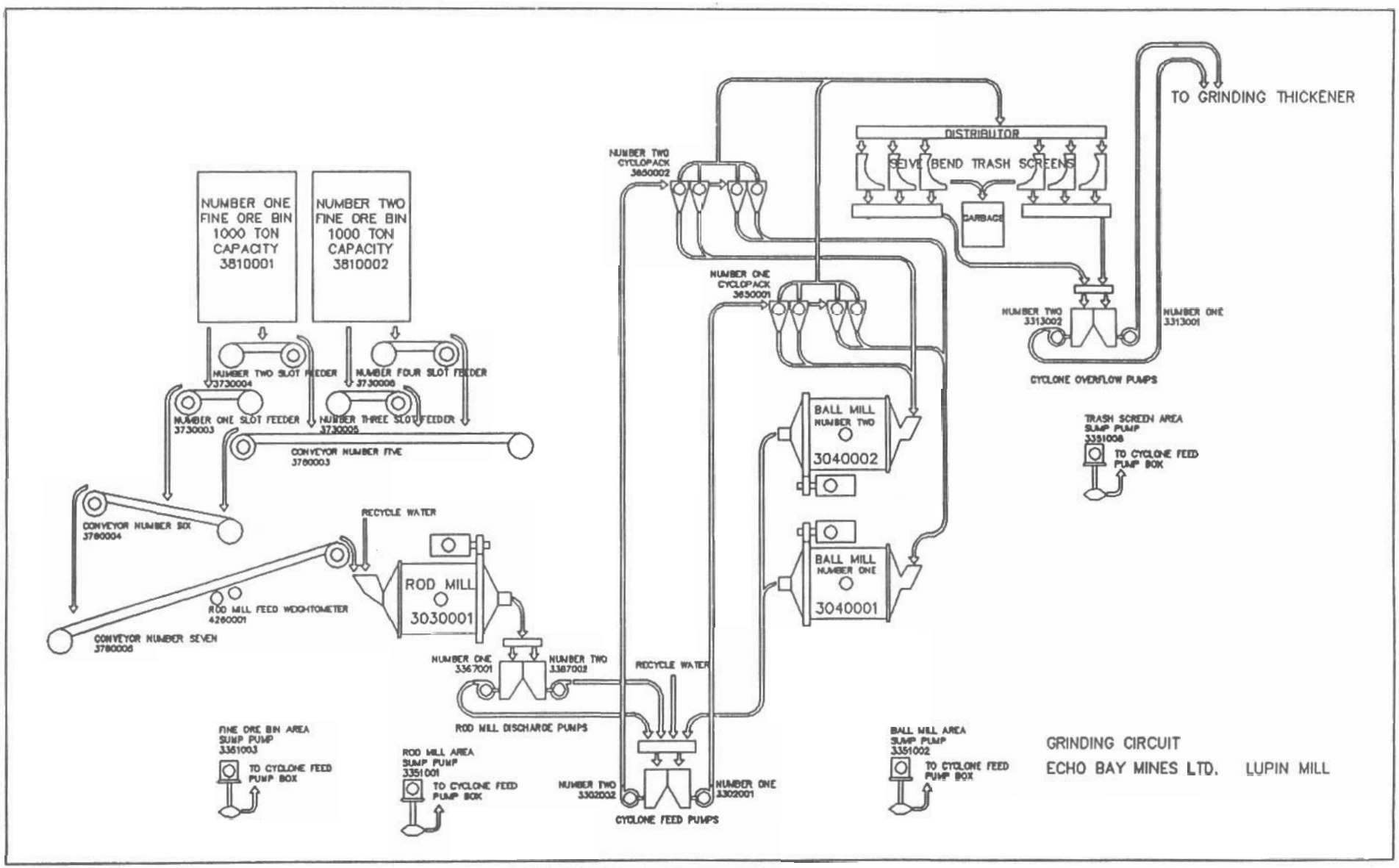
PASTE BACKFILL

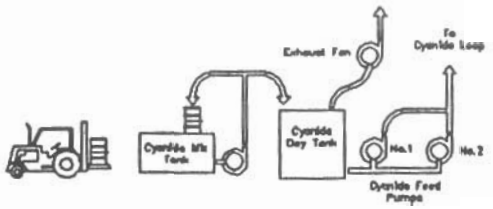
The filter cake, that is discharged from the filtration circuit, is conveyed to the paste backfill plant. It is mixed with cement, in the pan mixer, at a set point that is inputted by the operator. Each batch contains approximately 5 tons of cement and filter cake. The mixture is then diluted with water to obta

the desired slump. This is determined by measuring the power draw of the mixer, which is directly proportional to the slump. Once the power draw set point has been reached, the mixer discharge gate will open, allowing the paste to dump into the pump hopper. The paste is then pumped underground continuously by a Schwing positive displacement pump, through a 6" line.
150mm

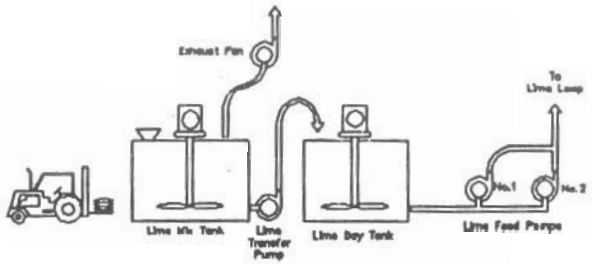
The process is fully automated by a process control computer system. The only part of the plant that requires manual labour is the dumping of 2 ton cement bags into a tanker, where it is then pneumatically transported to the cement silo. The storage for this cement is contained in an unheated building with an area of approximately 32,000 square feet. All of the cement, which amounts to approximately 8,000 tons, or 4,000 bags, is trucked to Lupin within a six week period on the winter road.


HEADFRAME
HOISTROOM
COARSE ORE BIN 600TONS
WASTE BIN
NUMBER ONE CONVEYOR MAGNET 4230001
COARSE ORE RECLAIM BIN AND FEEDER 3780002
NUMBER ONE CONVEYOR 3720001
VIBRATING FEEDER 3750001
NUMBER ZERO CONVEYOR 3720000
3020002 SECONDARY CRUSHER ALLIS CHALMERS HYDROCONE 51 BY 10 INCH
NUMBER ONE WEIGHTOMETER 4255001
TERTIARY CRUSHER 3011001 SEVEN FOOT NORDBERG SYMONS SHORTHEAD
NUMBER TWO MAGNET 4230002
CONVEYOR NUMBER THREE 3720003
CONVEYOR NUMBER TWO 3720002
ALLIS CHALMERS 8 BY 20 FOOT VIBRATING SCREEN 3626001
NUMBER TWO WEIGHTOMETER 4255002
TO SECONDARY CRUSHER SUMP PUMP
SCREEN SUMP PUMP 3351010
TO SECONDARY CRUSHER SUMP PUMP
TERTIARY CRUSHER SUMP PUMP 3351009
TO CYCLONE FEED PUMP BOX
SECONDARY CRUSHER SUMP PUMP NO EQUIPMENT NUMBER
CONVEYOR NUMBER FOUR 3720004
CONVEYOR NUMBER EIGHT 3720008
CONVEYOR NUMBER SEVEN 3720007
CONVEYOR NUMBER SIX 3720006
FINE ORE RECLAIM HOPPER AND FEEDER 3720009
NUMBER THREE WEIGHTOMETER 4255003
CONVEYOR NUMBER FIVE 3720005
NUMBER TWO FINE ORE BIN 1000 TON CAPACITY 3810002
NUMBER ONE FINE ORE BIN 1000 TON CAPACITY 3810001
OUTSIDE FINE ORE STOCKPILE

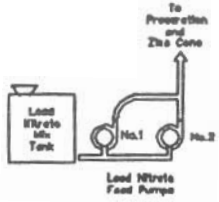

NUMBER ONE FINE ORE BIN 1000 TON CAPACITY 3810001
NUMBER TWO FINE ORE BIN 1000 TON CAPACITY 3810002
NUMBER TWO SLOT FEEDER 3730004
NUMBER FOUR SLOT FEEDER 3730006
NUMBER ONE SLOT FEEDER 3730003
NUMBER THREE SLOT FEEDER 3730005
CONVEYOR NUMBER FIVE 3780003
CONVEYOR NUMBER SIX 3780004
RECYCLE WATER
ROD MILL 3030001
ROD MILL FEED WEIGHTOMETER 4260001
CONVEYOR NUMBER SEVEN 3780006
NUMBER ONE 3367001
NUMBER TWO 3367002
ROD MILL DISCHARGE PUMPS
FINE ORE BIN AREA SUMP PUMP 3351003
TO CYCLONE FEED PUMP BOX
ROD MILL AREA SUMP PUMP 3351001
TO CYCLONE FEED PUMP BOX
NUMBER TWO 3302002
NUMBER ONE 3302001
CYCLONE FEED PUMPS
NUMBER TWO CYCLOPACK 3650002
NUMBER ONE CYCLOPACK 3650001
RECYCLE WATER
BALL MILL NUMBER TWO 3040002
BALL MILL NUMBER ONE 3040001
DISTRIBUTOR
SEIVE BEND TRASH SCREENS
GARBAGE
TO GRINDING THICKENER
NUMBER TWO 3313002
NUMBER ONE 3313001
CYCLONE OVERFLOW PUMPS
TRASH SCREEN AREA SUMP PUMP 3351008
TO CYCLONE FEED PUMP BOX
BALL MILL AREA SUMP PUMP 3351002
TO CYCLONE FEED PUMP BOX
GRINDING CIRCUIT
ECHO BAY MINES LTD. LUPIN MILL



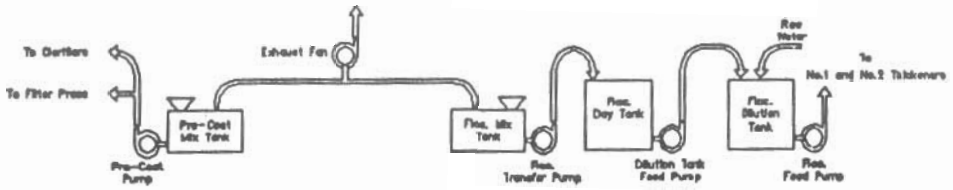
CYANIDE



LIME



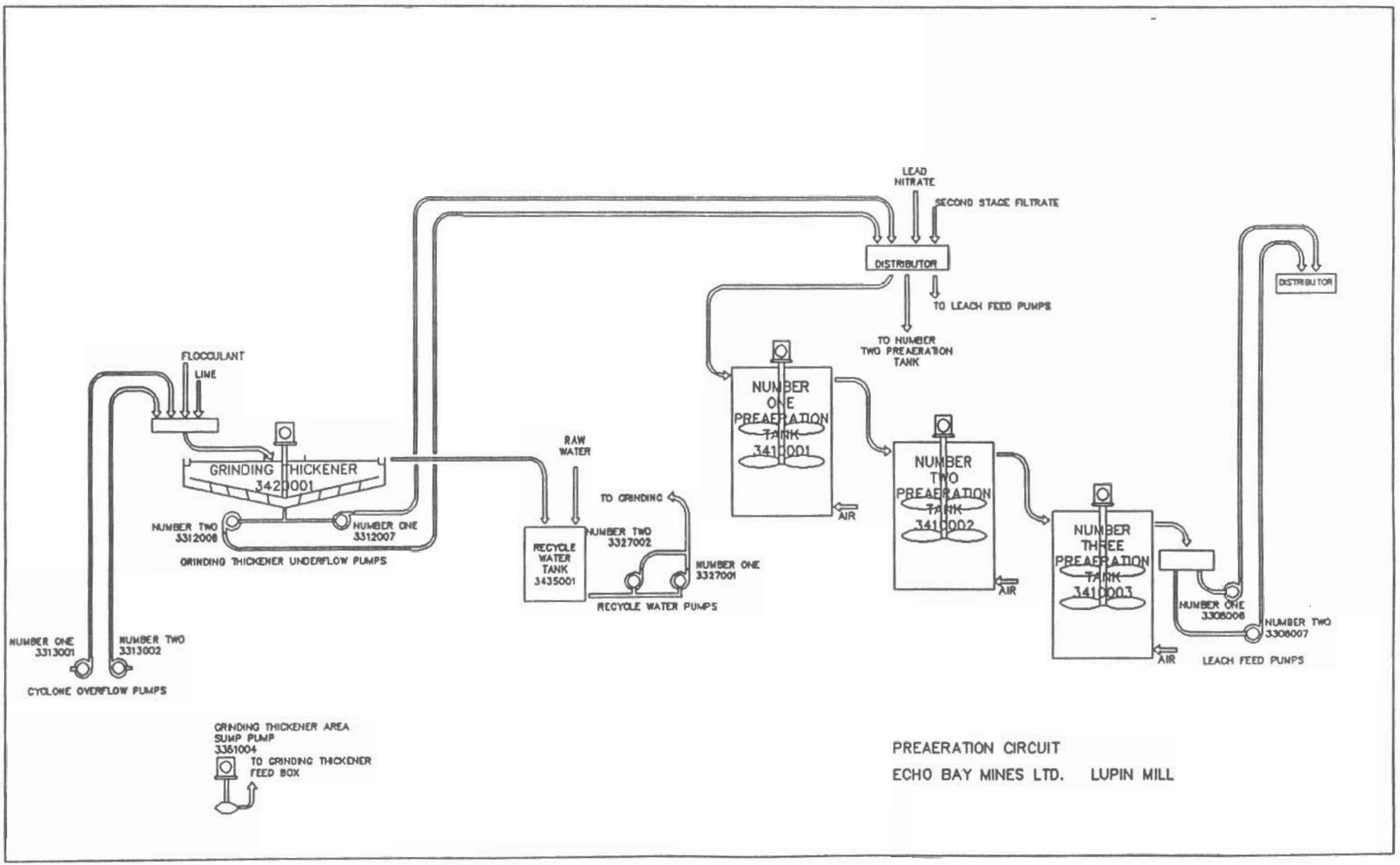
LEAD NITRATE

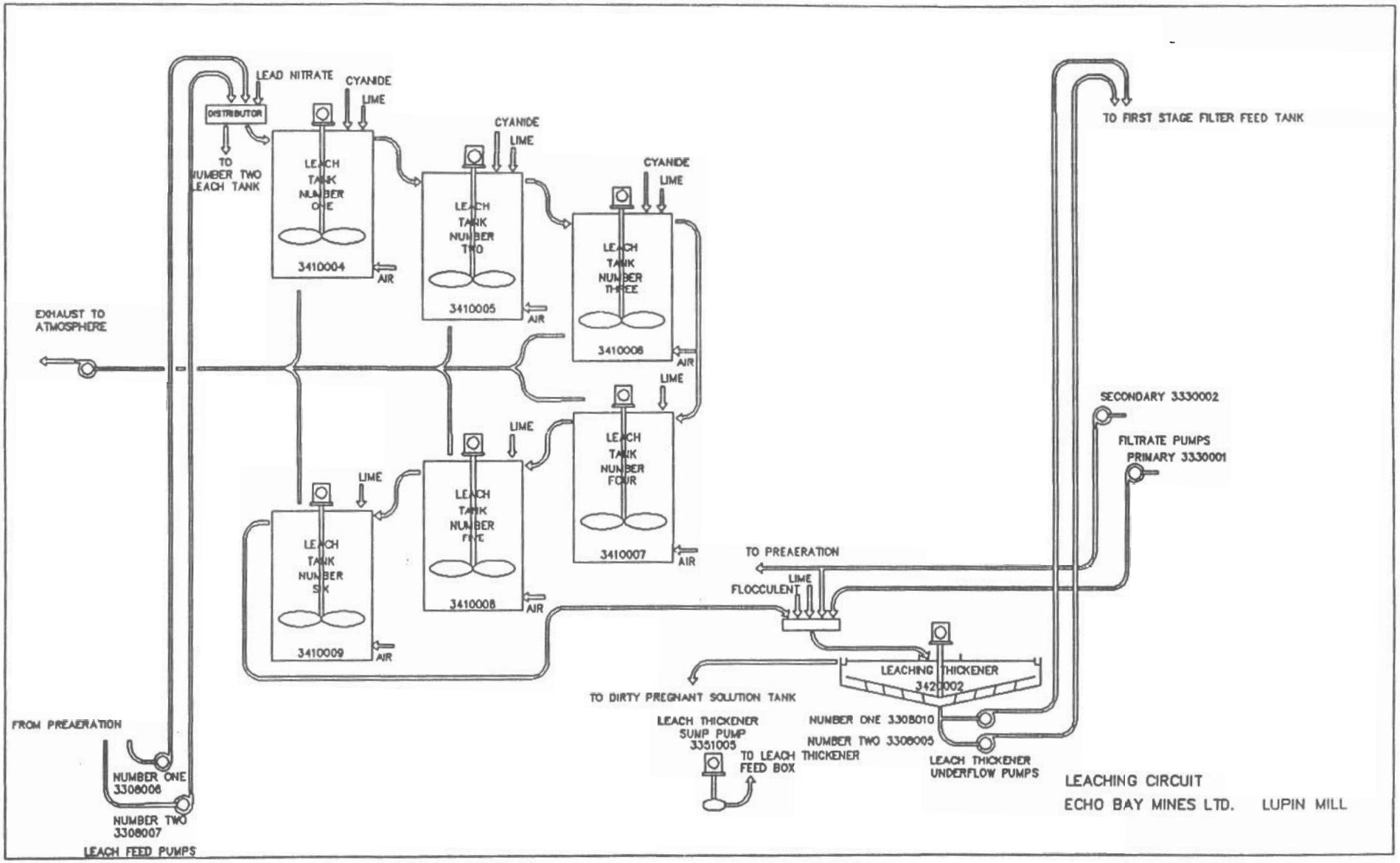


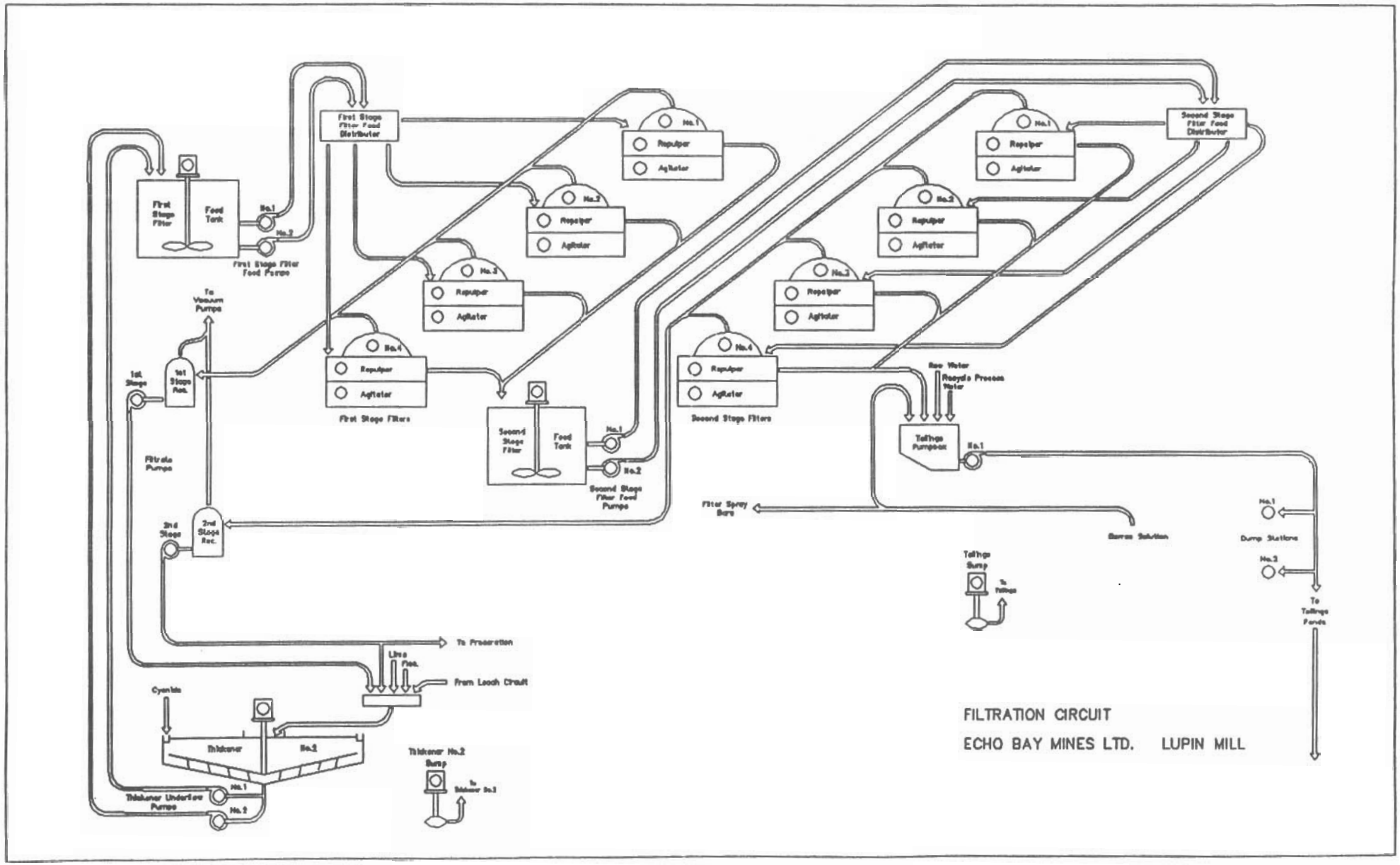
PRE-COAT FLOCCULANT

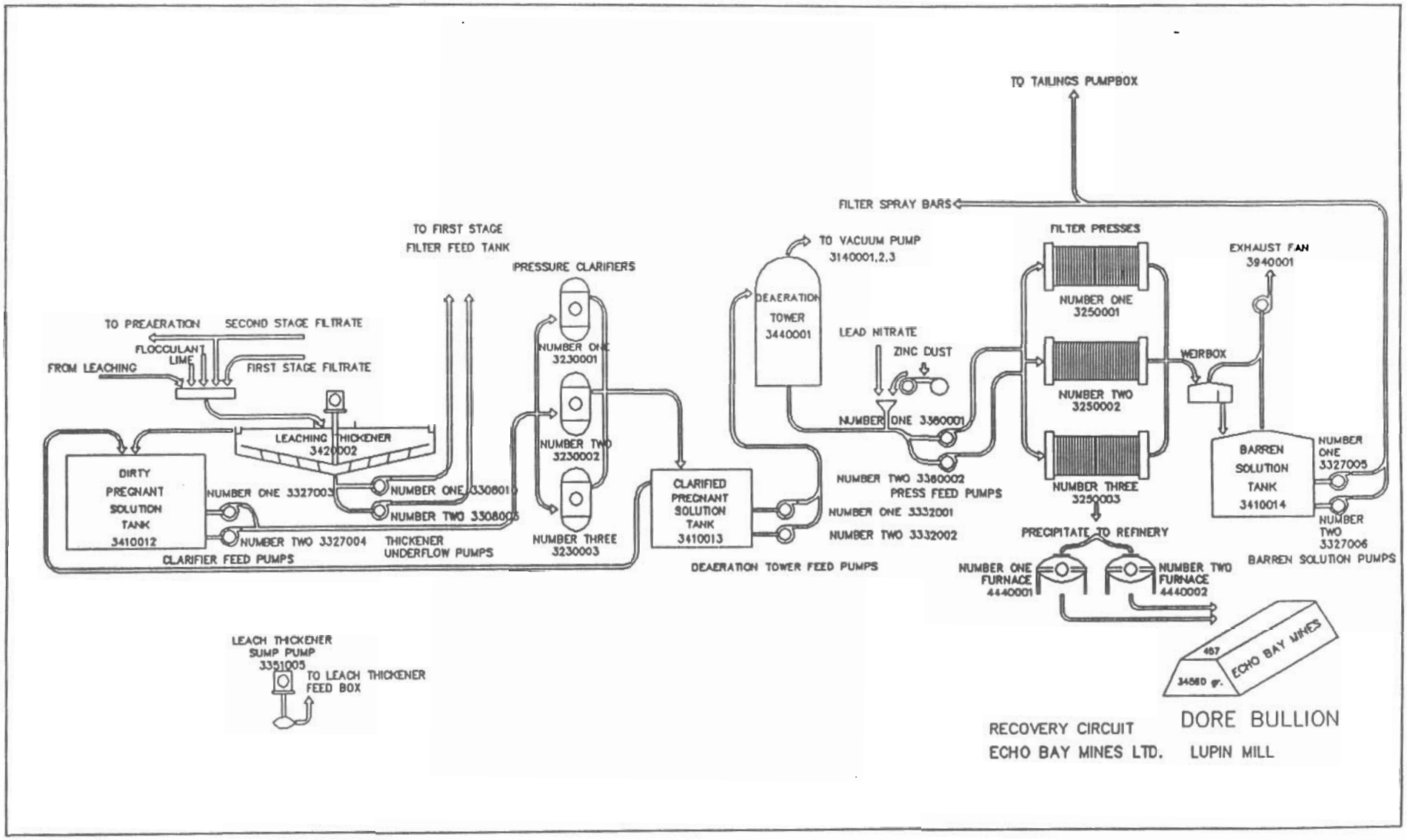
REAGENTS

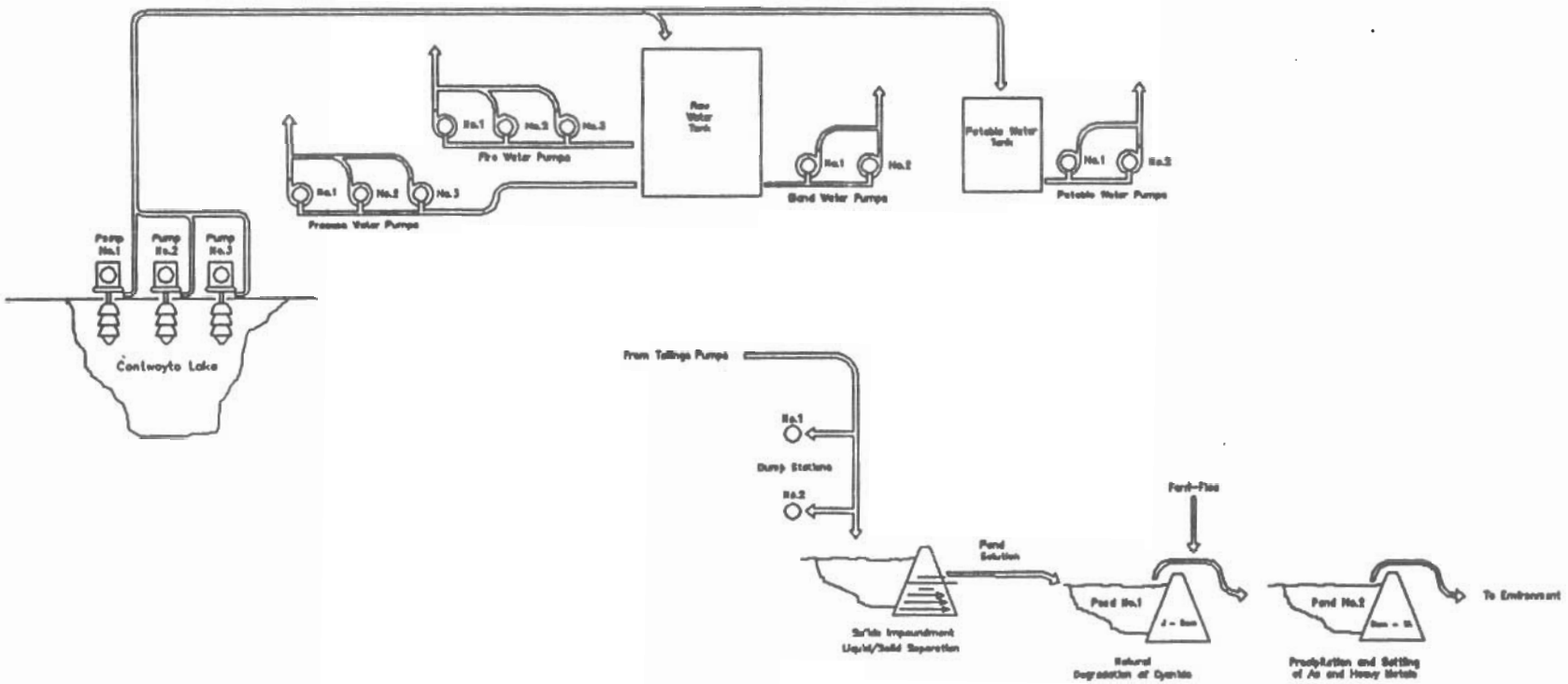
ECHO BAY MINES LTD. LUPIN MILL


LEAD NITRATE
SECOND STAGE FILTRATE
DISTRIBUTOR
TO LEACH FEED PUMPS
TO NUMBER TWO PREAERATION TANK
DISTRIBUTOR
FLOCCULANT
LIME
GRINDING THICKENER 3420001
NUMBER TWO 3312008
NUMBER ONE 3312007
GRINDING THICKENER UNDERFLOW PUMPS
RAW WATER
TO GRINDING
RECYCLE WATER TANK 3435001
NUMBER TWO 3327002
NUMBER ONE 3327001
RECYCLE WATER PUMPS
NUMBER ONE PREAERATION TANK 3410001
AIR
NUMBER TWO PREAERATION TANK 3410002
AIR
NUMBER THREE PREAERATION TANK 3410003
AIR
NUMBER ONE 3308006
NUMBER TWO 3308007
LEACH FEED PUMPS
NUMBER ONE 3313001
NUMBER TWO 3313002
CYCLONE OVERFLOW PUMPS
GRINDING THICKENER AREA SUMP PUMP 3361004
TO GRINDING THICKENER FEED BOX
PREAERATION CIRCUIT
ECHO BAY MINES LTD. LUPIN MILL


LEAD NITRATE
CYANIDE
LIME
DISTRIBUTOR
TO NUMBER TWO LEACH TANK
LEACH TANK NUMBER ONE
3410004
AIR
CYANIDE
LIME
LEACH TANK NUMBER TWO
3410005
AIR
CYANIDE
LIME
LEACH TANK NUMBER THREE
3410006
AIR
EXHAUST TO ATMOSPHERE
LIME
LEACH TANK NUMBER FOUR
3410007
AIR
LIME
LEACH TANK NUMBER FIVE
3410008
AIR
LIME
LEACH TANK NUMBER SIX
3410009
AIR
TO FIRST STAGE FILTER FEED TANK
SECONDARY 3330002
FILTRATE PUMPS PRIMARY 3330001
TO PREAERATION
LIME
FLOCCULENT
LEACHING THICKENER 3420002
TO DIRTY PREGNANT SOLUTION TANK
LEACH THICKENER SUMP PUMP 3351005
TO LEACH FEED BOX
NUMBER ONE 3308010
NUMBER TWO 3308005
THICKENER
LEACH THICKENER UNDERFLOW PUMPS
FROM PREAERATION
NUMBER ONE 3308006
NUMBER TWO 3308007
LEACH FEED PUMPS
LEACHING CIRCUIT
ECHO BAY MINES LTD. LUPIN MILL

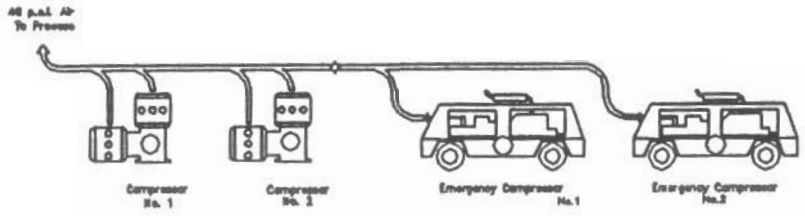

First Stage Filter Feed Distributor
First Stage Filter
Feed Tank
No.1
No.2
First Stage Filter Feed Pumps
No.1 Repulper
Agitator
No.2 Repulper
Agitator
No.3 Repulper
Agitator
No.4 Repulper
Agitator
First Stage Filters
To Vacuum Pumps
1st Stage
1st Stage Rec.
Filtrate Pumps
2nd Stage
2nd Stage Rec.
Second Stage Filter Feed Distributor
No.1 Repulper
Agitator
No.2 Repulper
Agitator
No.3 Repulper
Agitator
No.4 Repulper
Agitator
Second Stage Filters
Second Stage Filter
Feed Tank
No.1
No.2
Second Stage Filter Feed Pumps
Raw Water
Recycle Process Water
Tailings Pumpbox
No.1
Filter Spray Bars
Barren Solution
No.1
Dump Stations
No.2
To Tailings Ponds
Tailings Sump
To Tailings
To Precipitation
Lime Slurry
From Leach Circuit
Cyanide
Thickener No.2
Thickener Underflow Pumps
No.1
No.2
Thickener No.2 Sump
To Thickener No.1
FILTRATION CIRCUIT
ECHO BAY MINES LTD. LUPIN MILL


TO TAILINGS PUMPBOX
FILTER SPRAY BARS
TO FIRST STAGE
FILTER FEED TANK
PRESSURE CLARIFIERS
TO VACUUM PUMP
3140001,2,3
FILTER PRESSES
EXHAUST FAN
3940001
DEAERATION
TOWER
3440001
NUMBER ONE
3250001
NUMBER TWO
3250002
NUMBER THREE
3250003
WEIRBOX
TO PREAERATION
SECOND STAGE FILTRATE
FLOCCULANT
LIME
FROM LEACHING
FIRST STAGE FILTRATE
NUMBER ONE
3230001
NUMBER TWO
3230002
NUMBER THREE
3230003
LEAD NITRATE
ZINC DUST
NUMBER ONE 3360001
NUMBER TWO 3360002
PRESS FEED PUMPS
LEACHING THICKENER
3420002
DIRTY
PREGNANT
SOLUTION
TANK
3410012
NUMBER ONE 3327003
NUMBER TWO 3327004
CLARIFIER FEED PUMPS
NUMBER ONE 3308001
NUMBER TWO 3308002
THICKENER
UNDERFLOW PUMPS
CLARIFIED
PREGNANT
SOLUTION
TANK
3410013
DEAERATION TOWER FEED PUMPS
NUMBER ONE 3332001
NUMBER TWO 3332002
BARREN
SOLUTION
TANK
3410014
NUMBER
ONE
3327005
NUMBER
TWO
3327006
BARREN SOLUTION PUMPS
PRECIPITATE TO REFINERY
NUMBER ONE
FURNACE
4440001
NUMBER TWO
FURNACE
4440002
LEACH THICKENER
SUMP PUMP
3351005
TO LEACH THICKENER
FEED BOX
457
34580 gr.
ECHO BAY MINES
DORE BULLION
RECOVERY CIRCUIT
ECHO BAY MINES LTD. LUPIN MILL

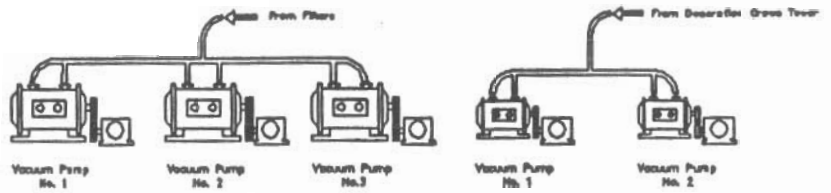


FRESH WATER and TAILINGS SCHEMATICS

ECHO BAY MINES LTD. LUPIN MILL



PLANT AIR

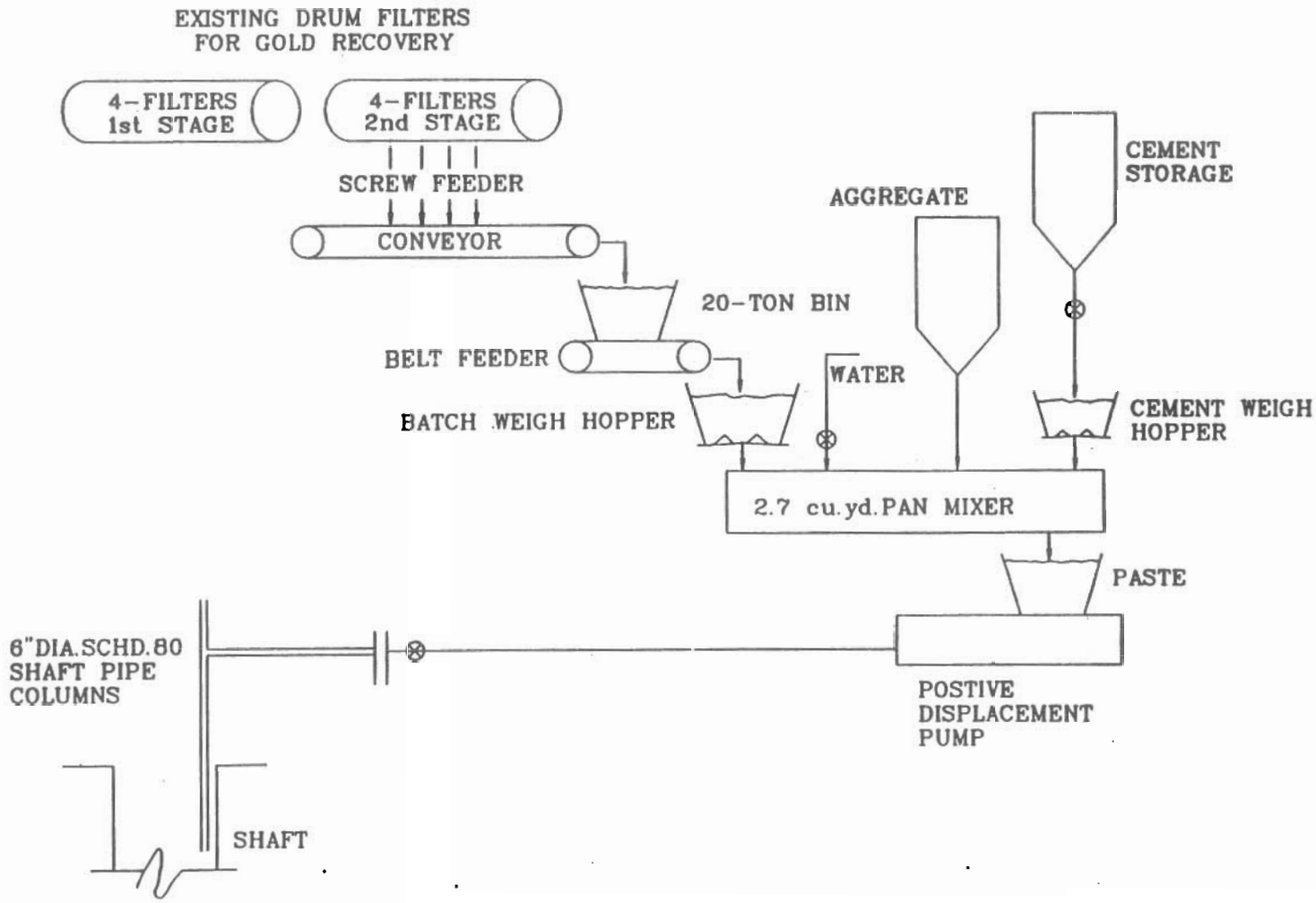


VACUUM PUMPS

POWER

PLANT EQUIPMENT
ECHO BAY MINES LTD. LUPIN MILL

LUPIN MINE
PASTE BACKFILL FLOWSHEET
(WITH EXISTING FILTERS)



MAY 4,1994

FLOWFIG3.DWG

RECLAMATION

On completion of mining at Lupin and in absence of any other industrial use for the facility (e.g. custom milling) all buildings, equipment and other structures will be dismantled and removed (if salvageable). Non-salvageable material will be disposed into the mined out workings or will be buried on surface.

Concrete foundations and pads will be left in place and may be left uncovered. All raises, shafts, portals or other entrances to the underground mine will be sealed with concrete plugs. Culverts in the roads will be removed and natural water courses left open. The docks, breakwater, and causeway will also be left in place.

The largest cost portion of site reclamation will be to cover the entire tailings area with esker material. The current provision is for an average 0.6m of cover material. As tailings areas become filled and are no longer required for any future deposition, they will be reclaimed. This will provide some earlier experience with reclamation and reduce the volume of work required at the end of the mine life.

Waste rock is expected to be used as roadbed, in dams, airstrip stabilization or as underground backfill. Any remaining waste rock stockpile will be recontoured. Fuel, oil and chemical storage will be dismantled and disposed or salvaged. Residual oil and contaminated soil from the storage area will be disposed as required. Liner material will be removed and the bermed areas recontoured. Existing garbage dumps will be covered with esker or waste rock, then contoured.

The upper sewage lake will require a decant trench to maintain a constant water level. The lower sewage lake will also have a decant trench or the existing dam may be breached.

The reclaimed site will be contoured to conform to the natural terrain and to minimize ponding of run-offwater.