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**CURRAGH RESOURCES**

**INTRODUCTION TO**

**CURRAGH RESOURCES**

**THE FARO ORE BODY, MINING AND MILLING OPERATIONS**

## TABLE OF CONTENTS

- 1.0 Introduction to Curragh Resources
- 2.0 Faro Mine Geology and Geography
- 3.0 Early History of the Anvil District
- 4.0 The Management Team
- 5.0 Faro Mine Progress Report
- 6.0 Faro Mining Operations
- 7.0 Faro Milling Operations
- 8.0 Transportation
- 9.0 Human Resources
- 10.0 Town of Faro

INTRODUCTION TO CURRAGH RESOURCES

## 1.0 Introduction to Curragh Resources

Curragh Resources was formed in the summer of 1985 under the leadership of Clifford H. Frame, as a new Canadian-based resource enterprise. Its first project was to acquire and re-open the lead zinc mine and mill complex at Faro, Yukon.

This acquisition was consummated on Nov. 22, 1985, and mine re-opening activities commenced immediately.

Curragh Resources is a partnership between Curragh Resources Corporation and an Alberta holding company representing American resource investment interests. Curragh Resources Corporation, in turn, is owned by the Swedish mining organization Boliden, A.B., plus investors associated with Clifford H. Frame, who is Chairman and Chief Executive Officer.

At full operation, Curragh Resources current operations in the Yukon will have annual sales volume of 550,000 tonnes of lead and zinc concentrate and about 475 employees. Curragh has total net current assets in excess of \$100 million, financed by shareholder and partner equity of some \$40 million, plus debenture and bank debt. The replacement value of the Curragh Assets, Yukon Operations, is in the order of \$500 million.

Currently, Curragh Resources has corporate offices in Faro, Whitehorse and Toronto.

The Faro office's major responsibilities encompass the operation of the mine and mill complex. The Whitehorse office is in charge of long range engineering, planning and regional geology. Furthermore, the office oversees all highway transport, loading, marine terminal operations and backhaul transportation. The Toronto office primarily looks after the marketing function as well as Curragh's financial and accounting concerns.

FARO MINE GEOLOGY AND GEOGRAPHY

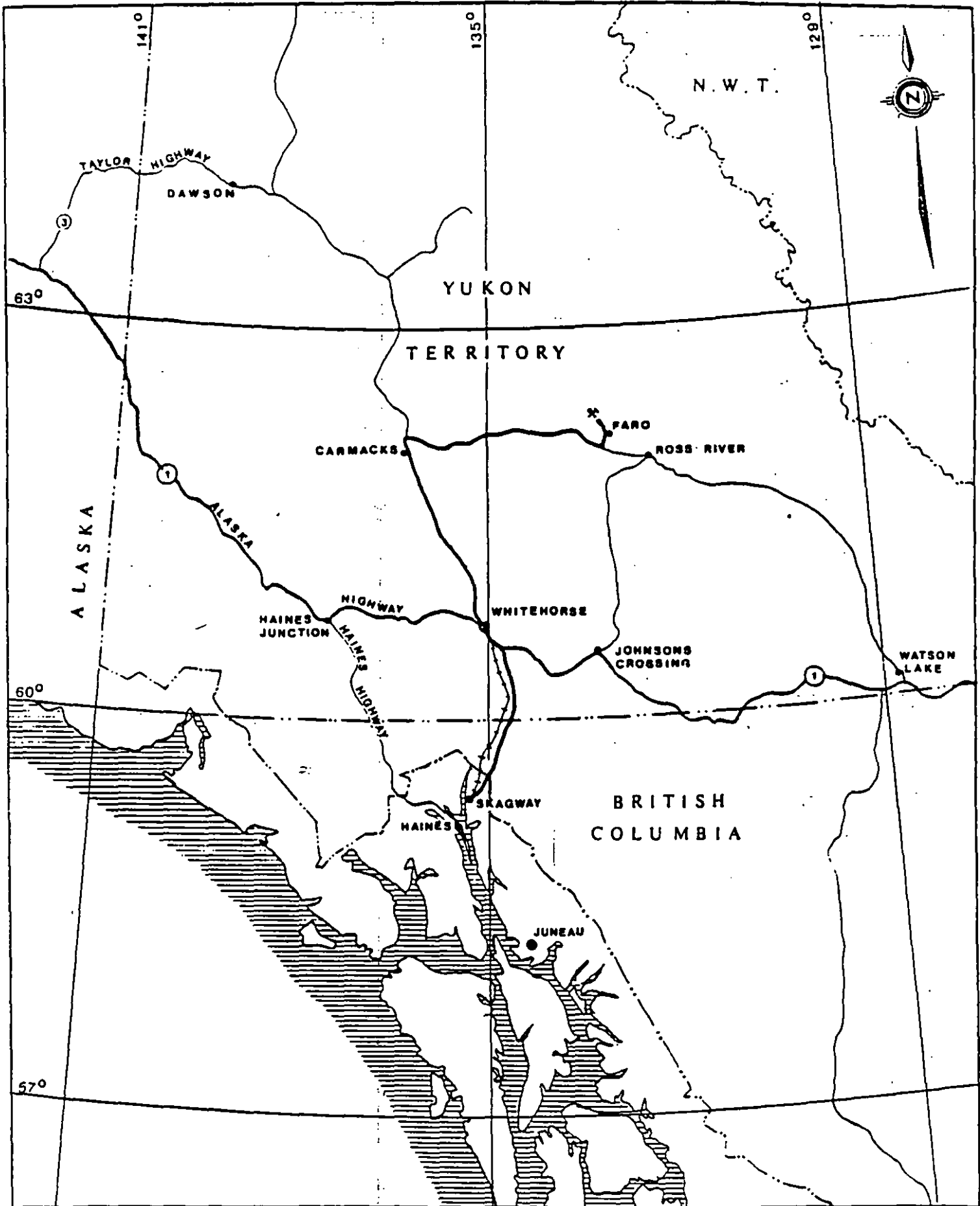
## 2.0 Geology and Geography

### Location, Access and Climate

The Faro orebody is located approximately 420 highway kilometers northeast of Whitehorse, Yukon. In geographical terms, the mine is located east of Rose Mountain and northwest of Mount Mye in the Anvil Range of mountains in the east central Yukon at latitude  $62^{\circ} 22'$  N, Longitude  $133^{\circ} 25'$  W, and is at an elevation of 1200 meters.

Access to the mine from Faro is by a 24 km unpaved, all weather road. Access to Faro from the Campbell Highway is via a double span (165 meter long bridge across the Pelly River). This road joins the Robert Campbell Highway (Highway 9), 174 km east of Carmacks. (See figure 2.1)

The climate in this area is usually semi arid. Temperatures at the minesite range from minus forty five degrees celcius at mid-winter minimum to plus thirty degrees celcius at summer maximum. Freezing conditions persist from mid-September until early May. Snowfall accounts for one-half of the mean annual precipitation of 38 cm. Maximum snowfall cover ranges up to 127 cm in late March.



TITLE: <b>LOCATION PLAN</b>		SECTION:	
CLIENT: <b>CURRAGH RESOURCES CORP. FARO, YUKON</b>		AREA NO:	REV. NO:
APPROVED:	DATE: <b>JULY 15, 1985</b>	DRAWING NO: <b>FIGURE I</b>	
			<b>A</b>

## General

Curragh Resources' open pit mine near Faro, Yukon is one of five principle lead-zinc-silver deposits located in the Anvil District, and it is the only deposit currently being mined in the district. The other deposits controlled by Curragh include VanGorda, Grum, Dy, and Swim, each containing significant lead-zinc-silver concentrations. These deposits offer good potential for economic mining upon exhaustion of the Faro Pit. (Fig. 2.2)

## Regional Geology

The Anvil District is underlain by a 7000 meter thick sequence of complexly folded metamorphic rocks ranging in age from late Precambrian to Triassic. The ore deposits are hosted within a 150 meter thick interval associated with quartzitic and graphitic horizons which are thought to be middle to upper Cambrian in age. Ore mineralization straddles the boundary between the older Mount Mye formation and the VanGorda formation on the southwestern edge of the Selwyn Basin adjacent to the Tintina Fault. (Fig. 2.3)

The Mount Mye formation consists of non-calcareous phyllites, graphitic phyllites and intermediate volcanics and their higher grade metamorphic equivalents.

The VanGorda formation consists of calcareous phyllite, graphitic phyllite, greenstone and volcanic tuffaceous rocks. Higher grade metamorphic equivalents include calcsilicate and amphibolite.

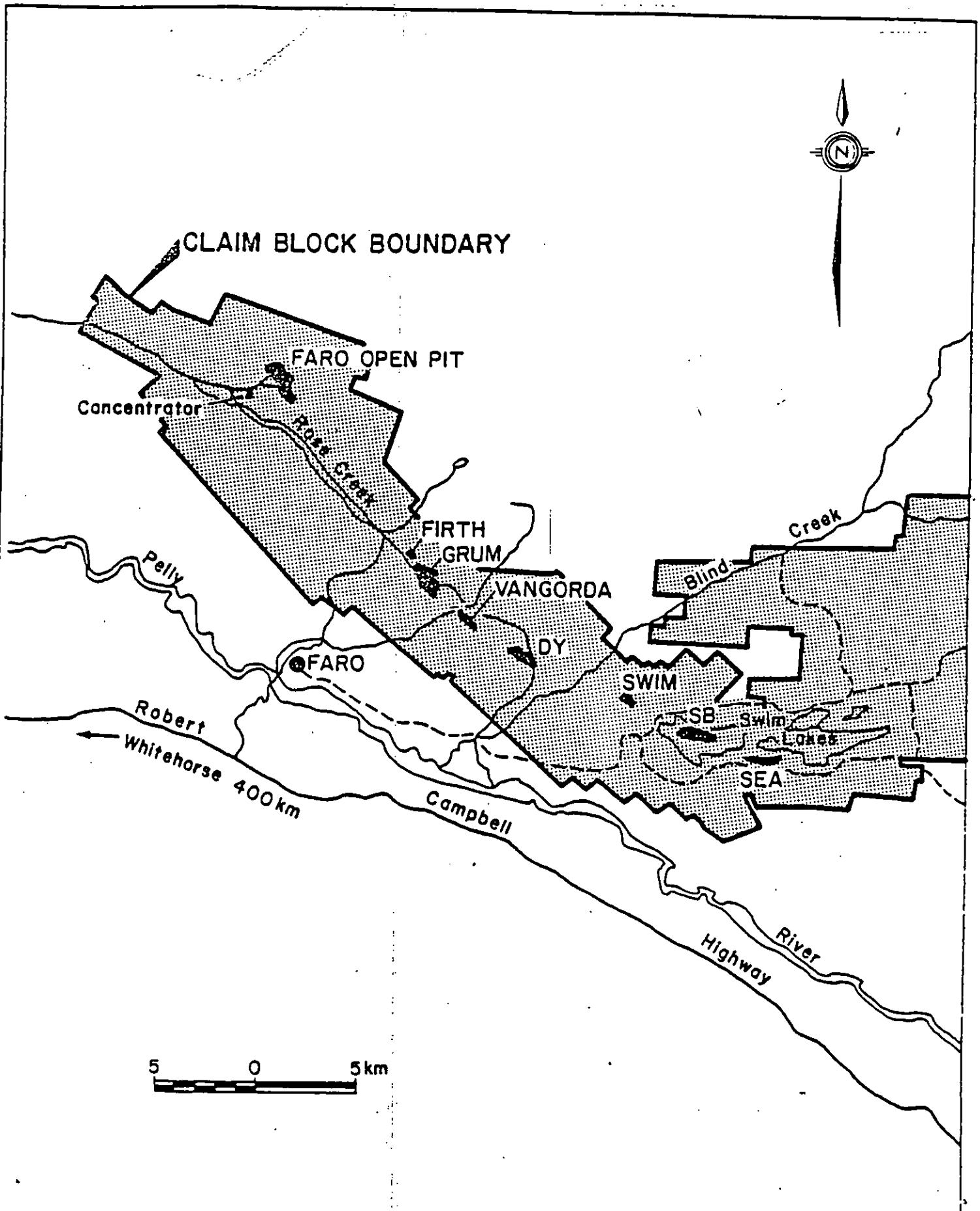
The Anvil deposits have undergone two major periods of regional metamorphism followed by three minor deformational events. Two major northwest trending faults cut across the trend of the mineralized deposits. As a result of extensive regional metamorphism, sulphide and host rocks in all deposits are strongly recrystallized.

### Deposit Geology

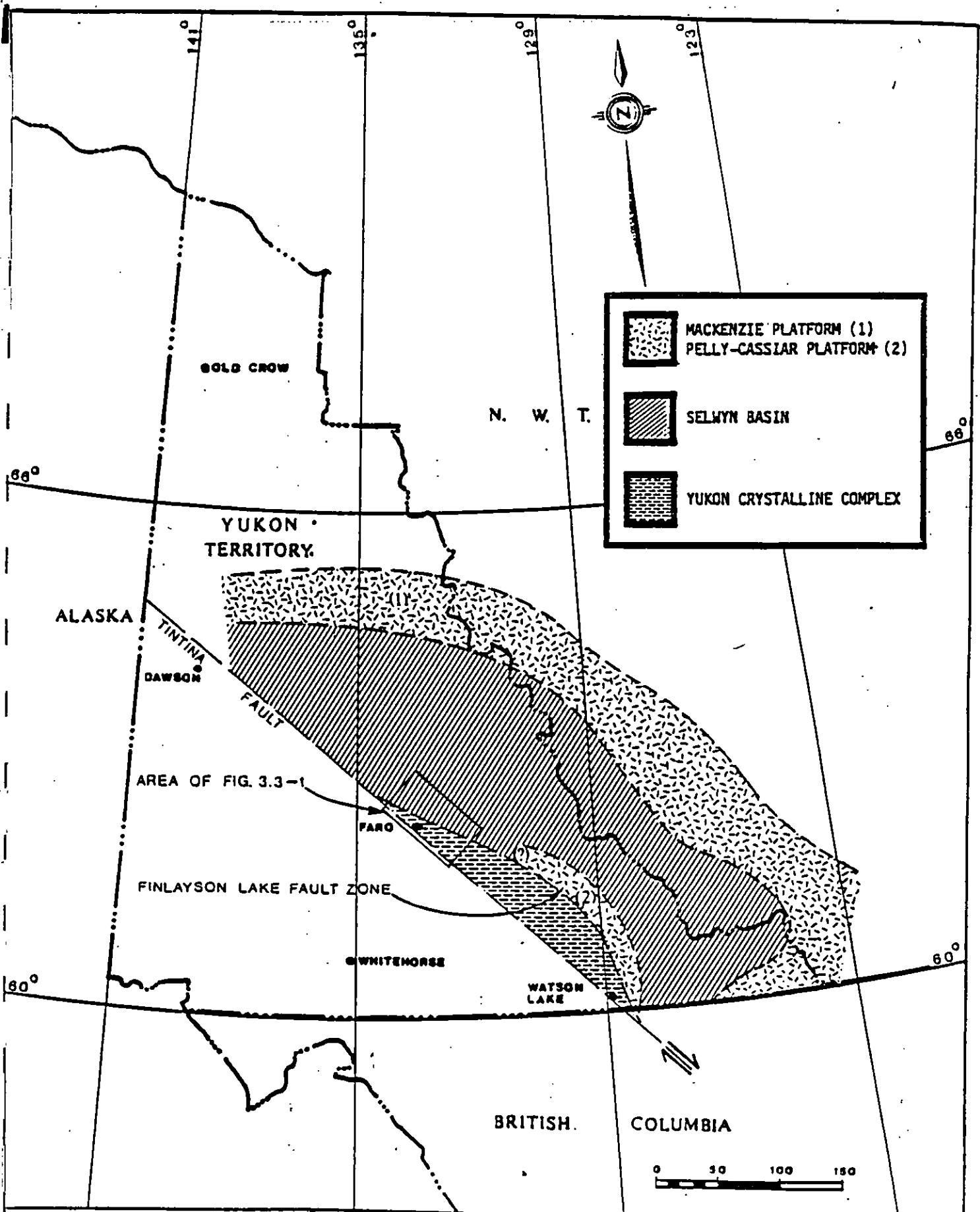
The lead, zinc, and silver deposits of the Anvil District are sediment hosted, stratiform, massive pyritic sulphide deposits. Stratiform meaning the deposit is situated conformably between and within its host sedimentary layers. The sulphides occur as a single thick major lens (e.g. Faro) or as multilayered deposits with several thinner sulphide lenses stacked approximately one above the other. (e.g. Grum and Dy)

The Faro deposit (of which half has been previously mined) is approximately 1500 meters in length, 400 meters in width containing ore lenses which are approximately 35 meters thick. An individual mineralized layer consists of an upper, often centrally positioned base metal bearing sulphide zone and a lower and peripheral disseminated quartzose sulphide zone. The upper and lower contacts of sulphide horizons are invariably sharp while lateral extensions grade into the enclosing host rocks. All deposits have a variably developed white mica alteration overprint in the adjacent wallrocks. (fig. 2.4)

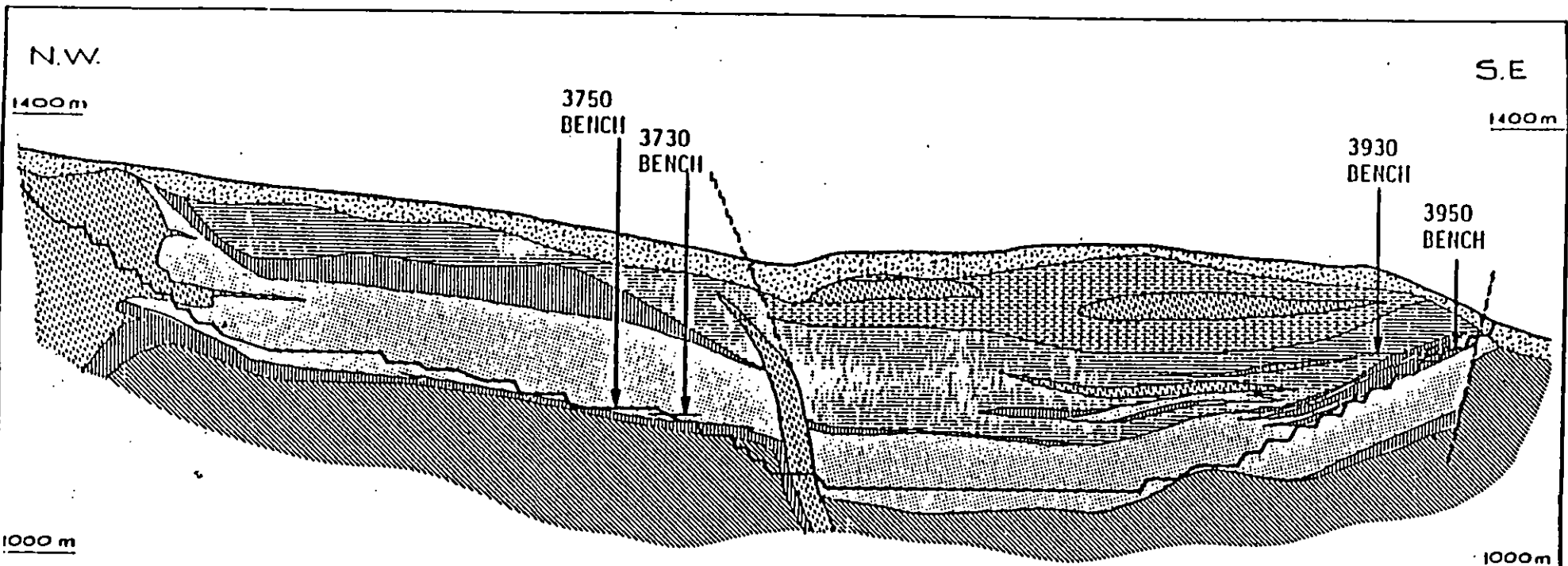
Curragh Resources is currently mining the remaining ore reserves at the Faro Pit. Reserves at Faro are 23.7 million tonnes averaging 7.3 percent combined lead-zinc and 36.3 grams per tonne silver. The silver occurs as minor inclusions within the crystal structure of Galena (PbS).



TITLE: <b>CLAIM BLOCKS</b>		SECTION:	
CLIENT: CURRAGH RESOURCES CORP. FARO, YUKON		AREA NO:	REV. NO:
APPROVED:	DATE: JULY 15 2005	DRAWING NO: <b>FIGURE 2.2</b>	
			<b>A</b>



TITLE: <b>REGIONAL GEOLOGY</b>		SECTION:	
CLIENT: <b>CURRAGH RESOURCES CORP</b>		AREA NO:	REV. NO:
APPROVED:	DATE: 15-7-1985	DRAWING NO: <b>FIG. 2,3</b>	<b>A</b>



**LEGEND**

OVERBURDEN

INTRUSIVE ROCKS

**VANGORDA FORMATION**

CALCAREOUS PHYLLITE / CALC-SILICATES

GRAPHITIC PHYLLITE / SCHIST

SULPHIDE HORIZON(S)

ALTERATION OVERPRINT

**MT. MYE FORMATION**

NON-CALCAREOUS PHYLLITE / SCHIST



SCALE IN FEET

TECHNICAL AND COST REVIEW		SCALE	DATE	CLIENT	FARO DEPOSIT LONGITUDINAL SECTION
DESIGNED		DESIGNED		CURRAGH RESOURCES CORPORATION	
DRAWN		DRAWN	JUL 85	LOCATION	FARO, YUKON
CHECKED		CHECKED			
DATE		DATE	APPROVED		
5-7-85			<i>[Signature]</i>		
REV A					
3505-15		FIG. 3.4		REV A	

EARLY HISTORY OF THE ANVIL DISTRICT

### 3.0 Early History of the Anvil District

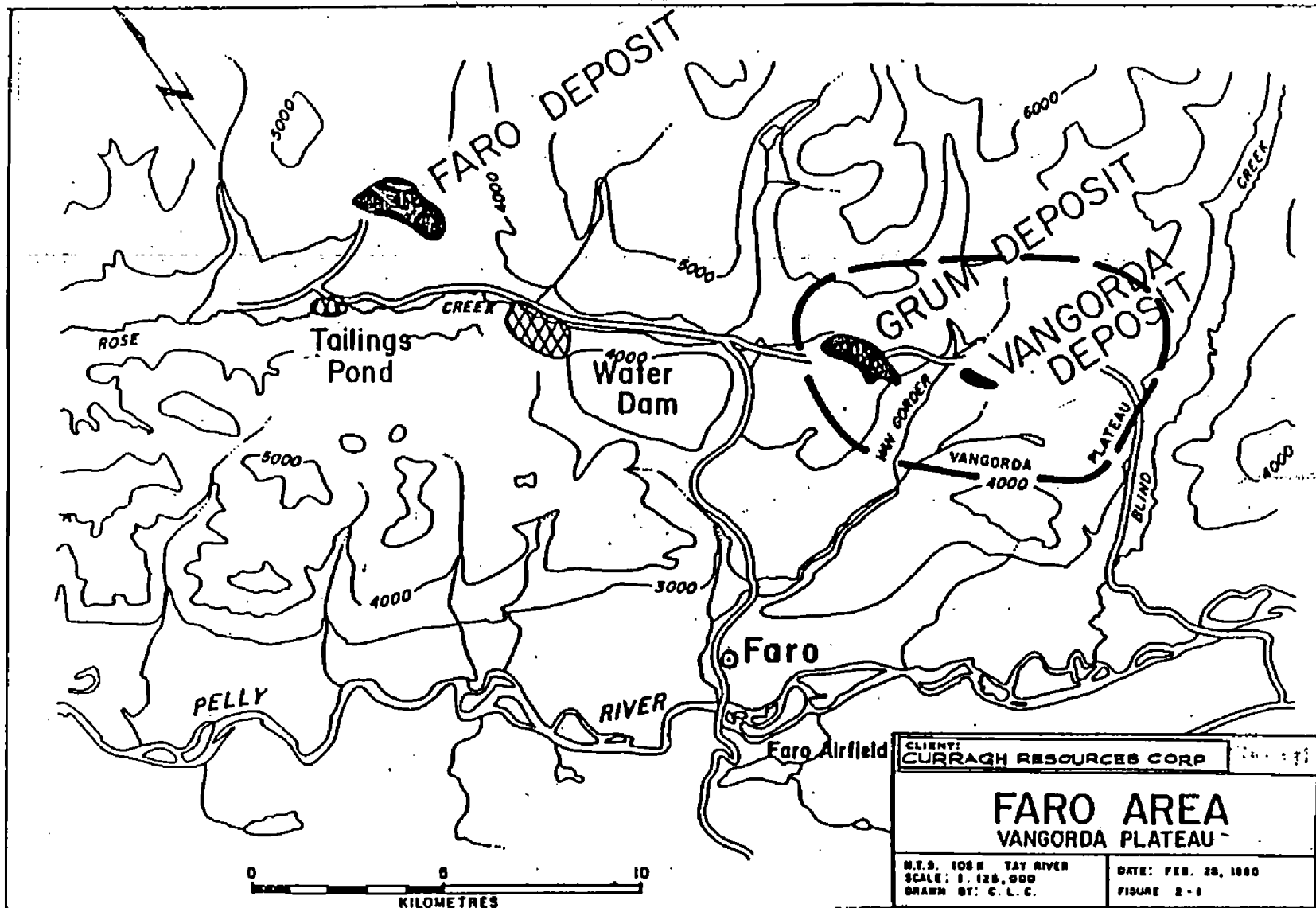
Curragh Resources' principal properties cover approximately 31 square kilometers in the heart of the known mineralized section of the Anvil District and include the Grum, VanGorda and Dy deposits, both of which contain significant amounts of ore. There is an estimated 100 million tonnes of ore in the Curragh properties at Faro and VanGorda.

Occurrences of lead and zinc sulphides in the VanGorda Creek about 15 kilometers southeast of the Faro deposit were first staked by A. Kulan and Associates in 1953. The property was optioned to Prospectors Airways and diamond drilling from 1953 - 1955 proved approximately 8.5 million tonnes of 9 percent combined lead-zinc which was later designated as the VanGorda deposit. Kerr Addison Mines of Toronto eventually acquired Prospectors Airways, but depressed base metal prices, declining metal markets and the extreme remoteness of the area caused interest in the prospect to subside. Kerr Addison resumed exploration of the area in 1962 and by 1964 had drilled one anomaly resulting in the discovery of the Swim Deposit (approximately 4.5 million tonnes of 10 percent combined lead-zinc, about 8 kilometers southeast of VanGorda).

In 1964 Dynasty Explorations commenced a detailed exploration program on several claim groups in the Swim-VanGorda-Rose Creek area. Encouraging geochemical results and reported occurrences of "float" in the Faro Creek bed lead to the staking of the Faro group of claims. In 1965 a drilling program intersected massive sulphides in a rotary hole on these claims now known as Faro No. 2 deposit. Subsequent diamond drilling through two winters and two summers proved an economic orebody with reserves estimated at 57 million tonnes averaging 3.4 percent lead, 5.7 percent zinc and 1.2 oz./tonne of silver.

By fall of 1969 the project had been brought into commercial production at a capital cost of \$63 million dollars for mine production equipment, concentrator and related plant service facilities and townsite. In addition, White Pass and Yukon Route spent an additional \$20 million on equipment related to hauling and handling the concentrate between Faro and Skagway. The Federal Government spent \$5 million on a new road link between Faro and Carmacks and Northern Canada Power Commission invested \$6 million to upgrade facilities at the Whitehorse Generating Station and construct a new power transmission line to the minesite and townsite.

Since that time, continuous investments have been made in the mine, the mill, and the Town. Today, the replacement capital cost of the Faro project, including transportation systems, has been calculated by Kilborn Engineering to be in the \$650 million range.



THE FARO MINE

PRODUCTION STATISTICS

YEAR	ORE AND WASTE MINED BCM* (000)	ORE MILLED DMT** (000)	CONCENTRATE PRODUCED DMT (000)
1970	4,850	1,779	242
1971	5,356	2,425	389
1972	3,951	2,636	402
1973	4,258	2,630	425
1974	4,936	2,654	388
1975	4,340	2,926	411
1976	2,823	1,520	183
1977	6,499	3,116	358
1978	8,015	3,280	414
1979	6,209	2,823	368
1980	7,144	2,825	326
1981	8,683	2,737	313

\*BCM - Bank Cubic Meters

\*\*DMT - Dry Metric Tonnes

The above table summarizes the principal production of lead and zinc concentrates since 1970. It should be noted that production was adversely effected in 1976 by the prolonged withdrawal of services by unionized employees.

THE MANAGEMENT TEAM

#### 4.0 The Management Team: Faro

##### Vice President and General Manager

Kurt Forgaard, B.Sc., Vice President and General Manager, age 43, is in charge of Mine and Mill Operations. He has 25 years of experience in senior open-pit mining and milling positions. He was with Cominco (17 years), McIntyre Mines, Fording Coal and Luscar. He received his Bachelor Degree in mineral processing at the Montana School of Mines.

##### Manager of Mining

James P. Moore, General Science. Jim as the Manager of Mining, is in charge of Mine Maintenance and Mine Operations. He started in the Mining Industry in 1959 with hard-rock mining to 1976. He worked in the Oil sands mining/overburden/tailings disposal until 1986. Jim is conversant with all types of mining equipment and has kept current with mining technology. He is safety, production and people-oriented.

##### Manager of Processing

Roy Bourke, B.Sc. Chemistry, M.Sc. Chemistry, age 46 years. Prior to his present position he was employed with Heath Steele Mines Ltd., as Concentrator Superintendent. His past work history has been primarily with Noranda Mines for a number of their operations. His positions with Noranda commenced with Junior Metallurgist and spanned several other positions up to Concentration Superintendent. He received his Bachelor Degree in Chemistry at Sir George Williams University in Montreal and his doctorate study in Chemistry and Master of Science in Chemistry at McGill University.

#### Director of Materials Control

Kenneth A. Johnson, C.I.M., P.P., age 37 years. Mr. Johnson was previously employed with Cardinal River Coal, Hinton, Alberta as Materials Manager. Earlier positions include Purchasing Agent, Potash Corporation of Saskatchewan, Lanigan Division; Senior Buyer, Buyer and Inventory Control, Hudson Bay Mining and Smelting, Flin Flon, Manitoba; Warehouseman/Shipper/Receiver, International Nickel INCO, Thompson, Manitoba. His C.I.M. was received from the University of Manitoba and his P.P. through the Purchasing Management Association of Canada.

#### Director of Human Resources

Larry Beitz, age 42 years, is the Director of Human Resources. Prior to his present position he was employed with Quintette Coal as the Superintendent of Personnel and Industrial Relations during their start-up phase. Furthermore, he has held numerous diversified positions with Eurocan Pulp and Paper at Kitimat, B.C. In total, he has 14 years of experience in the Industrial Relations field.

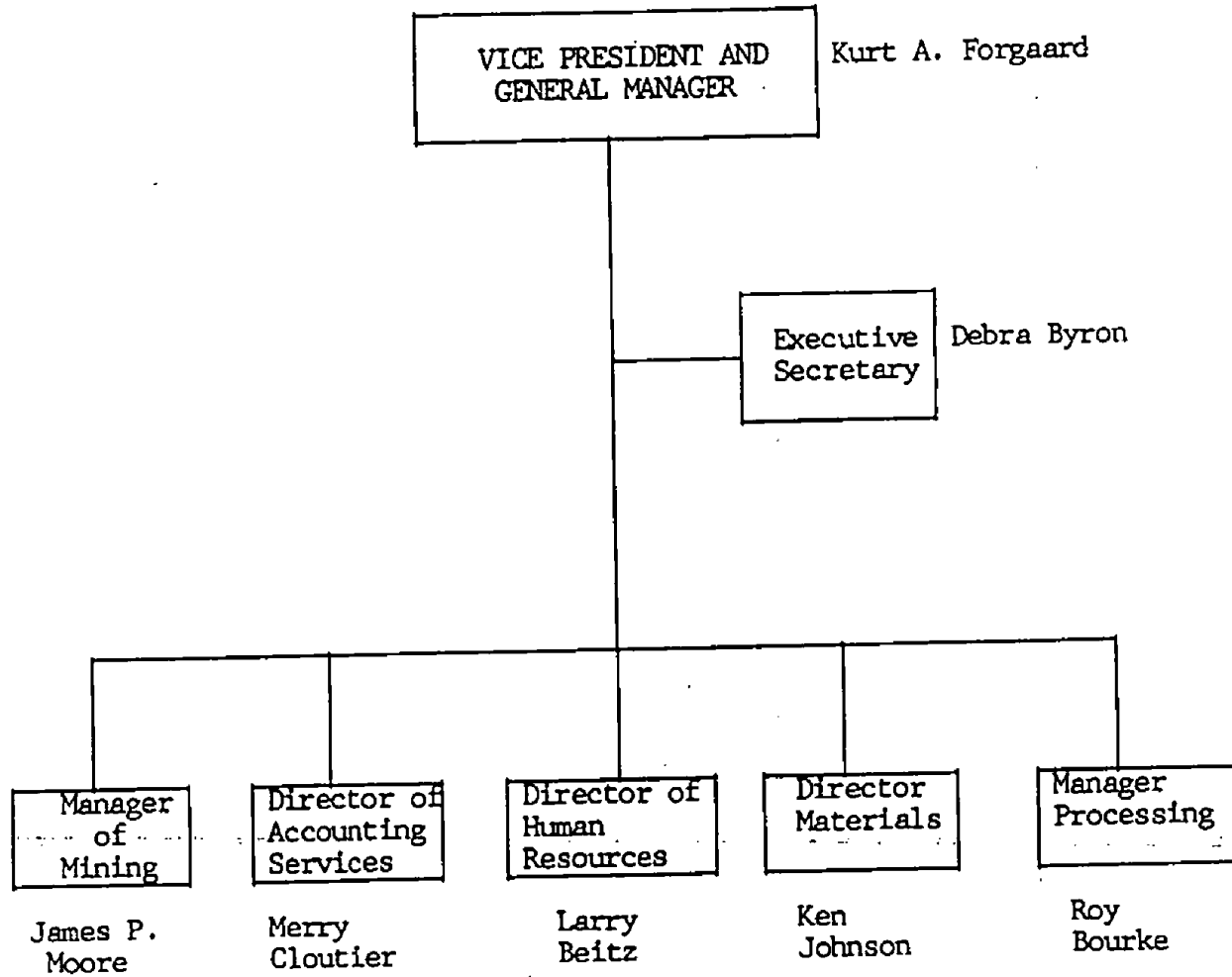
#### Director of Accounting Services

Merry Cloutier, B. Comm., CGA, Age 32 years. Prior to her current position she was Chief Accountant at Curragh Resources. Other positions she has held include Assistant Controller at Cominco Pine Point, NWT, Accounting Manager at Fording Coal, Calgary, Alberta, and Accounting Supervisor at Fording Coal, Elkford, B.C. She received her Bachelor of Commerce at the University of British Columbia in Vancouver in 1978, and the CGA through the Certified General Accountants Association of British Columbia in 1984.

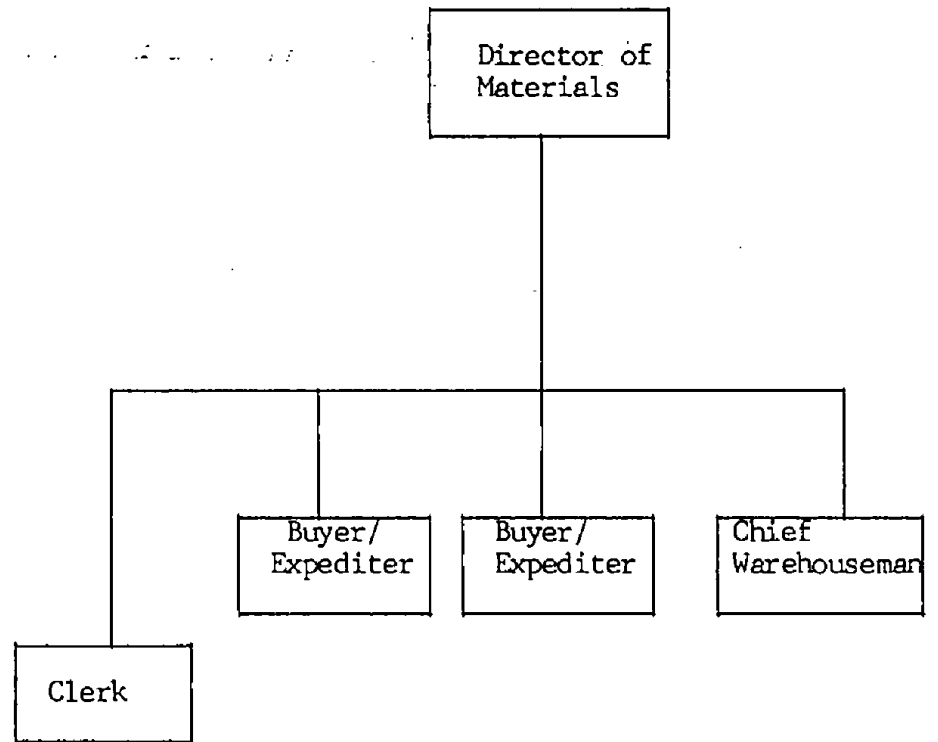
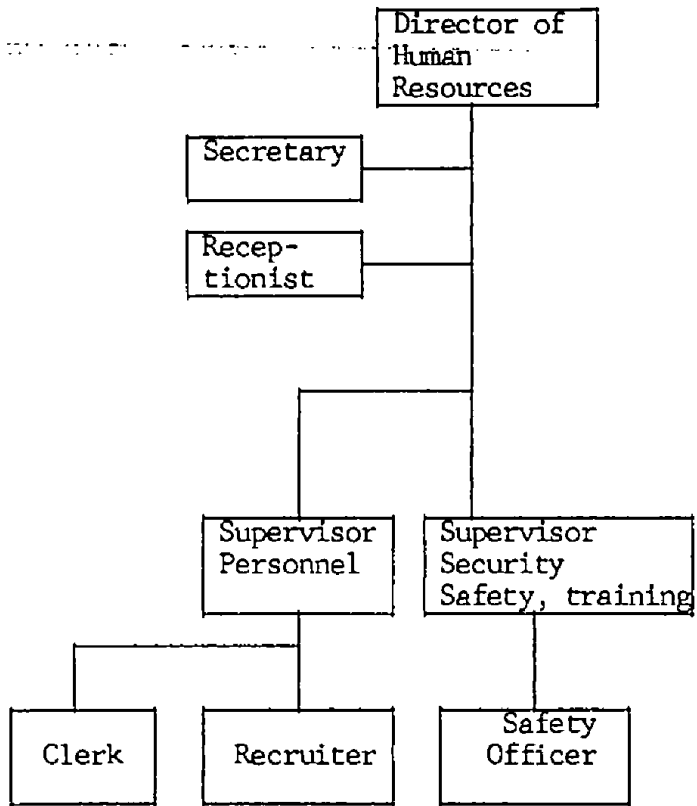
Senior Mine Engineer

Tom Cloutier, B.A.Sc. Mineral Engineering, Age 33. He has held positions in Operations, Mine Engineering and Project Engineering. He has had eight years experience in coal and base metal mines at Cominco Pine Point, NWT, Fording Coal, Calgary, Alberta, and Elford, B.C. He received his Bachelor of Applied Science in Mineral Engineering at the University of British Columbia, Vancouver in 1979.

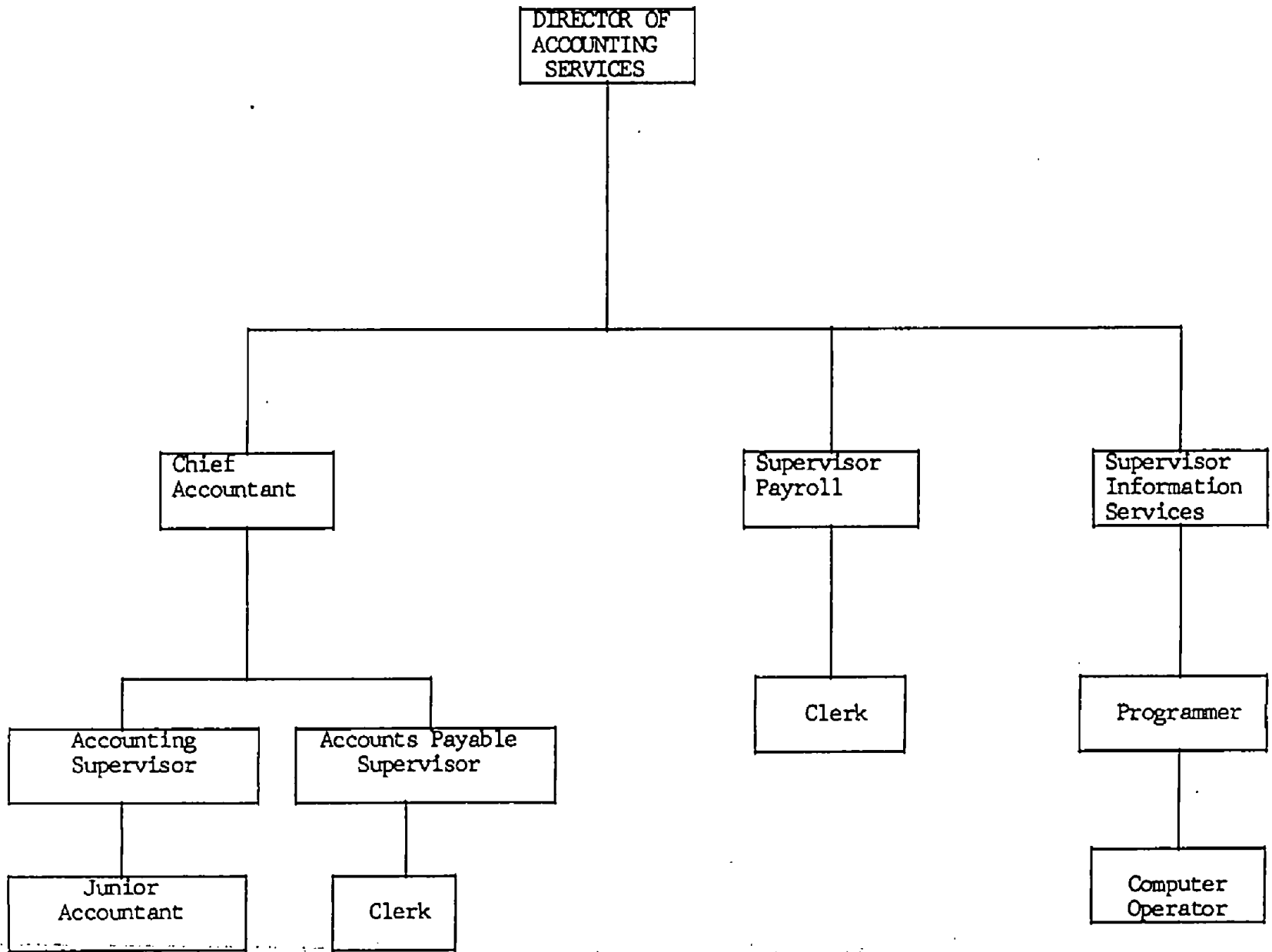
SENIOR STAFF



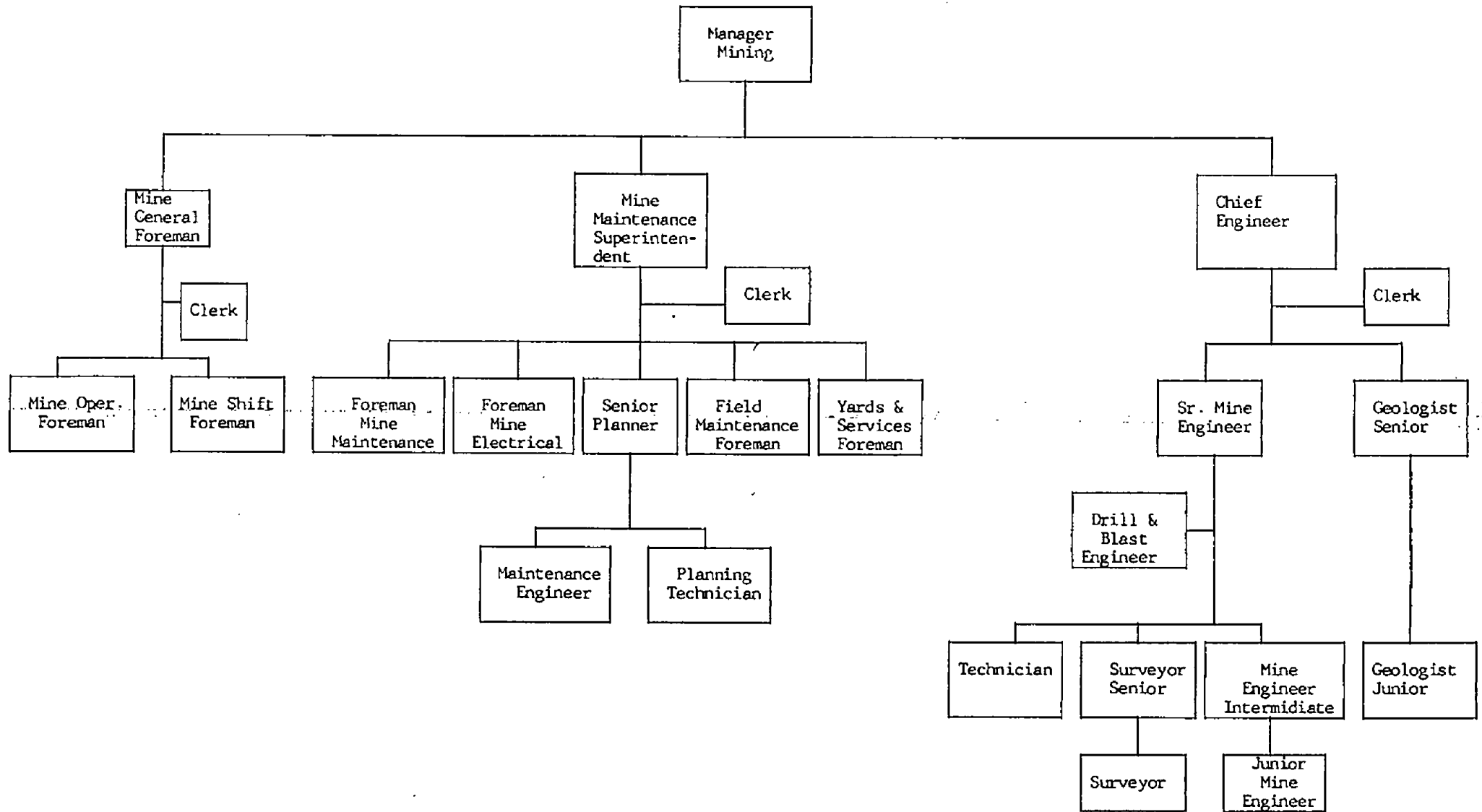
ADMINISTRATION



ADMINISTRATION



MINING DEPARTMENT



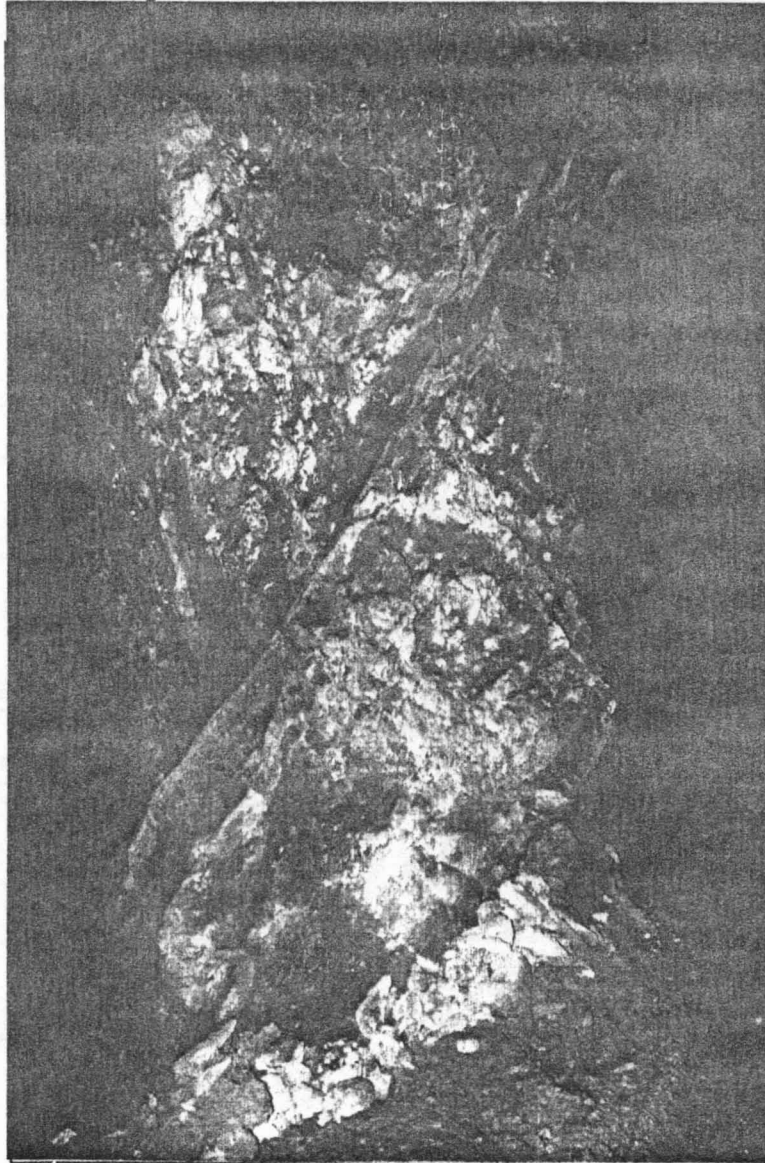


Plate 1

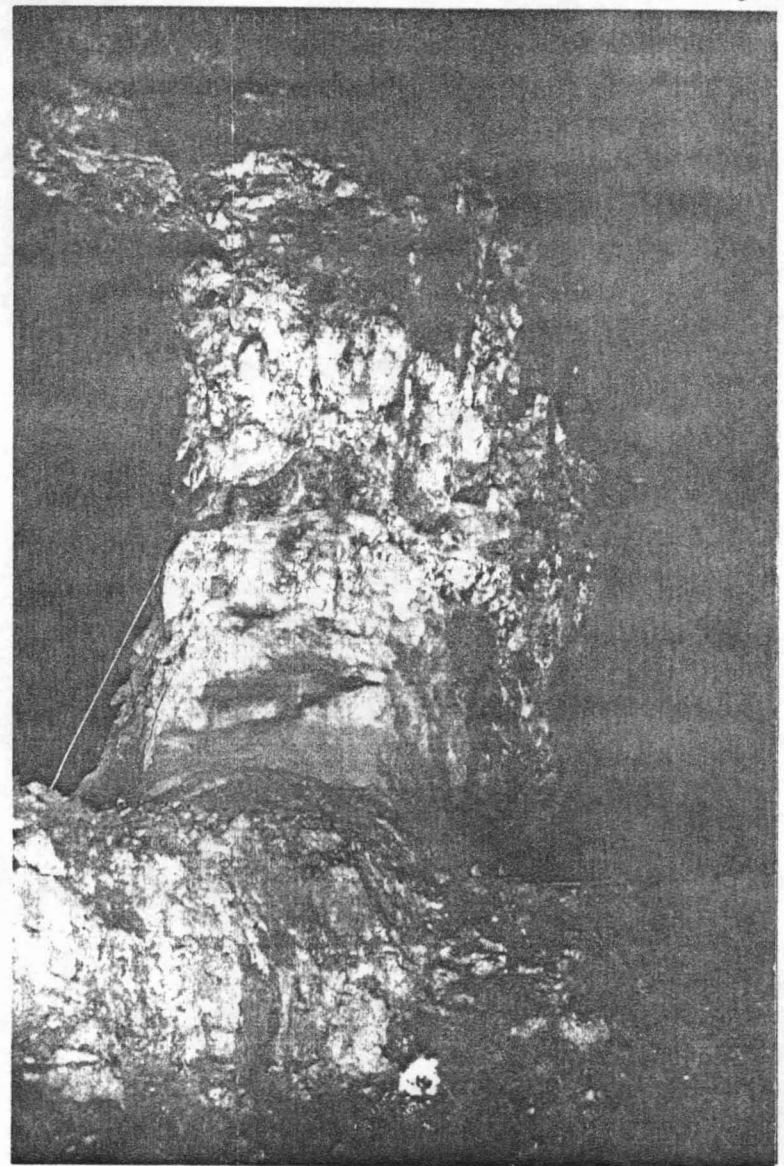


Plate 2

## The Management Team: Whitehorse

### Vice President: Engineering and Transportation

Marvin Pelley, age 38, is in charge of all highway transport, loading, marine terminal operations, and backhaul transportation; as well as engineering, planning, and regional geology. He is a graduate of Memorial University in Newfoundland. Marvin was formerly associated with Quintette Coal from its inception, and prior to that The Iron Ore Company of Canada.

### Manager, Transportation

Harold Upton manages the integrated systems for the transportation of mine concentrates and bulk mine supplies. This involves the coordination of the handling of storage facilities in Faro and Skagway along with the road and marine carriers.

Mr. Upton also must work closely with the Yukon, Alaskan, Canadian and American governments in operation of the highway system and various transportation regulatory matters.

### Manager, Regional Geology

Greg Jilson is the Regional Geology Manager. He oversees long term planning, exploration and land and is responsible for maintenance of accurate and up to date geological information for evaluation of exploration potential and ore deposit feasibility analysis.

Advisor, Government and Regulation

Robert Grant serves Curragh as Advisor, Government and Regulatory Affairs, and in this capacity has major responsibilities for Curragh's response to the Yukon Water Board, the Yukon Government, and the Federal Government of Canada.

## The Management Team: Toronto

### Chairman and Chief Executive Officer

Clifford H. Frame, P.Eng., age 52, is Chairman and CEO of both the partnership organization and its corporate parent. Mr. Frame is a well known mining executive. Prior to his present position, he was President of Denison Mines Limited of Toronto. His earlier positions included V.P. and G.M., Tara Exploration and Development Company, Ireland; V.P. Operations International Nickel Company; Australia and Indonesia; Assistant Manager, Elliot Lake, Denison Mines; Chief Mine Planning Engineer, International Nickel Company; Mine Captain, Denison Mines Ltd., and Development Engineer, Britannia Mines, British Columbia. He has been involved in the start-up and development of some seventeen mining projects. A native of Trail, B.C., he received his bachelor degree in mining engineering from the University of British Columbia.

### Vice Chairman

Associated with Clifford H. Frame in Curragh Resources is Ralph G.M. Sultan, P.Eng., age 52, whose previous corporate affiliations have included Senior Vice President, Global Energy and Minerals Group, Royal Bank of Canada, Calgary; Executive Vice President, Hudson Bay Mining and Smelting Company; Director of Investments, the J.W. McConnell Foundation. He is an engineering graduate of the University of British Columbia, and a former faculty member of the Harvard Business School, Boston, Massachusetts.

### Vice President and Comptroller

Ian Shaw, C.A., Vice President and Comptroller, is age 45. He was associated for 11 years with Sherritt Gordon Mines, Toronto, which he served as Treasurer and Comptroller. Previously he was Chief Financial Officer of AGF Management Limited, an investment management company. He is a graduate of the University of Toronto.

### Executive Assistant to the Chairman

Rick Visagie, age 37, a graduate in geology from the University of British Columbia, is Executive Assistant to the Chairman. He was formerly associated with Dome Petroleum, Calgary (16 years), where he acquired an extensive working knowledge of Cyprus Anvil Mining Operation, and Home Oil (3 years). He also has an M.B.A. degree from the University of British Columbia.

### Vice President of Human Resources

David Stitt, age 64, is V.P. of Human Resources. He was formerly Corporate Director of Industrial Relations of Denison Mines, and previously worked for Pickands Mather Wabush Mines (Quebec and Labrador) the Ford Motor Company of Canada and American Standard Products in Toronto and New York. Mr. Stitt is a graduate of the University of Western Ontario.

### Accountants, Legal Counsel and Engineering Consultants

Accountants and auditors to Curragh are Price Waterhouse, Toronto; legal advisors are Cassels, Brock and Blackwell; engineers are Kilborn Engineering. Financing to the project has been provided by the Toronto-Dominion Bank.

FARO MINE - PROGRESS REPORT

## 5.0 Faro Mine - Progress Report

During the latter part of 1985 agreements were executed which resulted in the receipt of \$15 million by Curragh from the sale of assets, second mortgages on housing, and a Yukon Mine Recovery Program.

Curragh has achieved significant progress in the area of cost reduction since reactivation of the Faro Mine. The main waste stripping program was underway by mid-January 1986 to ensure an adequate supply of ore of the proper grade to meet the scheduled mill feed rates.

At the end of April, Curragh paid down its bridge finance loans from the Toronto Dominion Bank, and entered into negotiations concerning an operating line secured by inventory and accounts receivable on a strictly commercial basis.

Mill renovation was completed in June and start-up occurred June 2, 1986, with production rates and recoveries compatible with sales projections. The first shipments of concentrate to markets occurred in July, 1986.

The truck transportation of the concentrate to Skagway is being conducted by Yukon-Alaska Trucking Ltd. The new truck loading facility at the mine has been completed along with modifications to the ocean terminal at Skagway. Furthermore, Curragh reached a 24 hour, 12 month per year Road Operation Agreement with the Yukon and Alaska Governments. In addition to the movement of concentrate, a backhaul system for mine supplies has also been developed.

Geological and engineering functions are now fully operational at the Whitehorse office and field work and service is being performed.

In addition to the marketing agreements for 1986 concentrate, a good part of 1987 production has been committed.

By October 1986 there were about 475 people employed at Faro, 12 at Whitehorse, 10 at Toronto, plus an additional 125 persons employed by Yukon-Alaska Trucking Ltd. in the haulage of concentrate.

Expenditures on the project through October 1986 were approximately \$80 million, the bulk of which are wages, salaries, capital equipment, and supplies in the Yukon.

Curragh's management feels the organization has responded well to the challenge of reactivating the mine.

FARO MINING OPERATIONS

## 6.0 Mining Operations

The Faro Minesite layout shown in Figure 1 indicates the relative locations of the Faro open pit, concentrator, service buildings and tailing impoundment ponds.

Open pit mining of the Faro Pit commenced in 1969 and continued until cessation of milling in June 1982. Waste stripping was carried out between June 1983 and October 1984, during which time approximately 19.8 million tonnes of waste were removed.

### Mining Plan

The Faro Pit will be mined in four main phases from northeast to southeast. An additional subphase at the southern end of the pit was mined soon after the commencement of mining activities.

Stripping operations commenced with one shovel operating in January 1986 increasing to four shovels by June, 1986. All shovels will be used until the middle of 1987 after which time they will be operated on a diminishing scale as stripping requirements are reduced.

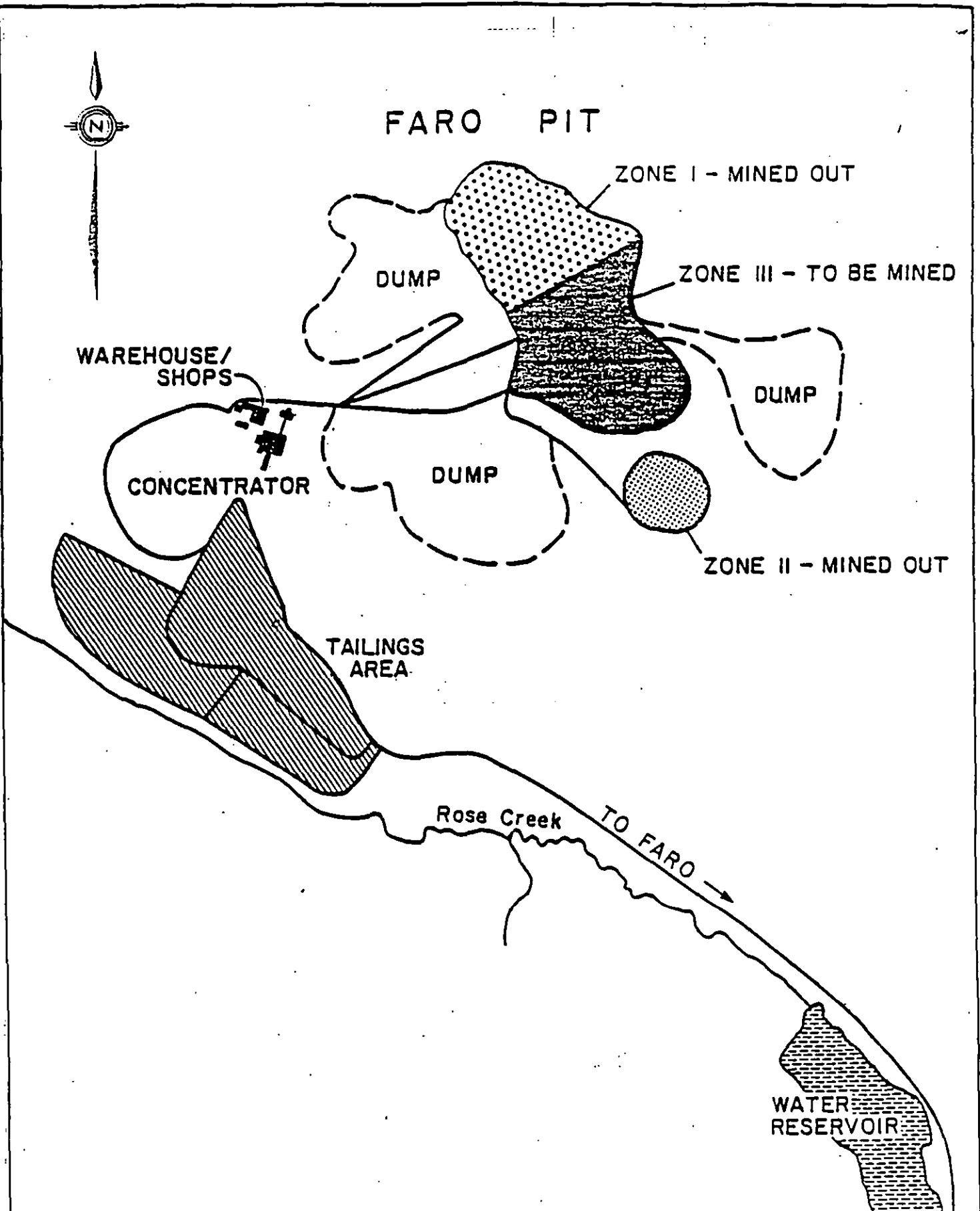
All material having a combined grade above 6.0 percent (Pb + Zn) will be delivered to the crusher or to temporary stockpiles near the crusher. Material with grades between 4.0 and 6.0 percent (Pb + Zn) will be stockpiled and treated after open-pit stripping is complete.

The mine operates as an integrated department containing all functions associated with mining, including Mine Operations, Mine Equipment Maintenance, Mine Engineering and Geology. The mine operates 24 hours per day, 7 days per week.

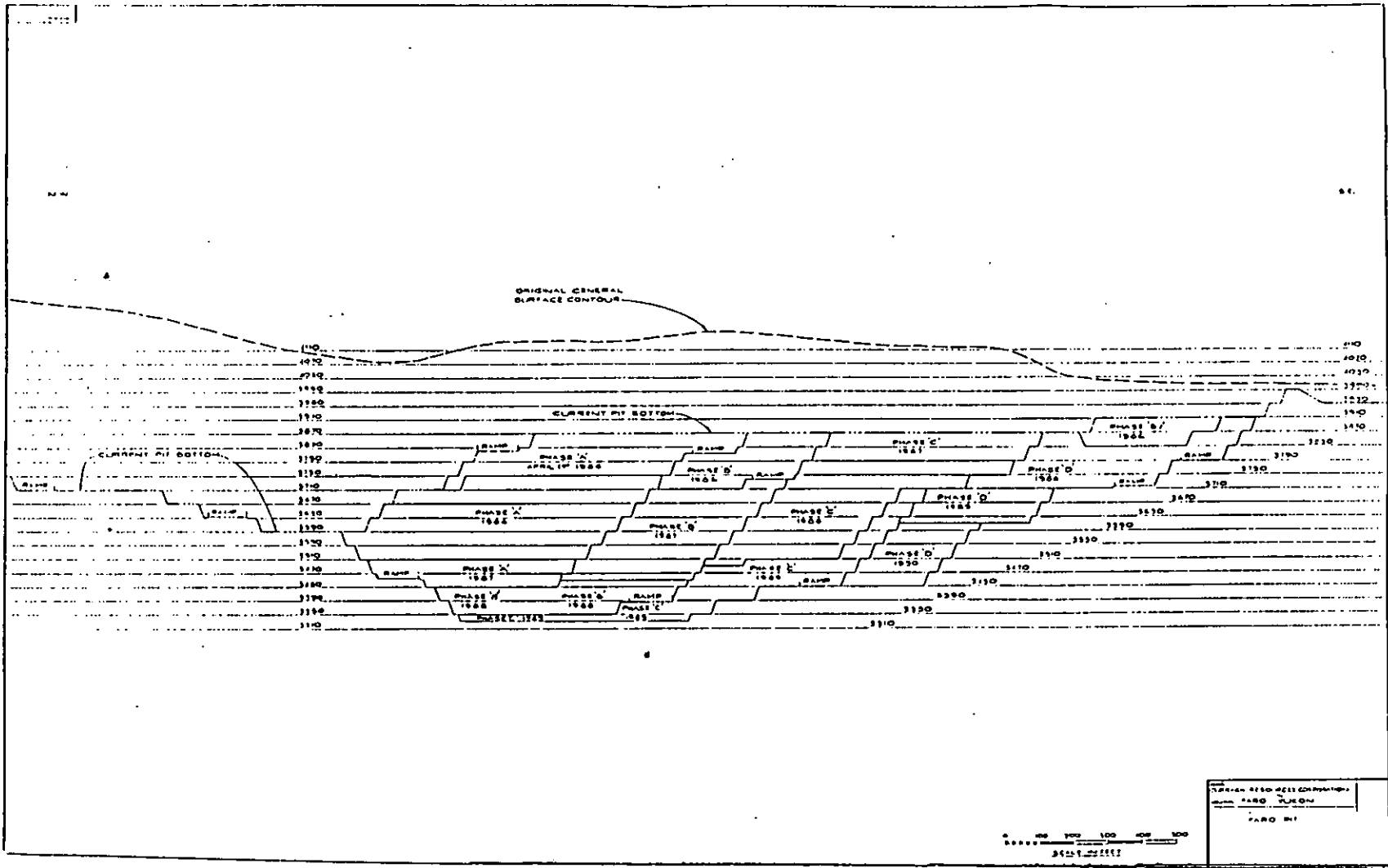
The Faro open pit has been mined out northwest of the Faro Fault. Figure 2 shows the remaining portion of the open pit which will be mined. Phases JB, A, B, C, and D are shown, as are the portions which will be mined in each time period.

#### Mine Statistics

Also included are listings of the major mining equipment, production schedule and pit data.



TITLE: <b>GENERAL SITE LAYOUT</b>		SECTION:	
		AREA NO:	REV. NO:
CLIENT: <b>CURRAGH RESOURCES CORP. FARO, YUKON</b>		DRAWING NO:	
APPROVED:	DATE: JULY 15, 1985	<b>FIGURE 1</b>	<b>A</b>



MONTHLY PRODUCTION 1986

MONTH	WASTE	ORE	TOTAL PRODUCTION
JAN	431,718	0	431,718
FEB	1,385,472	1,500	1,386,972
MAR	1,771,099	17,112	1,788,211
APR	2,068,646	24,780	2,093,426
MAY	2,088,879	26,064	2,114,943
JUN	2,166,020	135,791	2,301,811
JUL	2,074,585	238,976	2,313,561
AUG	1,783,725	277,750	2,061,475
SEP	1,993,319	349,894	2,343,213
OCT	1,800,132	544,913	2,345,045
NOV *	1,986,000	604,000	2,590,000
DEC *	2,280,000	328,000	2,608,000
TOTALS	21,829,595	2,548,780	24,378,375

\* Projected Fig.

## Mine Equipment

Major mine operating equipment at the site consists of the following:

### Shovels:

- 3 P & H model 2100
  - 11.5 cubic meter rated capacity
  - #6 purchased in 1977
  - #7 purchased in 1977
  - #8 purchased in 1979
  
- 1 Marion model 190M
  - 11.5 cubic meter rated capacity purchased in 1973
  - being refurbished for service in June, 1986

### Loaders:

- 2 LeTourneau model L800
  - Diesel-electric front end loaders
  - 11.5 cubic meter rated capacity

### Drills:

- 2 Marion model M-4 (electric)
  - equipped for 250 mm, 16.7 meters deep
  - purchased in 1979, 1974

Haulage Trucks:

- 8 Euclid model R170  
150 tonne rated capacity  
4 purchased in 1982  
4 purchased in 1983  
equipped with Cummins model KTA 3067  
16 cylinder, 1600 H.P. diesel engines  
generator and electric drive rear wheels
- 16 Wabco model 120c  
109 tonne rated capacity  
equipped with General Motors 12V149T 12 cylinder,  
1000 H.P. diesel engines or General Motors  
12V149TI 12 cylinder, 1200 H.P. diesel engines  
generator and electric drive rear wheels...three  
12V149TI engines were on site in January, the  
other engines (12V149T) are being rebuilt to  
12V149TI's, program scheduled for completion by  
January, 1987.
- 4 Unit Rig 170 t M-36

Support Equipment:

The fleet of support equipment includes bulldozers, graders, cranes, lubrication vehicles, mechanics workshops, and other equipment as is usually required for an operation of this size.

## OPEN PIT STATISTICS

### Material In-Place Specific Gravities:

Waste Rock	2.70
Average	3.93
Ore (All Types)	

### Swell Factor:

Pit Material	1.45
--------------	------

### Bench Heights:

Waste	13.63 Metres
Ore	6.06 Metres

Pit Slope Geometry	Overburden Slope 26°
--------------------	----------------------

Drilling and Blasting	Overall Rock Slope 36.5° to 45°
-----------------------	------------------------------------

### Blast Patterns:

Ore	7.3 x 7.3 m
Waste	7m x 7m to 7.6 x 7.6 m

Subgrade	1.5 metres
----------	------------

Ramp Gradient	8 %
---------------	-----

Ultimate Pit Dimensions	Length = 1,422 metres
	Width = 975 metres
	Depth = 304 metres

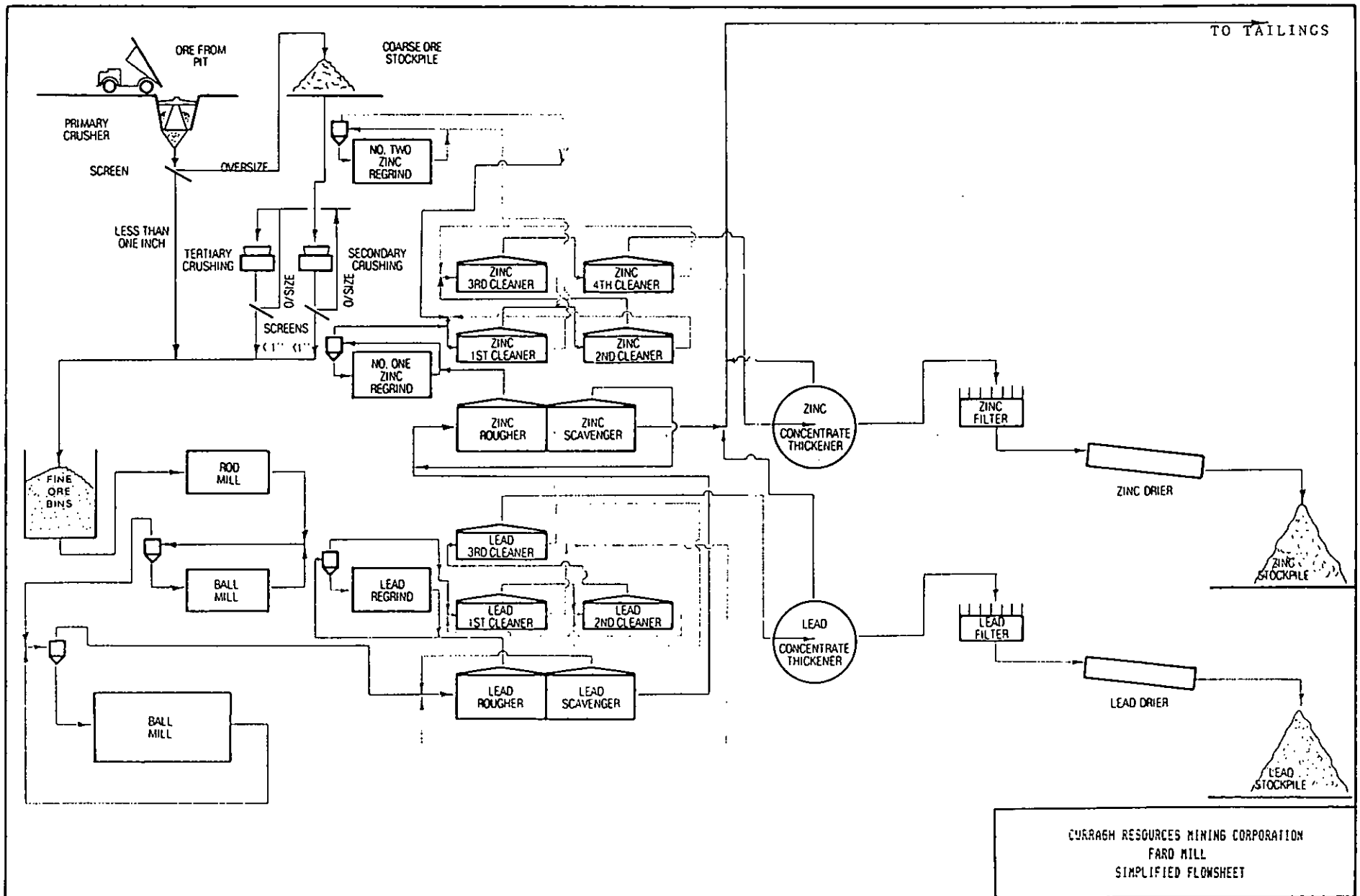
FARO MILLING OPERATIONS

## 7.0 MILLING OPERATIONS

The mill complex at Faro receives ore from the open pit mine, crushes, mills, and produces concentrate with an average grade of 60 % lead and 50 % zinc. This concentrate is then shipped to smelters in Asia and Europe.

Operation of the concentrator is a complex process, involving various chemical reagents, large mechanical equipment, sophisticated instrumentation, and tight environmental control for tailings disposal.

A simplified circuit diagram of the mill process is shown on the following page. There are separate circuits for the production of lead concentrate and zinc concentrate.



## General

Initial concentrator capacity was at 5000 TPD from the Pit with subsequent expansion to 9200 TPD undertaken in 1973. A major grinding and flotation section expansion, completed in 1981, allowed a further increase in capacity to a nominally 12000 TPD.

The mechanical and metallurgical tune-up was far from complete when operations were curtailed in June, 1982, due to depressed metal prices. From January to May, 1986 work was done to de-mothball the plant, perform major maintenance and complete crushing plant and circuit modifications to enhance mechanical and metallurgical performance under Curragh Resources' new ownership. Start-up at reduced tonnage commenced in June, 1986, with further circuits being brought on line to reach forecast production in August.

## Crushing

The operation uses major equipment items as listed and configured in Figures 1 - 3 (crushing, grinding and flotation and dewatering areas). The crushing circuit incorporates run-of-pit open circuit size reduction by gyratory crusher, followed by fines scalping, coarse-ore storage, open circuit secondary crushing by a single standard cone and closed circuit tertiary crushing by two shorthead cones. The crusher product is stored in five 1500 tonne silos.

## Grinding

The feed to the grinding circuit is 80 % - 15 mm. Two of the five ore silos are used to feed the single large grinding circuit installed in 1981. This circuit comprises a single 5' x 16' primary rod mill and a single 13.5' x 22' secondary and tertiary ball mills in closed circuit with 20" and 15" cyclones to produce a flotation feed of 80 % passing 65 microns. Total installed power is 6500 h.p.

The remaining five ore bins and their individual 9' x 12' rod and ball mill pairs and single 13' x 22' tertiary ball mill (5200 total installed h.p.) were brought into commission by August, 1986 to achieve maximum flotation feed tonnage.

### Flotation

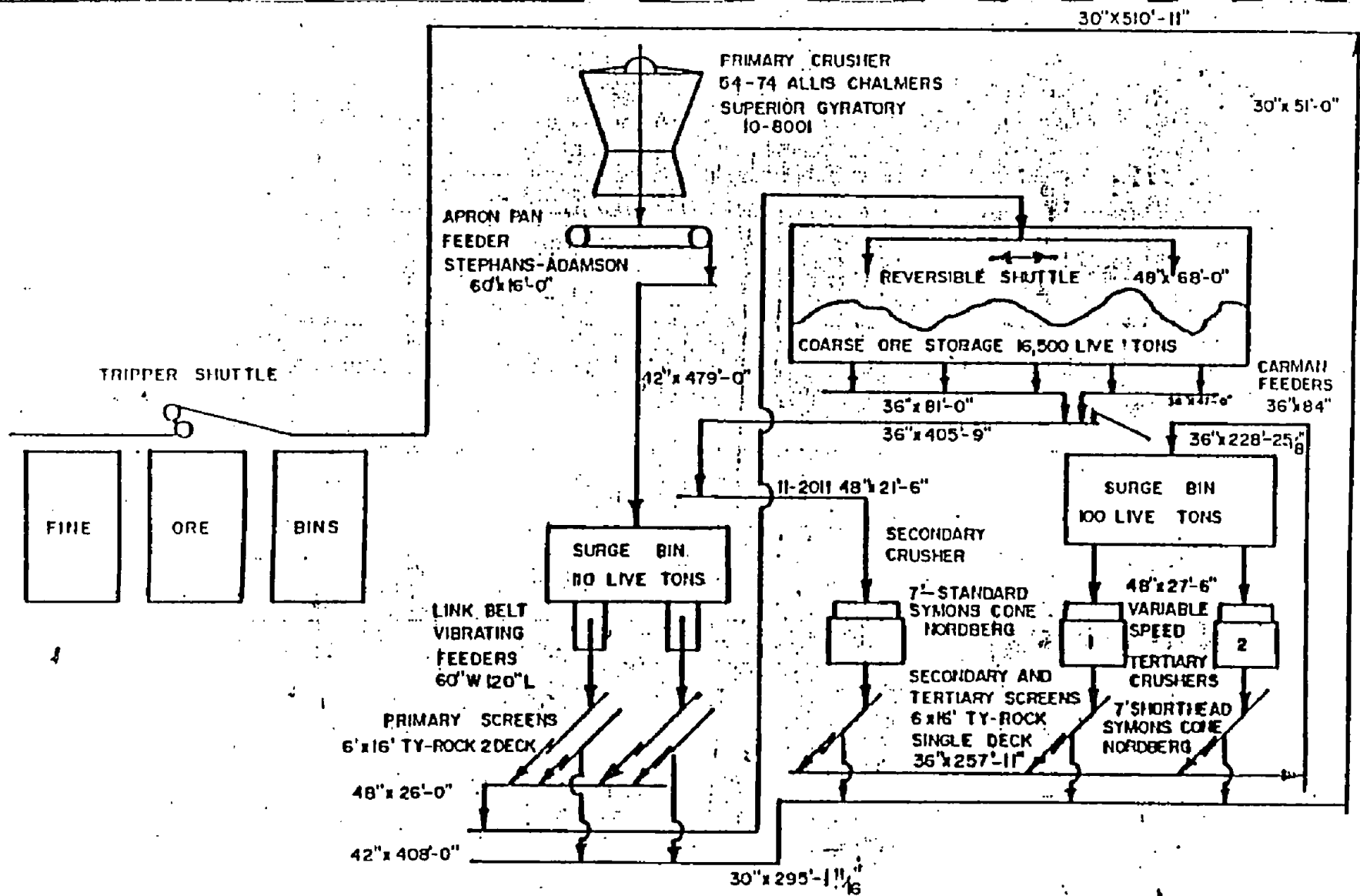
Production of concentrates is by sequential lead/zinc flotation. Roughing, scavenging and first stage cleaning are performed in large Outokumber 1350 cu. ft. cells, while second and third stage cleanings are performed in Dever DR 200 cu. ft. cells. In the lead circuit, rougher concentrate is reground in a single 9' x 12' ball mill before returning to the lead rougher, while the three cleaners operate fully counter currently. Lead scavenger tailings feeds the zinc rougher without further grinding, while the lead cleaner concentrate is pumped to 40' and 75' thickeners before disc filtration, rotary kiln drying and lead concentrate storage prior to load out.

### Concentrate Handling

The dewatering section comprises the thickeners mentioned above, a total of five 10.5' diameter of 10 disc Eimco filters, and 4 coal-fired and 1 oil fired rotary kiln are used for concentrate drying. Concentrates are transferred by loader from the storage areas to tandem container trucks for haul to Skagway via Whitehorse. There, concentrates are stockpiled before loading onto ocean freighters for delivery to customers. The trucks are equipped to take return loads of containerized operating supplies and materials back to the mine/mill site.

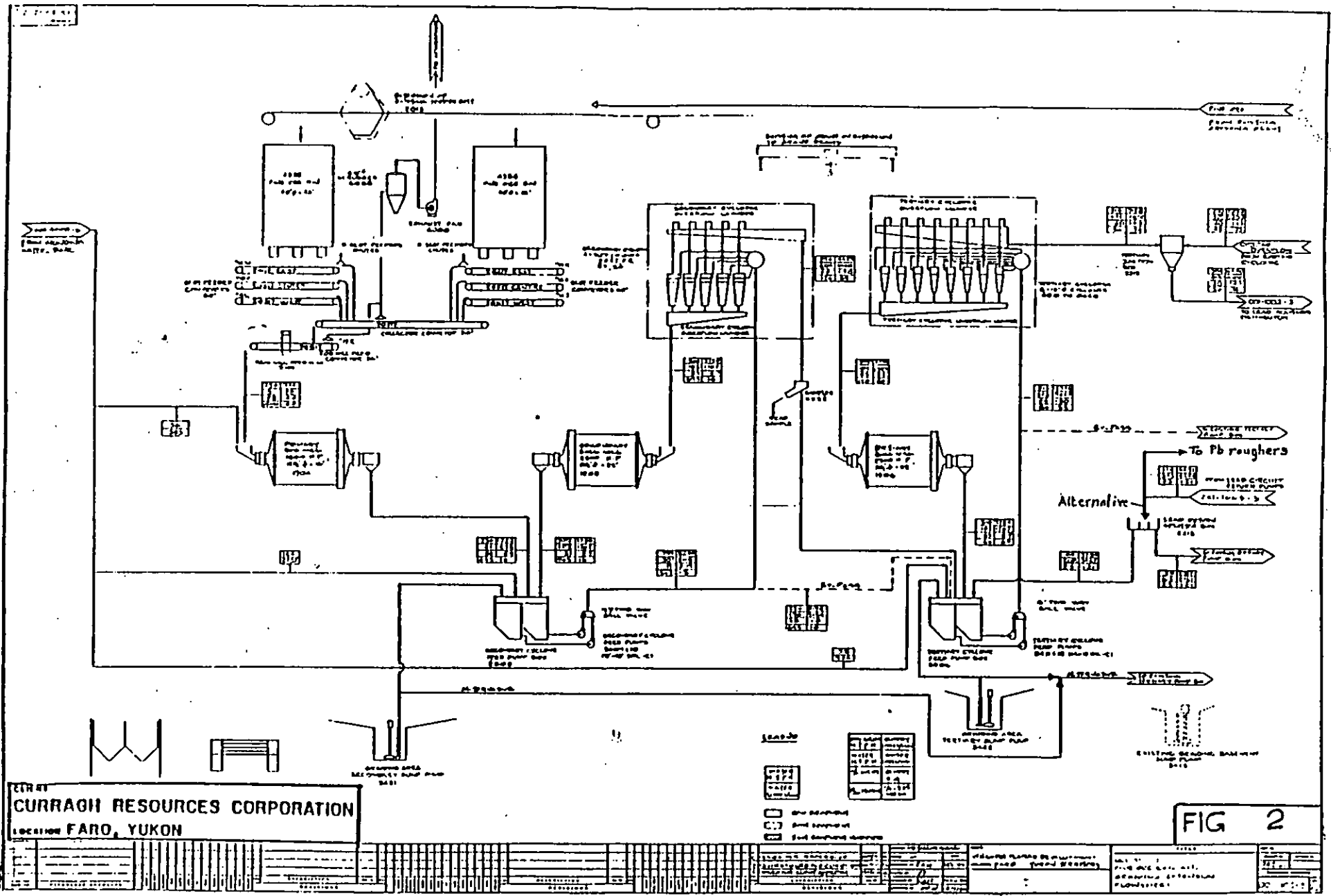
## Tailings Disposal

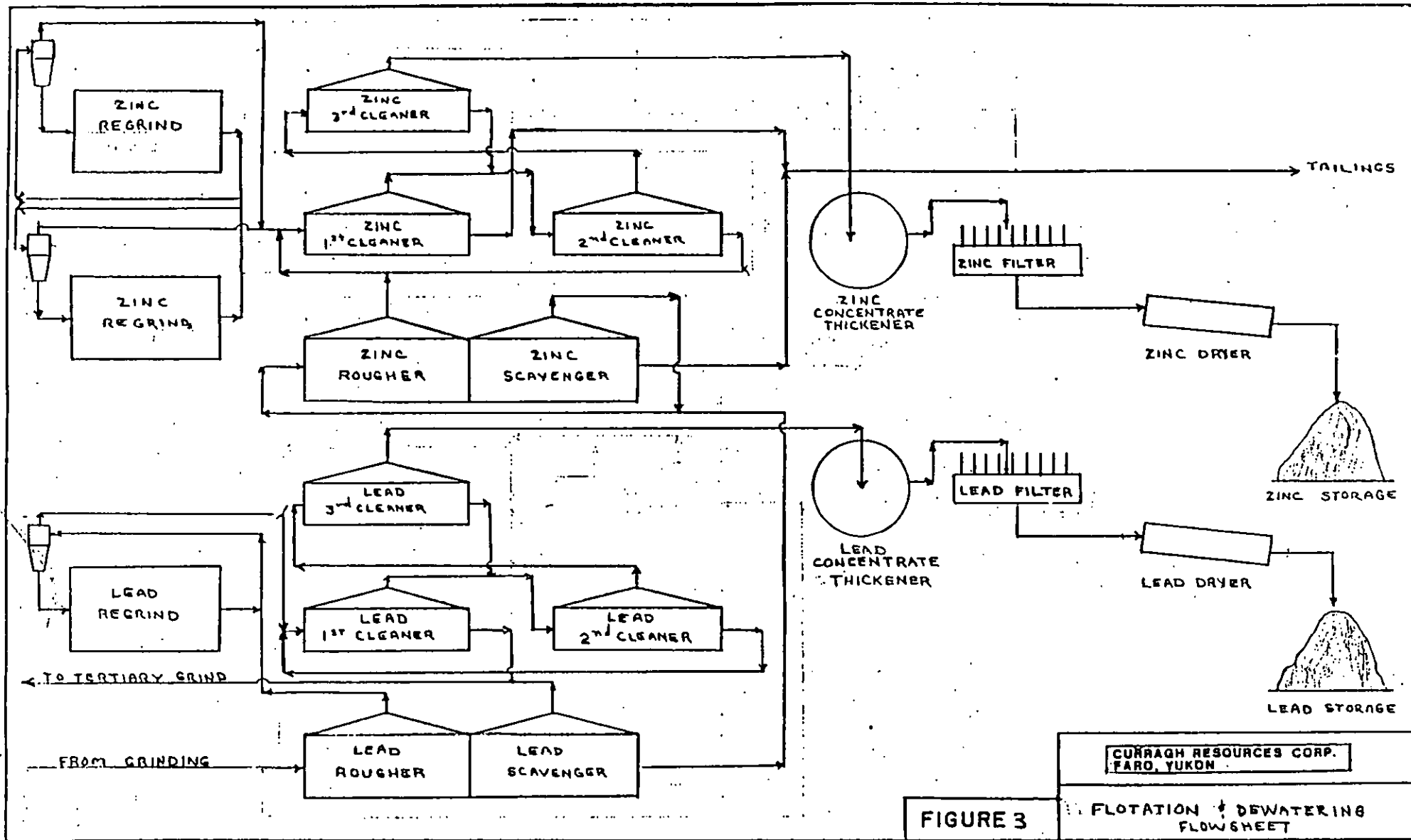
The tailings area is described in Figure 4. The ponds are located in the Rose Creek Valley to the South of the mine and mill. To date, two impoundment dams, surrounded by dykes of composite material, have been filled. These occupy some 67 hectares and contain 11 million cubic meters of tailings. As part of the 1980-81 expansion, another impoundment facility was built downstream of the previous site. This comprises a solid tailings containment dam 2 km downstream and a pond dam 500 meters further downstream. The function of the pond is to permit settlement of the fines from the upper dam overflow and chemical degradation before discharge into Rose Creek. This watercourse has been diverted onto a terrace and into a diversion channel on the South side of the Valley, while minor flows on the North side are diverted downstream by an interceptor ditch.

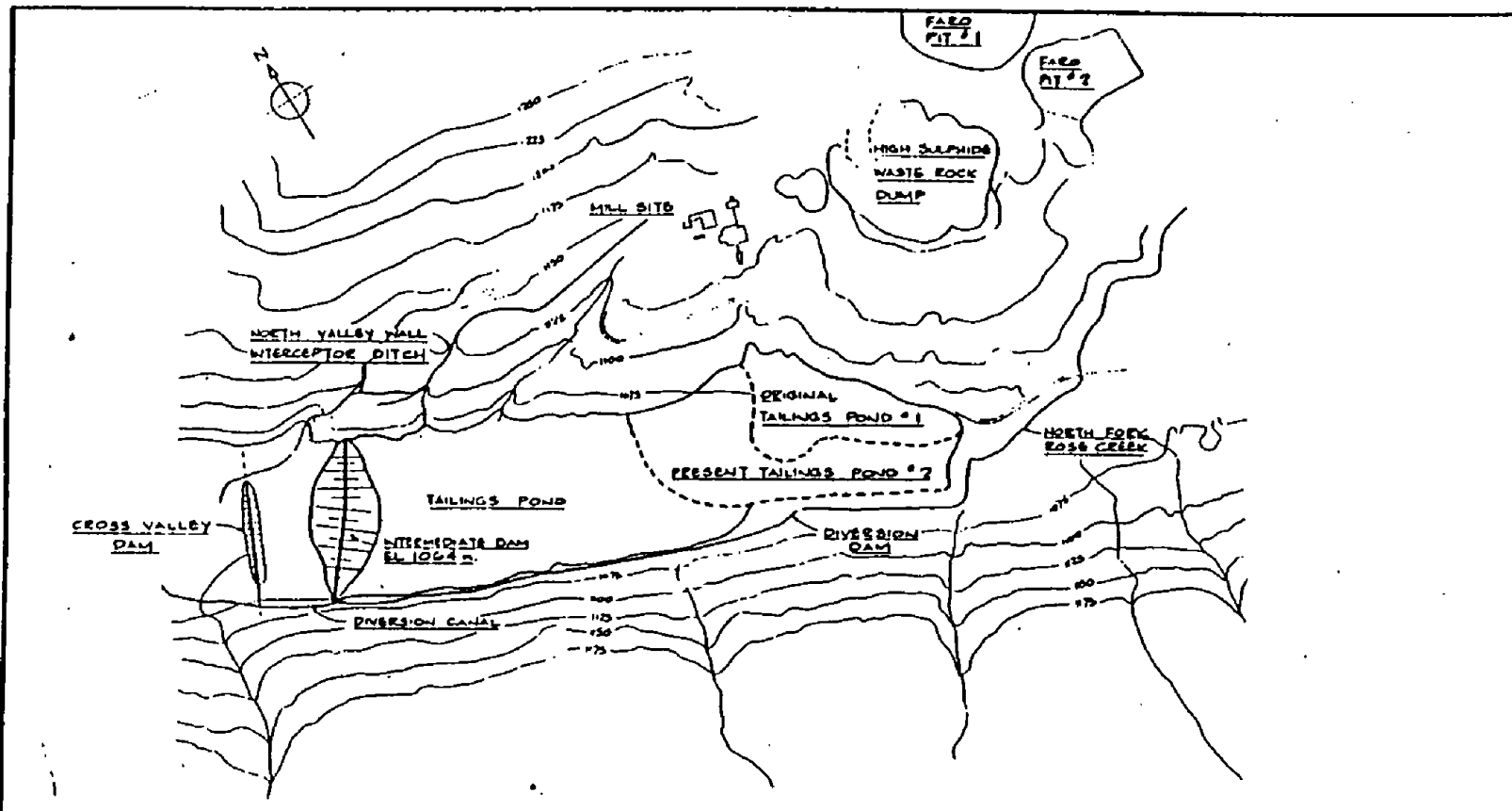


CURRAGH RESOURCES CORP.  
FARO, YUKON

FIGURE 1. FLOWSHEET — CRUSHING







				CLIENT CURRACH RESOURCES CORP.		TITLE	
				LOCATION FARO - YUKON		FINAL AREA OF DRY TAILINGS AT ABANDONMENT	
				SECTION	AREA No.		
				DRAWN P.C.	DESIGNED	COMT. No.	
REV	ISSUED FOR	DATE	APPROV No	DATE	REVISION	SHEET No.	CONF. OR
						DWG. No.	REV. No.
						FIG. 4	A

## MAJOR CONCENTRATOR EQUIPMENT LIST

### Crushing:

1	54" x 74"	AC Gyratory
1	60" x 16'	Apron Feeder
2	60" x 120"	Link Belt Vibrating Feeder
2	6' x 16'	Stephens Adamson Vibrating Screen
10	36" x 84"	Carman Vibrating Feeders
1	7'	Symons Standard Cone Crusher
2	7'	Symons Short Head Cone Crusher

### Grinding:

3	9' x 12'	Hardinge Rod Mill
3	9' x 12'	Hardinge Ball Mill
1	13'2" x 22'	Ball Mill
1	12'6" x 16'	AC Rod Mill
2	13'6" x 22"	AC Ball Mill
3	sets of 2-20"	Krebs Cyclones
1	set of 4-20"	Krebs Cyclones
1	set of 12-15"	Krebs Cyclones
1	set of 10-15"	Krebs Cyclones
1		Particle Size Monitor

Flotation:

2	Banks of 3 x 1350 cu. ft.	OK Lead Rougher Cells
2	Banks of 3 x 1350 cu. ft.	OK Lead Scavenger Cells
1	Bank of 6 x 1350 cu. ft.	OK Lead Cleaner Cells
2	Banks of 15 x 200 cu. ft.	Denver DR Lead Cleaner Cells
2	Banks of 3 x 1350 cu. ft.	OK Zinc Rougher Cells
2	Banks of 3 x 1350 cu. ft.	OK Zinc Scavenger Cells
1	Bank of 6 x 1350 cu. ft.	OK Zinc Cleaner Cells
3	Banks of 15 x 200 cu. ft.	Denver DR Zinc Cleaner Cells
3	9' x 12'	Hardinge Regrind Mill (1 Lead, 2 Zinc)
3	Sets of 6 - 10"	Krebs Cyclones
3	14000 CFM	Spencer Blowers
2	9800 CFM	Spencer Blowers
1	Courier 300	on stream analyser (14 streams)

Dewatering:

1	90'	Eimco Zinc Thickener
1	65'	Eimco Zinc Thickener
1	75'	Eimco Lead Thickener
1	40'	Eimco Lead Thickener
5	10'6" x 10	Disc Eimco Filter
3	5' x 40"	Coal Fired Drier
1	5' x 46.5'	Coal Fired Drier
1	6' x 44'	Oil Fired Drier

The tractors were built by Western Star. They are designed with special gearing to accommodate the heavy loads and hilly terrain of Yukon and Alaska.

The highway system between Faro and Skagway is paved for approximately 300 kms. and gravel for 200 kms. The average round trip will take about 24 hours. The Yukon and Alaska Governments agreed that the road between Whitehorse and Skagway, normally snow-bound in the winter, would be kept open on a year round basis. Furthermore, Curragh makes a per ton contribution to help pay for the highway maintenance. In addition, the Federal Government of Canada instituted plans to spend \$21 million to further upgrade the highway.

Truck maintenance facilities have been set up in Whitehorse. The new terminal includes offices, heated truck bays, truck washing facilities, and crew change facilities.

When the loaded trucks arrive in Skagway, they are unloaded into storage sheds leased from Whitepass Corporation. The concentrate is then loaded onto ships with capacities ranging from 20,000 to 30,000 WMT capacity (bulk cargo).

Once the trucks have been unloaded, they are reloaded with freight to be delivered to the minesite. About 54,000 tonnes of supplies, primarily fuel, tires, explosives, balls, rods, mill reagents etc., will be hauled. These supplies are shipped to Skagway by barge.

## Services

### Electrical Energy

#### Power Supply:

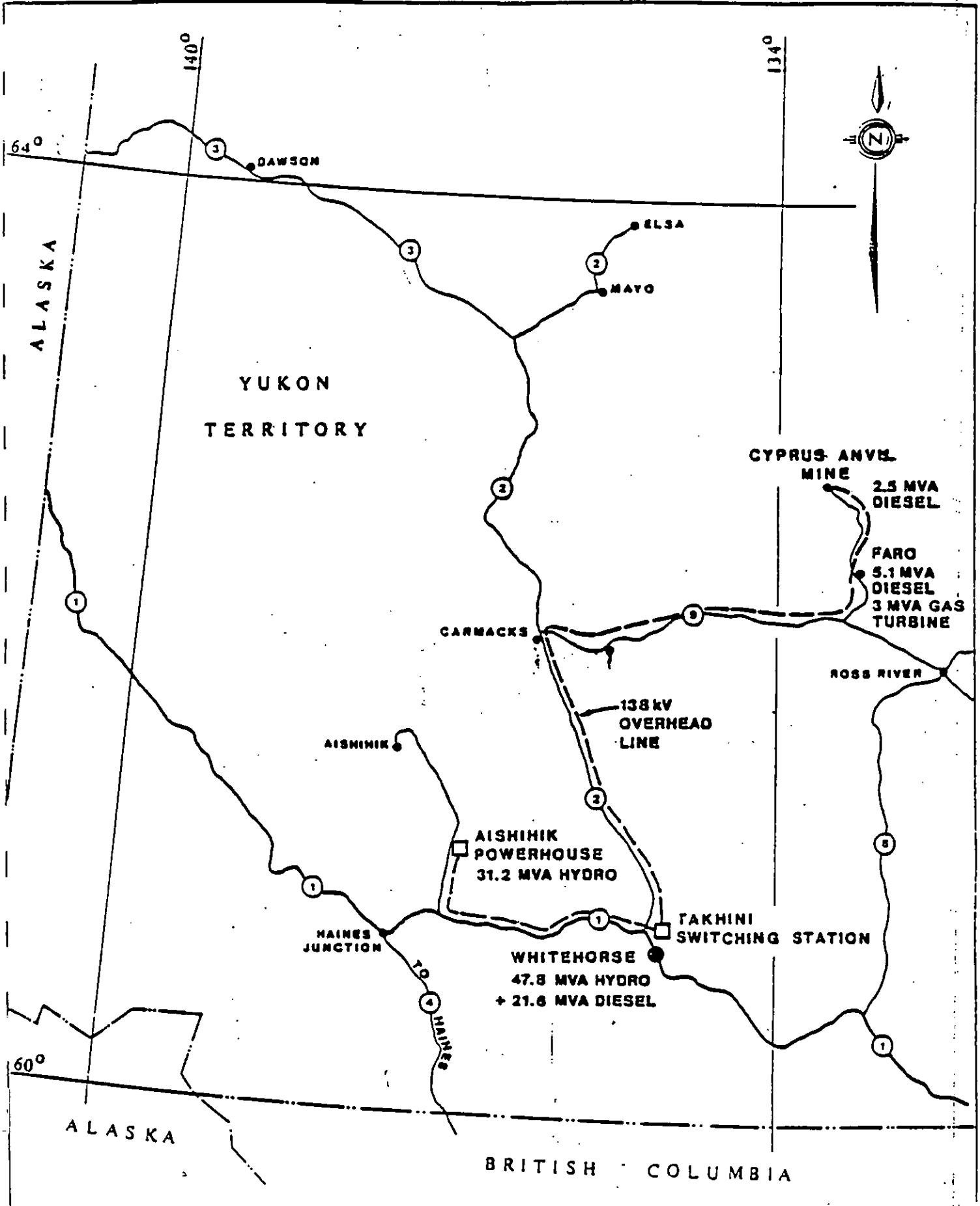
The Northern Canada Power Commission (NCPC) electrical power generating stations and distribution grid provides power to the mine site and the Town of Faro. The 138 kV overhead transmission line also services Whitehorse, Carmacks, Ross River and a number of smaller communities (see Figure 1).

The Commission generates hydro electric power at Aishihik and Whitehorse. Diesel generated power can be produced at Whitehorse and Faro.

TABLE 1

#### NCPC POWER GENERATING CAPABILITY

Source	Rated Capacity (MW)
Hydro - Aishihik	31.2
- Whitehorse	47.8
Diesel - Whitehorse	21.6
- Faro	5.1
- Faro Turbine	3.0
TOTAL	108.7



TITLE: <b>NCPC YUKON POWER SYSTEM</b>		SECTION:	
CLIENT: CURRAGH RESOURCES CORP. FARO, YUKON		AREA NO:	REV. NO:
APPROVED:	DATE: JULY 15, 1985	DRAWING NO: <b>FIGURE 1</b>	
			<b>A</b>

Constraints imposed by the availability of water dictate that the Aishihik hydro electric plant operate generally through the winter months. The hydro electric load during the summer months is generally assumed by the Whitehorse plant.

The depressed state of the Yukon's economy has resulted in the availability of electric power far in excess of the projected load growth requirements. In earlier times, portions of Faro's power were generated by diesel electric energy. The shutdown of the Whitehorse Copper Mine, the installation of the fourth hydro electric turbine and the general decline in Yukon economic growth have resulted in an excess of hydro electric power available to future consumers. It seems certain that virtually all the mine's future energy requirements will be serviced by hydro electric generators.

#### Power Requirements:

The total mine site energy consumption during the last 4 months of operation averaged 13.2 GWH.

### Water Supply

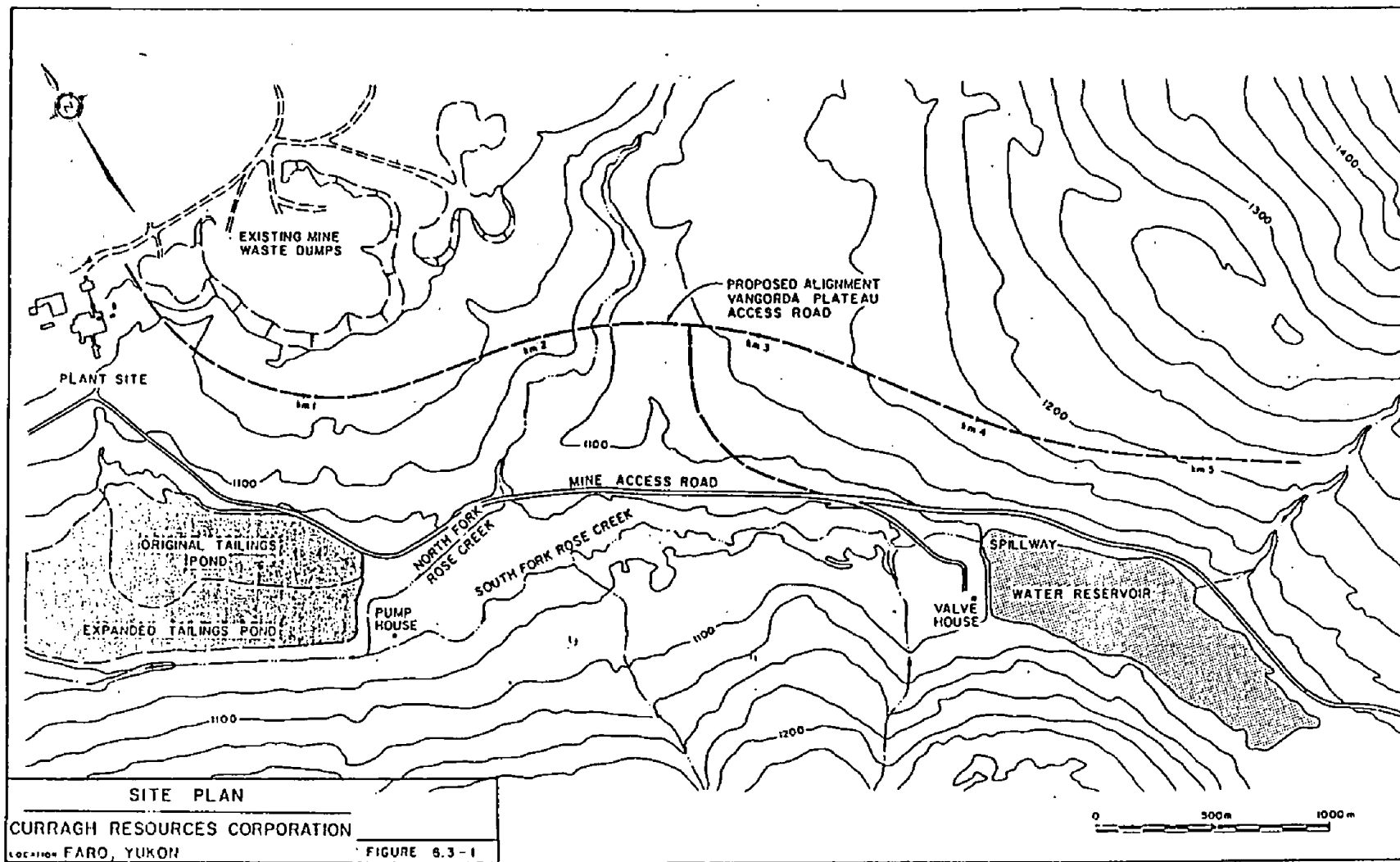
#### Existing Facilities:

A reservoir, located on the South Fork of Rose Creek is used to store fresh water for use at the mine site (Figure 6.3-1). Water is released in controlled volumes through a valve located at the lower southwest corner of the impoundment dam. Excess water produced during the spring run-off flows over a concrete decant spillway at the North end of the dam.

Water flows from the reservoir along the natural creek bed for approximately 2 kilometers at which point a pump house is located. Three 350 horsepower turbine pumps deliver the water to the mill storage tank through a 61 cm diameter, insulated steel pipeline. The pipe is approximately 2,300 meters long with a vertical rise of 115 meters. An additional diesel powered turbine pump is available at the pump house for emergency purposes. The electric pumps can each deliver 9,400 liters per minute while the emergency pump is rated at 5,600 liters per minute. Provision is made for the installation of a fourth electric turbine unit in the pump house.

The fresh water supply system has worked well since the commencement of operations in 1969. A steady and assured supply of fresh water is an essential ingredient of mill operations.

In 1986, the fresh water supply for the mill was supplemented by drilling four wells approximately 200 meters deep, with associated pumps.



TRANSPORTATION

## 8.0 Transportation

When Curragh acquired the mine, it was realized that the cost of transporting concentrate by the combined truck-rail system had become uncompetitive. Accordingly, Curragh engineers working closely with Swedish Transportation specialists from Boliden A.B., (one of the shareholders in Curragh), designed an all truck haulage system.

Early in 1986, Yukon Alaska Transportation Ltd. was selected to implement one of Canada's largest trucking contracts.

### Transportation History

#### Historical

Historically, concentrate from the zinc-lead mine was shipped to tidewater by the White Pass and Yukon Railroad Company which also handled most of the in-bound freight.

Freight destined for Faro was typically shipped by sea to Skagway, Alaska, where the cargo was transferred to a 176 kilometer long narrow-gauge railroad which terminated in Whitehorse, Yukon Territory. From this point, freight was transferred to trucks which transported the supplies the remaining 380 kilometers to Faro.

Concentrates outbound from Faro were shipped by highway to Whitehorse in custom-built containers, each of which carried approximately 22.5 tonnes of payload. Normally, one truck hauled two such containers to Whitehorse where they were transferred by gantry crane to flatbed rail cars.

From Whitehorse to Skagway, transportation was by narrow-gauge railroad, built to serve gold rush at the turn of the century. Upon arrival at Skagway, the containers were dumped by means of a gantry crane into a 100,000 tonne capacity storage shed. A special ship loader transferred concentrate to bulk carrier vessels.

Operations were curtailed in June, 1982. Dome Petroleum announced that resumption of operations would be contingent, in part, upon the reduction of the high costs of moving concentrate and supplies between Faro and Skagway.

#### Transportation Today

The results of numerous studies favoured the alternative by which concentrate would be hauled directly from Faro to Skagway by truck. On this basis, costs per tonne would be 40 % lower than the previous truck-rail operation.

A fleet of 40 tractor and trailer units were commissioned by Yukon Alaska Transport Ltd. to haul the concentrate to tidewater. Each unit has the following specifications:

Gross Vehicle Weights (lbs)	160,000
Payload (lbs)	110,000
Number of Axles	8
Length (ft)	85

The tandem-trailer "B-train" design of the ore haulage trailers was developed by Curragh with the consulting assistance of Kilborn Engineering, Boliden A.B. of Sweden, Knight Trailer of Vancouver and Westank-Willock of Regina, Sask. The trailers were built at Westank-Willock's plant in Regina.

HUMAN RESOURCES



TELECOPIER COVER LETTER

TO:

JIM MATHIS  
SRK CONSULTANTS

TELECOPIER NO. 604 687 5532

FROM:

NAME: NICK ROSE / LEO ANDRZYK

CURRAGH RESOURCES INC., Box 1000, Faro, Yukon, Y0B 1K0

TOTAL NO. OF PAGES: 8 DATE: FEB 28/92 TIME: OPERATOR

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MESSAGE JIM,

ENCLOSED ARE SECTIONS & DRILL RESULTS FROM PITWALL DRILLING IN VICINITY OF SA300 & PROPOSED SA300 WALL SLASHES (i.e. SA301 & SA303) CROSS SECTIONS A-A' & B-B' AS WELL AS SECTION 414 SHOW THAT THE PITWALL SURVEY IS ACCURATE WITHIN A COUPLE OF FEET. WE ARE IN GENERAL AGREEMENT THAT SA303 IS LIKELY TOO CLOSE TO THE PITWALL AS LAID OUT. YOUR INPUT ON THESE WALL SLASHES AS PROPOSED BY C.M.D. WOULD BE <sup>MUCH</sup> APPRECIATED & OUR MINING OR MUCKING OF THIS AREA WILL DEPEND ON YOUR RESPONSE.

THANK  
Nick Rose.

P.S. - CALL IF YOU REQUIRE A COPY TO BE SENT BY MAIL.

The proportion of Yukon residents hired at the mine has been consistently in the 45 % to 50 % range since project inception.

TOWN OF FARO

## 10.0 Town of Faro

Employees of the Curragh Resources mine live in the Town of Faro, 24 km from the minesite. Currently, Faro has a population of approximately 900 people.

The Town has a Recreation Center made up of a curling rink, hockey rink, lounge, meeting rooms and weight room. Furthermore, there is a nursing station operated by Northern Health Service, a grade 1 - 12 school provided by the Territorial Government, hotel, R.C.M.P. Station, movie theatre, grocery facility, restaurant, dentist, Human Resources office, liquor store, service station, Bank, Post office, travel agency, Municipal office, hardware store and other shopping facilities located throughout the town.

The community is serviced by live CBC radio from Whitehorse along with cable radio and T.V. There is also a 3000 ft. all-weather gravel air strip equipped with lights and navigational aid to allow for year-round service.

The Faro area offers a wide range of outdoor recreational possibilities. Spring, Summer, and Fall offer some of the best hunting, camping and trail riding anywhere. Snowmobiles, snowshoes and cross-country skiing are popular winter activities, plus all season fishing.