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**CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE
DEFINITION STUDY**

DECEMBER, 1989

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TABLE OF CONTENTS

<u>SECTION</u>		<u>Page</u>
1.0	INTRODUCTION AND SCOPE	1-1
	1.1 Introduction	
	1.2 The Mt. Hundere Property	
	1.3 History of Exploration	
	1.4 Scope of Study	
2.0	SUMMARY	2-1
	2.1 Capital Costs	
	2.2 Operating Costs	
	2.3 Personnel	
	2.4 Schedules	
	2.5 Definition Requirements	
3.0	GEOLOGY AND MINERAL RESOURCES	3-1
	3.1 Geology and Mineralization	
	3.2 Geological Reserves	
	3.3 Exploration Possibilities	
	3.4 Mineable Resources	
4.0	MINING	4-1
	4.1 Mine Exploration	
	4.2 Mine Development	
	4.3 Mine Production	
	4.4 Mine Services	
	4.5 Oxide Open Pit	
5.0	PROCESSING	5-1
	5.1 Metallurgical Testwork	
	5.2 Design Criteria	
	5.3 Process Description	
	5.4 Processing Plant Layout	

DRAFT

TABLE OF CONTENTS

<u>SECTION</u>		<u>Page</u>
6.0	SURFACE ANCILLARIES	6-1
6.1	Ancillary Buildings	
6.2	Power Supply and Distribution	
6.3	Site Services	
7.0	TAILINGS DISPOSAL FACILITIES	7-1
8.0	MANNING AND INFRASTRUCTURE	8-1
8.1	Manning	
8.2	Site Access	
8.3	Watson Lake	
9.0	TRANSPORTATION AND MARKETING	9-1
9.1	Transporation	
9.2	Marketing	
10.0	ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS	10-1
11.0	FINANCIAL EVALUATION	11-1
<u>APPENDICES</u>		
A	DRAWINGS	
B	CAPITAL COST DETAILS	
C	OPERATING COST DETAILS	
D	CURRAGH RESOURCES INC. - PHYSICALS AND COSTS REPORT	
E	ELECTRICAL POWER REQUIREMENTS	
F	H.S. CLARK OPEN PIT MINING REPORT	
G	HILLSBOROUGH UNDERGROUND MINING REPORT	
H	ROSCOE POSTLE ASSOCIATES ORE RESERVES REPORT	

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1.0 INTRODUCTION AND SCOPE

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1.1 INTRODUCTION

Kilborn Limited (Kilborn) has been retained by Frame Mining Corp. (FMC) to prepare a development plan and cost estimate for the production of lead and zinc concentrates from the Mt. Hundere base metal deposits located 45 km north of the Town of Watson Lake, Yukon Territory. The Mt. Hundere property is owned 80% by FMC and 20% by Hillsborough Resources Limited (Hillsborough).

Kilborn retained Roscoe Postle Associates Inc. (RPA) to update the in-situ ore reserve estimate and the geological description. RPA performed a similar service for Canamax Resources Inc. (Canamax), the previous owner of the Mt. Hundere property, in February 1989 based on exploration work completed at that time.

FMC retained H.S. Clarke Mining Consultants Ltd. (Harvey Clarke) to prepare the open pit mineable reserve estimates and the development and production plans, schedules and cost estimates for the proposed open pit mines.

FMC retained Hillsborough (drawing upon the experience of their wholly-owned subsidiary contracting company, Canadian Mine Development) to prepare the underground mineable reserve estimates, development and production plans, schedules and cost estimates for the proposed underground mines.

Bacon, Donaldson & Associates Ltd. carried out preliminary metallurgical testwork on Mt. Hundere samples for Canamax.

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1-2

Kilborn has reviewed the work of the sub-consultants in terms of scope only, and has relied upon it and upon the metallurgical testwork performed by Bacon, Donaldson & Associates, in preparing the overall development study.

The cash flow calculations were performed by FMC, using their established computerized financial model, and reviewed by Kilborn.

Kilborn personnel visited the project site on June 8, 1989 to familiarize themselves with local conditions.

This report describes a basic development plan for the Mt. Hundere deposits and recommends further specific studies for the purposes of upgrading and increasing the mineral reserves and of optimizing the estimated costs.

The purpose of this report is to facilitate the procurement of interim financing in order to advance the project to completion of a Feasibility Study.

1.2 THE MT. HUNDERE PROPERTY

The property is located in southeastern Yukon Territory, 45 km north of Watson Lake, as shown in Figure 1.1. Access to the property is via the Robert Campbell Highway for a distance of 54 km north from Watson Lake to a point immediately south of the Frances River bridge, then 22 km east on a single lane, four-wheel-drive tote road to the existing camp, as shown in Figure 1.2. Watson Lake has a population of 1800 and is served by commercial jet aircraft from Vancouver, Calgary and Edmonton.

It is reported that the Mt. Hundere property comprises 427 mining claims covering 8925 hectares (more than 22,000 acres) and is owned 80% by Frame Mining Corp. and 20% by Hillsborough Resources Limited.

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1-3

The known mineral occurrences are situated on bare, rounded hills ranging in elevation from 1200 to 1500 metres (4,000 to 4,900 feet) above sea level.

Climatic data for Watson Lake indicates winter frost penetration of up to 3.5 metres, in cleared areas, but no permafrost. Snowfall is relatively light (average 230 cm/year) and the prevailing wind is westerly. Temperatures for January are -26.3°C average, -31.6°C mean low; and for July are 14.0°C average and 20.3°C mean high.

1.3 HISTORY OF EXPLORATION

The original surface showings were discovered in 1962 by two prospectors, J.Hundere and P.Ritco, employed by the Francis River Syndicate. The following year they constructed an access road and carried out bulldozer trenching and 561 metres of drilling in 7 holes.

In 1966, Atlas Exploration carried out geochemical and geophysical surveys and additional bulldozer trenching.

In 1979 and 1980, Cima Resources Ltd. (previously Atlas Exploration) conducted 1768 metres of drilling in 44 holes, electromagnetic and legal surveys, and commissioned a Feasibility Study by H.A. Simons (International) Ltd. on a small open pit.

In 1981 and 1982, in Joint Venture partnership with Canadian Natural Resources Ltd., Cima conducted a further 1214 metres of drilling in 28 holes, all on the Main and East zones of the Jewelbox Hill deposit.

In 1984, Canamax Resources Inc. (Canamax) purchased the property outright and began systematic geological and geochemical prospecting, airborne geophysical surveying and follow-up ground surveys which

identified other mineralized zones. To the end of 1988, Canamax had completed 19 941 metres of drilling in 111 holes and had increased the inventory of lead-zinc-silver mineralization from approximately 250 000 tonnes to more than 5 000 000 tonnes. Exploration expenditures to date, by Canamax and previous owners, are estimated to exceed \$3,000,000.

[PARAGRAPH ON ACQUISITION BY CURRAGH/HILLSBOROUGH]

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1.4 SCOPE OF STUDY

The scope of this study is to prepare and evaluate a development plan for the Mt. Hundere property. It encompasses the following:

- A review of the geology of the deposits and an assessment of current reserves and future potential;
- Mine exploration and development plans for the Jewelbox, Gribbler Ridge and North Hill deposits;
- Process design for production of lead-silver and zinc concentrates;
- Assessment of the infrastructure required to support production;
- Project development and production schedules;
- An estimate of the capital cost to bring the project into production at the rate of 400,000 tonnes of ore per year (approximately 1 100 tonnes of ore per day);
- An estimate of the operating costs to sustain that rate of production; and
- Financial analysis of the project including net cash flow and sensitivity analyses.

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2.0 SUMMARY

2.0 SUMMARY

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2.1 CAPITAL COST

The capital cost for mining and surface facilities for a 400 000 tonnes per year processing rate is estimated to be \$_____

A summary of these costs is shown in Table 2.1 (page 2-2) and the details are included in Appendix B.

Pre-production capital costs (Area 680 in Table 2.1) for mining were estimated by Hillsborough and summarized under the headings of Exploration, \$4,291,000, and Development, \$5,932,000, for a total of \$10,223,000. The estimate, which has not been checked by Kilborn, is reported to include construction indirects, engineering and procurement, but no contingency. Contingency at 15% has been included in Area 690 of Table 2.1.

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TABLE 2.1
SUMMARY OF CAPITAL COSTS

<u>Area</u>	<u>Cost \$</u>
120 Site Services	652,000
130 Site Electrical	300,000
160 Surface Mobile Equipment	329,000
170 Roads	5,067,000
180 Skagway Facilities	1,100,000
220 SAG Mill Feed Belt Conveyor	728,000
230 Coarse Ore Receiving	876,000
240 Concentrator	16,370,000
310 Ancillary Facilities	891,000
360 Powerhouse	96,000
370 Fresh Water Supply	1,474,000
380 Tailings Disposal	1,008,000
390 Water Reclaim	389,000
SUBTOTAL	<u>32,239,000</u>
660 Construction Indirects	3,029,000
670 Engineering, Procurement & Construction Management	4,907,000
680 Mine Costs (Pit 2,326 + U/g)	N/A
690 Contingency	4,580,000
691 Camp Costs	4,602,000
692 Spare Parts and Inventory	500,000
693 Special Freight and Insurance Conditions	520,000
TOTAL - Excluding Mining Costs	<u>\$40,376,000</u>

The following have been excluded from the capital cost estimate:

360 - Powerhouse (power plant equipment assumed to be supplied by CU Power. Cost of equipment and installation included in operating costs of \$0.13/kWh.)

Working Capital

Owner's Costs

Interest and Financing Charges

Escalation

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2.2 OPERATING COSTS

Operating costs for underground mining and surface are estimated to be \$52 per tonne of ore processed and are summarized in Table 2.2. For open pit mining at \$15 per tonne, the total operating costs will drop to \$37 per tonne of ore processed. Operating cost details are included in Appendix C.

TABLE 2.2
OPERATING COST SUMMARY

	<u>Annual Cost</u>	<u>Cost/Tonne</u> <u>of Ore Milled</u>
.Mining *	11,224,000	28.06 *
Administration	928,000	2.32
Concentrator Supervision	518,000	1.29
Concentrator Operating Labour	621,000	1.55
Concentrator Maintenance Labour	315,000	0.79
Concentrator Operating Supplies	1,891,000	4.73
Maintenance Supplies	410,000	1.03
Assay Laboratory	216,000	0.54
Power House *	3,140,000	7.85 *
Surface	405,000	1.01
Tailings Pond	200,000	0.50 -
General Expenses	<u>944,000</u>	<u>2.36</u>
Total	20,812,000	52.03

9.93
50
10.43

* For underground mining and surface facilities. For open pit mining reduce the mining cost by \$5,600,000/year or \$14/tonne and the powerhouse cost by \$706,000/year or \$1.76/tonne of ore milled.

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2-4

Open pit operating costs have been estimated by Clarke on a contract mining basis. For the Jewelbox Hill pits, the average operating cost (after capitalized stripping of waste) is \$1.67 per tonne mined or \$13.84 per tonne of ore milled. For the Burnick pit, the average operating cost is \$1.34 per tonne mined (again, after stripping) or \$13.97 per tonne of ore milled.

Underground mine operating costs have been estimated by Hillsborough, also on a contract mining basis which includes equipment lease costs. These costs are shown in Table 2.3, Data Summary, under the headings of Exploration, Development and Production. Variations over time are due to mining method, ore thickness and haul distance from the different ore zones. The total post-production cost of \$..... indicates an average unit cost of \$.... per tonne over the tonnes of ore mined.

Mine supervision costs are estimated at \$425,000 per year or \$1.06 per tonne milled.

2.3 PERSONNEL

The total personnel required for the operating phase of the project are shown in Table 2.4.

TABLE 2.4
PERSONNEL REQUIREMENTS

Mine Supervision	9
Mining Contractor *	40 *
Administration	16
Concentrator Supervision	7
Concentrator Operating Labour	12
Concentrator Maintenance Labour	6
Assay Laboratory	3
Surface	5
TOTAL	<u>98</u>

* For initial open pit mining at Jewelbox Hill. Increases to 54 for Burnick open pit and to .. for underground mining.

Table 2.3

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2.4 Definition Requirements

There are a number of items which require greater definition and confirmation at the onset of the project development. Kilborn has made certain assumptions based on experience and it is not anticipated that there will be any significant deviation from the capital or operating costs presented in this Definition Study. Some of these items are as follows:

1. Detailed surveying of the truck dump-concentrator area combined with a rock profile. This may allow optimization of cut and fill quantities improved, footings for heavy foundations plus the use of the natural topography for the concentrator requirements.
2. Determination of well location and water availability. This report uses assumptions based on similar experiences at the Faro mine. This is an early requirement as a winter start-up is predicated upon having adequate water available in both the tailings and reclaim water ponds.
3. Additional soils work and surveying in the specific tailings and water dam areas. The current soils report indicates a costly method of dam footing stabilization which is not normally practiced for mine tailings dams. A more detailed review may allow a smaller tailings dam plus ongoing buildup using waste produced from the mining operations.

This study is costed on the basis of all new purchases (with the exception of the surplus flotation cells from Faro). This is necessary as commitments cannot be made at this time for the acquisition of available used equipment and materials. A number of used items may be available for purchase which could result in significant capital savings.

Concentrator: Grinding mills, thickeners, agitators, conveyors and electrical switchgear and starters are commonly found. These could reduce the allowed capital of quite significantly.

Trailers: Construction camps complete with kitchen and recreation facilities may be purchased used or may be simply rented as part of the construction contract. The purchase price shown in this study is.....

Other operations trailers for administration, mill dry and offices and laboratory are included at a new purchase price of These may be commonly purchased as used equipment.

Surface Mobile: Low usage items such as forklifts and bull moose are also common on the used market.

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3.0 GEOLOGY AND MINERAL RESOURCES

3.0 GEOLOGY AND MINERAL RESOURCES

Sub-sections 3.1 and 3.2 were excerpted from the "Report on In-situ Reserves, Mt.Hundere Project, prepared by Roscoe Postle Associates Inc. (RPA) dated December, 1989. That report is reproduced in Appendix H.

Sub-section 3.4.1 was prepared by Hillsborough Resources. Kilborn considers the extraction and dilution factors to be appropriate for converting the in-situ proven plus probable reserves into mineable reserves. Further exploration is required to upgrade the possible resources. A considerable quantity of definition diamond drilling is required to facilitate detailed mine planning.

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3.1 GEOLOGY AND MINERALIZATION

The property covers most of a 9 km by 7 km block of Lower Cambrian sedimentary rocks that has been up-faulted into sedimentary rocks of Devonian and Silurian age.

The predominant rock type on the property is a grey to black phyllite. Limestone, which hosts the mineralization, occurs in units up to 100 meters thick but makes up less than 5% of the exposed strata. Narrow, steeply dipping dikes of intermediate to felsic composition are relatively widespread, but form a minor part of the rock package.

Although the drilling to date shows that dips are usually fairly consistent and gentle (mostly less than 25°), there are certain exceptions and a number of unexplained complexities. Dips of 45° or more occur locally in the Jewelbox Hill and Burnick deposits, and predominate in the Attila Zones. The situation which creates the

most uncertainty involves the rapid disappearance laterally of extensive, 50-100 m thick, limestone bands over a drill hole spacing of 50-100 m. Explanations involving steeply dipping faults, tight (recumbent) folds, and very rapid facies changes have been offered, but to date there is no definite evidence to prove or disprove any of these suggestions.

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In the attached drill sections, situations of this type have mostly been interpreted as "facies changes", although the uncertainties of this choice are appreciated. If the role of facies changes can be determined, the effects of folding and faulting can be more readily assessed.

Prominent alteration zones, up to 2 km long and 1 km wide, occur in four locations: Jewelbox Hill, Gribbler Ridge, North Hill and Porcupine Hill. From current information, the alteration pattern appears to be similar in all four areas. In the alteration zones the phyllite is altered to a mica hornfels over a large vertical distance - at least 300 meters. Limestone beds are converted to marble, in most cases (the Burnick area is the main exception), and more locally to an actinolite, diopside or garnet skarn. The skarn zones are up to 30 meters thick and have lateral dimensions up to several hundreds of meters. They usually occur at or near limestone-phyllite contacts; for example, at the upper and lower contacts of thick limestone units, along phyllite beds within the thickener limestone beds, or in association with thin limestone beds within the phyllites. Zinc-lead-silver mineralization is directly associated with the skarn zones.

The sulphide mineralization is fairly similar throughout the Mt. Hundere property. It consists of medium to coarse grained sphalerite and galena (with essentially no iron sulphides) more or less evenly

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3-3

distributed in selected skarn layers. Variable but minor amounts of quartz and calcite are commonly present as blebs. The Pb:Zn ratio is generally in the order of 1:2; however, the Burnick zone at North Hill is an exception with a 1:30 ratio.

Silver values are associated with the galena: no separate silver bearing minerals have been identified. The ratio of Ag to Pb, however, is different in different deposits. At Jewelbox Hill, an average Pb grade of 9% corresponds to 55 g/t Ag, while in the Burnick zone 0.4% Pb is associated with 40 g/t Ag.

Parts of some of the mineralized zones show varying degrees of oxidation. At an early stage, smithsonite develops from sphalerite, and iron and manganese oxides from the skarn silicates. In extreme cases the sphalerite and calc-silicates are completely converted to smithsonite and iron oxides, and the galena to cerussite. Although most of the oxidized mineralization appears to occur in situ, there are a few cases where downward migration has apparently occurred, resulting in smithsonite healed cracks in unaltered limestone in the footwall of oxidized skarn mineralization.

A few drill holes have intersected steeply dipping faults with a different type of mineralization, consisting of drusy quartz, chalcedony, fluorite and calcite, over widths of up to 10 meters. Fluorite is occasionally present in the Pb-Zn mineralization, but is minor.

3.2 GEOLOGICAL RESERVES

3.2.1 Database

This in-situ reserve estimate is based on the following data, provided by Curragh.

Survey information, summarized geological data, and all assay information for holes numbered from 80 to 326 were supplied in digital form using PC-Xplor software. From this material, selected intersections were averaged, and plans and sections were plotted, by computer in RPA's Toronto office. Interpretations were carried out independently by RPA, although some Curragh plans and sections were supplied, for comparison, late in the study.

For drill holes 1 to 79, new plans and sections were drawn by hand, based on the original drill logs.

3.2.2 Procedures

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In most cases, tonnage and grade estimates were made by RPA using a modified polygon procedure. A cross section method was used for the Main Zone, and portions of the Jewelbox and Burnick Zones where it seemed more appropriate. In most cases, measurements were made on 1:1000 scale plans and sections. The exceptions were the Main and East Zones, where 1:500 figures were used initially for reserve estimation, but reduced to 1:1000 scale for presentation.

The bulk of the grade information is provided by the diamond drilling (mostly NQ Size) carried out by the previous property owner, Canamax Resources Inc. (Canamax) from 1985 to 1988, and by Curragh in 1989. Assays and specific gravity determinations on Canamax's samples, were carried out by Rossbacker Laboratory Ltd., Burnaby, B.C. and on the Curragh samples by Min-En Laboratory, North Vancouver, B.C. A systematic program of cross checks is planned by Curragh.

Reserve boundaries were selected on the assumption of a 2 m minimum mining width and a 3 m minimum separation between parallel bands of mineralization, to allow each band to be considered extractable. The

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3-5

classification of reserves into the "Sulphide" and "Oxide" categories was based on the owner's visual observations recorded in the drill logs and data base.

A cut-off grade of 8% combined Pb-Zn was applied in most places, but in certain situations marginal grade material was included if it resulted in a more realistic mining boundary. The 8% combined Pb-Zn cut-off grade provides a revenue which roughly corresponds to anticipated operating costs in the \$60-70 per ton range. In addition, in most places it corresponds to a natural boundary between grades above 8% combined Pb-Zn and grades substantially lower.

3.2.3 Density Weighting

For the holes drilled by Canamax and Curragh, specific gravity (s.g.) measurements were made on all assayed samples. In the reserve estimates involving these holes (over 90% of the total), grades were combined on a density weighted basis: sample grades were weighted by length x s.g. to provide intersection averages, and reserve blocks were combined on a volume x s.g. (i.e. tonnage) basis.

For the Main and East Zones at Jewelbox Hill, which were drilled off by earlier property owners, s.g. measurements were restricted to a few character samples. For these deposits, the grades were not density weighted, and overall densities were assumed to be the same as average figures for mineralization of similar grade and character in the other deposits at Jewelbox Hill: 3.4 for the high grade Main Zone and 2.9 for the oxidized East Zone mineralization.

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3.2.4 Results

Reserve estimates by RPA are listed in Table 1. Data for individual blocks are given in Tables 2 to 7 and Figures 2 to 78 in the Appendix.

In situ reserve estimates are summarized as follows:

	<u>Tonnes</u>	<u>% Pb</u>	<u>% Zn</u>	<u>oz/ton Ag</u>
<u>Sulphide Reserves</u>				
Proven (Jewelbox Hill)	75,000	16.9	18.8	2.6
Probable (Jewelbox, North Hill)	3,909,000	3.9	12.8	1.7
Possible (Jewelbox, North Hill, Gribbler)	1,045,000	5.1	13.1	2.0
<u>Oxide Reserves</u>				
Probable	483,000	7.7	11.8	3.2

3.2.5 Correlations and Continuity of Mineralization

In most cases, individual zones of mineralization can be correlated with a high degree of certainty. Normally, the mineralized skarn layers occur at the borders of relatively thick, easily identified limestone units; or form bands that parallel the contacts of the main limestone bands. In parts of the Jewelbox and Burnick zones, where there are pronounced structural complexities, correlation is less certain, but the implications regarding tonnage possibilities are probably not too serious. In other words, alternative interpretations provide a similar tonnage in blocks of mineable size.

ROSCOE POSTLE ASSOCIATES INC.

TABLE 1
MT. HUNDERE IN SITU RESERVE ESTIMATE

	PROVEN RESERVES				PROBABLE RESERVES				POSSIBLE RESERVES			
	Tonnes	% Pb	% Zn	Oz/S.T. Ag	Tonnes	% Pb	% Zn	Oz/S.T. Ag	Tonnes	% Pb	% Zn	Oz/S.T. A
SULPHIDE RESERVES												
Main Zone	75,000	16.9	18.8	2.6	43,000	7.8	10.8	1.3				
JB Hill					1,431,000	8.3	13.0	2.1	171,000	7.1	10.2	1.1
Gribbler									347,000	11.1	16.1	3.1
Attila					406,000	3.4	12.4	1.8				
Burnick					2,029,000	0.8	12.7	1.4	527,000	0.6	12.0	1.5
	75,000	16.9	18.8	2.6	3,909,000	3.9	12.8	1.7	1,045,000	5.1	13.1	2.0

OXIDE RESERVES				
East Zone	129,000	5.4	7.3	7.2
J.B. Hill	354,000	8.5	13.5	1.8
	483,000	7.7	11.8	3.2

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3.2.6 Classification of Reserves

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The terms Proven, Probable and Possible Reserves, as used in the present report, are synonymous with the terms Measured, Indicated and Inferred Reserves, respectively.

At the property's present stage of development, Proven Reserves are restricted to the eastern two thirds of the Main Zone at Jewelbox Hill. This is the best defined mineralization on the property, with drilling on 10 m sections, several holes per section, and a series of surface trenches. Boundaries are defined with sufficient accuracy for open pit mining to commence.

Most of the reserves are in the Probable class, although different parts of different zones have a range of confidence levels. The best defined area is in the northeast end of the Jewelbox Hill sulphide mineralization where the JB-1 East Block, the JB2-A block and the eastern edge of the JB-2 block contain some 600,000 tons averaging 20-25% combined Pb-Zn. This area has been tested by vertical holes at 25 m centres, and a number of flat holes which cut the mineralization at lower angles. Although the grade and tonnage estimates for this section are probably fairly reliable, the shape of the mineralization is complex, and considerably more drilling will be required to locate boundaries to the accuracy required for mining.

The tonnage and grade figures for the remaining Probable Reserves are somewhat less well defined, but are still within the Probable Reserve category. These situations range from vertical drill holes on 25 m centres with simple to complex geology, to cases of wider spaced drilling where the mineralization correlates particularly well.

The term Possible Reserves has been used for the Gribbler zones and parts of the Burnick deposit because of the limited number of drill

holes that are spaced as much as 100m apart. At Jewelbox Hill, the reserves in the Possible category involve the poorly defined J-1 Zone (stratigraphically above the main zones of mineralization) plus the extension possibilities of the JB1 and JB1-A zones, which are open to the west for much of their length. Isolated intersections, which do not correlate with the main zones of mineralization were not included in the reserve estimates.

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3.2.7 Oxidized Reserves

Based on visual estimates, close to 20% of the Jewelbox mineralization has been oxidized to a significant degree, but the oxidation appears to be mostly restricted to well defined areas. Although minor oxidation is sometimes present elsewhere (in the Main Zone and the parts of the JB1 Zone that are close to surface), no problem is anticipated in mining essentially unoxidized material on a selective basis.

3.3 COMPARATIVE IN-SITU RESERVE ESTIMATES

The Mt. Hundere Joint Venture, between site and the Whitehorse exploration office, prepared computerized borehole sections, interpreted the geology and ore zones, and estimated the in-situ reserves for each deposit with the aid of a spread sheet.

The Joint Venture interpreted sections were issued to Clarke and to Hillsborough for pit and underground mine design and mineable reserve estimation.

The results of these various estimates are set out in Table 3-3 and compared with the control estimate by RPA.

3.4 MINEABLE RESERVES

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3.4.1 Open Pit Sulphide Reserves

The mineable ore reserves in the Jewelbox and Burnick open pits were calculated by Clarke working from ore zone sections which were interpreted by Curragh. The following methodology is quoted from the Clarke Report:

Within each open pit boundary, geological sections (1:500 scale) spaced at 25 m intervals were used to calculate open pit ore reserves. The drillhole spacing on each section is approximately 25 m. A 4% combined lead-zinc grade is used to determine the boundary between ore and waste. The open pit walls were drawn on each section. The ore zone on each section was divided into segments. Each segment represented an area half the distance to the nearest drillhole. These segments or ore blocks were planimeted and used to calculate the area weighted grade of ore. The areas of waste were planimeted as well and used to calculate the quantities of waste. In addition to the volume measurement by section, the open pit quantities were also calculated for each 10 m bench. The bench quantities were used for mine planning and scheduling purposes.

The criteria used for determining open pit ore reserves are listed below.

- .1 Minimum mining thickness is 3 m.
- .2 Mining losses are 5% by weight (i.e. recovery is 95%)
- .3 Dilution is 10% by weight at 0% metal content.
- .4 The average S.G. of the ore is 3.0.
- .5 All oxide ore is excluded.

The following summary table is reproduced from the Clarke Report. It should be noted that the Main Zone pit reserve was calculated by Canadian Geoscience Corporation on the assumption of 100 percent recovery with 20 percent dilution at zero metal content.

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TABLE 3.1
SUMMARY
OPEN PIT ORE RESERVES

<u>Mining Area</u>	<u>Waste Tonnes</u>	<u>Ore Tonnes</u>	<u>S.R. T/T</u>	<u>% Pb</u>	<u>% Zn</u>	<u>g/t Ag</u>
Main Zone Pit	520,000	142,200	3.66:1	11.88	14.14	61.6
Jewelbox Pit	2,101,800	218,350	9.63:1	7.48	11.07	40.6
Burnick Pit	9,399,400	1,010,400	9.30:1	0.73	10.69	31.4
<u>Total</u>	<u>12,021,200</u>	<u>1,370,950</u>	<u>8.77:1</u>	<u>2.96</u>	<u>11.11</u>	<u>36.0</u>

3.4.2 Underground Sulphide Resources

The mineable inventory was calculated rather conservatively, allowing for mining without backfilling.

In general, the pillar size was designed 5 meters wide and 10 meters long, except the thick zone area in the Jewelbox Zones. This resulted in an average mining extraction of 70% in the Jewelbox and Burnick Zones.

The Gribbler Ridge and Attila Zones have a maximum thickness of less than 10 meters, and pillars larger than 5 meters by 10 meters are not required. The mining extraction was increased to 75%.

Hillsborough's derivation of the 3 700 000 tonnes sulphide mill feed, at 4.3% Pb, 12.1% Zn and 51.4 g/t Ag, is set out in Table 3.2

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4.0 MINING

4.0 MINING

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4.1 SUMMARY

The mineable deposits and zones are located in two main areas approximately 4km apart: Jewelbox Hill and North Hill. The Gribbler Ridge deposit, adjacent to Jewelbox Hill, has an attractive grade and will probably be mined before the North Hill zones. However, the drill spacing is such that Gribbler reserves have been classed as "possible" and are not included in the production plans until the proven and probable reserves have been exhausted.

The proven and probable reserves will be mined at the rate of 400,000 tonnes per year by a combination of open pit and underground mining methods. Table 4-1 provides a summary of the production figures by years from the various zones.

In general, the open pit plans have been developed by H.S. Clarke Mining Consultants Ltd. (Clarke) and the underground plans by Hillsborough. Their reports are reproduced in Appendices F and G respectively. The mining plans have been reviewed by Kilborn and found to be reasonable and achievable.

4.2 JEWELBOX HILL AREA - OPEN PITS

4.2.1 Main Zone Pit

It is proposed to commence mining from the small, high grade 'Main' zone which outcrops on the north face of Jewelbox Hill and which was the subject of a feasibility study in 1980. At that time, Canadian Geoscience Corporation (CGC) designed and costed a small open pit and two possible extensions as a sub-contract to H.A. Simons International. As no further work has been done on the Main zone

since that time, the extended CGC design has been accepted. It is illustrated in Figure 1 at the end of this section.

The Main zone pit will be mined downward, as a series of side hill cuts, in 6 metre benches from elevation 1428 to a final floor elevation of 1368 metres. CGC assumed that all of the ore would be recovered from the pit together with 20% dilution at zero grade:

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	<u>Quantity</u>	<u>Pb Grade</u>	<u>Zn Grade</u>	<u>Ag Grade</u>
	(Tonnes)	(%)	(%)	(g/t)
In-situ Ore	118,000	14.32	17.04	74.2
Dilution	<u>24,000</u>	0	0	0
Diluted Ore	142,000	11.88	14.14	61.6
Waste	<u>520,000</u>	0	0	0
Total Mined	662,000	-	-	-

The stripping ratio on the Main zone pit is 3.66:1.

Mining is assumed to be contracted and is described below.

4.2.2 Jewelbox Pit

The second mining target is the Jewelbox pit which is shown in plan in Figure 2. Two pits were designed, as outlined in Figures 2 and 3, but the larger pit (with a stripping ratio of 13.7:1) was shown to be less attractive when combined with underground mining than the smaller pit.

The Jewelbox Pit contains 218,000 tonnes of mineable ore plus 2,102,000 tonnes of waste for a stripping ratio of 9.6:1. The design criteria are summarized as follows:

Table 4-1
MINE PRODUCTION SUMMARY

YEAR QUARTER	1990		1991		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTALS	Pb %	Zn %	Ag g/t
	3	4	1	2	3	4												
OPEN PITS																		
ORE(1,000 tonnes)																		
-Main Pit			100	42											142	11.88	14.14	61.6
-Jewelbox Pit				58	100	60									218	7.48	11.07	40.6
-Burnick Pit							300	400	300						1000	0.73	10.69	31.4
-Sub-Total Ore			100	100	100	60	300	400	300						1360			
WASTE(1,000 tonnes)																		
-Main Pit	100	320	100												520			
-Jewel Pit	722	480	590	270	40										2102			
-Burnick Pit							3000	3800	2250	360					9410			
-Sub-Total Waste	822	800	690	270	40		3000	3800	2250	360					12032			
Pit Total Mined	822	900	790	370	100	0	3000	4100	2650	660					13392			
UNDERGROUND																		
ORE(1,000 tonnes)																		
-Jewelbox					40	400	400	400	279						1519			
-Attila									100	280					380			
-Burnick										120	390				510			
-Sub-Total Ore					40	400	400	400	279	100	400	390			2409			
WASTE																		
-Jewelbox Devel.																		
-North Hill Devel.																		
TOTAL ORE(1,000 tonnes)	0	100	100	100	100	400	400	700	679	400	400	390	0	0	3769			
Aver. Ore Grade - % Pb		11.88	9.33	7.48	4.49	0.00	0.00	0.31	0.43	0.55	0.00	0.00	ERR	ERR	ERR			
- % Zn		14.14	12.35	11.07	6.64	0	0	0.312857	0.430044	0.5475	0	0	ERR	ERR	ERR			
-g/tAg		61.6	49.42	40.6	24.3	0	0	13.45714	18.49779	23.55	0	0	ERR	ERR				

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Waste Dump Slope	= 37°
Overall Pit Slope	= 56°
Rock Face Slope	= 68°
Bench Height	= 10m
Berm Width (every second bench)	= 5m
Haul Road Width	= 15m
Maximum Road Grades	= 8%
Maximum Road Grades (short distance)	= 12%

Geotechnical studies have not been completed on the stability of the highwall slopes. Until these studies have been completed, highwall slopes of 56° are utilized in the pit designs.

The waste dumps are built in terraces adjacent to the open pits. The waste dumps are designed and located to provide short waste haul distances and flat grades. The hillside terrain has also been utilized to minimize the quantity of stripping necessary for the construction of the ore haul road to the bottom of each pit.

4.2.3 Mining Method

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Combined ore production from the Main Zone and Jewelbox pits is 360,000 tonnes, equivalent to a little less than 11 months of mill feed. It is proposed that this mining be contracted in order to minimize pre-production capital expenditures.

The ore in the Main Zone Pit outcrops on the surface and only approximately 100,000 tonnes of waste pre-stripping is required. However, in the Jewelbox Pit, 1,700,000 tonnes of waste rock has to be pre-stripped before the first ore is exposed. This quantity of pre-strip requires the mining equipment to be mobilized and operating on a productive basis by the end of September, 1990.

The pits have been costed on the assumption that the contractor will use conventional shovel-truck mining methods. Typical equipment would include a 250 mm blasthole drill, a 4.6m³ hydraulic shovel backed up by a 5.4m³ front-end loader, three 36t trucks, two dozers, a grader and miscellaneous service vehicles. The contractor provides his own ancillary facilities such as office, shops, warehouse, pumps and power generator.

Waste haul distances are short, but the ore must be hauled 6.9 km from the Main Zone pit, and 7.4 km from the Jewelbox, to the ore dump pocket above the mill site.

4.3 JEWELBOX HILL AREA - UNDERGROUND

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It is planned to mine the deeper ore, below and to the south of the open pits, by underground methods. Access will be provided from the 1250 production portal and main haulage adit, and from the 1420 ventilation portal and exploration decline. The Jewelbox mine development is shown on Dwg. No..... in Appendix....

The 1250 and the 1420 portals will be connected by driving the lower zone haulage drift a distance of 750 m at a gradient of plus 5.5% and then a ramp at 18% to the middle zone. An incline will be driven from the middle zone through the upper zone and break through to surface at the 1420 elevation (for ventilation purposes only). A second ramp will be driven from the middle zone to the upper zone to access the J-1 and also serve as a ventilation connection on the south end of the orebody. As the haulage drifts are developed through the various ore zones, the panel accesses will be collared to facilitate production drilling without causing interference with the ore haulage. In several locations, exploration cross-cuts will be driven across the zone to further define the mining limits.

The main haulage drift will be established on the 1250 level. Two orepasses will be driven from this level to the upper zones with finger raise connections to the individual zones. Truck chutes will be constructed under both orepasses.

The ventilation system will be set up to intake air at the 1420 portal and distribute it down the access ramps, along the haulage drifts out the 1250 adit.

The Gribbler Ridge deposit will be explored by ramping down from the 1250 main haulage adit as shown on Dwg. No. Since the Gribbler deposit is classified as possible ore, this development is currently scheduled near the end of the life of the proven plus probable reserves.

4.3.1 Mining Methods

The selected mining method will be room and pillar. Details of the room and pillar sizes will be dependent on ore thickness, inclination of the ore, and ground conditions.

In general, ore thickness is higher than 5 metres, with a maximum of 28 metres. Only a small percentage (less than 6%) is 2 metres thick.

The method involves driving pilot drifts on the strike of a zone, 5 metres high and 8 metres wide. Rooms will be mined off the pilot drifts, up and down dip, 8 metres wide. A pillar 5 metres wide and 10 metres long will be left between the rooms.

Ore thicker than 5 metres will be benched in the pilot drifts and in the rooms. Refer to Drawing #89-14-023.

The ore will be hauled to centrally located orepasses. Large haulage trucks will deliver the ore from the orepasses directly to the crushing plant on surface.

The mining sequence will vary in the orebodies depending on hanging wall conditions, zone thickness, and distance between zones. Generally, mining will progress from the upper to the lower zones.

The mining schedule, 547 000 tonnes per year, takes advantage of the higher grades of the Jewelbox and Gribbler Ridge areas in the early years of mining. Production estimates are set out in Table 4.1.

The mine equipment requirement is set out in Table 4.2. Since Hillsborough owns a mining contracting company, Canadian Mine Development, this equipment will be supplied on a rental basis against operating costs, not as capital.

Production manpower requirements are set out in Section 8.0.

4.3.2 Mine Services

Ventilation systems will be designed to have flow through ventilation during the production phase. Auxiliary fans and ducting will be required during exploration and development. A main intake fan and heater will be set up at the 1420 portal for the Jewelbox zones. The 1250 level will serve as exhaust for Jewelbox and Gribbler Ridge. A fresh air raise will be driven to surface at Gribbler Ridge.

Mine discharge water from the Jewelbox orebody will be collected in a sump near the 1250 elevation adit portal and discharged to surface. All other zones will require pumping from underground sumps.

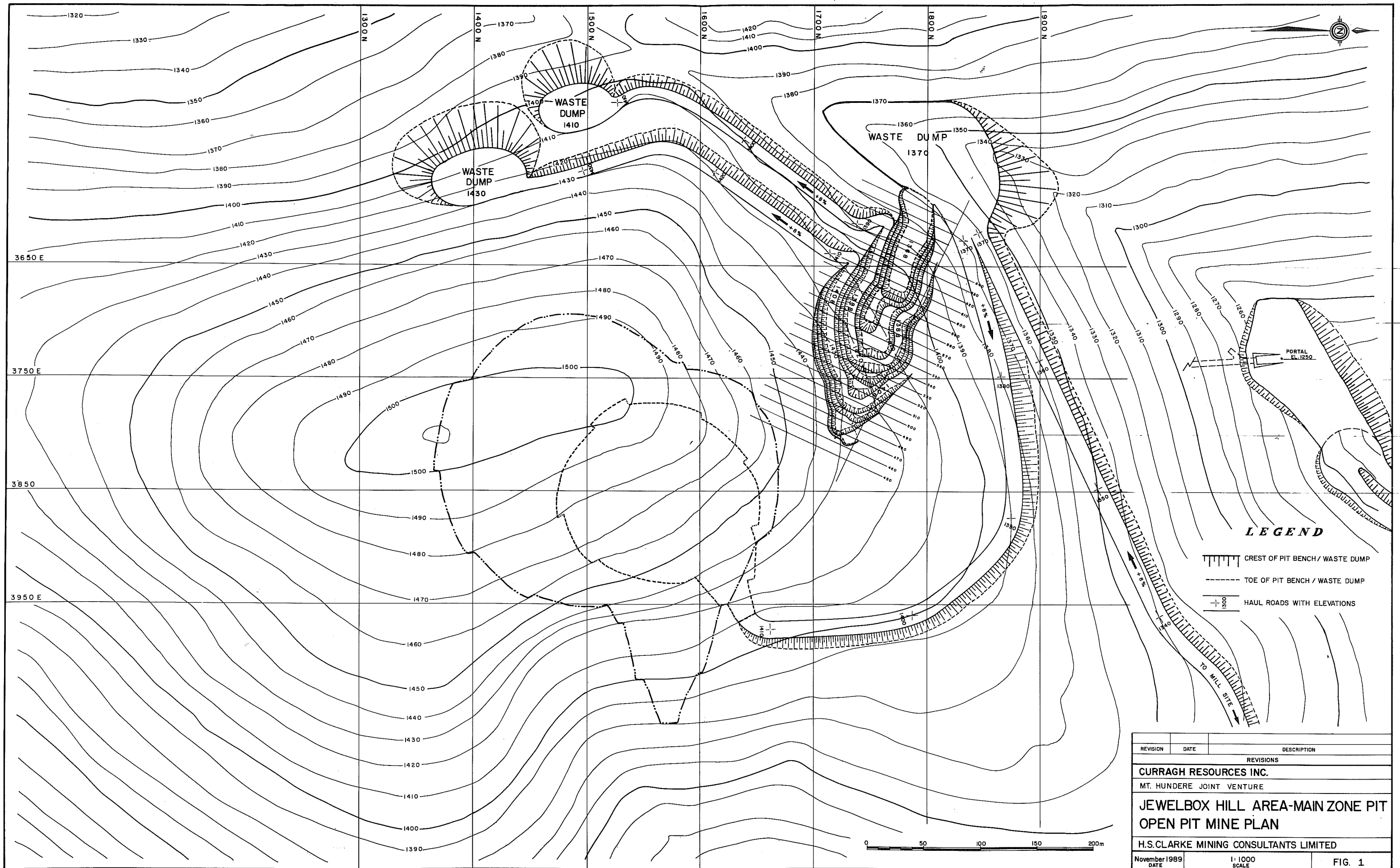
4.4 BURNICK OPEN PIT

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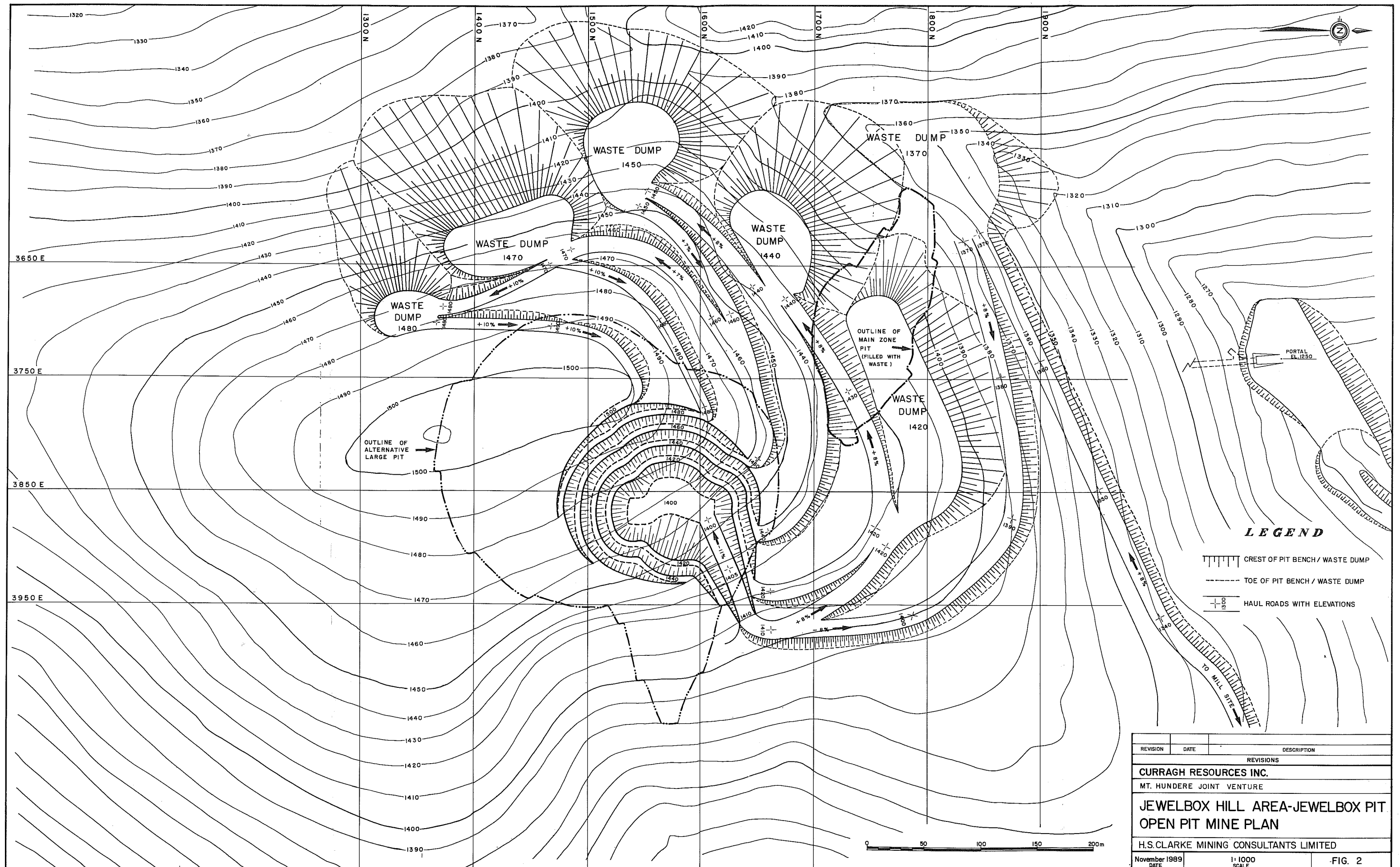
The Burnick pit, on the eastern flank of North Hill, contains 1,010,000 tonnes of mineable ore plus 9,400,000 tonnes of waste for a stripping ratio of 9.3:1. This is sufficient to feed the mill for 2.5 years. In order to sustain ore production of 400,000 tonnes per year, it will be necessary to pre-strip approximately 3,000,000 tonnes of waste from the Burnick pit. This stripping is scheduled over a 6 month period prior to exhaustion of the Jewelbox underground ore.

The design criteria are the same as those described for the Jewelbox pit in Section 4.2.2.

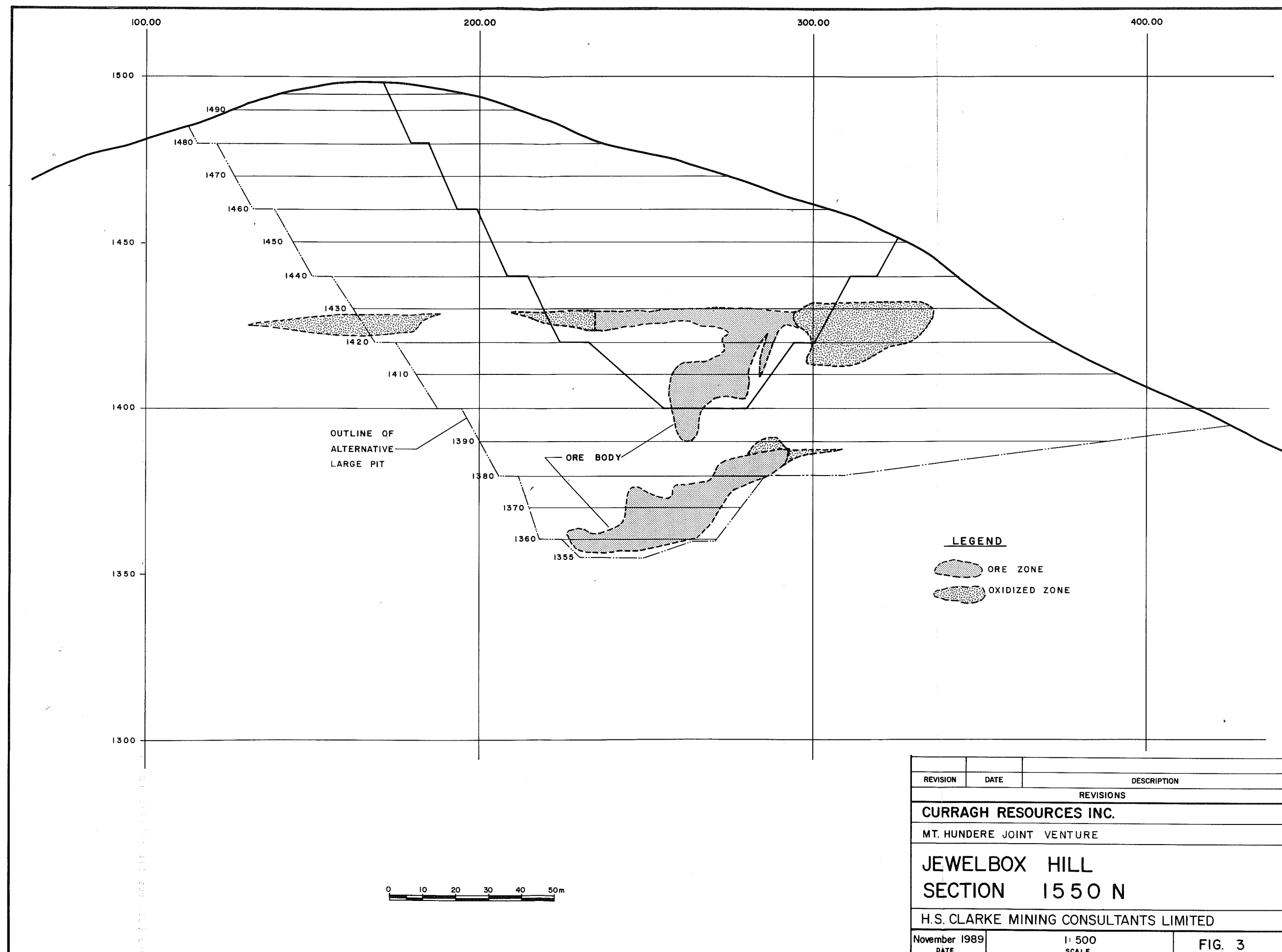
Costing assumes post-production capitalization of the stripping and contract operation with a conventional truck-shovel fleet. Waste haul distances are short and the ore haul is 2.2 km downhill to the dump pocket. The contractor is expected to use an 8.0m³ hydraulic shovel and three 52.6 tonne trucks. Other equipment would be the same as for the Jewelbox pit.



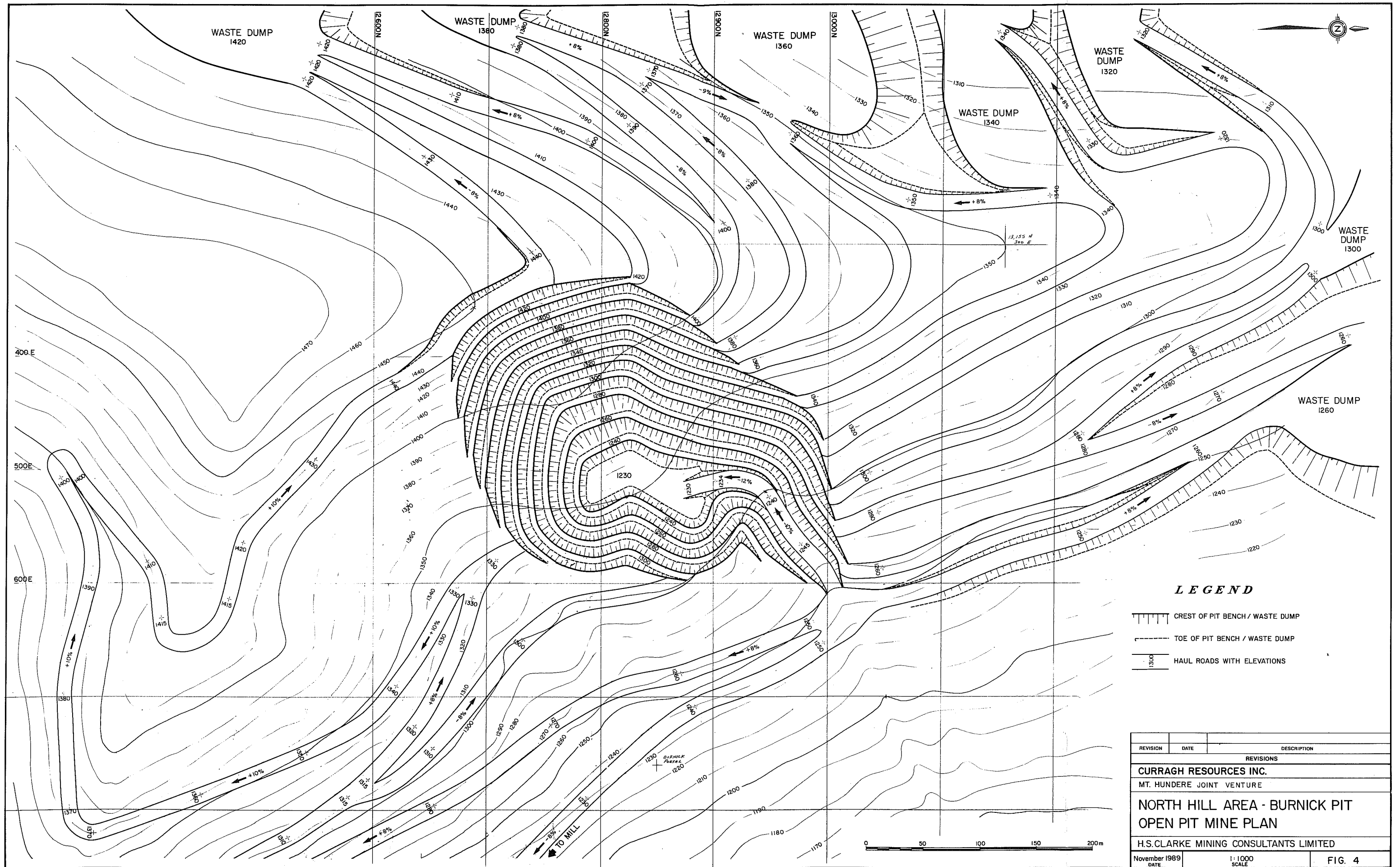
REVISION		DATE	DESCRIPTION
REVISIONS			
CURRAGH RESOURCES INC.			
MT. HUNDRE JOINT VENTURE			
JEWELBOX HILL AREA-MAIN ZONE PIT			
OPEN PIT MINE PLAN			
H.S.CLARKE MINING CONSULTANTS LIMITED			
November 1989		1:1000	FIG. 1
DATE		SCALE	

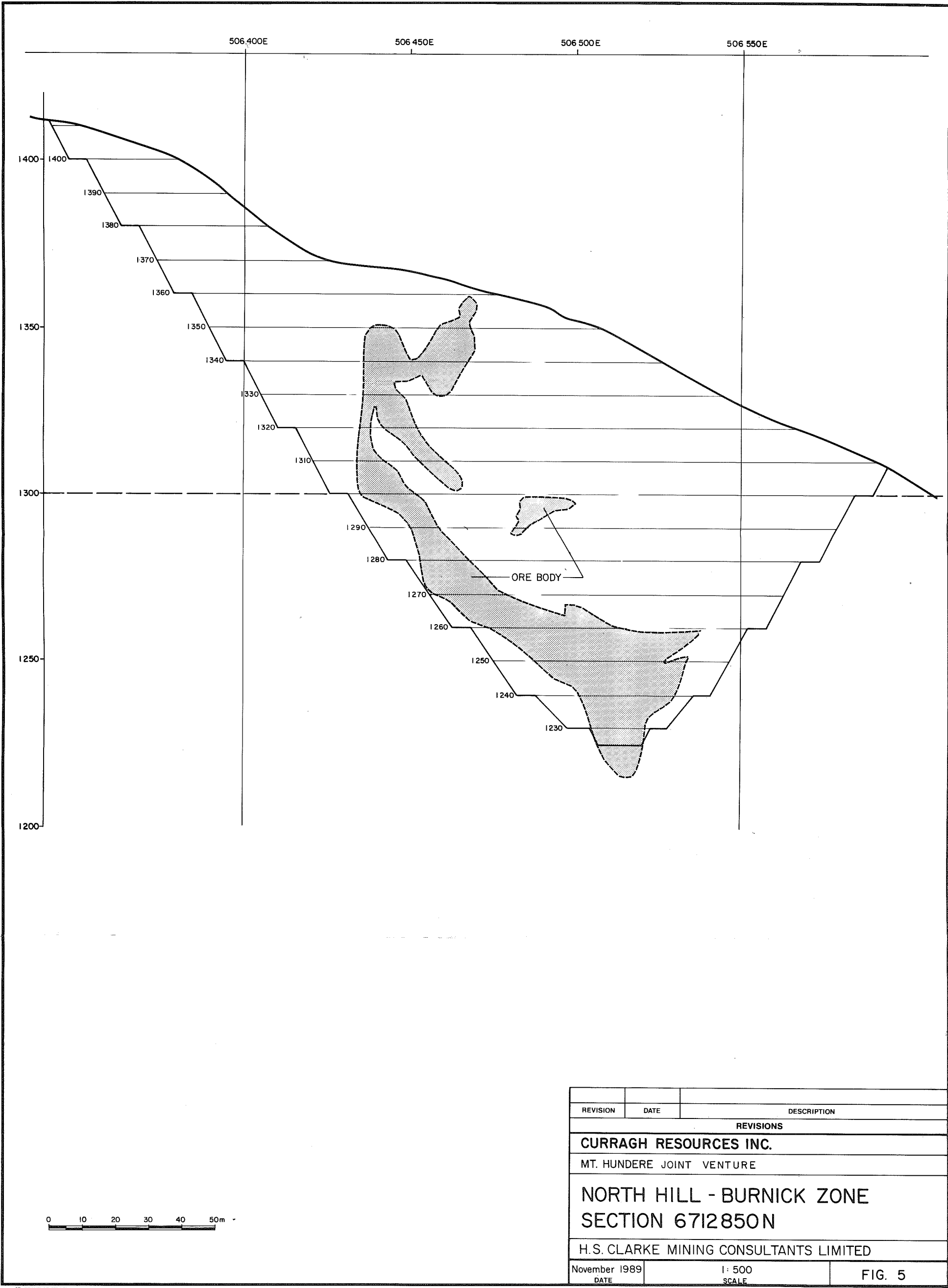


REVISION	DATE	DESCRIPTION
REVISIONS		
CURRAGH RESOURCES INC.		
MT. HUNDERE JOINT VENTURE		
JEWELBOX HILL AREA-JEWELBOX PIT		
OPEN PIT MINE PLAN		
H.S. CLARKE MINING CONSULTANTS LIMITED		
November 1989	1:1000	FIG. 2
DATE	SCALE	



REVISIONS		
REVISION	DATE	DESCRIPTION
CURRAGH RESOURCES INC.		
MT. HUNDERE JOINT VENTURE		
JEWELBOX HILL		
SECTION 1550 N		
H.S. CLARKE MINING CONSULTANTS LIMITED		
November 1989	1: 500	FIG. 3
DATE	SCALE	





5.0 PROCESSING

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5.0 PROCESSING

5.1 METALLURGICAL TESTWORK

Metallurgical testwork by Bacon, Donaldson & Associates Ltd. has been reported in the following reports:

- Preliminary Metallurgical Testwork on Mt. Hundere Samples - January, 1986
- Metallurgical Testwork on Samples from Mt. Hundere Project - March, 1989

The 1986 testwork was carried out on composites MH-1 and MH-2 from the Jewell Box Hill deposit.

Assays of each composite were as follows:

	<u>MH-1</u>	<u>MH-2</u>
% Pb (total)	7.86	8.48
% Pb (oxide)	0.49	2.39
% Zn (total)	12.72	13.39
% Zn (oxide)	0.10	0.30
% Fe	3.47	3.78
g/t Ag	53.60	226.30

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Test #4 from the January, 1986 report produced the following results from a sample of MH-1 ore:

	<u>Assays</u>			<u>Distribution - %</u>		
	<u>% Pb</u>	<u>% Zn</u>	<u>g/t Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Ag</u>
Pb Concentrate	72.28	6.86	512	95.89	5.17	88.37
Zn Concentrate	N/A	56.94	9	N/A	90.54	3.39
Mill Feed	7.36	12.96	56	100.0	100.0	100.0

Test #8 produced the following results from a sample of MH-2 ore containing 28% of the lead as oxide:

	<u>Assays</u>			<u>Distribution - %</u>		
	<u>% Pb</u>	<u>% Zn</u>	<u>g/t Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Ag</u>
Pb Concentrate	74.48	5.02	2435	74.99	2.83	83.87
Zn Concentrate	0.16	57.76	16	0.43	87.21	1.49
Mill Feed	7.59	13.56	222	100.0	100.0	100.0

Concentrate grades for the MH-2 sample were similar to those produced from the MH-1 sample but recoveries were lower by approximately 21% for lead, 5% for silver and 3% for zinc.

Tests #4 and #8 were carried out with no regrinding of the lead and zinc rougher concentrates.

The 1989 testwork was carried out on composites MH-3 and MH-4 from the Attila and Burnick deposits respectively.

Assays of each composite were as follows:

	<u>MH-3</u>	<u>MH-4</u>
%Pb	3.71	0.10
%Zn	16.25	12.98
g/t Ag	79.30	18.50

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Test F1 on composite MH-3 produced the following results:

	<u>Assays</u>			<u>Distribution - %</u>		
	<u>% Pb</u>	<u>% Zn</u>	<u>g/t Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Ag</u>
Pb Concentrate	72.0	5.0	1459	87.7	1.40	83.1
Zn Concentrate	0.28	66.4	26.5	1.6	89.1	7.3
Mill Feed	3.71	16.25	79	100.0	100.0	100.0

Tests on composite MH-4 did not produce marketable lead concentrate due to the low lead assay of the mill feed.

Locked cycle test F4 performed on a 50/50 composite of MH-3 and MH-4 produced the following results:

	<u>Assays</u>			<u>Distribution - %</u>		
	<u>% Pb</u>	<u>% Zn</u>	<u>g/t Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Ag</u>
Pb Concentrate	70.7	4.99	1650	93.8	0.9	87.2
Zn Concentrate	0.2	62.2	25	2.2	91.8	11.4
Mill Feed	1.77	13.65	44	100.0	100.0	100.0

Tests F1 and F4 utilized regrinding of both the lead and zinc rougher concentrates.

The lead and zinc concentrates produced by test F4 were subjected to detailed element analysis. The analyses are presented in Table 5.1.

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TABLE 5.1
CONCENTRATE ANALYSIS

	<u>Lead</u>	<u>Zinc</u>
Au, oz/ton	0.022	0.002
Cu, %	0.12	0.09
Cd, %	0.033	0.300
Co, %	<0.002	0.028
As, %	0.002	0.002
F, %	<0.10	<0.10
Bi, %	0.312	0.004
Ag, oz/ton	48.43	0.76
S, %	14.4	32.4
Hg, ppb	190	260
Sb, ppm	2	10
V, ppm	1	4
Pb, %	73.58	0.20
Zn, %	5.24	61.81
SiO ₂ , %	2.03	0.98
Al ₂ O ₃ , %	0.35	0.31
Fe ₂ O ₃ , %	2.14	4.82
MgO, %	0.30	0.16
CaO, %	1.26	0.88
Na ₂ O, %	0.16	0.16
K ₂ O, %	0.25	0.21
TiO ₂ , %	0.04	0.01
P ₂ O ₅ , %	0.28	0.28
MnO, %	0.11	0.16
BaO, %	<0.01	<0.01
LOI, %	7.24	16.05

From testwork carried out to-date by Bacon, Donaldson on composites MH-1, MH-3 and 50/50 MH-3/MH-4, it appears that the following metallurgical results can be expected:

	<u>Assays</u>			<u>Distribution - %</u>		
	<u>% Pb</u>	<u>% Zn</u>	<u>g/t Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Ag</u>
Pb Concentrate	70.0	5.0	394	93.0	4.0	88.0
Zn Concentrate	0.3	60.0	9	1.0	90.0	4.0

Future testwork should include the following:

- regrinding requirements for rougher/scavenger concentrates
- column flotation tests of rougher/scavenger concentrates to finalize size and quantity of columns
- simplification of reagent requirements
- autogenous and/or SAG grinding tests followed by ball mill grinding
- conditioning requirements
- production of rougher concentrates at 1.0 minute intervals and analyses of same to determine cleaning requirements
- settling tests for concentrates
- pressure filtration tests for concentrates
- aging tests of tailings
- effect of reclaim water on flotation
- locked cycle tests to determine distribution of middlings

Testwork should be carried out on representative composites from the various ore bodies which match the mine plan.

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5.2 DESIGN CRITERIAGeneral

Ore Processed/Year-Tonnes	400 000
Grade of Ore - % Lead	8.4
- % Zinc	14.5
- Grams Silver/Tonne	50
SG of Ore	3.0
Bulk Density of Ore - t/m ³	1.8
Moisture in Ore	5.0%
Angle of Repose	38 Degrees

Coarse Ore Storage

Live Tonnage-Tonnes (Hours)	200(4)
Ore Size	80% - 300 mm
Draw Down Angle - Degrees	60

Concentrator

Operating Days/Year	365
% Operating Time	90
Operating Hours/Year	7884
Operating Days/Week	7
Shifts/Day	2
Hours/Shift	12
Ore Processed/Day-Tonnes	1100
Ore Processed/Hour-Tonnes	51

Grinding

Ball Mill Work Index (Metric)	14
Feed Size	80% - 300 mm
Product Size	65% - 200 mesh
	80% - 100 microns
Circulating Load	300%
Cyclone Overflow Density	35% Solids

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Flotation

Lead Concentrate Grade - % Lead	70
- Grams Silver/Tonne	394
Recovery - % Lead	93
- % Silver	88
Lead Concentrate Produced - Tonnes/Hour	6
Lead Concentrate Produced - Tonnes/Day	144
Lead Rougher Retention Time	10 mins
Lead Scavenger Retention Time	10 mins
Lead Cleaner Retention Time	30 mins
Zinc Concentrate Grade - % Zinc	60
- Grams Silver/Tonne	9
Recovery - % Zinc	90
- % Silver	4
Zinc Concentrate Produced - Tonnes/Hour	11
Zinc Concentrate Produced - Tonnes/Day	264
Zinc Rougher Retention Time	10 mins
Zinc Scavenger Retention Time	10 mins
Zinc Cleaner Retention Time	30 mins

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Dewatering

Lead Thickener Design Basis - m ² /t/d	0.61
Lead Filter Design Basis - kg/h/m ²	365
Moisture in Lead Filter Cake	7.0%
Zinc Thickener Design Basis - m ² /t/d	0.61
Zinc Filter Design Basis - kg/h/m ²	365
Moisture in Zinc Filter Cake	7.5%

Concentrate Storage

Lead Concentrate - Slurry - Tonnes (Days)	150 (1)
Lead Concentrate - Cake - Tonnes (Days)	100 (.7)
Zinc Concentrate - Slurry - Tonnes (Days)	300 (1)
Zinc Concentrate - Cake - Tonnes (Days)	100 (.4)

5.3 PROCESS DESCRIPTION

5.3.1 Coarse Ore Handling and Grinding (Reference Drawings #100-10-PR1 and 230-10-PR1 in Appendix A)

Ore from open pit and underground mines will be delivered by 50 tonne capacity mine trucks to a 200 tonne capacity ore pass provided with a grizzly having 300 mm by 300 mm openings. Oversize retained on the grizzly will be broken by a rock breaker operated by the mine truck driver.

Ore will be removed from the ore pass by a 1220 mm by 5500 mm variable speed vibrating feeder and will discharge onto a 1067 mm wide SAG mill feed belt conveyor.

The SAG mill feed belt conveyor will discharge into a 5500 mm diameter by 1450 mm effective grinding length SAG mill powered by a 525 kW variable speed motor.

Discharge from the SAG mill will be pumped to a 1525 mm by 3660 mm horizontal vibrating screen by two 150 mm by 100 mm all metal slurry pumps. One of the SAG mill discharge pumps will be provided with a variable speed drive. The standby pump will be fixed speed.

Oversize from the vibrating screen (plus 10 mesh) will return to the SAG mill. Slurry passing through the screen (minus 10 mesh) will flow to a bank of four 5.0 m³ lead unit flotation cells.

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Tailings from the unit cells will be pumped by two 250 mm by 200 mm cyclone feed pumps to a cluster of four 380 mm diameter cyclones. One of the cyclone feed pumps will be provided with a variable speed drive. The standby pump will be fixed speed.

Cyclone underflow will be fed to a 3050 mm diameter by 3660 mm ball mill powered by a 525 kW motor. Discharge from the ball mill will flow through the lead unit flotation cells.

Concentrate from the lead unit flotation cells will be pumped to the lead concentrate thickener.

Cyclone overflow at 35% solids and 65% minus 200 mesh will be sampled and flow to the lead rougher flotation cells.

5.3.2 Flotation (Reference Drawing #100-10-PR2 in Appendix A)

Cyclone overflow from the grinding circuit will flow by gravity to a bank of ten 5.0 m³ lead rougher flotation cells. Rougher concentrate will be pumped by two 100 mm vertical slurry pumps to a 1830 mm diameter by 2440 mm surge tank. A 125 mm by 100 mm slurry pump will feed a 1680 mm diameter by 10 200 mm lead cleaner column flotation cell for final upgrading. Concentrate from the column will flow by gravity to the lead thickener. Tailings from the column will be pumped back to the head end of the lead rougher cells.

Tailings from the lead rougher cells will be pumped to a bank of twelve 5.0 m³ zinc rougher flotation cells. Rougher concentrate will be pumped by two 100 mm vertical slurry pumps to a 1830 mm diameter by 2440 mm surge tank. A 125 mm by 100 mm slurry pump will feed a 2440 mm diameter by 10 200 mm zinc cleaner column flotation cell for final upgrading. Concentrate from the column will flow by gravity to the zinc thickener. Tailings from the column will be pumped back to the head end of the zinc rougher cells.

Tailings from the zinc rougher cells will be pumped to the tailings pond for impoundment of the solids. Reclaim water will be pumped back to the concentrator for reuse in the grinding and flotation circuits.

Samplers have been provided for the following sample streams:

- cyclone overflow
- lead final concentrate
- zinc final concentrate
- final tailings

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5.3.3 Dewatering (Reference Drawing #100-10-PR3 in Appendix A)

Lead concentrate from the lead cleaner column flotation cell will flow by gravity to a 11 000 mm diameter on-grade thickener.

Underflow from the thickener will be pumped to a 150 tonne capacity storage tank sized to hold twenty-four hours of thickener underflow.

Slurry will be pumped from the storage tank to a 28 m² pressure filter. Discharge from the pressure filter, containing 7.0% moisture, will fall into a 100 tonne capacity concentrate storage bin located below the filter. A 1370 mm wide belt conveyor will remove concentrate from the bin and discharge into 12 tonne capacity pots located on B-train tractor/trailer units.

Overflow from the lead thickener will be collected in an overflow tank and pumped to the grinding circuit and lead flotation cell froth launders.

Zinc concentrate from the zinc cleaner column flotation cell will flow by gravity to a 15 000 mm diameter on-grade thickener.

Underflow from the thickener will be pumped to a 300 tonne capacity concentrate storage tank sized to hold twenty-four hours of thickener underflow.

Slurry will be pumped from the storage tank to a 28m² pressure filter. Discharge from the pressure filter, containing 7.5% moisture, will fall into a 100 tonne capacity concentrate storage bin located below the filter. A belt conveyor identical to that described for the lead concentrate will deliver concentrate from the zinc storage bin to 12 tonne capacity pots on the B-train trucks. Each B-train unit will carry four 12 tonne pots and will deliver the lead and zinc concentrates to Skagway, Alaska.

Overflow from the zinc thickener will be collected in an overflow tank and pumped to the zinc flotation cell froth launders.

5.4 PROCESSING PLANT LAYOUT

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The concentrator will be housed in a building measuring 68 000 mm by 22 000 mm (Reference Drawings #240-10-PR1 and PR2 in Appendix A).

The grinding bay will contain the SAG mill, ball mill, lead unit flotation cells and 2 ball bins for 125 and 50 mm diameter grinding balls. In addition, a 1-tonne capacity ball bucket and ball magnet for charging the grinding mills have been provided.

A 10 tonne capacity overhead crane has been provided over the grinding bay for maintenance.

A sump pump has been provided in the SAG mill/ball mill circuit for clean-up.

The flotation bay will contain the lead and zinc rougher and cleaner column flotation cells. Sump pumps for clean-up have been provided in the lead and zinc flotation areas. The rougher flotation cells have been located at ground level. Tailings pumps have been located in a depressed pump aisle adjacent to the rougher flotation cells discharge boxes.

A 5 tonne capacity overhead crane has been provided over the flotation bay for maintenance.

The lead and zinc concentrate thickeners have been located adjacent to the concentrator in a Sprung type steel structure having a 18 288 mm span and 600 mm side wall extension.

The two 28 m² pressure filters and concentrate storage bins will be housed in a high bay at the east end of the concentrator.

A compressor/blower room located in the north east corner of the concentrator will house the following equipment:

- 170 m³/h 760 kPa instrument air compressor
- 2 - 2650 m³/h 760 kPa plant air compressors
- 8500 m³/h 14 kPa rougher flotation cell blower
- 1020 m³/h 415 kPa column flotation cell blower

DRAFT

Two 20 tonne capacity hoppers for lime and soda ash have been located outside adjacent to the concentrator.

The reagent mixing area will contain the following equipment:

- 300 kg/hr lime slaker.
- 1525 mm diameter by 1830 mm agitated stock tank for storage of lime slurry.
- 1220 mm diameter by 1830 mm agitated mix tanks for 343, sodium silicate, copper sulphate and zinc sulphate.
- 1220 mm diameter by 2440 mm agitated mix tank for flocculant.
- a spare 1220 mm diameter by 1830 mm agitated mix tank for testing new reagents.

DRAFT

6.0 SURFACE ANCILLARIES

6.0 SURFACE ANCILLARIES

DRAFT

6.1 ANCILLARY BUILDINGS

In the interests of economy on this relatively short life project, the ancillary buildings comprise a number of portable units, some of which may be available on the used market. Their locations are shown on the Plant Site Plan (Reference Drawing #100-30-F02 in Appendix A).

6.1.1 Administration Office

Personnel to be accommodated in the Administration Office are identified in Table 8.1. A five-trailer complex, 12 metres by 19 metres has been selected to provide eight private offices, a conference room and space for secretarial and clerical personnel.

6.1.2 Assay Laboratory

The assay laboratory is housed in a 4 metre by 20 metre custom trailer unit.

A sample preparation room, balance room, wet lab and atomic absorption spectrophotometer room are included to provide Pb, Zn, Ag and Fe analyses.

6.1.3 Concentrator Offices and Laboratory

The concentrator offices and laboratory will be housed in a 4 metre by 20 metre custom trailer unit.

The concentrator laboratory will consist of sample filters, sample drying ovens, Ro-Tap, sample preparation bench, grinding rolls and flotation cell in order to carry out test work and prepare samples for the assay laboratory.

Offices will also be provided for the Concentrator Superintendent, Metallurgist and Clerk.

DRAFT

6.1.4 Gatehouse First Aid

A 3 metre by 6 metre trailer, located beside the main gate, will serve as a security house and as a first aid station.

6.1.5 Surface Repair Shelter/Garage

A 4.6 metre by 10 metre sheltered space will be reserved within the Sprung building enclosing the thickeners. This space will provide storage for the ambulance and portable fire pumps and a repair bay. A concrete apron will provide a paved operating space. Simple lighting and minimal heating are provided for winter conditions. Only routine mobile equipment maintenance will be performed in the surface repair shelter/garage.

The shelter will be a Sprung structure with a roll-away door on the end for vehicle access. Vehicles such as pickup trucks and buses will be serviced in Watson Lake.

6.1.6 Cold Storage

A 4 metre by 18 metre trailer with a standard cargo door, will be provided for cold storage.

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6.2 POWER SUPPLY AND DISTRIBUTION

Electrical power will be generated at the concentrator site to supply a demand load of 3432 kW. The power house will be a metal clad enclosure, located adjacent to the concentrator building, comprising diesel generator sets, heat recovery facilities and associated switchgear. The supply of power will be contracted out. The Owner will provide the power supply contractor with a level site for the buildings and a 75,000 USG fuel tank which will be capable of supplying fuel to the power plant for a two week duration. The owner will receive power at 4160 volts from the supplied switchgear in the Powerhouse and also waste heat energy.

The electrical power will be supplied by four diesel generator sets with each generator rated at 1600 kW; 4160 V; 3Ø; 60 hz; 0.8 P.f. All generator-sets can operate in parallel, two operational, with the third on standby and the fourth can be down for maintenance.

Power distribution to the outlying mining operation sites will be via single overhead line.

Motors over 200 HP will be directly supplied at 4160 V from a motor control centre (MCC), adjacent to the concentrator and flotation area.

All other concentrator motors will be supplied at from two outdoor power transformers, at 600 Volts and MCC's, located in the main electrical room.

The truck dump area will be fed from an outdoor transformer located at the truck dump.

Lighting, ventilation and other miscellaneous services will be supplied from 600 V MCC's.

6.3 SITE SERVICES

DRAFT

6.3.1 Fresh Water Supply

Fresh water will be obtained from two wells located north east of the concentrator site on the hillside. Each well will be capable of providing $11.4 \text{ m}^3/\text{hr}$. Two pumps, one per well, one operating, one standby will pump water through an insulated pipeline installed on grade, to the concentrator site storage tanks. A proposed location of the wells and pipeline is shown on Drawing 100-30-F01.

The initial fresh water supply will come from the reclaim dam. The current schedule requires plant startup in January 1991. To ensure availability of water for start-up and the first 8 months of operating, seasonal wells will be installed immediately in June 1990 and filling of the reclaim dam will commence.

Domestic water for the construction camp will be pumped from the reservoir.

The ore body is basic and the forecasted water quality from the taings pond is considered to be very good. However, should problems develop in the tailings causing water quality problems, an alternate fresh water supply would then be available. During construction and early operation, the permanent year round wells would be sited and developed.

6.3.2 Fresh Water Distribution

A fresh/fire water storage tank will be installed on the hillside west of and 90 meters above the concentrator site. This Fabri-tank will be sized for 757 m^3 , 680 m^3 of which will be reserved for fire protection.

A 15 mm dia. HDPE series, 160 underground pipeline will be used to distribute fresh water, by gravity, to the concentrator site.

Water distribution pipelines will be installed in utilidors in between the plant buildings. Water lines to the office and dry trailers will be buried.

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6.3.3 Fire Water Distribution

An 20 mm dia. HDPE Series 160 underground pipeline will be used to distribute firewater around the concentrator site. Wall mounted hydrants will be used for outside protection.

6.3.4 Potable Water Distribution

Fresh water will be treated and stored for potable useage. A 15 m³ potable water storage tank will be provided. A potable water distribution pump will distribute potable water throughout the site.

6.3.5 Sewage Treatment

Sanitary waste will be connected by gravity sewer system discharging to a pump station. Two pumps, one operating, one standby will be installed in the pump station and will pump to a sewage treatment plant, effluent from the treatment plant will discharge by gravity to local drainage thence to the tailings pond.

6.3.6 Camp Services

Initially the domestic water supply and sewage treatment plant will serve the construction camp. The construction camp services will be installed in utilidors. The permanent sewer and water lines will be buried.

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6.3.6 Fuel Storage

350 m³ diesel, storage will be used for fuel storage at the concentrator site. Tank will be installed within a lined bermed area sized for spill containment. Dispensing pumps will be provided for fuelling vehicles and equipment and pumping fuel to the diesel generators.

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7.0 TAILINGS DISPOSAL FACILITIES

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7.0 TAILINGS DISPOSAL FACILITIES

There will be approximately 700 tonnes per day of mill tailings produced from the 1100 t/d lead-zinc milling operation. The tailings will require containment by a suitable impoundment structure located in close proximity to the concentrator site.

As an indication of ultimate capacity, two dams at the selected site, if constructed to elevation 967 will provide for the storage of 5 000 000 tonnes of tailings from a concentrator feed of approximately 7 500 000 tonnes. The tailings dam will be initially constructed to elevation 955 to store the first five years of production. The reclaim water dam will be constructed to elevation 955 and will store enough water for 8 months of operation at an estimated demand of $140 \text{ m}^3/\text{h}$.

The design of the tailings dams will require a geotechnical investigation to determine the nature of the subsurface condition at the selected site, and an appraisal of locally available borrow material. Some cost savings may be possible by steepening the side slopes to reduce the earthworks quantities, however, this will depend on the findings of a future geotechnical investigation.

Reclaim water will be pumped from a pumphouse located adjacent to the small dam, through an insulated pipeline installed on grade back to the concentrator site reclaim water tanks.

As mentioned previously, the design of the earthwork cross section will depend on the result of a future geotechnical investigation. For the purpose of the capital cost estimate however, it is envisaged that each of the rockfill dams will consist of an upstream section of locally available low permeable glacial till, a geotextile filter and a downstream shell of rock fill from mine development waste. Raising of the dams from the initial 955 elevation starter level will be in the downstream direction.

DRAFT

8.0 MANNING AND INFRASTRUCTURE

8.0 MANNING AND INFRASTRUCTURE

A 300 man camp will be provided to house the mine development crews and surface construction crews at the Mt. Hundere site during the pre-production period. It is the intent of the Joint Venture that the operating personnel will live in Watson Lake and that bus transportation will be provided. It may be necessary to retain part of the camp until such time as a full complement of suitably skilled miners can be attracted to the area or trained.

8.1 MANNING

DRAFT

The Operations Manning Chart (Table 8.1) shows a total of 98 persons.

The mine complement of 49 is Curragh's estimated requirement for underground operations. Clarke's estimates of contract personnel for open pit operations is 40 for the initial work on Jewelbox Hill, and 54 for the later Burnick pit. Some Joint Venture supervisory and engineering personnel would also be required.

The remaining 49 persons, in the mill and administration categories, are included in Kiborn's estimate of surface operating costs and are considered to be the practical minimum for operation at the rate of 1,100 tonnes per day. It is assumed that the mine haul truck operators will also operate the rockbreaker to pass ore through the 300 x 300 mm grizzly, and that maintenance of surface vehicles will be performed either in the mine shop or in Watson Lake.

TABLE 8.1
OPERATIONS MANNING CHART

MANAGER - Secretary/Receptionist

MINE SUPERINTENDENT			MILL SUPERINTENDENT			ADMIN. SUPERINTENDENT		
Clerk			Clerk			Receptionist/Switchboard		
MINE ENGINEER			GENERAL MILL FOREMAN(2)			CHIEF ACCOUNTANT		
Geologist(2)						Payroll Accountant		
Sampler (2)								
Surveyor			Grinding Operators (4)					
MINE FOREMAN			Flotation Op. (4)			Clerk/Typist		
Buyer/Warehouse			Helpers (4)			Purchasing Agent		
Expeditor								
Dry/Lampman			Mill Maint. Foreman					
Cook, Bullcook (2)			Mill Mechanics (4)					
Master Mechanic						HUMAN RESOURCES MAN.		
Mechanics (3)			Electrician					
Electrician						Clerk/Typist		
Shiftboss/Jumbo Op. (3)			Instrument Tech.			Security/F. Aid (4)		
Rockbolter (2)			Equip. Operators (2)			Janitors (2)		
Scoop Operator (3)			Labourers (3)					
Truck Operator (3)			MILL METALLURGIST					
Blaster/Services (3)			Metallurgical Technician					
Development Miner (6)			Chief Assayer					
Devel. Mechanic (3)			Assayer					
Devel. Electrician			Sample Prep.					
Raise Miner (6)								

8.2 SITE ACCESS ROAD

The Robert Campbell Highway is paved for a distance of 10 km north from Watson Lake to the airport turnoff. The unpaved surface from the airport 44 km to the Frances River bridge is in excellent condition.

The existing site access road is 23 km long from the Frances River bridge to the camp at Jewelbox Hill. It is a sinuous, single lane road, steep in places, and soft and slippery when wet. It climbs from an elevation of 700 metres to the shoulder of Mt. Hundere at 1550 metres then drops down to the camp site at 1350 metres. The route is shown on Drawing #MTH-D-001, and totals 77 km from Watson Lake.

The capital cost estimate provides for the construction of 28 km of new access road with a gravelled surface of a standard equal to the unpaved portion of the Campbell Highway. This proposed access road is also shown on Dwg. MTH-D-001. The total distance from Watson Lake to the proposed mill location at the base of North Hill is 70 km.

8.3 Road Maintenance

The operating cost estimate provides for the maintenance of the access road by contract. The estimated costs provide for winter snow ploughing, annual repairs after the frost goes out and road grading through the summer and early fall.

Contracting road maintenance will reduce the early capital cost of mobile equipment and repair shops. Competitive contract prices should be available during the early years of operation when the traffic is highest due to open pit work and at a time when outside contractors will be competing for the maintenance work.

The capital cost estimate provides for two 50 passenger inter-city type buses for transporting employees to and from designated pick-up points in Watson Lake. The buses would be driven by designated heavy equipment operators. This service should improve safety and will minimize traffic congestion on the access road, security requirements, and provision of parking areas.

8.4 WATSON LAKE

DRAFT

The Town of Watson Lake exercises control over urban and rural areas covering nearly 120 square kilometers and has an estimated population of 1,800. The Official Community Plan, dated March 1988, indicates that general facilities (such as schools and hospital) and urban services (such as water supply, sewage treatment and garbage disposal) can support a population increase of several hundred persons.

The town's economy is based on forestry, transportation services, tourism and government. The Watson Lake forest reserves, situated in the Liard River drainage basin, comprise approximately 60 percent of the total forest resources of the Yukon. There are three sawmills operating in the Watson Lake area, two of which are seasonal while the third operates year round. When all are in full production, they employ a full-time staff of approximately 100 persons.

The presence of the Alaska Highway, the Robert Campbell Highway, the nearby Cassiar Highway and the Watson Lake Airport has prompted the town to evolve as a goods and services supply centre for the users of these transportation facilities. Excellent local sport fishing opportunities, plus greater convenience of travel by road and by air in recent years, have increased tourism to the area and stimulated expansion of the consequent accommodation and food and beverage industries. There are more than 180 hotel and motel rooms in town.

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9.0 TRANSPORTATION AND MARKETING

9.0 TRANSPORTATION AND MARKETING

9.1 TRANSPORTATION

9.1.1 General

DRAFT

Mt. Hundere will use an integrated shipping system for concentrates leaving the concentrate site for world markets and for the backhaul of supplies necessary for the operation, similar to the system currently used by Curragh Resources Inc. (Curragh) for the Faro Mine.

Overland transport will be by B-train trucking to the ice-free port of Skagway, Alaska. Concentrates will be loaded through a bulk terminal at Skagway and shipped to smelters in the Orient and Western Europe in 40 000 tonne class bulk freighters. Economies are available in ocean shipping when combining products from both the Faro Mine and Mt. Hundere.

9.1.2 Overland Transport

Concentrates will be trucked over highways to the port of Skagway. The system will be similar to that used by Curragh where concentrates are transported using special-purpose B-Train trucks and trailers, each carrying four 12.5 tonne capacity concentrate containers.

The truck route will be from the concentrator site, where the concentrates will be loaded, through Watson Lake, then along the Alaska Highway and South Klondike Highway through the community of Carcross to Skagway, Alaska. The total distance from the concentrator to Skagway is approximately 600 km, and all highways are all-weather status. The round trip will take 24 hours, including rest and maintenance stops.

Supplies will be backhauled from Skagway to the mine site on the flat bed trailers of the B-Trains. To permit the use of standard freight-shipping containers, the empty concentrate containers will be repositioned on the trailers.

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All over-land transport facilities will operate seven days a week, 24 hours per day. The system will require: a load-out system including a front-end loader at the mine site; a forklift (for handling backhaul materials); 12 B-Train units; a strategically located trucking terminal facility; and, at Skagway, ore storage terminal and dock facilities, ship loading facilities, two forklifts for concentrate container handling, and a front-end loader for clean-up. Some or all of the operations can be contracted.

The over-land transport system will have the capacity to transport in excess of 150 000 tonnes of concentrates per year, and several times the capacity of the required freight backhaul.

9.1.3 Port Facilities

The Port of Skagway, located in the mild coastal zone of the Alaska panhandle, can handle large bulk carriers and is ice-free for the entire year. At Skagway, concentrates will be stored in a bulk-handling terminal for ship loading.

The existing concentrate storage and ship loading facilities at Skagway are leased by Curragh from White Pass and Yukon Route. Curragh Resources Inc. has studied development plans to construct a new terminal and dock facilities at Skagway. Either of these facilities can be expanded to handle the Mt. Hundere concentrates.

For this study, an allowance of \$1,000,000 is made for storage and loadout expansion at the existing facilities.

9.1.4 Ocean Freight

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Concentrates will be shipped from Skagway to the Orient or Europe in bulk cargo ships of approximately 40 000 tonne capacity. The potential of combining Mt. Hundere and Faro concentrates into common large ships at Skagway offers significant freight cost and inventory holding cost benefits for both companies. Further, it is possible that additional benefits can be obtained by combining shipments from the proposed Cirque mine (located in N.E. British Columbia) which will be shipped out of a British Columbia port and will have the same destination as the Mt. Hundere concentrates. The flexibility of combining concentrates in large ships is a distinct advantage for the three mines.

9.2 MARKETING

Zinc and lead concentrates will be marketed globally. Curragh maintains marketing offices in Toronto, Canada; London, England; Geneva, Switzerland; and Frankfurt, West Germany. It also receives marketing assistance from its shareholders. To take advantage of this existing set-up and also to improve the strategic position of both companies for smelter contract negotiations, Mt. Hundere concentrates will be marketed by and through Curragh Resources Inc.

Curragh has firm sales for all of the Faro concentrates. In addition, Curragh has entered into a supply agreement for up to 350 000 DMT annually of zinc concentrates with Asturiana de Zinc; and the Mt. Hundere zinc concentrate is a good feed for the Asturiana smelter. Although it does not have firm contracts for the lead concentrate, Curragh plans to sell it in the Far East or India. The Mt. Hundere concentrate lead quality is also suitable for European smelters.

Smelters pay for recoverable zinc metal and lead metal based on the London Metal Exchange prices as averaged for the month following the month of arrival of concentrates at the ocean discharging port. All selling prices are denominated in U.S. dollars.

For the zinc concentrate, both zinc and cadmium are payable. The zinc payable metal, which is 85% of the zinc content, is priced at the daily LME settlement price. About 25% of the cadmium is payable at the quoted European Free Market Price. The actual payable amount is dependent on the grade of the material.

For the lead concentrate, lead, silver and gold are payable at roughly 95% of the daily LME settlement prices.

Quotational periods for shipments are generally the applicable price averaged for the month period after the month of arrival of the concentrates at the ocean discharging port. However the quotational period can be extended to average over up to three months after arrival when dealing with large lots.

During the years between 1982 and 1988, zinc and lead prices have been relatively depressed due to high inventories and rationalization of demand. In 1988 and 1989, prices for metals have been strong reflecting the relative lack of production capacity. Today, the price of zinc is \$.75 per lb. compared with a period average of \$.40 per lb and the price of lead is \$.30 per lb compared with a period average of \$.24 per lb. Unless demand fails significantly from current levels, prices are not expected to return to former levels; in fact, prices are expected to remain closer to current prices.

Subtracted from gross metal sales revenue are smelter charges and marketing costs. The magnitude of smelter costs is negotiated annually and is internationally competitive. The marketing cost is generally a percentage of the net smelter return.

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10.0 ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

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10.0 ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

There are numerous government legislation acts, ordinances and regulations which control mining activities and land development in the Yukon, with the objective of protecting the environment.

The Yukon Territory has a Lands Act which provides the authority for dealing with the administration and protection of Federal Crown Lands under the direct control of the Minister of the Department of Indian and Northern Affairs (D.I.A.N.A.).

Territorial Land use regulations of D.I.A.N.A. provide regulatory control for maintaining sound environmental practice for any operations on crown land in the Yukon. These regulations require that Land Use Permits be issued for, amongst other things, all work involving the use of heavy equipment, establishment of camps, use of explosives and clearing of lines, trails and rights of way. The regulations are administered by D.I.A.N.A. Land Use Engineers, who review land use applications and issue Land Use Permits, and Land Use Inspectors who conduct field inspections to ensure compliance with the Regulations and Land Use Permits.

The Yukon Territorial Water Board in Whitehorse administers the Northern Inland Waters Act. The Act provides for the licensing of water use. It serves as a means for controlling pollution by prohibiting waste deposition in water bodies, and requiring the establishment of a comprehensive water management program.

The Mt. Hundere Project will be designed to minimize the environmental impact on the area and to facilitate reclamation at the conclusion of operations. Also it is desirable to maximize the use of the existing infrastructure and labour resources in the Yukon in order to meet the objectives and aspirations particularly of the local population in Watson Lake.

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10-2

To date specialist consultants have been engaged by the company to review such matters as obtaining environmental baseline conditions, and geotechnical design parameters for tailings retention earthworks. This work is ongoing and will require detailed investigations of the tailings dam designs proposed herein.

In the design of the project facilities, it will be necessary to ensure that there are positive controls on all site emissions. The engineering design criteria will comply with all government regulations, or best available technology, related to environmental safeguards for minimizing gaseous, liquid and solids emissions. For example, spill containment, and maximum water reclaim will be incorporated. Spills within the concentrator will be contained and returned to the circuit for reprocessing. All final solid wastes (mill tailings) will be contained in the tailings disposal area. Reclaim water will be recycled from the tailings area for reuse in the concentrator. Proper sewage treatment equipment will be installed.

Meetings with the Yukon Territorial Government in Whitehorse and local government officials in Watson Lake will continue. These meetings will further define the scope of the required land use permits, and allow the opportunity to indicate the socio-economic benefits contributed by the project.

The use of services of local businesses in Watson Lake be maximized in the project during construction and operations in order to reduce front end capital costs. Initial discussions with the Town Manager indicate there is likely to be wide spread support for the project. Efforts will be made to recruit local citizens including the large native population in the area.

DRAFT

11.0 FINANCIAL EVALUATION

A
APPENDIX

DRAFT

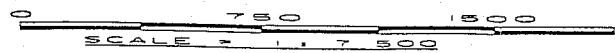
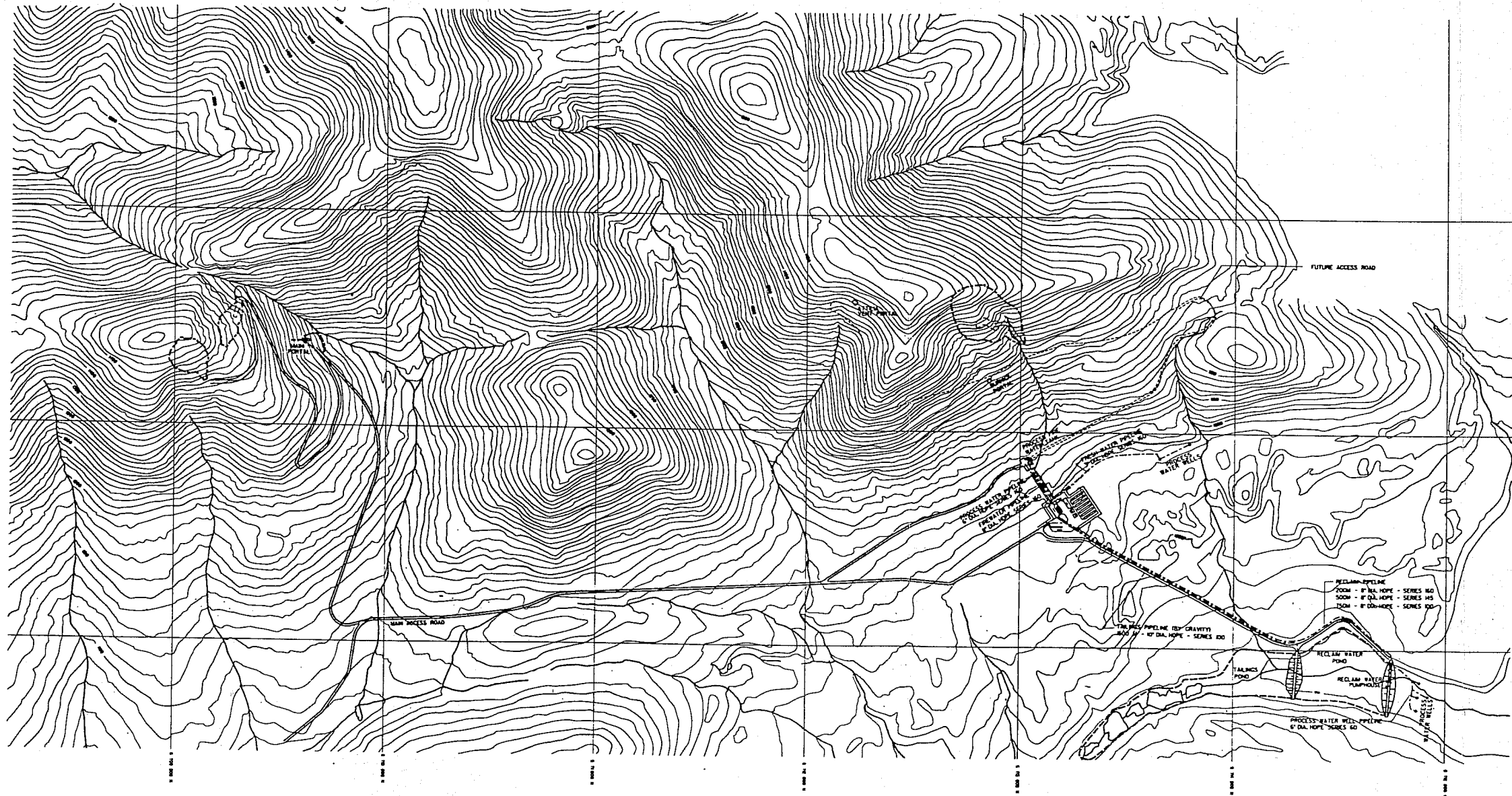
APPENDIX A

~~LIST OF~~ DRAWINGS

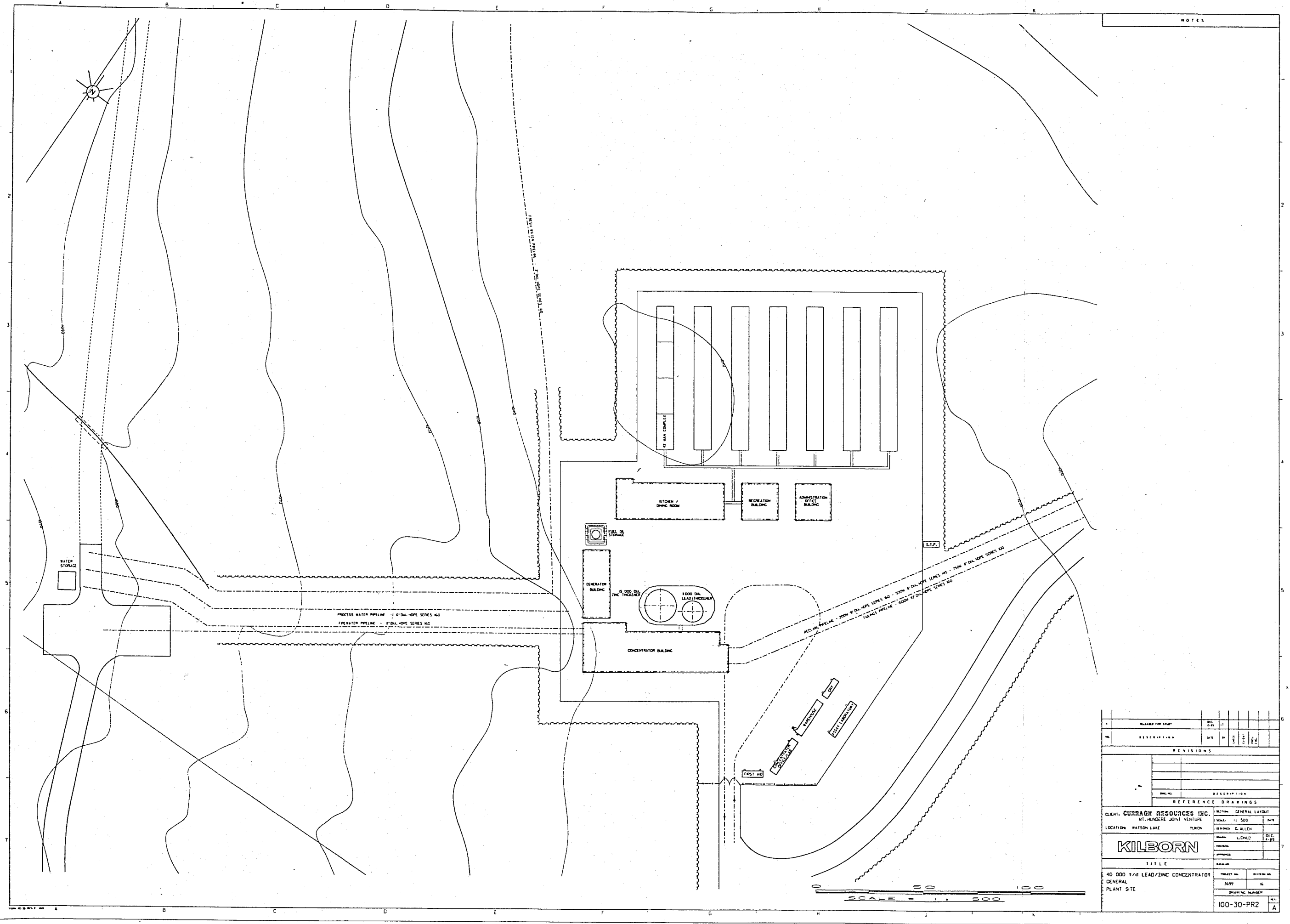
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LIST OF DRAWINGS**DRAFT**

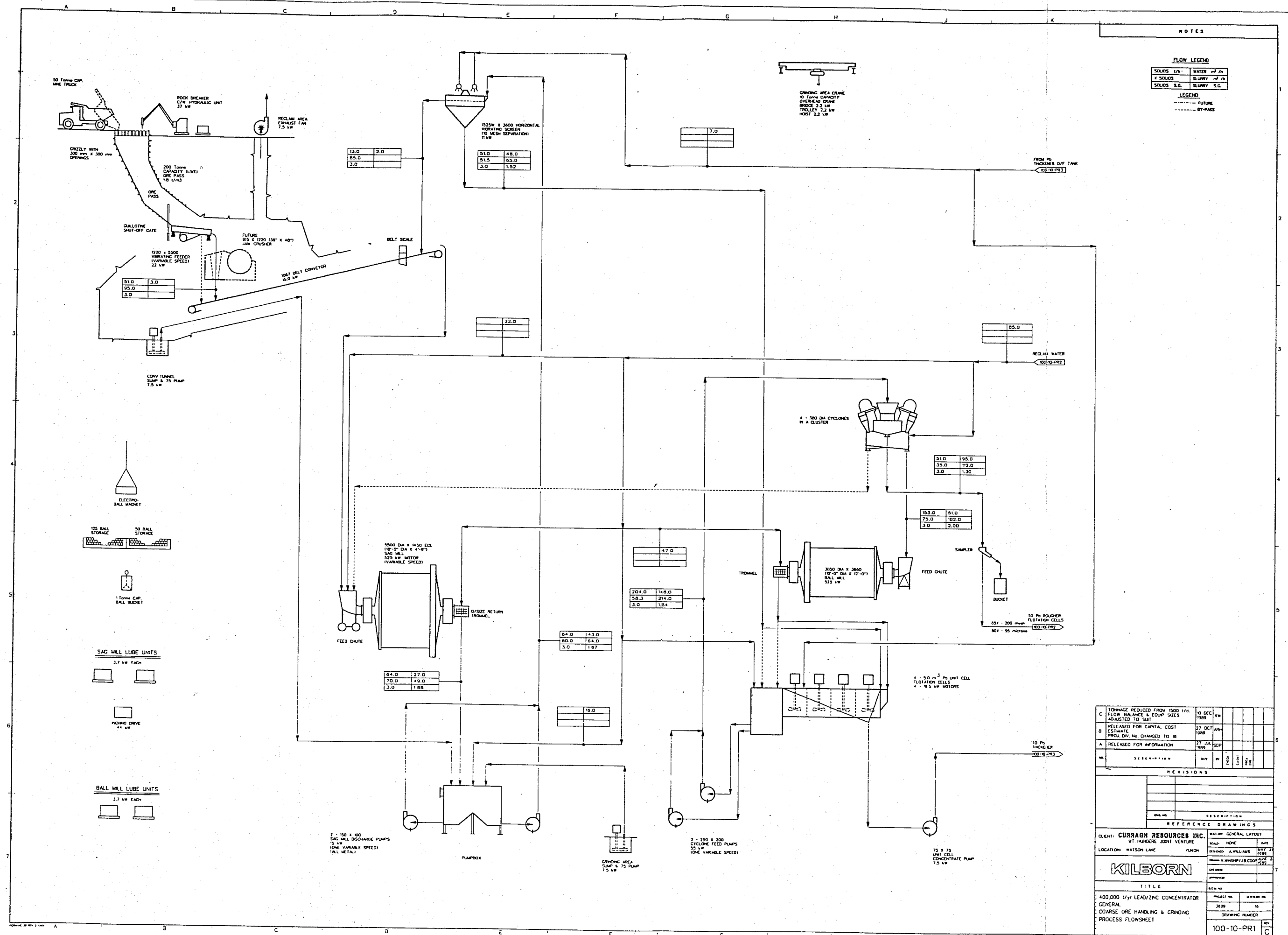
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100-30-PR2		Plant Site Plan
100-10-PR1	C	Process Flowsheet Crushing and Grinding
100-10-PR2	C	Process Flowsheet Flotation
100-10-PR3	C	Process Flowsheet Dewatering
100-10-PR4 & PR5	C	Process Flowsheet Reagents and Utilities
100-10-PR6	C	Process Flowsheet Fresh Water Supply, Storage, Treatment and Distribution
230-10-PR1	C	Crushing and Storage General Arrangement Plan and Section
240-10-PR1	C	Concentrator General Arrangement Plan - Operating Floors
240-10-PR2	C	Concentrator General Arrangement Sections

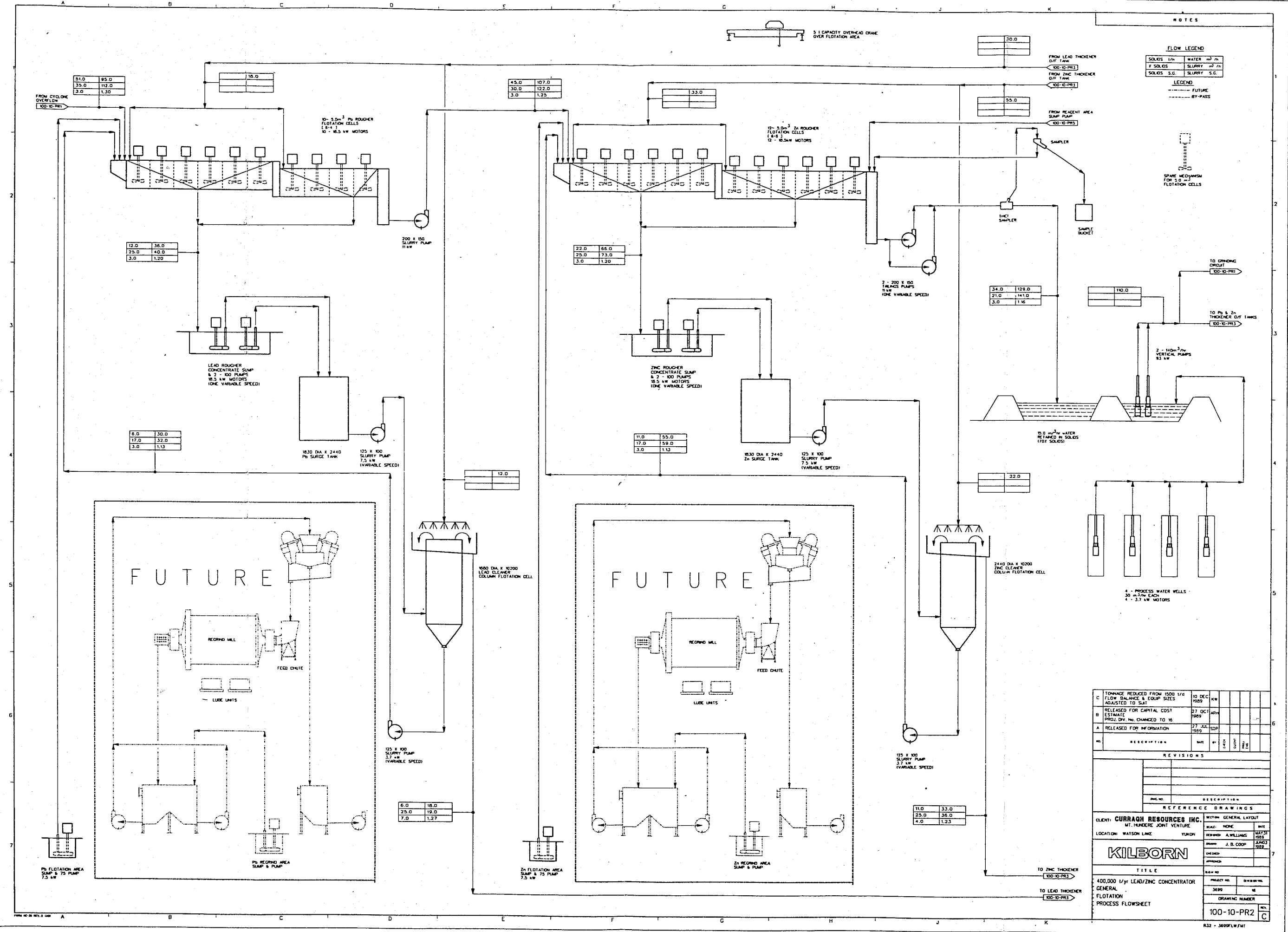


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2	RELEASED FOR STUDY	JUNE 30/90	LC																
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REVISIONS																			
REFERENCE DRAWINGS																			
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MT. HANCOCK JOINT VENTURE																			
LOCATION: WATSON LAKE																			
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KILBORN																			
TITLE																			
40,000 TPD LEAD/ZINC CONCENTRATOR OVERALL SITE PLAN																			
DRAWING NUMBER 100-30-PR1																			



REVISIONS			
NO.	DESCRIPTION	DATE	BY
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MT. HENDER JOINT VENTURE			
LOCATION: WATSON LAKE			
TOWN			
KILBORN			
TITLE			
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PROJECT NO. 100-30-PR2			
DRAWING NUMBER			
100-30-PR2			



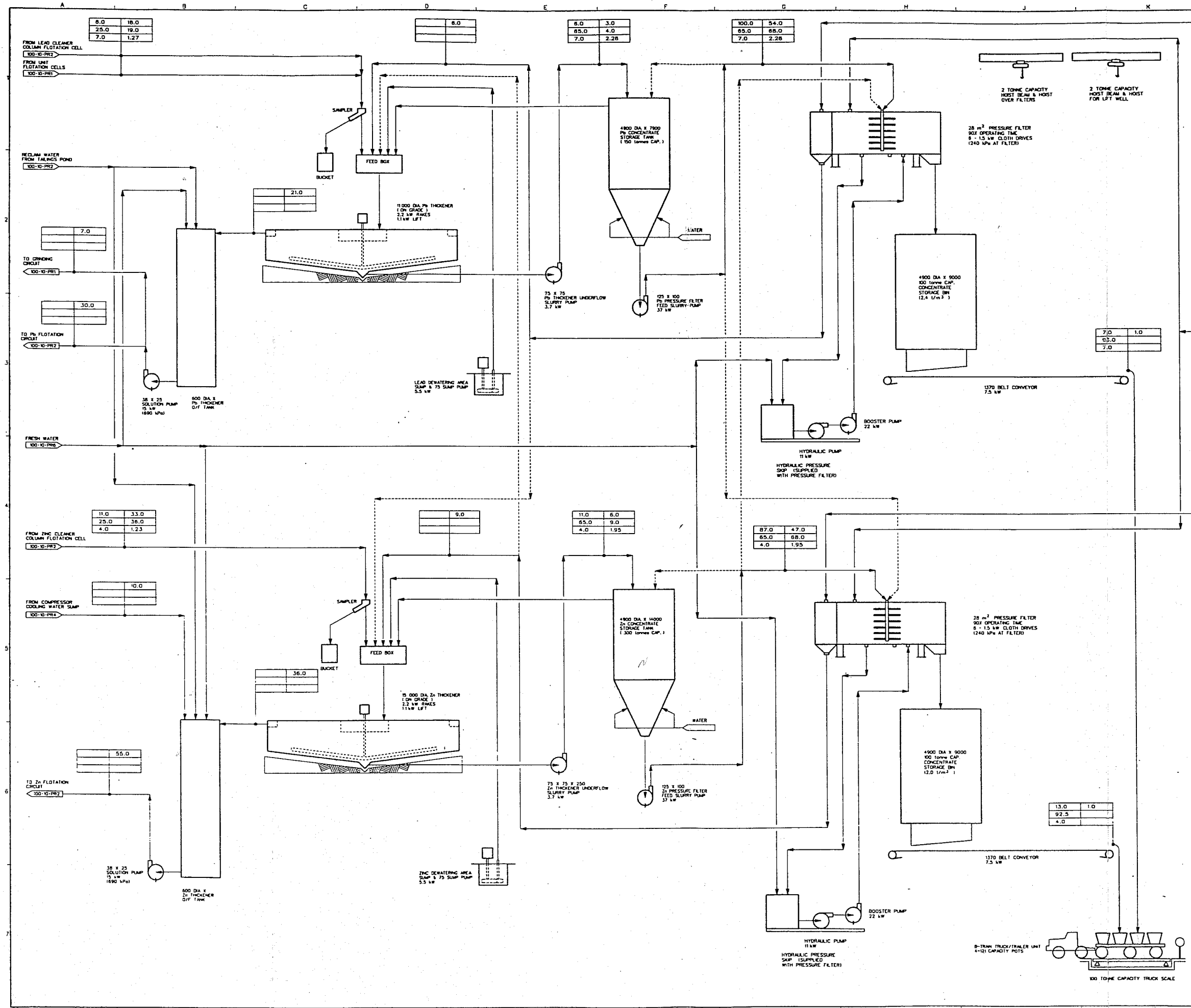


NOTES

FLOW LEGEND

SOLIDS 1/m	WATER m ³ /m
SOLIDS S.G.	SLURRY m ³ /m
LEGEND	
--- FUTURE	
--- BY-PASS	

C TONNAGE REDUCED FROM 1500 T/D FLOW BALANCE & EQUIP SIZES ADJUSTED TO SUIT		10 DEC 1989	KE						
B RELEASED FOR CAPITAL COST ESTIMATE		27 OCT 1989	APM						
A RELEASED FOR INFORMATION		27 JUL 1989	SDP						
NO.	DESCRIPTION	DATE	BY	CHECK	STATUS	REV.			
REVISIONS									
REFERENCE DRAWINGS									
CLIENT: CURRAGH RESOURCES INC. MT. HENDER JOINT VENTURE									
LOCATION: WATSON LAKE YUKON									
DRAWN: J. B. COOP									
CHECKED: J. B. COOP									
APPROVED: J. B. COOP									
TITLE									
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PROJECT NO. 3699									
DRAWING NUMBER 100-10-PR2									
REV. C									



NOTES

FLOW LEGEND

SOLIDS	l/h	WATER	m³/h
X SOLIDS	SLURRY	m³/h	
SOLIDS	S.G.	SLURRY	S.G.

LEGEND

----- FUTURE

----- BY-PASS

12.0 MMS./CYCLE

18.0

FRESH WATER

100-10-PR3

13.0 MMS./CYCLE

18.0 DIA X 4000

AP RECEIVER

100-10-PR4

FROM PLANT

AIR COMPRESSORS

10 DEC 1989

10 DEC 1989

27 OCT 1989

27 JUL 1989

DESCRIPTION

DATE

BY

CHKD

APP'D

REVISIONS

DESCRIPTION

DATE

BY

CHKD

APP'D

REFERENCE DRAWINGS

CLIENT: CURRAGH RESOURCES INC.

MT. HENDER JOINT VENTURE

LOCATION: WATSON LAKE

YULON

SCALE: NONE

DATE: 1989

DESIGNED: A. WILLIAMS

DRAWN: J.B. COOP

CHKD: J.B. COOP

APP'D: J.B. COOP

TITLE

400,000 t/yr LEAD/ZINC CONCENTRATOR

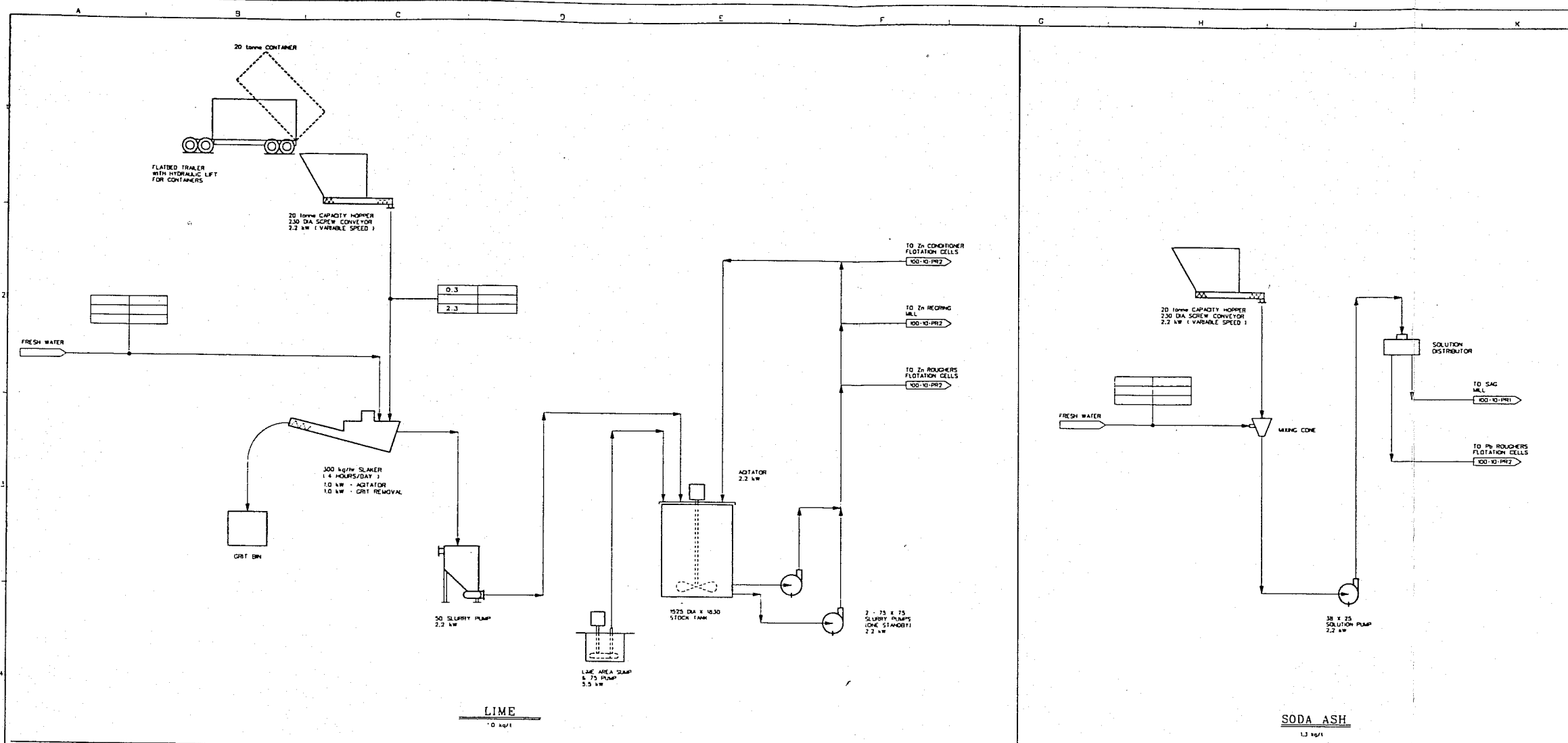
GENERAL

DEWATERING

PROCESS FLOWSHEET

100-10-PR3

REV C



NOTES

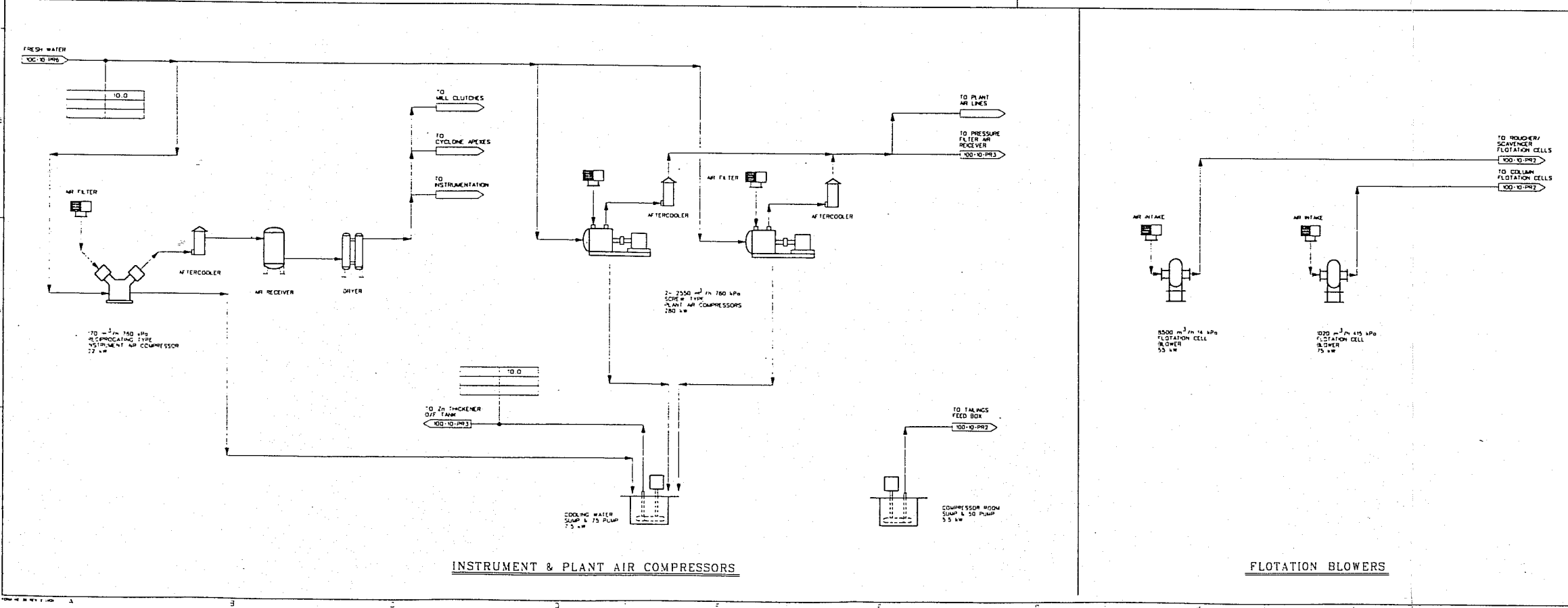
FLOW LEGEND

SOLIDS	L/H	WATER	m ³ /h
SOLIDS	S.G.	SLURRY	m ³ /h
SOLIDS	S.G.	SLURRY	S.G.

LEGEND

----- FUTURE

----- BY-PASS



REVISIONS

NO.	DESCRIPTION	DATE	BY	CHKD.
1				
2				
3				
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REFERENCE DRAWINGS

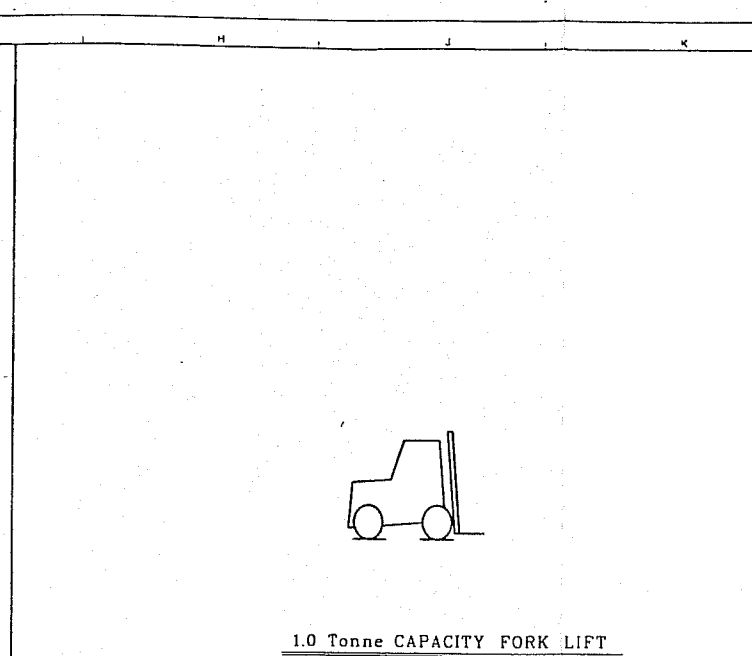
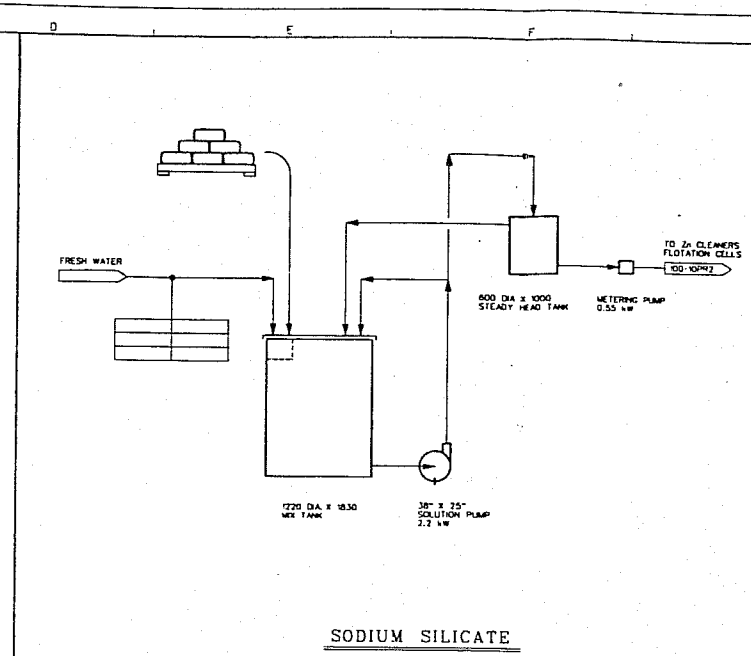
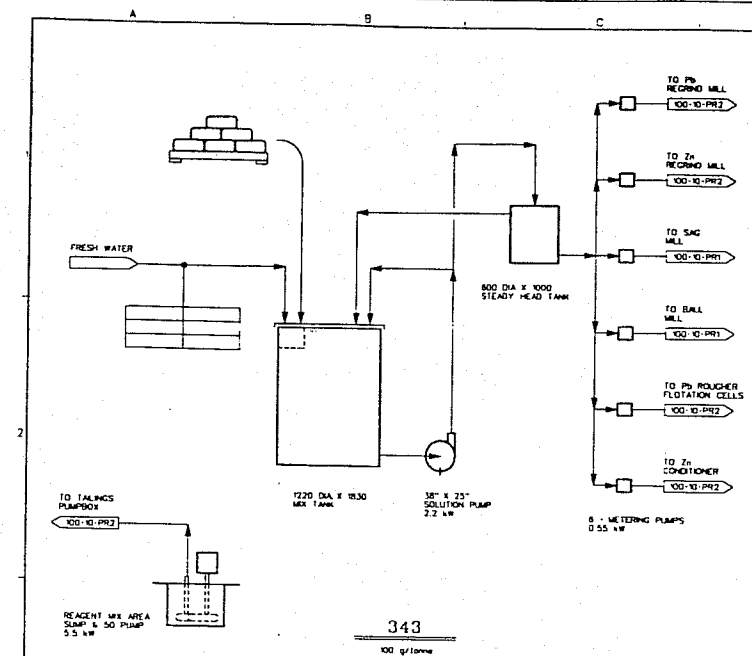
CLIENT	PROJECT NO.	SCALE	DATE
CURRAGH RESOURCES INC.	100-10-PR4	NONE	1999
MT HENDERSON JOINT VENTURE			
LOCATION: WATSON LAKE			

KILBORN

TITLE

400,000 t/y LEAD/ZINC CONCENTRATOR
GENERAL
REAGENT AND UTILITIES - SHEET 1
PROCESS FLOWSHEET

PROJECT NO. 100-10-PR4
DRAWING NO. 100-10-PR4
DATE 1999
BY [Signature]
CHKD. [Signature]
APP'D. [Signature]



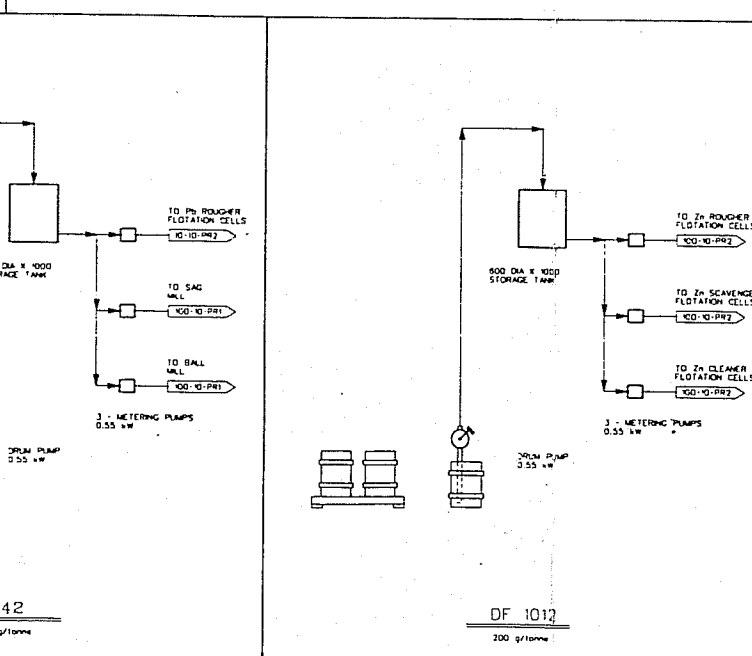
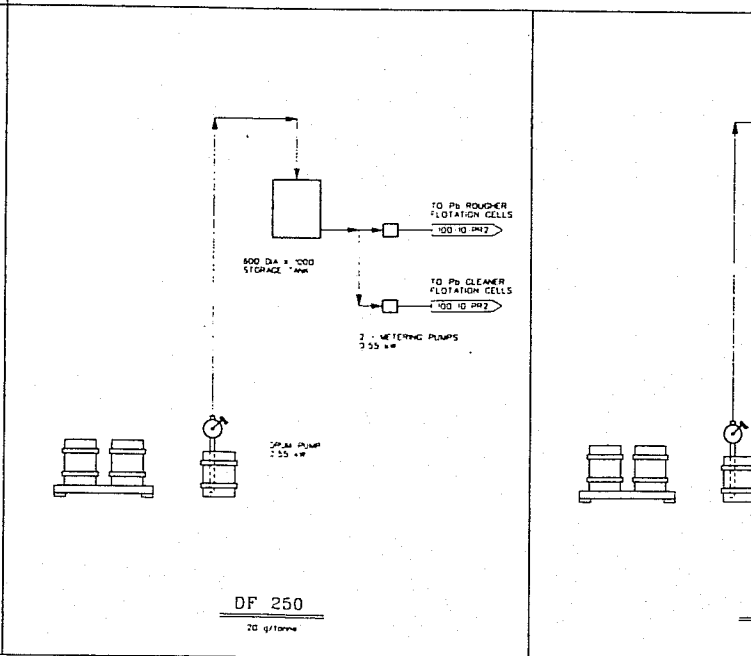
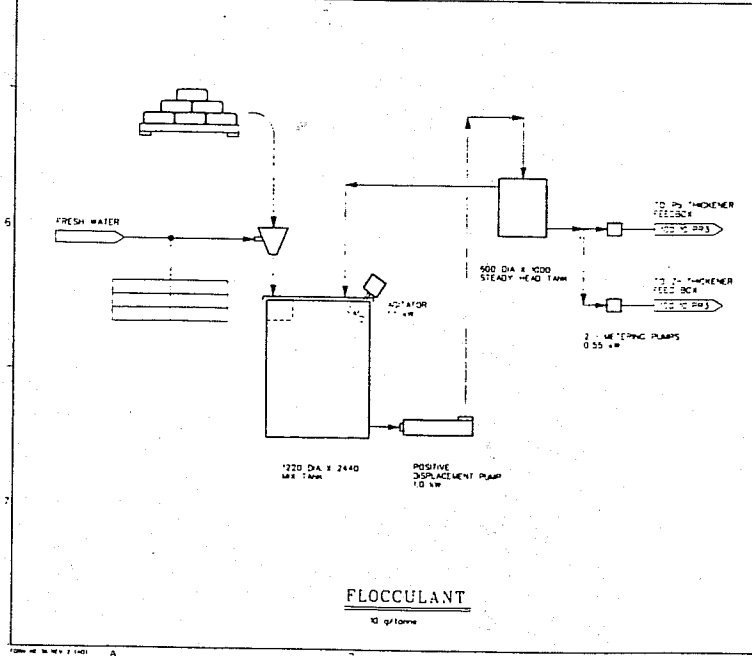
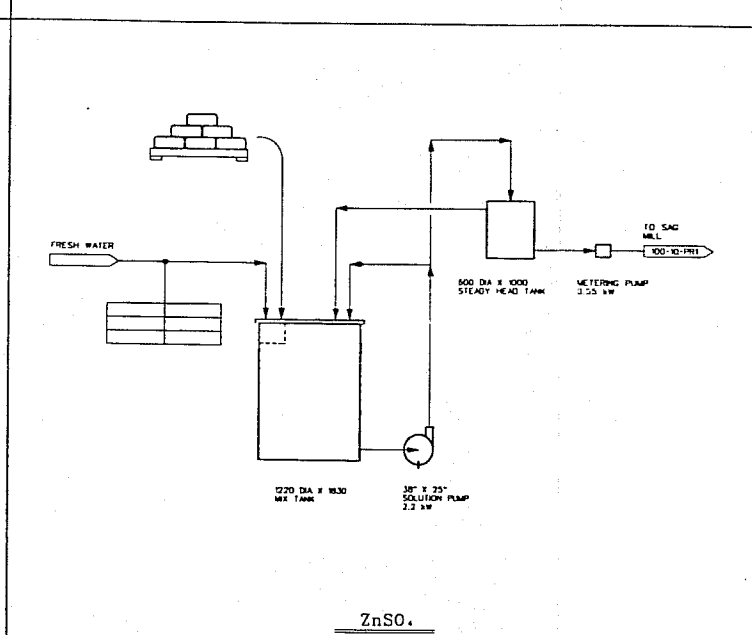
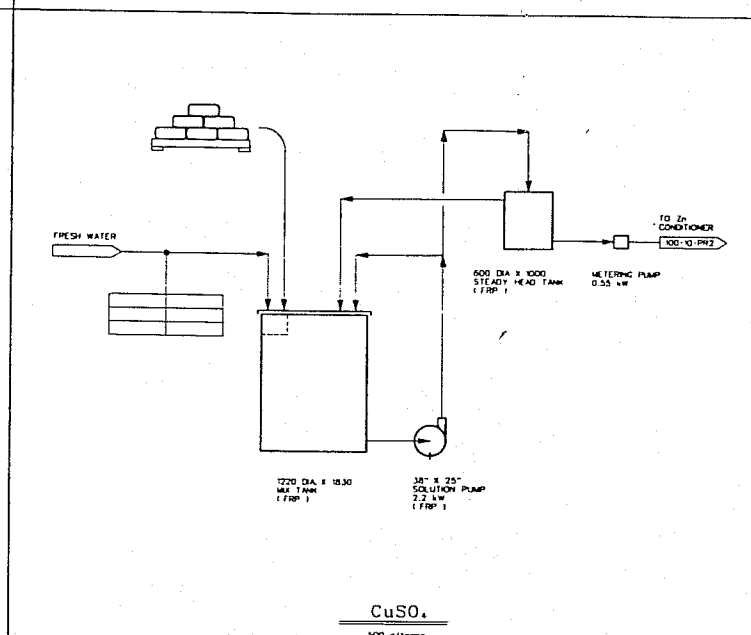
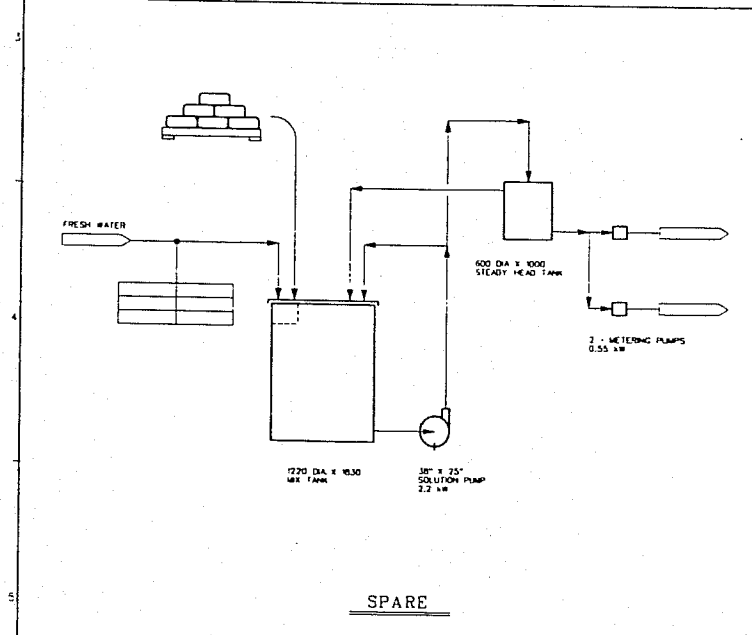
NOTES

FLOW LEGEND			
SOLIDS 1/2"	WATER 1/2"		
7 SOLIDS 1/2"	SLURRY 1/2"		
SOLIDS 5/8"	SLURRY 5/8"		

LEGEND

----- FUTURE

----- BY-PASS



REVISIONS

NO.	DESCRIPTION	DATE	BY	CHECKED	DATE
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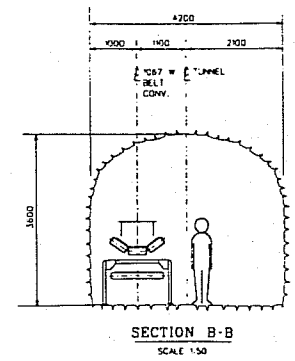
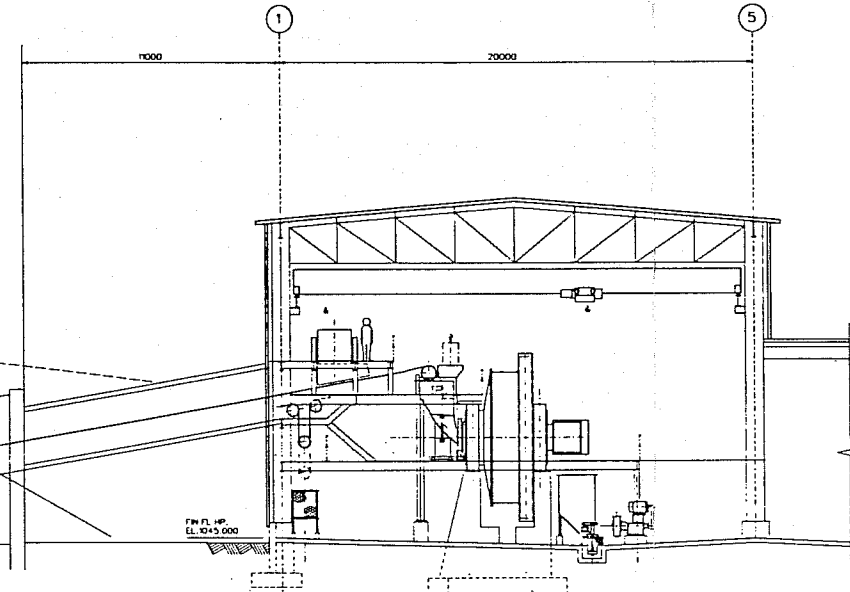
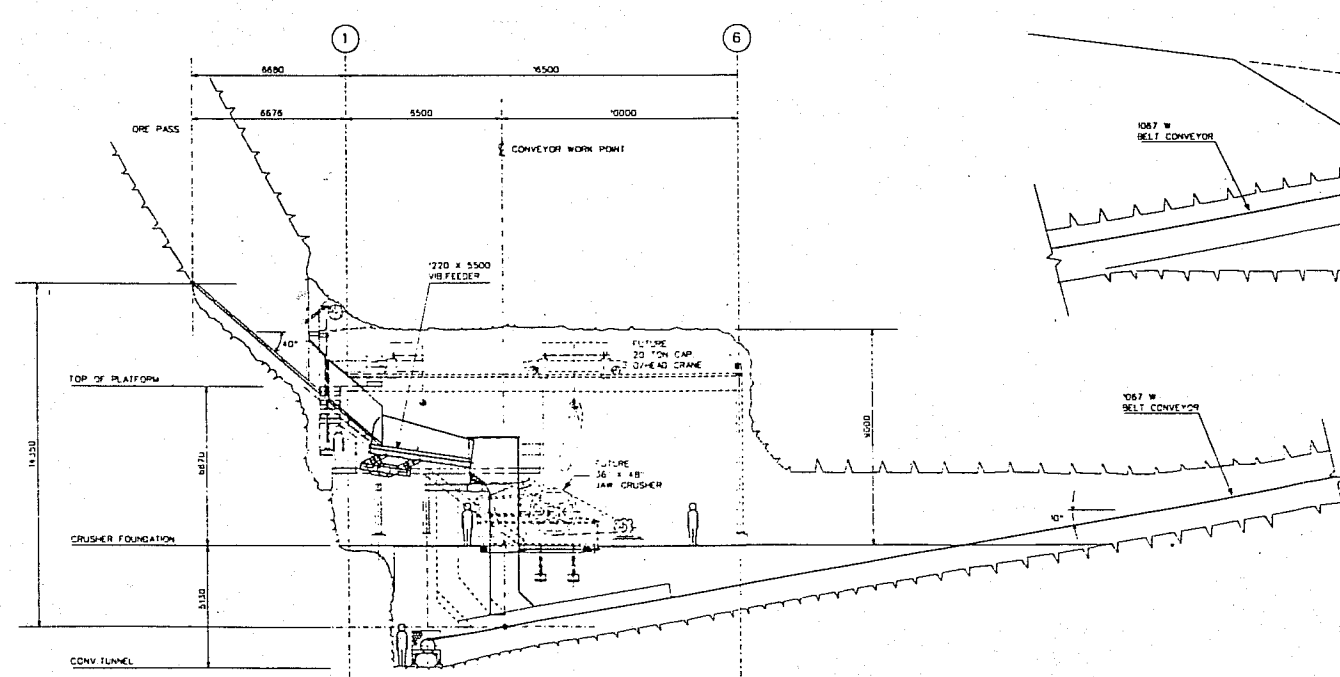
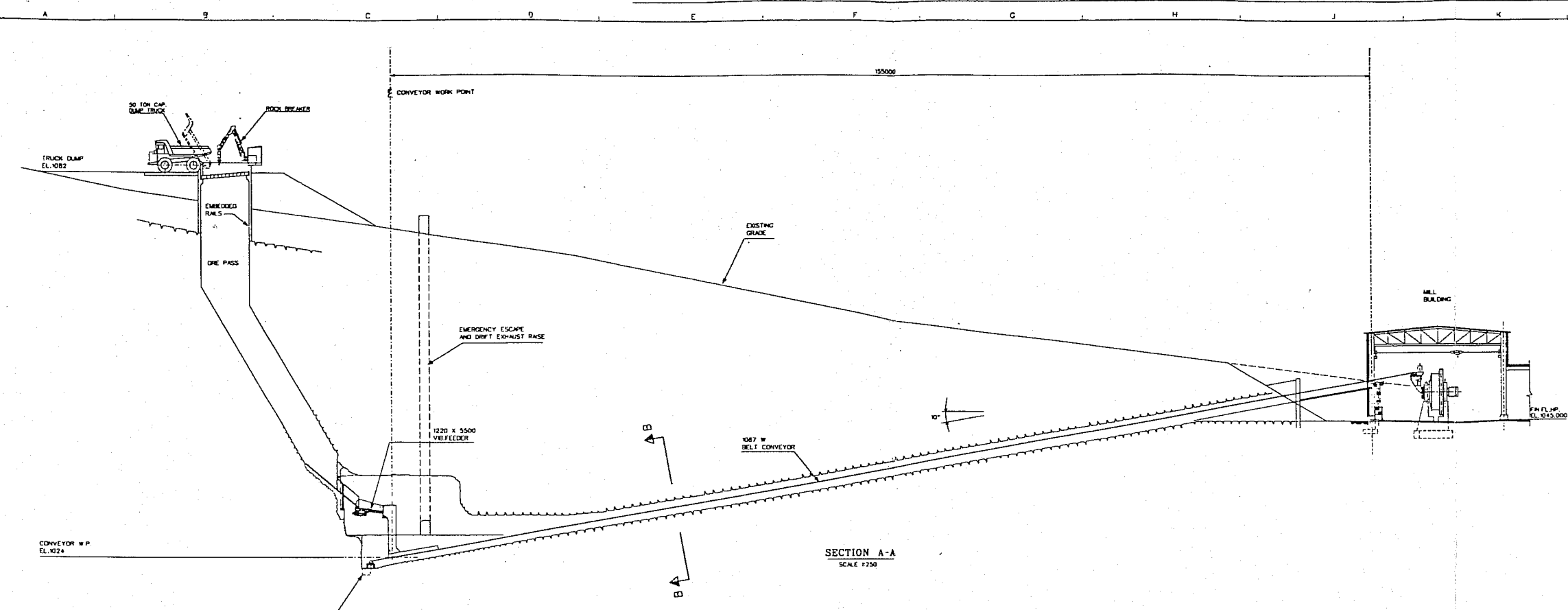
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NO.	DESCRIPTION	DATE
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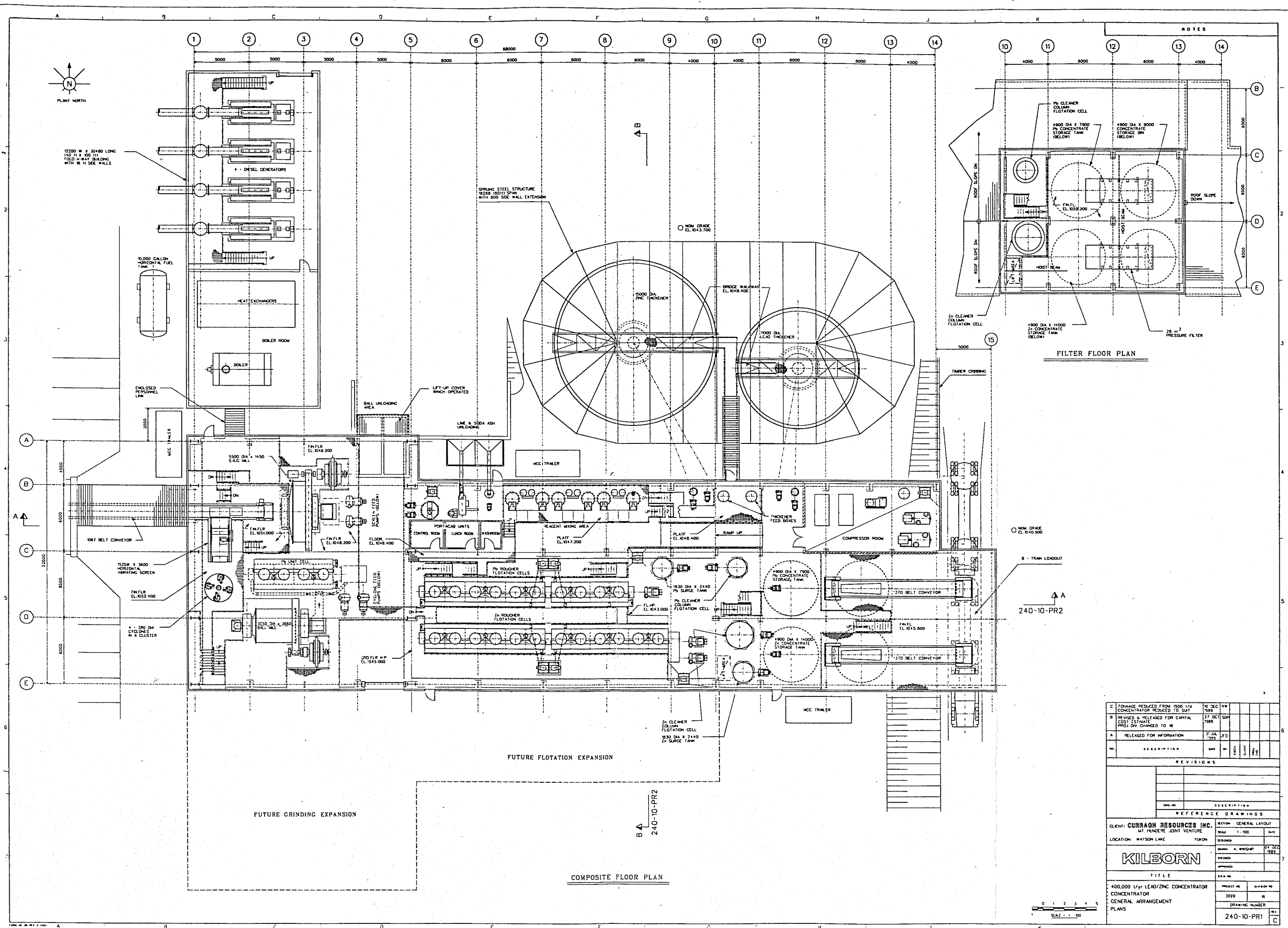
CLIENT: CURRAGH RESOURCES INC.
MT HENDERSON JOINT VENTURE
LOCATION: WATSON LAKE
PROJECT NO: 3599
DRAWING NO: 100-10-PR5

TITLE: 400,000 1/yr LEAD/ZINC CONCENTRATOR
GENERAL
REAGENT AND UTILITIES - SHEET 2
PROCESS FLOWSHEET

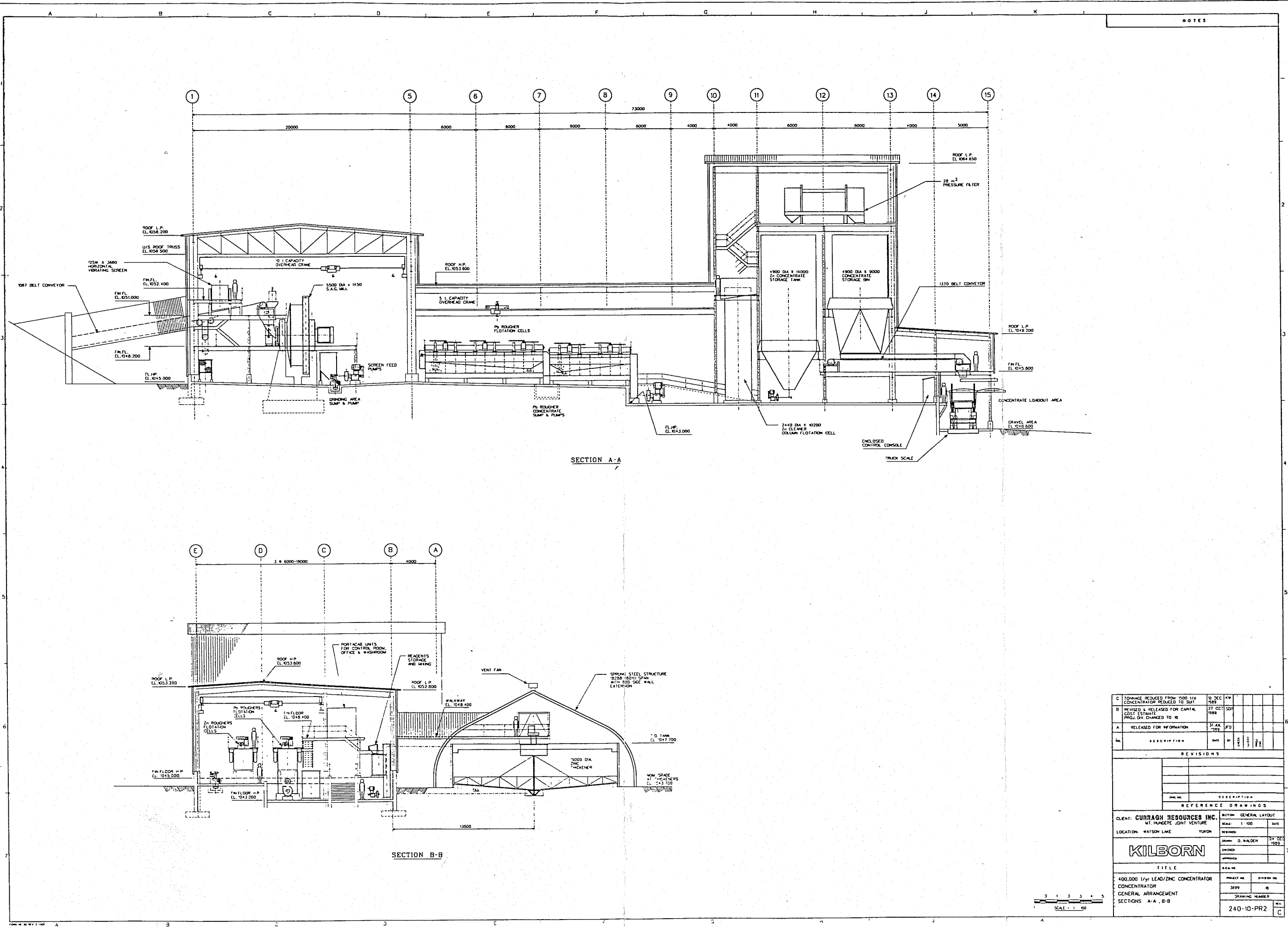
100-10-PR5



C DUMP HOPPER & RECLAIM MOVED LAYOUT		10 DEC 1989	D.W.						
B REVISED & RELEASED FOR CAPITAL COST ESTIMATE		27 OCT 1989	SOP						
A RELEASED FOR INFORMATION									
NO	DESCRIPTION	DATE	BY	CHECK	APPROVED	DATE	BY	CHECK	APPROVED
REVISIONS									
REFERENCE DRAWINGS									
CLIENT: CURRAGH RESOURCES INC. WT. HUNDERS JOINT VENTURE		REVISION: GENERAL LAYOUT		SCALE: 1/100	DATE: OCT 24 1989				
LOCATION: WATSON LAKE		FUNCTION: MILL		DRAWING: S. PARHAM					
KILBORN		TITLE		PROJECT NO.					
400,000 1/yr LEAD/ZINC CONCENTRATOR		TRUCK DUMP HOPPER & RECLAIM		3899					
GENERAL ARRANGEMENT		PLAN & SECTION		DRAWING NUMBER					
				230-10-PR1					



C	FOAMAGE REDUCED FROM 1500 L/YR CONCENTRATION REDUCED TO SAT	NO DEC 7989	KW			
B	REVISED & RELEASED FOR CAPITAL COST ESTIMATE	27 OCT 7989	SDF			
A	RELEASED FOR INFORMATION	31 JUL 7989	JTD			
REL	DESCRIPTION	DATE	BY	CHECK	CLERK	FILE NO.
REVISIONS						
	(ENCL. NO.)					
REFERENCE DRAWINGS						
CLIENT: CURRAHOON RESOURCES INC. 411 HUNTERE JOINT VENTURE			SECTION: GENERAL LATOIN			
LOCATION: WATSON LAKE			TOWN:			
			SCALE: 1"=100'			
			DESIGNED:			
			DRAWN: A. WINGSPAN			
			CHECKED:			
			APPROVED:			
			DATE: MS			
TITLE						
400,000 L/YR LEAD/ZINC CONCENTRATOR CONCENTRATOR						
GENERAL ARRANGEMENT						
PLANS						
			PROJECT NO. 3699 MS			
			DRAWING NUMBER			
			240-10-PRI			



NOTES

C TONNAGE REDUCED FROM 1500 TPD CONCENTRATOR REDUCED TO 400,000 TPD		13 DEC 1988	HW						
B REVISED & RELEASED FOR CAPITAL COST ESTIMATE PROJ. DIV. CHANGED TO 16		27 OCT 1988	SP						
A RELEASED FOR INFORMATION		31 JUL 1988	SP						
NO	DESCRIPTION	DATE	BY	CHECK	INITIALS	DATE	BY	CHECK	INITIALS
REVISIONS									
REFERENCE DRAWINGS									
CLIENT: CURRAGH RESOURCES INC. MT. MUMFORD JOINT VENTURE									
LOCATION: WATSON LAKE YUKON									
DRAWN: D. WALDEN									
CHECKED: [blank]									
APPROVED: [blank]									
TITLE									
400,000 TPD LEAD/ZINC CONCENTRATOR									
CONCENTRATOR									
GENERAL ARRANGEMENT									
SECTIONS A-A, B-B									
PROJECT NO.		DRAWING NO.		DATE		REV.		BY	
240-10-PR2		16		1988		C		[blank]	

APPENDIX B

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APPENDIX B

CAPITAL COST DETAILS

APPENDIX B

CAPITAL COST ESTIMATE

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BASIS FOR CAPITAL COST ESTIMATE

The figures derived for the Capital Cost Estimate are based on the following information:

1. Flow Diagrams, General Arrangement Drawings and design concepts developed by Kilborn Limited.
2. The Scope of Work covered by this Capital Cost Estimate is as defined in Sections 4.0 and 5.0 of the Table of Contents.
3. The following categories of work have been estimated as subcontracts.
 - a) Sitework
 - b) Buildings and Structures
 - c) Building Services
 - d) Process Piping
 - e) Process Electrical
 - f) Process Instrumentation
4.
 - a) Mechanical equipment quantities are based on the flowsheets and the General Arrangement Drawings.
 - b) Site Pre-distribution and Process Piping quantities are developed from the site layout and process area drawings.

The basic labour rate includes:

- a) Payroll insurance and assessments
- b) Construction overheads
- c) Temporary construction and cleanup
- d) Consumables
- e) Site supervision and clerical
- f) Small tools and non-rented equipment
- g) Recruiting and staff turn-over
- h) Office overhead and fee
- j) Subsistence costs.

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6. The Capital Costs are reported in terms of 4th quarter 1988 Canadian Dollars.
7. An allowance for export packaging, freight and insurance is included.
8. Custom duties and brokerage fees, where applicable, are included.
9. The allowance for insurance coverage in the Construction Indirect Costs, cover a general policy for Builders All-Risk, construction managing and engineering insurance.
10. There are no allowances included for:
 - a) Vendor specialists
 - b) Local or government taxes
 - c) Financing charges
 - d) Working capital or interest during construction
 - e) Permits of bond costs
 - f) Owner's administration or management costs
 - g) Project insurance
 - h) Escalation

11. Construction indirects are included as a percentage (8%) of direct cost.
12. E.P.C.M. Costs are included as a percentage (12%) of direct cost.
13. A contingency allowance is included and is based on a percentage (10%) of the Direct, E.P.C.M., commissioning and mobile equipment cost.

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KILBORN MANAGEMENT SYSTEMS ASRD

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

K I L B O R N L I M I T E D

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA SUMMARY REPORT

PAGE NO. : 1

RUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:18:14

AREA	DESCRIPTION	100 SITE WORK	200 BUILDING STRUCTURE	300 BLDG. SERVICE	400 PROCESS MECH.	500 PIPING	600 ELECTRICAL	700 INSTRUMEN TATION	900 INDIRECT	TOTAL
120	SITE SERVICES	170000	0	310000	171520	0	0	0	0	651520
130	SITE ELECTRICAL	0	0	129000	0	0	171000	0	0	300000
160	MOBILE EQUIP. (SURFACE)	0	17000	0	3272000	0	0	0	0	3289000
170	ROADS	5066700	0	0	0	0	0	0	0	5066700
180	SKAGWAY FACILITIES	0	1000000	0	100000	0	0	0	0	1100000
220	SAG MILL FEED BELT CONVEYOR	0	0	0	728163	0	0	0	0	728163
230	COARSE ORE RECEIVING	459500	79380	0	329769	0	7620	0	0	876269
240	CONCENTRATOR	240000	3095720	373000	7931306	1988075	2044175	697927	0	16370203
310	ANCILLARY FACILITIES	0	890720	0	0	0	0	0	0	890720
360	POWERHOUSE	0	8000	0	88000	0	0	0	0	96000
370	FRESH WATER SUPPLY	1059500	25000	0	261210	101000	27000	0	0	1473710

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CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA SUMMARY REPORT

RUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:18:14

AREA	DESCRIPTION	100 SITE WORK	200 BUILDING STRUCTURE	300 BLDG. SERVICE	400 PROCESS MECH.	500 PIPING	600 ELECTRICAL	700 INSTRUMEN TATION	900 INDIRECT	TOTAL
380	TAILINGS DISPOSAL	652500	30000	0	0	325000	0	0	0	1007500
390	WATER RECLAIM	75000	25000	0	101760	139000	48000	0	0	388760
COST TYPE	D TOTAL	7723200	5170820	812000	12983728	2553075	2297795	697927	0	32238545
660	CONSTR. INDIRECTS	0	0	0	0	0	0	0	3029000	3029000
670	E.P.C.M.	0	0	0	0	0	0	0	4907000	4907000
680	MINE COSTS	0	0	0	0	0	0	0	0	0
690	CONTINGENCY	0	0	0	0	0	0	0	4579455	4579455
691	CAMP COSTS	0	0	0	0	0	0	0	4602000	4602000
692	SPARE PARTS AND INVENTORY	0	0	0	0	0	0	0	500000	500000
693	SPECIAL FREIGHT & INSURANCE CONDIT	0	0	0	0	0	0	0	520000	520000
COST TYPE	I TOTAL	0	0	0	0	0	0	0	18137455	18137455
PROJECT TOTAL		7723200	5170820	812000	12983728	2553075	2297795	697927	18137455	50376000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 1

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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120 SITE SERVICES

120	1000.001	SITE CLEARING\GRUBING & GRADING	100	1	LT	MAT LAB SUB	0.00 0.00 50000.00	0.00	0 0 0	0 0 50000	ITEM COST----- 50000
120	1250.001	SEWAGE TREATMENT PLANT	400	1	LT	MAT LAB SUB	163000.00 120.00 0.00	71.00	120	163000 8520 0	ITEM COST----- 171520
120	1270.001	SEWERS	100	1	LT	MAT LAB SUB	0.00 0.00 100000.00	0.00	0	0 0 100000	ITEM COST----- 100000
120	1310.001	WATER SERVICE	100	1	LT	MAT LAB SUB	0.00 0.00 20000.00	0.00	0	0 0 20000	ITEM COST----- 20000
120	3711.001	TELEPHONE LINES AND EQUIPMENT	300	1	LT	MAT LAB SUB	0.00 0.00 35000.00	0.00	0	0 0 35000	ITEM COST----- 35000
120	3715.001	MICROWAVE SYSTEM	300	1	LT	MAT LAB SUB	0.00 0.00 275000.00	0.00	0	0 0 275000	ITEM COST----- 275000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 2

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

RUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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120		SITE SERVICES								
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120 SITE SERVICES

TOTAL

120

651520

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 3

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA	WORK SEQ	DESCRIPTION	WORK	UNITS	UNIT	WAGE	MANHR	COST	PACKAGE
NO.	CLAS NO.		CAT.	QUANTITY	COST (MH)	RATE	TOTAL		NUMBER

130 SITE ELECTRICAL

130	3600.001	PLANT SITE AREA LIGHTING	300	1	LT	MAT	0.00		0
						LAB	0.00		0
						SUB	129000.00		129000
								ITEM COST-----	
									129000
130	6000.011	PLANT SITE POWER DISTRIBUTION	600	1	LT	MAT	100000.00		100000
						LAB	1000.00		71000
						SUB	0.00		0
								ITEM COST-----	
									121000

130 SITE ELECTRICAL

TOTAL 1000

300000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 4

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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160 MOBILE EQUIP. (SURFACE)

160	2030.003	CONCRETE PAD FOR DIESEL STORAGE (INCL'G BOLLARDS)	200	40	M3	MAT 0.00 LAB 0.00 SUB 425.00	0.00	0	0 0 17000	
-----	----------	--	-----	----	----	------------------------------------	------	---	-----------------	--

ITEM COST-----
17000

160	4950.001	CONTAINER HANDLER (FORK LIFT)	400	1	EA	MAT 275000.00 LAB 0.00 SUB 0.00	71.00	0	275000 0 0	
-----	----------	-------------------------------	-----	---	----	---------------------------------------	-------	---	------------------	--

ITEM COST-----
275000

160	4950.002	MOBILE EQUIP-PASSENGER\4EA PICK-UPS\2EA SUBURBANS	400	1	LT	MAT 110000.00 LAB 0.00 SUB 0.00	71.00	0	110000 0 0	
-----	----------	--	-----	---	----	---------------------------------------	-------	---	------------------	--

ITEM COST-----
110000

160	4950.003	MOBILE EQUIPMENT - PERSONNEL SERV/1 EA AMBULANCE/2 EA THEAUBAULT FIRE PUMPS	400	1	LT	MAT 65000.00 LAB 0.00 SUB 0.00	71.00	0	65000 0 0	
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ITEM COST-----
65000

160	4950.004	3.5 CY. FRONT END LOADER	400	1	EA	MAT 235000.00 LAB 0.00 SUB 0.00	71.00	0	235000 0 0	
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ITEM COST-----
235000

160	4950.007	FLATBED TRAILER WITH HYDRAULIC LIFT FOR 20T CONTAINERS	400	1	LT	MAT 60000.00 LAB 0.00 SUB 0.00	71.00	0	60000 0 0	
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ITEM COST-----
60000

160	4950.008	BULL MOOSE 7.5T	400	1	EA	MAT 70000.00 LAB 0.00 SUB 0.00	71.00	0	70000 0 0	
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ITEM COST-----
70000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 5

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA	WORK SEQ	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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160 MOBILE EQUIP. (SURFACE)

160	4950.009	10T TRUCK WITH A 7.5T HI-AB AND A 2 C.Y. SAND BOX	400	1	EA	MAT LAB SUB	85000.00 0.00 0.00	0.00	0	85000 0 0	ITEM COST----- 85000
160	4951.001	"B" TRAIN TRUCK & TRAILER UNIT (CLIENT ALLOWANCE)	400	12	EA	MAT LAB SUB	150000.00 0.00 0.00	71.00	0	1800000 0 0	ITEM COST----- 1800000
160	4951.002	"B" TRAIN POTS (CLIENT ALLOWANCE)	400	52	EA	MAT LAB SUB	11000.00 0.00 0.00	0.00	0	572000 0 0	ITEM COST----- 572000

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160 MOBILE EQUIP. (SURFACE)

TOTAL

0

3289000

KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 6

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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170 ROADS

170 1120.001	ACCESS ROAD 28KM - ROBERT CAMPBELL HWY TO PLANTSITE	100	28	KM	MAT 0.00 LAB 0.00 SUB 150000.00	0.00	0	0 0 4200000	
								ITEM COST-----	4200000
170 1120.002	MINE ROAD 3.75KM - MAIN PORTAL AND OPEN PIT TO ACCESS ROAD	100	4	KM	MAT 0.00 LAB 0.00 SUB 150000.00	0.00	0	0 0 562500	
								ITEM COST-----	562500
170 1120.003	HAUL ROAD 1.8KM - TRUCK DUMP STN TO ACCESS ROAD	100	2	KM	MAT 0.00 LAB 0.00 SUB 78000.00	0.00	0	0 0 140400	
								ITEM COST-----	140400
170 1120.004	TAILINGS ROAD 2.1KM - DAMS TO PLANTSITE	100	2	KM	MAT 0.00 LAB 0.00 SUB 78000.00	0.00	0	0 0 163800	
								ITEM COST-----	163800

170 ROADS

TOTAL

0

5066700

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KILBORN MANAGEMENT SYSTEMS ADRD
CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

K I L B O R N L I M I T E D
400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

PAGE NO. : 7
RUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA	WORK	SEQ	DESCRIPTION	WORK	UNITS	UNIT	WAGE	MANHR	COST	PACKAGE
NO.	CAT.	NO.		QUANTITY		COST (MH)	RATE	TOTAL		NUMBER
180			SKAGWAY FACILITIES							
180	2810.001		ORE STORAGE BUILDING EXTENSION AND NEW CONVEYOR (CLIENT ALLOWANCE)	200	1 LT	MAT 0.00 LAB 0.00 SUB 1000000.00	0.00	0	0 0 1000000	
									ITEM COST	
									1000000	
180	4950.010		FRONT END LOADER FOR SKAGWAY FACILITIES - \$200000 UNIT 50% SHARED WITH FARD (CLIENT ALLOWANCE)	400	1 EA	MAT 100000.00 LAB 0.00 SUB 0.00	0.00	0	100000 0 0	
									ITEM COST	
									100000	
									-	
									100000	
			180 SKAGWAY FACILITIES				TOTAL	0		
									1100000	

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 8

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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220 SAG MILL FEED BELT CONVEYOR

220 2820.002	1067MM BELT CONVEYOR GALLERY - 5M	400	5	M	MAT 0.00 LAB 0.00 SUB 3772.00	0.00	0	0 0 18860	
								ITEM COST-----	18860
220 4403.001	1067MM BELT CONVEYOR 165M INCL. 20 H.P. MOTOR	400	165	M	MAT 3040.00 LAB 13.50 SUB 0.00	71.00	2228	501600 158153 0	
								ITEM COST-----	659753
220 4432.002	CHUTES FEEDING-VIB FEED\1067 BELT CONV\SAG MILL	400	6	T	MAT 0.00 LAB 0.00 SUB 5000.00	71.00	0	0 0 30000	
								ITEM COST-----	30000
220 4451.001	BELT SCALE C/W TEST CHAIN AND MOTORIZED REEL	400	1	EA	MAT 16000.00 LAB 50.00 SUB 0.00	71.00	50	16000 3550 0	
								ITEM COST-----	19550

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220 SAG MILL FEED BELT CONVEYOR

TOTAL

2278

728163

KILBORN MANAGEMENT SYSTEMS ADRD
 CURRAGH RESOURCES INC.
 MT. HUNDERE JOINT VENTURE - WATSON LAKE
 3699-16

K I L B O R N L I M I T E D
 400000 t/yr LEAD ZINC CONCENTRATOR
 PROJECT ESTIMATE
 AREA DETAIL

PAGE NO. : 9
 RUN DATE : 22DEC89
 DATA DATE: 22DEC89
 RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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230 COARSE ORE RECEIVING

230	1320.003	ROCK EXCAVATION FOR ORE PASS	100	1	LT	MAT 0.00 LAB 0.00 SUB 200000.00	0.00	0	0 0 200000	ITEM COST----- 200000
230	1320.004	TRUCK DUMP (FOLLOWING ITEMS)	100	0		MAT 0.00 LAB 0.00 SUB 0.00	0.00	0	0 0 0	ITEM COST----- 0
230	1320.010	CONCRETE COLLAR	100	536	M3	MAT 0.00 LAB 0.00 SUB 300.00	0.00	0	0 0 160800	ITEM COST----- 160800
230	1320.011	RAIL REINFORCEMENT	100	63	T	MAT 0.00 LAB 0.00 SUB 1100.00	0.00	0	0 0 69300	ITEM COST----- 69300
230	1320.012	CONSTRUCT RAMP W\MINE WASTE	100	2700	M3	MAT 0.00 LAB 0.00 SUB 2.00	0.00	0	0 0 5400	ITEM COST----- 5400
230	1320.013	CONCRETE TRUCK PAD	100	60	M3	MAT 0.00 LAB 0.00 SUB 400.00	0.00	0	0 0 24000	ITEM COST----- 24000
230	2020.004	CONCRETE FOOTINGS FOR VIBRATING FEEDER	200	107	M3	MAT 0.00 LAB 0.00 SUB 500.00	0.00	0	0 0 53500	ITEM COST----- 53500

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CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

RUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
230	COARSE ORE RECEIVING								
230 2210.003	STRUCTURAL STEEL FOR VIBRATING FEEDER	200	2	T	MAT LAB SUB	0.00 0.00 3300.00	0.00	0 0 6600	
								ITEM COST-----	6600
230 2222.002	CHECKER PLATE FOR VIBRATING FEEDER	200	36	M2	MAT LAB SUB	0.00 0.00 210.00	0.00	0 0 7560	
								ITEM COST-----	7560
230 2224.003	STAIRS INCLUDING HANDRAIL FOR VIBRATING FEEDER	200	12	M	MAT LAB SUB	0.00 0.00 610.00	0.00	0 0 7320	
								ITEM COST-----	7320
230 2225.003	HANDRAIL	200	40	M	MAT LAB SUB	0.00 0.00 110.00	0.00	0 0 4400	
								ITEM COST-----	4400
230 4095.001	ROCK BREAKER C/W HYDRAULIC UNIT (50 H.P.)	400	1	EA	MAT LAB SUB	70000.00 128.00 0.00	71.00	128 9088 0	
								ITEM COST-----	79088
230 4153.006	CONVEYOR TUNNEL SUMP PUMP 75MM INCL MOTOR 10HP	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46 3266 0	
								ITEM COST-----	11266
230 4174.001	RECLAIM AREA EXHAUST FAN INCL MOTOR 10HP	400	1	EA	MAT LAB SUB	20000.00 40.00 0.00	71.00	40 2840 0	
								ITEM COST-----	22840

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 11

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA	WORK SEQ	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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230 COARSE ORE RECEIVING

230 4432.001	CHUTE FROM VIBRATING FEEDER TO BELT CONVEYOR	400	2	T	MAT LAB SUB	0.00 0.00 5000.00	71.00	0	0 0 10000	ITEM COST----- 10000
230 4433.001	CONTROL CHAIN & COLLAR RAILS FOR 200 TONNE ORE PASS	400	1	LT	MAT LAB SUB	0.00 0.00 20000.00	71.00	0	0 0 20000	ITEM COST----- 20000
230 4434.001	GRIZZLY WITH 300MM X 300MM OPENINGS (19 TONS)	400	1	LT	MAT LAB SUB	0.00 0.00 112050.00	71.00	0	0 0 112050	ITEM COST----- 112050
230 4461.001	VIBRATING FEEDER 1220MMW X 5500MML C/W MOTOR 30 H.P.	400	1	EA	MAT LAB SUB	55000.00 275.00 0.00	71.00	275	55000 19525 0	ITEM COST----- 74525
230 4461.001.C1	V.S.CONTROLLER	600	1	EA	MAT LAB SUB	6200.00 20.00 0.00	71.00	20	6200 1420 0	ITEM COST----- 7620

230 COARSE ORE RECEIVING

TOTAL

509

876269

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 12

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
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AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	1320.000	MASS EXCAVATION	100	40000	M3	MAT LAB SUB	0.00 0.00 4.00	0.00	0	0 0 160000	ITEM COST----- 160000
240	1320.001	EXCAVATION GRAVEL/EARTH	200	2200	M3	MAT LAB SUB	0.00 0.00 20.00	0.00	0	0 0 44000	ITEM COST----- 44000
240	1320.002	EXCAVATION ROCK	200	1000	M3	MAT LAB SUB	0.00 0.00 40.00	0.00	0	0 0 40000	ITEM COST----- 40000
240	1330.001	BACKFILL WITH GRAN.MATL.	200	1200	M3	MAT LAB SUB	0.00 0.00 25.00	0.00	0	0 0 30000	ITEM COST----- 30000
240	1330.002	CRUSHED ROCK TO U/S SLAB	200	210	M3	MAT LAB SUB	0.00 0.00 35.00	0.00	0	0 0 7350	ITEM COST----- 7350
240	2020.001	CONCRETE TO FOOTINGS	200	206	M3	MAT LAB SUB	0.00 0.00 500.00	0.00	0	0 0 103000	ITEM COST----- 103000
240	2020.002	CONCRETE TO PIERS	200	43	M3	MAT LAB SUB	0.00 0.00 900.00	0.00	0	0 0 38700	ITEM COST----- 38700

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 13

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
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AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	2020.003	CONCRETE TO GRADE BEAMS	200	84	M3	MAT LAB SUB	0.00 0.00 700.00	0.00	0 0 0	0 0 58800	ITEM COST----- 58800
240	2030.001	CONCRETE FDNS. FOR SAG MILL	200	450	M3	MAT LAB SUB	0.00 0.00 800.00	0.00	0 0 0	0 0 360000	ITEM COST----- 360000
240	2030.002	CONCRETE FDNS. FOR BALL MILL	200	350	M3	MAT LAB SUB	0.00 0.00 800.00	0.00	0 0 0	0 0 280000	ITEM COST----- 280000
240	2030.004	CONCRETE TO EQUIPMT. FDNS. & BASES	200	200	M3	MAT LAB SUB	0.00 0.00 600.00	0.00	0 0 0	0 0 120000	ITEM COST----- 120000
240	2040.001	SLAB-ON-GRADE	200	280	M3	MAT LAB SUB	0.00 0.00 450.00	0.00	0 0 0	0 0 126000	ITEM COST----- 126000
240	2040.002	CONCRETE TO SUMPS & CURBS	200	10	M3	MAT LAB SUB	0.00 0.00 800.00	0.00	0 0 0	0 0 8000	ITEM COST----- 8000
240	2090.001	BLOCK WALLS	200	114	M2	MAT LAB SUB	0.00 0.00 95.00	0.00	0 0 0	0 0 10830	ITEM COST----- 10830

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CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

RUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	2210.001	STRUCTURAL STEEL	200	203	T	MAT LAB SUB	0.00 0.00 3300.00	0.00	0 0 0	0 0 669900	ITEM COST----- 669900
240	2220.001	PLATFORM & SUPPORT STEEL	200	43	t	MAT LAB SUB	0.00 0.00 3700.00	0.00	0 0 0	0 0 159100	ITEM COST----- 159100
240	2221.001	GRATING	200	615	M2	MAT LAB SUB	0.00 0.00 210.00	0.00	0 0 0	0 0 129150	ITEM COST----- 129150
240	2224.001	STAIRS INCL HANDRAILING	200	45	M	MAT LAB SUB	0.00 0.00 610.00	0.00	0 0 0	0 0 27450	ITEM COST----- 27450
240	2225.001	HANDRAILING	200	234	M	MAT LAB SUB	0.00 0.00 110.00	0.00	0 0 0	0 0 25740	ITEM COST----- 25740
240	2230.001	ANCHOR BOLTS & EMBEDDED METALS	200	1000	KG	MAT LAB SUB	0.00 0.00 9.00	0.00	0 0 0	0 0 9000	ITEM COST----- 9000
240	2290.001	CRANE & HOIST BEAMS AND CRANE & HOIST RAILS	200	13	MT	MAT LAB SUB	0.00 0.00 3100.00	0.00	0 0 0	0 0 40300	ITEM COST----- 40300

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 15

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
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AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 2410.001	SIDING (INSULATED)	200 2060	M2	MAT LAB SUB	0.00 0.00 130.00	0.00	0 0 0	0 0 267800
							ITEM COST-----	267800
240 2430.001	ROOFING	200 1400	M2	MAT LAB SUB	0.00 0.00 118.00	0.00	0 0 0	0 0 165200
							ITEM COST-----	165200
240 2440.001	DOORS - OVERHEAD	200 2	EA	MAT LAB SUB	0.00 0.00 12000.00	0.00	0 0 0	0 0 24000
							ITEM COST-----	24000
240 2440.002	DOORS - EXTERIOR	200 6	EA	MAT LAB SUB	0.00 0.00 1100.00	0.00	0 0 0	0 0 6600
							ITEM COST-----	6600
240 2440.003	DOORS - INTERIOR (SINGLE)	200 2	EA	MAT LAB SUB	0.00 0.00 900.00	0.00	0 0 0	0 0 1800
							ITEM COST-----	1800
240 2440.004	DOORS - INTERIOR (DOUBLE)	200 1	EA	MAT LAB SUB	0.00 0.00 3000.00	0.00	0 0 0	0 0 3000
							ITEM COST-----	3000
240 2900.001	LEAD & ZINC THICKENER TANK (SPRUNG TYPE BUILDING) FABRIC COVER	200 1	LT	MAT LAB SUB	0.00 0.00 193000.00	0.00	0 0 0	0 0 193000
							ITEM COST-----	193000

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CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

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AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 2900.002	ENCLOSED BRIDGE AND WALKWAY	200	1	LT	MAT LAB SUB	0.00 0.00 58000.00	0.00	0	0 0 58000	ITEM COST----- 58000
240 2930.006	CONCENTRATE LOADOUT BLDG.	200	1	LT	MAT LAB SUB	0.00 0.00 72000.00	0.00	0	0 0 72000	ITEM COST----- 72000
240 2930.014	CONTROL ROOM (PORT A CAB) 8' X 10'	200	1	EA	MAT LAB SUB	0.00 0.00 6000.00	0.00	0	0 0 6000	ITEM COST----- 6000
240 2930.015	LUNCH ROOM (ROOM A CAB) 8' X 10'	200	1	EA	MAT LAB SUB	0.00 0.00 6000.00	0.00	0	0 0 6000	ITEM COST----- 6000
240 2930.016	WASH ROOM (PORT A CAB) 8' X 6'	200	1	EA	MAT LAB SUB	0.00 0.00 5000.00	0.00	0	0 0 5000	ITEM COST----- 5000
240 3100.002	BUILDING SERVICES - PLUMBING\DRAINAGE	300	1	LT	MAT LAB SUB	0.00 0.00 154000.00	0.00	0	0 0 154000	ITEM COST----- 154000
240 3200.002	BUILDING SERVICES - HEATING (PROVISIONAL ALLOWANCE)	300	1	LT	MAT LAB SUB	0.00 0.00 99000.00	0.00	0	0 0 99000	ITEM COST----- 99000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 17

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
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AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 3600.003	BUILDING SERVICES - ELECTRICAL	300	1	LT	MAT 0.00 LAB 0.00 SUB 120000.00	0.00	0	0 0 120000	
								ITEM COST-----	120000
240 4101.002	BALL MILL 3050MM DIA. X 3660MM INCL. 700 H.P. VARIABLE SPEED MOTOR INCL. FEED CHUTE - TROMMEL - AND LUBE UNITS	400	1	EA	MAT 850000.00 LAB 2347.00 SUB 0.00	71.00	2347	850000 166637 0	
								ITEM COST-----	1016637
240 4101.002.G1	INITIAL BALL CHARGE	400	50	T	MAT 800.00 LAB 0.50 SUB 0.00	71.00	25	40000 1775 0	
								ITEM COST-----	41775
240 4103.001	SAG MILL 5500MM DIA X 1450MM INCL 700HP VARIABLE SPEED MOTOR AND FEED CHUTE TROMMEL AND LUBE UNITS	400	1	EA	MAT 1500000.00 LAB 3158.00 SUB 0.00	71.00	3158	1500000 224218 0	
								ITEM COST-----	1724218
240 4103.001.C1	SAG MILL INCHING DRIVE	400	1	EA	MAT 75000.00 LAB 150.00 SUB 0.00	71.00	150	75000 10650 0	
								ITEM COST-----	85650
240 4103.001.G1	INITIAL BALL CHARGE	400	20	T	MAT 800.00 LAB 0.50 SUB 0.00	71.00	10	16000 710 0	
								ITEM COST-----	16710
240 4120.001	4 X 5M3 LEAD FLOTATION CELLS C/W LAUNDERS\MECHANISMS\MOTORS & LEVEL CONTROLS (FARO PRICE FOR EQUIVALENT)	400	1	EA	MAT 79800.00 LAB 225.00 SUB 0.00	71.00	225	79800 15975 0	
								ITEM COST-----	95775

DRAFT

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

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AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4120.002	10 X 5M3 LEAD ROUGHER FLOTATION CELLS C/W LAUNDERS\MECHANISMS\MOTORS & LEVEL CONTROLS (FARO PRICE FOR EQUIVALENT)	400	1	EA	MAT LAB SUB	199400.00 570.00 0.00	71.00	570	199400 40470 0 ITEM COST----- 239870
240	4120.003	12 X 5M3 ZINC ROUGHER FLOTATION CELLS C/W LAUNDERS\MECHANISMS\MOTORS & LEVEL CONTROLS (FARO PRICE FOR EQUIVALENT)	400	1	EA	MAT LAB SUB	240700.00 685.00 0.00	71.00	685	240700 48635 0 ITEM COST----- 289335
240	4120.004	SPARE MECHANISM FOR 5.0M3 FLOTATION CELLS	400	1	EA	MAT LAB SUB	10000.00 0.00 0.00	71.00	0	10000 0 0 ITEM COST----- 10000
240	4122.001	1680 DIA. X 10200 LEAD CLEANER COLUMN FLOTATION CELL INCL. INTERNALS	400	1	EA	MAT LAB SUB	85000.00 365.00 0.00	71.00	365	85000 25915 0 ITEM COST----- 110915
240	4122.002	2440 DIA. X 10200 ZINC CLEANER COLUMN FLOTATION CELL INCL. INTERNALS	400	1	EA	MAT LAB SUB	115000.00 570.00 0.00	71.00	570	115000 40470 0 ITEM COST----- 155470
240	4142.001	380 DIA. CYCLONES - 4\CLUSTER	400	1	EA	MAT LAB SUB	36200.00 90.00 0.00	71.00	90	36200 6390 0 ITEM COST----- 42590
240	4145.001	300KG/HR SLAKER INCL. 2 - 1.5 H.P. MOTORS	400	1	EA	MAT LAB SUB	39300.00 50.00 0.00	71.00	50	39300 3550 0 ITEM COST----- 42850

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 19

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4151.001	SAG MILL DISCHARGE PUMPS 150MM X 100MM (ALL METAL) INCL. 20 H.P. MOTOR	400	2	EA	MAT 12303.00 LAB 66.00 SUB 0.00	71.00	132	24606 9372 0	
									ITEM COST-----	33978
240	4151.001.C1	VAR. SPEED CONTROLLER	400	1	EA	MAT 7300.00 LAB 20.00 SUB 0.00	71.00	20	7300 1420 0	
									ITEM COST-----	8720
240	4151.002	CYCLONE FEED PUMPS 250MM X 200MM INCL. 75 H.P. MOTOR	400	2	EA	MAT 21400.00 LAB 106.00 SUB 0.00	71.00	212	42800 15052 0	
									ITEM COST-----	57852
240	4151.002.C1	VAR. SPEED CONTROLLER	400	1	EA	MAT 17300.00 LAB 20.00 SUB 0.00	71.00	20	17300 1420 0	
									ITEM COST-----	18720
240	4151.003	UNIT CELL CONCENTRATE PUMP 75MM X 75MM INCL. 10 H.P. MOTOR	400	1	EA	MAT 5850.00 LAB 44.00 SUB 0.00	71.00	44	5850 3124 0	
									ITEM COST-----	8974
240	4151.004	LINE SLAKER 50MM PUMP C\W PUMP BOX & 3HP MOTOR	400	1	EA	MAT 3800.00 LAB 35.00 SUB 0.00	71.00	35	3800 2485 0	
									ITEM COST-----	6285
240	4151.005	200MM X 150MM LEAD ROUGHER TAILS SLURRY PUMP INCL. 15 H.P. MOTOR	400	1	EA	MAT 10565.00 LAB 76.00 SUB 0.00	71.00	76	10565 5396 0	
									ITEM COST-----	15961

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 20

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 4151.006	LEAD ROUGHER SURGE TANK SLURRY PUMP 125MM X 100MM INCL. 10 H.P. MOTOR & VAR. SPEED CONTROLLER	400	1	EA	MAT LAB SUB	9360.00 76.00 0.00	71.00	76	9360 5396 0	ITEM COST----- 14756
240 4151.007	ZINC ROUGHER SURGE TANK SLURRY PUMP 125MM X 100MM INCL. 10 H.P. MOTOR & VAR. SPEED CONTROLLER	400	1	EA	MAT LAB SUB	9360.00 76.00 0.00	71.00	76	9360 5396 0	ITEM COST----- 14756
240 4151.008	TAILINGS PUMPS 200MM X 150MM INCL. 15 H.P. MOTOR	400	2	EA	MAT LAB SUB	10565.00 76.00 0.00	71.00	152	21130 10792 0	ITEM COST----- 31922
240 4151.008.C1	VAR. SPEED CONTROLLER	400	1	EA	MAT LAB SUB	5475.00 20.00 0.00	71.00	20	5475 1420 0	ITEM COST----- 6895
240 4151.011	LEAD ROUGHER COLUMN 125MM X 100MM SLURRY PUMP INCL. 5 H.P. MOTOR & VAR. SPEED CONTROLLER	400	1	EA	MAT LAB SUB	10577.00 72.00 0.00	71.00	72	10577 5112 0	ITEM COST----- 15689
240 4151.015	ZINC CLEANER COLUMN 125MM X 100MM SLURRY PUMP INCL. 5 H.P. MOTOR & VAR. SPEED CONTROLLER	400	1	EA	MAT LAB SUB	10577.00 72.00 0.00	71.00	72	10577 5112 0	ITEM COST----- 15689
240 4151.016	LEAD THICKENER SOLUTION PUMP 38MM X 25MM INCL. 20 H.P. MOTOR	400	1	EA	MAT LAB SUB	2500.00 20.00 0.00	71.00	20	2500 1420 0	ITEM COST----- 3920

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 21

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4151.017	75 X 75 LEAD THICKENER UNDERFLOW SLURRY PUMP INCL. 5 HP MOTOR	400	1	EA	MAT LAB SUB	5500.00 34.00 0.00	71.00	34	5500 2414 0	ITEM COST----- 7914
240	4151.018	LEAD PRESSURE FILTER FEED PUMP 125MM X 100MM INCL. 50 HP MOTOR	400	1	EA	MAT LAB SUB	8900.00 60.00 0.00	71.00	60	8900 4260 0	ITEM COST----- 13160
240	4151.022	ZINC THICKENER SOLUTION PUMP 38MM X 25MM INCL. 20 HP MOTOR	400	1	EA	MAT LAB SUB	2500.00 20.00 0.00	71.00	20	2500 1420 0	ITEM COST----- 3920
240	4151.023	75 X 75 ZINC THICKENER UNDERFLOW SLURRY PUMP INCL. 5 HP MOTOR	400	1	EA	MAT LAB SUB	5500.00 34.00 0.00	71.00	34	5500 2414 0	ITEM COST----- 7914
240	4151.024	ZINC PRESSURE FILTER FEED PUMP 125MM X 100MM INCL. 50 HP MOTOR	400	1	EA	MAT LAB SUB	8900.00 60.00 0.00	71.00	60	8900 4260 0	ITEM COST----- 13160
240	4151.025	SLURRY PUMPS 75MM X 75MM INCL. 3HP MOTORS	400	2	EA	MAT LAB SUB	5463.00 40.00 0.00	71.00	80	10926 5680 0	ITEM COST----- 16606
240	4152.010	SKIP MTD. BOOSTER & HYDRAULIC PUMPS C/W MOTOR (SUPPLIED WITH PRESSURE FILTER)	400	2	EA	MAT LAB SUB	0.00 100.00 0.00	71.00	200	0 14200 0	ITEM COST----- 14200

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 22

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 4153.001	GRINDING AREA SUMP PUMP 75MM INCL. 10 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46	8000 3266 0	ITEM COST----- 11266
240 4153.002	LEAD ROUGHER CONCENTRATE SUMP PUMPS 100MM INCL. 25 HP MOTOR	400	2	EA	MAT LAB SUB	10990.00 68.00 0.00	71.00	136	21980 9656 0	ITEM COST----- 31636
240 4153.002.C1	VAR. SPEED CONTROLLER	400	1	EA	MAT LAB SUB	16800.00 20.00 0.00	71.00	20	16800 1420 0	ITEM COST----- 18220
240 4153.003	ZINC ROUGHER CONCENTRATE SUMP PUMPS 100MM INCL. 25 HP MOTOR	400	2	EA	MAT LAB SUB	10990.00 68.00 0.00	71.00	136	21980 9656 0	ITEM COST----- 31636
240 4153.003.C1	VAR. SPEED CONTROLLER	400	1	EA	MAT LAB SUB	16800.00 20.00 0.00	71.00	20	16800 1420 0	ITEM COST----- 18220
240 4153.004	ZN FLOTATION AREA SUMP PUMP 75MM INCL. 10 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46	8000 3266 0	ITEM COST----- 11266
240 4153.005	Pb FLOTATION AREA SUMP PUMP 75MM INCL. 10 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 40.00 0.00	71.00	40	8000 2840 0	ITEM COST----- 10840

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 23

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4153.009	LEAD DEWATERING SUMP PUMP (75MM) INCL. 7.5 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46	8000 3266 0	ITEM COST----- 11266
240	4153.011	ZINC DEWATERING SUMP PUMP (75MM) INCL. 7.5 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46	8000 3266 0	ITEM COST----- 11266
240	4153.012	LIME AREA 75 SUMP PUMP INCL. 7.5 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46	8000 3266 0	ITEM COST----- 11266
240	4153.013	COOLING WATER SUMP PUMP (75MM) INCL. 10 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46	8000 3266 0	ITEM COST----- 11266
240	4153.014	COMPRESSOR ROOM SUMP PUMP (50MM) INCL. 7.5 HP MOTOR	400	1	EA	MAT LAB SUB	4000.00 40.00 0.00	71.00	40	4000 2840 0	ITEM COST----- 6840
240	4153.015	REAGENT AREA SUMP PUMP (75mm) INCL. 7.5 HP MOTOR	400	1	EA	MAT LAB SUB	8000.00 46.00 0.00	71.00	46	8000 3266 0	ITEM COST----- 11266
240	4154.001	38 X 25 SOLUTION PUMP (SODA ASH) INCL. 3 HP MOTOR	400	1	EA	MAT LAB SUB	2000.00 36.00 0.00	71.00	36	2000 2556 0	ITEM COST----- 4556

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CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

RUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA	WORK SEQ	DESCRIPTION	WORK	UNITS	UNIT	WAGE	MANHR	COST	PACKAGE
NO.	CLAS NO.		CAT.	QUANTITY	COST (MH)	RATE	TOTAL		NUMBER

240 CONCENTRATOR

240	4155.001	METERING PUMP (343) INCL. 1 H. P. MOTOR	400	6	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	72	9000 5112 0
ITEM COST-----										
14112										
240	4155.002	METERING PUMP (SPARE) INCL. MOTOR 1 H.P.	400	2	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	24	3000 1704 0
ITEM COST-----										
4704										
240	4155.003	FLOCCULANT METERING PUMP INCL. MOTOR 1 H.P.	400	2	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	24	3000 1704 0
ITEM COST-----										
4704										
240	4155.004	METERING PUMP (DF250) INCL. 1 H.P. MOTOR	400	2	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	24	3000 1704 0
ITEM COST-----										
4704										
240	4155.005	CUS04 METERING PUMP INCL. MOTOR 1H.P.	400	1	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	12	1500 852 0
ITEM COST-----										
2352										
240	4155.006	SODIUM SILICATE METERING PUMP INCL. MOTOR 1H.P.	400	1	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	12	1500 852 0
ITEM COST-----										
2352										
240	4155.007	SOLUTION PUMP (343) 38MM X 25MM INCL. 3 HP MOTOR	400	1	EA	MAT LAB SUB	2000.00 34.00 0.00	71.00	34	2000 2414 0
ITEM COST-----										
4414										

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 25

CURRAGH RESOURCES INC.
MT, HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4155.008	38 X 25 SODIUM SILICATE SOLUTION PUMP INCL., 3 HP MOTOR	400	1	EA	MAT LAB SUB	2000.00 34.00 0.00	71.00	34	2000 2414 0
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ITEM COST-----

4414

240	4155.009	METERING PUMP (242) INCL. 1 HP MOTOR	400	3	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	36	4500 2556 0
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ITEM COST-----

7056

240	4155.012	SPARE 38 X 25 SOLUTION PUMP INCL. 3 HP MOTOR	400	1	EA	MAT LAB SUB	2000.00 34.00 0.00	71.00	34	2000 2414 0
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ITEM COST-----

4414

240	4155.013	SOLUTION PUMP (CUS04) 38MM X 25MM FRP INCL 3 HP MOTOR	400	1	EA	MAT LAB SUB	5000.00 34.00 0.00	71.00	34	5000 2414 0
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ITEM COST-----

7414

240	4155.014	ZNS04 METERING PUMP INCL. MOTOR 1 H.P.	400	1	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	12	1500 852 0
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ITEM COST-----

2352

240	4155.015	ZNS04 SOLUTION PUMP 38MM X 25MM INCL. 3 HP MOTOR	400	1	EA	MAT LAB SUB	2000.00 34.00 0.00	71.00	34	2000 2414 0
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ITEM COST-----

4414

240	4155.016	METERING PUMP (DF1012) INCL. MOTOR 1 H.P.	400	3	EA	MAT LAB SUB	1500.00 12.00 0.00	71.00	36	4500 2556 0
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ITEM COST-----

7056

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CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

RUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 4155.017	POSITIVE DISPLACEMENT PUMP (FLOCCULANT) INCL. 1.5 HP MOTOR	400	1	EA	MAT LAB SUB	2000.00 16.00 0.00	71.00	16	2000 1136 0
ITEM COST-----									
3136									
240 4159.001	DRUM PUMP (DF250) INCL. MOTOR 0.75 H.P.	400	1	EA	MAT LAB SUB	1500.00 4.00 0.00	71.00	4	1500 284 0
ITEM COST-----									
1784									
240 4159.002	DRUM PUMP (242) INCL. MOTOR 0.75 H.P.	400	1	EA	MAT LAB SUB	1500.00 4.00 0.00	71.00	4	1500 284 0
ITEM COST-----									
1784									
240 4159.003	DRUM PUMP (DF1012) INCL. MOTOR 0.75 H.P.	400	1	EA	MAT LAB SUB	1500.00 4.00 0.00	71.00	4	1500 284 0
ITEM COST-----									
1784									
240 4161.001	SCREW TYPE AIR COMPRESSOR 2550 CMH AT 760 KPA C/W FILTER AND 4" COOLER INCLD MOTOR 375 HP	400	2	EA	MAT LAB SUB	78000.00 370.00 0.00	71.00	740	156000 52540 0
ITEM COST-----									
208540									
240 4162.001	INSTRUMENT AIR RECIPROCATING AIR COMPRESSOR 170CMH AT 760KPA C/W FILTER 4" COOLER-MOTOR 30HP-AIR RECEIVER&DRYER	400	1	EA	MAT LAB SUB	46200.00 70.00 0.00	71.00	70	46200 4970 0
ITEM COST-----									
51170									
240 4177.001	FLOTATION CELL BLOWER 8500 CMH AT 14 KPA INCL. 75 HP MOTOR	400	1	EA	MAT LAB SUB	46800.00 100.00 0.00	71.00	100	46800 7100 0
ITEM COST-----									
53900									

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 27

CURRAGH RESOURCES INC.

400000 t/yr LEAD ZINC CONCENTRATOR

MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16PROJECT ESTIMATE
AREA DETAIL

RUN DATE : 22DEC89

DATA DATE: 22DEC89

RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4177.003	FLOTATION CELL BLOWER 1020 CMH AT 415 KPA INCL. 100 HP MOTOR	400	1	EA	MAT LAB SUB	72800.00 105.00 0.00	71.00	105	72800 7455 0	ITEM COST----- 80255
240	4190.001	SAMPLER	400	1	EA	MAT LAB SUB	5000.00 20.00 0.00	71.00	20	5000 1420 0	ITEM COST----- 6420
240	4190.002	SAMPLER	400	1	EA	MAT LAB SUB	5000.00 20.00 0.00	71.00	20	5000 1420 0	ITEM COST----- 6420
240	4190.003	THIEF SAMPLER	400	1	EA	MAT LAB SUB	5500.00 25.00 0.00	71.00	25	5500 1775 0	ITEM COST----- 7275
240	4190.004	SAMPLER	400	1	EA	MAT LAB SUB	5000.00 20.00 0.00	71.00	20	5000 1420 0	ITEM COST----- 6420
240	4190.005	SAMPLER	400	1	EA	MAT LAB SUB	5000.00 20.00 0.00	71.00	20	5000 1420 0	ITEM COST----- 6420
240	4225.001	28M2 LEAD CONCENTRATE PRESSURE FILTER	400	1	EA	MAT LAB SUB	749000.00 200.00 0.00	71.00	200	749000 14200 0	ITEM COST----- 763200

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 28

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA	WORK SEQ	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4225.002	28M2 ZINC CONCENTRATE PRESSURE FILTER	400	1	EA	MAT LAB SUB	749000.00 200.00 0.00	71.00	200	749000 14200 0	ITEM COST----- 763200
240	4317.005	AGITATOR:LIME STOCK TANK INCL. 3 HP MOTOR	400	1	EA	MAT LAB SUB	3000.00 40.00 0.00	71.00	40	3000 2840 0	ITEM COST----- 5840
240	4317.013	AGITATOR FOR FLOCCULANT MIX TANK INCL. 1.5 HP MOTOR	400	1	EA	MAT LAB SUB	2000.00 50.00 0.00	71.00	50	2000 3550 0	ITEM COST----- 5550
240	4318.001	LEAD THICKENER MECHANISM C\W BRIDGE AND WALKWAY	400	1	EA	MAT LAB SUB	78936.00 590.00 0.00	71.00	590	78936 41890 0	ITEM COST----- 120826
240	4318.002	ZINC THICKENER MECHANISM C\W BRIDGE AND WALKWAY	400	1	EA	MAT LAB SUB	86320.00 1000.00 0.00	71.00	1000	86320 71000 0	ITEM COST----- 157320
240	4403.002	BELT CONVEYOR (LEAD CONCENTRATE STORAGE) 1370MMW X 12ML INCL MOTOR 10HP	400	1	LT	MAT LAB SUB	24400.00 206.00 0.00	71.00	206	24400 14626 0	ITEM COST----- 39026
240	4403.004	BELT CONVEYOR (ZINC CONCENTRATE STORAGE) 1370MMW X 12ML INCL MOTOR 10HP	400	1	LT	MAT LAB SUB	24400.00 206.00 0.00	71.00	206	24400 14626 0	ITEM COST----- 39026

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KILBORN MANAGEMENT SYSTEMS ADRD
CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

K I L B O R N L I M I T E D
400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

PAGE NO. : 29
RUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4433.002	20 TONNE CAP. LIME HOPPER AND 230MM DIA X 3M LONG SCREW CONVEYOR INCL VARIABLE SPEED 3HP MOTOR	400	1	EA	MAT LAB SUB	12300.00 100.00 0.00	71.00	100	12300 7100 0	ITEM COST----- 19400
240	4433.003	20 TONNE CAP. SODA ASH HOPPER AND 230MM DIA X 3M LONG SCREW CONVEYOR INCL VARIABLE SPEED 3HP MOTOR	400	1	EA	MAT LAB SUB	12300.00 100.00 0.00	71.00	100	12300 7100 0	ITEM COST----- 19400
240	4441.002	GRINDING AREA O/H CRANE 10 TONNE INCL. MOTORS	400	1	EA	MAT LAB SUB	53000.00 120.00 0.00	71.00	120	53000 8520 0	ITEM COST----- 61520
240	4441.003	FLOTATION AREA O/H CRANE 5 TONNE INCL MOTORS	400	1	EA	MAT LAB SUB	24000.00 80.00 0.00	71.00	80	24000 5680 0	ITEM COST----- 29680
240	4441.004	2 TONNE HOIST OVER FILTERS	400	1	EA	MAT LAB SUB	6000.00 40.00 0.00	71.00	40	6000 2840 0	ITEM COST----- 8840
240	4441.005	2 TONNE HOIST FOR LIFT WELL	400	1	EA	MAT LAB SUB	6000.00 40.00 0.00	71.00	40	6000 2840 0	ITEM COST----- 8840
240	4451.002	ELECTRO BALL MAGNET INCL. RECTIFIER	400	1	EA	MAT LAB SUB	16523.00 50.00 0.00	71.00	50	16523 3550 0	ITEM COST----- 20073

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 30

CURRAGH RESOURCES INC.

400000 t/yr LEAD ZINC CONCENTRATOR

RUN DATE : 22DEC89

MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16PROJECT ESTIMATE
AREA DETAILDATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 4452.001	TRUCK SCALE MECHANISM 100 TONNE CAPACITY	400	1	EA	MAT 0.00 LAB 0.00 SUB 70000.00	71.00	0	0 0 70000 ITEM COST----- 70000
240 4452.002	TRUCK SCALE CIVIL	100	1	EA	MAT 0.00 LAB 0.00 SUB 80000.00	71.00	0	0 0 80000 ITEM COST----- 80000
240 4461.002	VIBRATING SCREEN 1525MM X 3600MM HORIZONTAL (10 MESH SEPARATION) INCL. 15 HP MOTOR AND O/S & U/S CHUTES	400	1	EA	MAT 35000.00 LAB 48.00 SUB 0.00	71.00	48	35000 3408 0 ITEM COST----- 38408
240 4461.005	MIXING CONE	400	1	EA	MAT 2000.00 LAB 15.00 SUB 0.00	71.00	15	2000 1065 0 ITEM COST----- 3065
240 4461.006	SOLUTION DISTRIBUTOR	400	1	EA	MAT 2000.00 LAB 15.00 SUB 0.00	71.00	15	2000 1065 0 ITEM COST----- 3065
240 4461.007	EDUCTOR	400	1	EA	MAT 1500.00 LAB 5.00 SUB 0.00	71.00	5	1500 355 0 ITEM COST----- 1855
240 4810.001	FEED BOX: PB THICKENER 3ML X 1.5MW X 1MDP	400	1	EA	MAT 2600.00 LAB 20.00 SUB 0.00	71.00	20	2600 1420 0 ITEM COST----- 4020

DRAFT

KILBORN MANAGEMENT SYSTEMS ADRD
CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

K I L B O R N L I M I T E D
400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

PAGE NO. : 31
RUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
240		CONCENTRATOR								
240	4810.002	FEED BOX: ZN THICKENER 3ML X 1.5MW X 1MDP	400	1	EA	MAT LAB SUB	2600.00 20.00 0.00	71.00	20	2600 1420 0
								ITEM COST-----	4020	
240	4811.001	SAG MILL 1200MM X 2400MM PUMPBOX (RUBBER LINED)	400	1	EA	MAT LAB SUB	7000.00 75.00 0.00	71.00	75	7000 5325 0
								ITEM COST-----	12325	
240	4811.004	LEAD 1830MM DIA. X 1830MM SURGE TANK	400	1	EA	MAT LAB SUB	2700.00 15.00 0.00	71.00	15	2700 1065 0
								ITEM COST-----	3765	
240	4811.005	ZINC 1830MM DIA. X 1830MM SURGE TANK	400	1	EA	MAT LAB SUB	2700.00 15.00 0.00	71.00	15	2700 1065 0
								ITEM COST-----	3765	
240	4811.019	600 DIA. X 1000 STEADY HEAD TANK (343)	400	1	EA	MAT LAB SUB	500.00 10.00 0.00	71.00	10	500 710 0
								ITEM COST-----	1210	
240	4811.021	STEADY HEAD TANK: 600 DIA. X 1000 (SODIUM SILICATE)	400	1	EA	MAT LAB SUB	500.00 10.00 0.00	71.00	10	500 710 0
								ITEM COST-----	1210	
240	4811.022	SPARE STEADY HEAD TANK: 600 DIA. X 1000 (SPARE)	400	1	EA	MAT LAB SUB	500.00 0.00 0.00	71.00	0	500 0 0
								ITEM COST-----	500	

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 32

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 4811.023	600 DIA. X 1000 STEADY HEAD TANK (CUS04) (FRP)	400	1	EA	MAT LAB SUB	1500.00 10.00 0.00	71.00	10	1500 710 0	ITEM COST----- 2210
240 4811.024	600 DIA. X 1000 STEADY HEAD TANK (ZNS04)	400	1	EA	MAT LAB SUB	500.00 10.00 0.00	71.00	10	500 710 0	ITEM COST----- 1210
240 4811.025	600 DIA. X 1000 STEADY HEAD TANK (FLOCCULANT)	400	1	EA	MAT LAB SUB	500.00 10.00 0.00	71.00	10	500 710 0	ITEM COST----- 1210
240 4811.026	600 DIA. X 1000 STORAGE TANK (DF250)	400	1	EA	MAT LAB SUB	500.00 10.00 0.00	71.00	10	500 710 0	ITEM COST----- 1210
240 4811.027	600 DIA. X 1000 STORAGE TANK (242)	400	1	EA	MAT LAB SUB	500.00 10.00 0.00	71.00	10	500 710 0	ITEM COST----- 1210
240 4811.028	600 DIA. X 1000 STORAGE TANK (DF1012)	400	1	EA	MAT LAB SUB	500.00 10.00 0.00	71.00	10	500 710 0	ITEM COST----- 1210
240 4813.002	Pb THICKENER O/F TANK 600MM DIA. X 5MH	400	1	EA	MAT LAB SUB	2056.00 15.00 0.00	71.00	15	2056 1065 0	ITEM COST----- 3121

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

PAGE NO. : 33

RUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK CAT.	SEQ CLAS NO.	DESCRIPTION	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 4813.004	1830 X 4000 AIR RECEIVER	400	1	EA	MAT LAB SUB	3000.00 30.00 0.00	71.00	30	3000 2130 0	
								ITEM COST	5130	
240 4813.005	4900MM DIA. X 7900MM LEAD CONCENTRATE STORAGE TANK INCL. SUPPORT STEEL	400	1	EA	MAT LAB SUB	0.00 0.00 90350.00	71.00	0	0 0 90350	
								ITEM COST	90350	
240 4813.006	4900MM DIA. X 14000MM ZINC CONCENTRATE STORAGE TANK INCL. SUPPORT STEEL	400	1	EA	MAT LAB SUB	0.00 0.00 136400.00	71.00	0	0 0 136400	
								ITEM COST	136400	
240 4813.007	100 TONNE CAP. LEAD CONCENTRATE STORAGE BIN	400	1	EA	MAT LAB SUB	0.00 0.00 31900.00	0.00	0	0 0 31900	
								ITEM COST	31900	
240 4813.008	100 TONNE CAP. ZINC CONCENTRATE STORAGE BIN	400	1	EA	MAT LAB SUB	0.00 0.00 31900.00	0.00	0	0 0 31900	
								ITEM COST	31900	
240 4813.011	600 DIA. X 5MH Zn THICKENER O/F TANK	400	1	EA	MAT LAB SUB	2056.00 15.00 0.00	71.00	15	2056 1065 0	
								ITEM COST	3121	
240 4813.015	LIME STOCK TANK: 1525 DIA. X 1830	400	1	EA	MAT LAB SUB	2474.00 15.00 0.00	71.00	15	2474 1065 0	
								ITEM COST	3539	

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 34

CURRAGH RESOURCES INC.

400000 t/yr LEAD ZINC CONCENTRATOR

RUN DATE : 22DEC89

MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16PROJECT ESTIMATE
AREA DETAILDATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	4813.017	1220 DIA. X 1830 MIX TANK (343)	400	1	EA	MAT LAB SUB	1500.00 10.00 0.00	71.00	10	1500 710 0	ITEM COST----- 2210
240	4813.018	1220 DIA. X 1830 SODIUM SIL MIX TANK	400	1	EA	MAT LAB SUB	1500.00 10.00 0.00	71.00	10	1500 710 0	ITEM COST----- 2210
240	4813.019	1220 DIA. X 1830 SPARE MIX TANK (SPARE)	400	1	EA	MAT LAB SUB	1500.00 10.00 0.00	71.00	10	1500 710 0	ITEM COST----- 2210
240	4813.020	1220 DIA. X 1830 CUSO4 MIX TANK, FRP CONSTRUCTION	400	1	EA	MAT LAB SUB	2500.00 10.00 0.00	71.00	10	2500 710 0	ITEM COST----- 3210
240	4813.021	1220 DIA. X 1830 (ZnSO4) MIX TANK	400	1	EA	MAT LAB SUB	1500.00 10.00 0.00	71.00	10	1500 710 0	ITEM COST----- 2210
240	4813.022	1220 DIA. X 2440 MIX TANK (FLOCCULANT)	400	1	EA	MAT LAB SUB	2000.00 15.00 0.00	71.00	15	2000 1065 0	ITEM COST----- 3065
240	4813.025	11.0M DIA LEAD THICKENER TANK INCL LAUNDER & DISC CONE (36T)	400	1	LT	MAT LAB SUB	0.00 0.00 141600.00	71.00	0	0 0 141600	ITEM COST----- 141600

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 35

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240 4813.026	15.0M DIA ZINC THICKENER TANK INCL LAUNDER AND CONE (49T)	400	1	LT	MAT 0.00 LAB 0.00 SUB 185200.00	71.00	0	0 0 185200 ITEM COST----- 185200
240 4815.002	125 BALL STORAGE	400	1	EA	MAT 0.00 LAB 0.00 SUB 2500.00	71.00	0	0 0 2500 ITEM COST----- 2500
240 4815.003	50 BALL STORAGE	400	1	EA	MAT 0.00 LAB 0.00 SUB 2500.00	71.00	0	0 0 2500 ITEM COST----- 2500
240 4815.004	BALL STORAGE LIFT-UP COVER WINCH OPERATED	400	1	LT	MAT 0.00 LAB 0.00 SUB 16000.00	0.00	0	0 0 16000 ITEM COST----- 16000
240 4818.005	1 TONNE CAPACITY BALL BUCKET	400	1	EA	MAT 2000.00 LAB 5.00 SUB 0.00	71.00	5	2000 355 0 ITEM COST----- 2355
240 4910.001	SMALL TOOLS	400	1	LT	MAT 100000.00 LAB 0.00 SUB 0.00	0.00	0	100000 0 0 ITEM COST----- 100000
240 4950.005	FORKLIFT 1T-CAP (PROPANE) FOR REAGENT MIXING AREA-CONCENTRATOR	400	1	EA	MAT 0.00 LAB 0.00 SUB 30000.00	71.00	0	0 0 30000 ITEM COST----- 30000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 36

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240 CONCENTRATOR

240	5000.001	PROCESS PIPING	500	1	LT	MAT LAB SUB	1113000.00 12325.00 0.00	71.00	12325	1113000 875075 0
										ITEM COST-----
										1988075
240	6000.001	CABLE TRAY \ CABLE \ MOTOR CONTROL DEVICE ETC	600	1	LT	MAT LAB SUB	967200.00 12575.00 0.00	71.00	12575	967200 892825 0
										ITEM COST-----
										1860025
240	6000.002	TRANSFORMER 2 MVA	600	1	LT	MAT LAB SUB	40000.00 100.00 0.00	71.00	100	40000 7100 0
										ITEM COST-----
										47100
240	6000.003	5KV FEEDERS	600	1	LT	MAT LAB SUB	20000.00 600.00 0.00	71.00	600	20000 42600 0
										ITEM COST-----
										62600
240	6000.004	600V FEEDERS	600	1	LT	MAT LAB SUB	32500.00 400.00 0.00	71.00	400	32500 28400 0
										ITEM COST-----
										60900
240	6000.005	600V BREAKERS	600	1	LT	MAT LAB SUB	10000.00 50.00 0.00	71.00	50	10000 3550 0
										ITEM COST-----
										13550
240	7000.001	INSTRUMENTATION	700	1	LT	MAT LAB SUB	439400.00 2912.00 0.00	71.00	2912	439400 206752 0
										ITEM COST-----
										646152

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 37

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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240		CONCENTRATOR								
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240	7030.001	PORTABLE X-RAY ANALYZER	700	1	LT	MAT LAB SUB	50000.00 25.00 0.00	71.00	25	50000 1775 0
									ITEM COST	51725

240 CONCENTRATOR

TOTAL 44542

16370203

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 38

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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310 ANCILLARY FACILITIES

310	2600.001	FURNISHINGS	200	1	LT	MAT LAB SUB	0.00 0.00 182720.00	0.00	0	0 0 182720	ITEM COST----- 182720
310	2930.001	SECURITY & FIRST AID TRAILER	200	1	LT	MAT LAB SUB	0.00 0.00 30000.00	0.00	0	0 0 30000	ITEM COST----- 30000
310	2930.002	ADMINISTRATION AND CONCENTRATOR OFFICE	200	1	LT	MAT LAB SUB	0.00 0.00 160000.00	0.00	0	0 0 160000	ITEM COST----- 160000
310	2930.003	EQUIPMENT & FURNITURE FOR ASSAY LAB	200	1	LT	MAT LAB SUB	0.00 0.00 150000.00	0.00	0	0 0 150000	ITEM COST----- 150000
310	2930.004	AMBULANCE GARAGE	200	1	LT	MAT LAB SUB	0.00 0.00 20000.00	0.00	0	0 0 20000	ITEM COST----- 20000
310	2930.005	COLD WAREHOUSE	200	1	LT	MAT LAB SUB	0.00 0.00 95000.00	0.00	0	0 0 95000	ITEM COST----- 95000
310	2930.008	M.C.C. TRAILER	200	3	EA	MAT LAB SUB	0.00 0.00 15000.00	0.00	0	0 0 45000	ITEM COST----- 45000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 39

CURRAGH RESOURCES INC.

400000 t/yr LEAD ZINC CONCENTRATOR

RUN DATE : 22DEC89

MT. HUNDERE JOINT VENTURE - WATSON LAKE

PROJECT ESTIMATE

DATA DATE : 22DEC89

3699-16

AREA DETAIL

RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	HANHR TOTAL	COST	PACKAGE NUMBER
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310 ANCILLARY FACILITIES

310 2930.010 EQUIPMENT & FURNITURE FOR
CONCENTRATOR LAB

200

1

LT

MAT
LAB
SUB

0.00

0.00

0.00

0

0

70000.00

70000

ITEM COST-----

70000

310 2930.011 DRY TRAILER

200

1

LT

MAT
LAB
SUB

0.00

0.00

0.00

0

0

46000.00

46000

ITEM COST-----

46000

310 2930.012 ASSAY LABORATORY TRAILER

200

1

LT

MAT
LAB
SUB

0.00

0.00

0.00

0

0

92000.00

92000

ITEM COST-----

92000

310 ANCILLARY FACILITIES

TOTAL

0

890720

KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 40

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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360 POWERHOUSE

360 2030.005	CONCRETE PAD FOR POWER GENERATION DIESEL STORAGE TANK (INCL BOLLARDS)	200	1	LT	MAT LAB SUB	0.00 0.00 8000.00	0.00	0	0 0 8000	ITEM COST----- 8000
360 4919.002	DIESEL STORAGE TANK FOR POWER GENERATION 20'DIA X 30' HIGH (65000USG) INCL DISPENSING PUMP & METER FOR MOBILE EQUIP	400	1	LT	MAT LAB SUB	0.00 0.00 88000.00	0.00	0	0 0 88000	ITEM COST----- 88000
360 6170.001	POWER GENERATION FACILITY (BY CLIENT CONTRACT)	600	0	LT	MAT LAB SUB	0.00 0.00 0.00	71.00	0	0 0 0	ITEM COST----- -----0

360 POWERHOUSE

TOTAL

0

96000

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KILBORN MANAGEMENT SYSTEMS ADRD
 CURRAGH RESOURCES INC.
 MT. HUNDERE JOINT VENTURE - WATSON LAKE
 3699-16

K I L B O R N L I M I T E D
 400000 t/yr LEAD ZINC CONCENTRATOR
 PROJECT ESTIMATE
 AREA DETAIL

PAGE NO. : 41
 RUN DATE : 22DEC89
 DATA DATE: 22DEC89
 RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
370		FRESH WATER SUPPLY								
370	1240.001	POTABLE WATER TREATMENT PLANT - 5.0 USGPM	400	1	LT	MAT 0.00 LAB 0.00 SUB 75000.00	0.00	0	0 0 75000	
									ITEM COST-----	75000
370	1330.050	RECLAIM WATER DAM - MINE WASTE	100	130000	M3	MAT 0.00 LAB 0.00 SUB 6.00	0.00	0	0 0 780000	
									ITEM COST-----	780000
370	1330.051	RECLAIM WATER DAM - TILL	100	22000	M3	MAT 0.00 LAB 0.00 SUB 10.00	0.00	0	0 0 220000	
									ITEM COST-----	220000
370	1330.052	RECLAIM WATER DAM - FILTER FABRIC	100	35000	M2	MAT 0.00 LAB 0.00 SUB 1.70	0.00	0	0 0 59500	
									ITEM COST-----	59500
370	2310.011	FRESH WATER STORAGE TANK (200000 USG FABRI-TANK)	400	1	LT	MAT 0.00 LAB 0.00 SUB 132000.00	0.00	0	0 0 132000	
									ITEM COST-----	132000
370	2310.012	3050 DIA. X 7050 POTABLE WATER STORAGE TANK (4000USG)	400	1	EA	MAT 14600.00 LAB 40.00 SUB 0.00	61.00	40	14600 2440 0	
									ITEM COST-----	17040
370	2810.002	FRESH WATER PUMPHOUSE	200	1	LT	MAT 0.00 LAB 0.00 SUB 25000.00	0.00	0	0 0 25000	
									ITEM COST-----	25000

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 42

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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370 FRESH WATER SUPPLY

370 4152.006	FRESH WATER RECIRCULATION PUMP INCL MOTOR 3HP	400	1	EA	MAT LAB SUB	2765.00 40.00 0.00	71.00	40	2765 2840 0	ITEM COST-----	5605
370 4152.013	200 USGPM POTABLE WATER DISTRIBUTION PUMP INCL. 10 H.P. MOTOR	400	1	EA	MAT LAB SUB	2765.00 40.00 0.00	71.00	40	2765 2840 0	ITEM COST-----	5605
370 4152.020	FRESH WATER SUPPLY PUMP 100 USGPM INCL. 10 H.P. MOTOR	400	2	EA	MAT LAB SUB	7513.00 77.00 0.00	71.00	154	15026 10934 0	ITEM COST-----	25960
370 5250.002	FIRE RING MAIN	500	1	LT	MAT LAB SUB	0.00 0.00 101000.00	71.00	0	0 0 101000	ITEM COST-----	101000
370 6000.012	ELECTRICAL SUPPLY TO FRESH WATER PUMPHOUSE & RECIRCULATION PUMP	600	1	LT	MAT LAB SUB	0.00 0.00 27000.00	0.00	0	0 0 27000	ITEM COST-----	27000
										---	22000

370 FRESH WATER SUPPLY

TOTAL

274

1473710

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 43

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
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380 TAILINGS DISPOSAL

380 1330.055	TAILINGS DAM (5YR STORAGE) - MINE WASTE	100 95000	M3	MAT LAB SUB	0.00 0.00 6.00	0.00	0	0 0 570000
							ITEM COST-----	570000
380 1330.056	TAILINGS DAM (5YR STORAGE) - TILL	100 4000	M3	MAT LAB SUB	0.00 0.00 10.00	0.00	0	0 0 40000
							ITEM COST-----	40000
380 1330.057	TAILINGS DAM (5YR STORAGE) - FILTER FABRIC	100 25000	M2	MAT LAB SUB	0.00 0.00 1.70	0.00	0	0 0 42500
							ITEM COST-----	42500
380 2900.003	DECANT STRUCTURE	200 1	LT	MAT LAB SUB	0.00 0.00 30000.00	0.00	0	0 0 30000
							ITEM COST-----	30000
380 5100.001	PIPELINE TAILINGS DISPOSAL	500 1	LT	MAT LAB SUB	0.00 0.00 325000.00	71.00	0	0 0 325000
							ITEM COST-----	325000

380 TAILINGS DISPOSAL

TOTAL

0

1007500

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KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 44

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

390 WATER RECLAIM

390 1260.001	WATER WELLS	100	5	EA	MAT LAB SUB	0.00 0.00 15000.00	0.00	0	0 0 75000	ITEM COST----- 75000
390 2810.003	RECLAIM WATER PUMPHOUSE	200	1	LT	MAT LAB SUB	0.00 0.00 25000.00	0.00	0	0 0 25000	ITEM COST----- 25000
390 4152.001	RECLAIM WATER (VERTICAL PUMP) 140M3HR SINGLE STAGE INCL. 125 H.P. MOTOR	400	2	EA	MAT LAB SUB	26400.00 134.00 0.00	71.00	268	52800 19028 0	ITEM COST----- 71828
390 4152.005	PROCESS WATER PUMPS 30M3HR INCL. 5 H.P.MOTOR	400	4	EA	MAT LAB SUB	4217.00 46.00 0.00	71.00	184	16868 13064 0	ITEM COST----- 29932
390 5200.001	PIPELINE WATER RECLAIM	500	1	LT	MAT LAB SUB	0.00 0.00 139000.00	71.00	0	0 0 139000	ITEM COST----- 139000
390 6000.013	ELECTRICAL SUPPLY TO RECLAIM WATER SUPPLY	600	1	LT	MAT LAB SUB	0.00 0.00 48000.00	0.00	0	0 0 48000	ITEM COST----- 48000

DRAFT

KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 45

CURRAGH RESOURCES INC.

400000 t/yr LEAD ZINC CONCENTRATOR

RUN DATE : 22DEC89

MT. HUNDERE JOINT VENTURE - WATSON LAKE

PROJECT ESTIMATE

DATA DATE: 22DEC89

3699-16

AREA DETAIL

RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

390	WATER RECLAIM							
-----	---------------	--	--	--	--	--	--	--

390 WATER RECLAIM

TOTAL

452

388760

DRAFT

KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 46

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

660	CONSTR. INDIRECTS							
-----	-------------------	--	--	--	--	--	--	--

COST TYPE

D TOTAL

49175

32238545

660 9001.001 CONSTRUCTION INDIRECTS

900

1

LT

MAT
LAB
SUB0.00
0.00
3029000.00

0.00

0

0
0
3029000

ITEM COST

3029000

660 CONSTR. INDIRECTS

TOTAL

0

3029000

KILBORN MANAGEMENT SYSTEMS ADRD
CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

K I L B O R N L I M I T E D
400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

PAGE NO. : 47
RUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA NO.	WORK SEQ CLAS NO.	DESCRIPTION	WORK CAT.	QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------	-------------------------	-------------	--------------	----------	-------	-------------------	--------------	----------------	------	-------------------

670 E.P.C.M.

670	9570.001	E.P.C.M.	900	1	LT	MAT 0.00 LAB 0.00 SUB 4907000.00	0.00	0	0	0
-----	----------	----------	-----	---	----	--	------	---	---	---

DRAFT

ITEM COST-----
4907000

670 E.P.C.M.

TOTAL

0

4907000

KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 48

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

680 MINE COSTS

680 9600.001	MINE COSTS - BY HILLSBOROUGH RESOURCES	900	0	LT	MAT LAB SUB	0.00 0.00 0.00	0.00	
--------------	---	-----	---	----	-------------------	----------------------	------	--

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ITEM COST-----
0

680 MINE COSTS

TOTAL

0

0

KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 49

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16

400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAIL

RUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

690 CONTINGENCY

690 9800.001	CONTINGENCY	900	1	LT	MAT	0.00		0
					LAB	0.00		0
					SUB	4579455.00	0.00	0
								4579455
							ITEM COST	4579455

690 CONTINGENCY

TOTAL

DRAFT

4579455

DRAFT

KILBORN MANAGEMENT SYSTEMS ADRD

KILBORN LIMITED

PAGE NO. : 50

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

691 CAMP COSTS

691 9010.001	CAMP COMPLEX 300MAN	900	1	LT	MAT 0.00 LAB 0.00 SUB 4602000.00	0.00	0	0 0 4602000
							ITEM COST	4602000
691 CAMP COSTS							TOTAL	0
								4602000

DRAFT

KILBORN MANAGEMENT SYSTEMS ADRD

K I L B O R N L I M I T E D

PAGE NO. : 51

CURRAGH RESOURCES INC.
MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE: 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

692 SPARE PARTS AND INVENTORY

692 9710.002	WAREHOUSE INVENTORY	900	1	LT	MAT	0.00		0
					LAB	0.00		0
					SUB	150000.00	0.00	0
								150000
								ITEM COST-----
								150000
692 9710.003	SPARE PARTS	900	1	LT	MAT	0.00		0
					LAB	0.00	0.00	0
					SUB	350000.00		0
								350000
								ITEM COST-----
								350000

692 SPARE PARTS AND INVENTORY

TOTAL

0

500000

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KILBORN MANAGEMENT SYSTEMS ADRD

KILBORN LIMITED

PAGE NO. : 52

CURRAGH RESOURCES INC.

MT. HUNDERE JOINT VENTURE - WATSON LAKE
3699-16400000 t/yr LEAD ZINC CONCENTRATOR
PROJECT ESTIMATE
AREA DETAILRUN DATE : 22DEC89
DATA DATE : 22DEC89
RUN TIME : 10:38:39

AREA WORK SEQ NO. CLAS NO.	DESCRIPTION	WORK CAT. QUANTITY	UNITS	UNIT COST (MH)	WAGE RATE	MANHR TOTAL	COST	PACKAGE NUMBER
-------------------------------	-------------	-----------------------	-------	-------------------	--------------	----------------	------	-------------------

693 SPECIAL FREIGHT & INSURANCE CONDITIONS

693 9750.001	SPECIAL FREIGHT & INSURANCE CONDITIONS	900	1	LT	MAT 0.00 LAB 0.00 SUB 520000.00	0.00	0	0
							ITEM COST	520000
							-	520000

693 SPECIAL FREIGHT & INSURANCE CONDITIONS TOTAL

COST TYPE

I TOTAL

GRAND TOTAL ALL

DRAFT

520000

18137455

49175

50376000

APPENDIX C

APPENDIX C

OPERATING COST DETAILS

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SUMMARY OF SURFACE OPERATING COSTS

DEC 19, 1989

	PERSONNEL	ANNUAL COST	COST/TONNE
ADMINISTRATION	16	927,360	2.32
MILL SUPERVISION	7	517,500	1.29
MILL OPERATING LABOUR	12	620,639	1.55
MILL MAINTENANCE LABOUR	6	314,825	0.79
MILL OPERATING SUPPLIES		1,890,611	4.73
MAINTENANCE SUPPLIES		410,000	1.03
ASSAY LABORATORY	3	215,280	0.54
POWER HOUSE		3,139,672	7.85
SURFACE	5	404,660	1.01
TAILINGS POND		200,000	0.50
GENERAL EXPENSES		944,000	2.36
TOTAL	49	9,584,547	23.96
TONNES OF ORE MILLED/YEAR		400,000	
COST/TONNE OF ORE MILLED		23.96	

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ADMINISTRATION

	NUMBER	ANNUAL SALARY	ANNUAL COST
MANAGER	1	100000	100000
SECRETARY/RECEPTIONIST	1	30000	30000
ADMINISTRATION SUPERINTENDENT	1	60000	60000
PURCHASING AGENT	1	50000	50000
CHIEF ACCOUNTANT	1	50000	50000
ACCOUNTANT	1	35000	35000
HUMAN RESOURCES SUPERINTENDENT	1	50000	50000
SECURITY/FIRST AID	4	35000	140000
CLERKS/TYPISTS	3	25000	75000
JANITORS	2	25000	50000
SUBTOTAL	16		640000
PAYROLL BURDEN	0.38		243200
TOTAL LABOUR			883200
ADMINISTRATION SUPPLIES			44160
TOTAL ADMINISTRATION			927360
TONNES MILLED/YEAR			400000
COST/TON MILLED			2.318

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MILL SUPERVISION

NUMBER ANNUAL SALARY ANNUAL COST

MILL SUPERINTENDENT	1	75000	75000
GENERAL MILL FOREMEN	2	60000	120000
MAINTENANCE FOREMEN	1	65000	65000
METALLURGIST	1	50000	50000
METALLURGICAL TECH	1	40000	40000
CLERK	1	25000	25000

SUBTOTAL	7		375000
----------	---	--	--------

PAYROLL BURDEN	0.38		142500
----------------	------	--	--------

TOTAL			517500
-------	--	--	--------

TONNES MILLED/YEAR			400000
--------------------	--	--	--------

COST/TONNE MILLED			1.294
-------------------	--	--	-------

DRAFT

MILL OPERATING LABOUR

	NUMBER	RATE	HOURS/YR	ANNUAL COST
GRIND OP	4	17.28	2190	151373
LEADHAND/ FLOTATION OP	4	18.28	2190	160133
HELPERS	4	15.78	2190	138233
SUBTOTAL	12			449738
PAYROLL BURDEN	0.38			170901
TOTAL				620639
TONNES MILLED/YEAR				400000
COST/TONNE MILLED				1.552

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MILL MAINTENANCE LABOUR -----

	NUMBER	RATE	HOURS/YR	ANNUAL COST
MILL MECHANICS	4	18.28	2080	152090
INST TECH	1	18.28	2080	38022
ELECTRICIAN	1	18.28	2080	38022
SUBTOTAL	6			228134
PAYROLL BURDEN	0.38			86691
TOTAL				314825
TONNES MILLED/YEAR				400000
COST/TONNE MILLED				0.787

DRAFT

MILL OPERATING SUPPLIES

	CONSUMPTION		COST-\$/t	ANNUAL COST
	kg/t	t/y		
GRINDING BALLS(5")	0.66	262	800	209626
GRINDING BALLS(2.5")	0.66	262	800	209626
SAG MILL LINERS	1 SET/YR			205000
BALL MILL LINERS	1 SET/YR			30000
SODA ASH	1.33	532	220	117040
ZINC SULPHATE	0.5	200	850	170000
343	0.1	40	2600	104000
242	0.01	4	6500	26000
DF250	0.02	8	2740	21920
LIME	1.00	400	220	88000
COPPER SULPHATE	0.5	200	1475	295000
DF1012	0.2	80	2500	200000
SODIUM SILICATE	0.5	200	1000	200000
FLOCCULANT	0.01	4	3600	14400
TOTAL				1890611
TONNES MILLED/YEAR				400000
COST/TONNE MILLED				4.727

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MAINTENANCE SUPPLIES

	CAPITAL COST	%OF CAP COST	ANNUAL COST
BUILDINGS	5000000	1.00	50000
EQUIPMENT	9000000	4.00	360000
TOTAL			410000
TONNES MILLED/YEAR			400000
COST/TONNE MILLED			1.025

DRAFT

ASSAY LAB

	NUMBER	RATE	ANNUAL COST
CHIEF ASSAYER	1	50000	50000
ASSAYER	1	40000	40000
SAMPLE PREP	1	30000	30000
SUBTOTAL	3		120000
PAYROLL BURDEN	0.38		45600
TOTAL LABOUR			165600
ASSAY LAB SUPPLIES			49680
TOTAL ASSAY LAB			215280
TONNES MILLED/YEAR			400000
COST/TONNE MILLED			0.538

DRAFT

POWER HOUSE

	<u>MINE</u>	<u>SURFACE</u>
POWER CONSUMPTION/YEAR-kWh	5425944	18725376
POWER COST-\$/kWh	0.13	0.13
POWER COST/YEAR-\$	705373	2434299
TONNES MILLED /YEAR	400000	400000
COST/TONNE MILLED-\$	1.76	6.09

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SURFACE

	NUMBER	ANNUAL SALARY	ANNUAL COST
SURFACE LABOURERS	3	27000	81000
HEAVY EQUIPMENT OPERATORS	2	38000	76000
SUB TOTAL	5		157000
PAYROLL BURDEN	0.38		59660
TOTAL LABOUR			216660
MOBILE EQUIP	940000	0.2	188000
TOTAL SURFACE			404660
TONNES MILLED/YEAR			400000
COST/TONNE MILLED			1.012

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TAILINGS POND

ANNUAL COST

MAINTENANCE & INCREASING DAM HEIGHT

200000

TONNES MILLED/YEAR

400000

COST/TONNE MILLED

0.500

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GENERAL EXPENSES

ANNUAL COST

CONSULTANTS	50000
TRAVEL EXPENSES	25000
COMMUNICATIONS	35000
CONVENTIONS	15000
INSURANCE	100000
LEGAL FEES	25000
RECRUITING	25000
HEATING	0
TOWNSITE	0
CAMP/KITCHEN(\$40/MAN/DAY)	0
FREIGHT	0
EMPLOYEE TRANSPORTATION(\$13/MAN/DAY)	169000
ROAD MAINTENANCE	350000
MUNICIPAL TAXES	0
MARKETING COSTS	0
CAPITAL EXPENDITURES	50000
HEAD OFFICE MANAGEMENT FEE(\$.50/TONNE)	0
RECREATION	0
STUDENTS	50000
MISCELLANEOUS	50000
TOTAL	944000
TONNES MILLED/YEAR	400000
COST/TONNE MILLED	2.36

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APPENDIX E

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APPENDIX E

ELECTRICAL POWER REQUIREMENTS

MOTOR LIST

MT. HUNDERE

DEC 11, 1989

CONNECTED KW

COARSE ORE RECEIVING

ROCK BREAKER

37.0

COARSE ORE RECEIVING TOTAL

37.0

COARSE ORE RECLAIM

VIBRATING FEEDER

22.0

SAG MILL FEED BELT CONVEYOR

15.0

SUMP PUMP

7.5

EXHAUST FAN

7.5

COARSE ORE RECLAIM TOTAL

52.0

GRINDING

SAG MILL

525.0

BALL MILL

525.0

SAG MILL DISCHARGE PUMPS

2x15=

30.0

VIBRATING SCREEN

11.0

CYCLONE FEED PUMPS

2x55=

110.0

PB UNIT CELLS

4x18.5=

74.0

UNIT CELL CONCENTRATE PUMP

7.5

SUMP PUMP

7.5

SAG/BALL MILL LUBE UNITS

4x3.7=

14.8

OVERHEAD CRANE

3x2.2=

6.6

INCHING DEVICE

44.0

GRINDING TOTAL

1355.4

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FLOTATION

PB ROUGHER FLOTATION CELLS	10x18.5=	185.0
ZN ROUGHER FLOTATION CELLS	12x18.5=	222.0
PB ROUGHER CONCENTRATE PUMPS	2x18.5=	37.0
ZN ROUGHER CONCENTRATE PUMPS	2x18.5=	37.0
PB COLUMN CELL FEED PUMP		7.5
ZN COLUMN CELL FEED PUMP		7.5
PB CLEANER TAILS PUMP		3.7
ZN CLEANER TAILS PUMP		7.5
PB ROUGHER TAILS PUMP		11.0
TAILINGS PUMPS	2x11=	22.0
SUMP PUMPS	2x7.5=	15.0
RECLAIM WATER PUMPS	2x93=	186.0
PROCESS WATER PUMPS	4x3.7=	14.8

FLOTATION TOTAL		756.0
-----------------	--	-------

DEWATERING

PB THICKENER DRIVE		2.2
PB THICKENER LIFT		1.1
ZN THICKENER DRIVE		2.2
ZN THICKENER LIFT		1.1
PB THICKENER O/F PUMP		15.0
ZN THICKENER O/F PUMP		15.0
PB THICKENER U/F PUMP		3.7
ZN THICKENER U/F PUMP		3.7
PB PRESSURE FILTER FEED PUMP		37.0
ZN PRESSURE FILTER FEED PUMP		37.0
PRESSURE FILTER BELT CONVS	12x1.5=	18.0
CONCENTRATE BIN LOADOUT BELT CONVEYORS	2x7.5=	15.0
HYDRAULIC PRESSURE PUMPS	2x11=	22.0
HYDRAULIC PRESSURE PUMPS	2x22=	44.0
SUMP PUMPS	2x5.5=	11.0

DEWATERING TOTAL		228.0
------------------	--	-------

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REAGENTS AND UTILITIES

FLOCCULANT MIX TANK AGITATOR		1.1
LIME STOCK TANK AGITATOR		2.2
SOLUTION PUMPS	6x2.2=	13.2
LIME SLURRY PUMPS	3x2.2=	6.6
POSITIVE DISPLACEMENT PUMP		1.0
METERING PUMPS	21x.55=	11.6
SUMP PUMPS	3x5.5=	16.5
SUMP PUMP		7.5
PLANT AIR COMPRESSORS	2x280=	560.0
INSTRUMENT AIR COMPRESSOR		22.0
FLOTATION BLOWER		55.0
FLOTATION BLOWER		75.0
SCREW CONVEYORS	2x2.2=	4.4
LIME SLAKING MILL	2x1=	2.0
DRUM PUMPS	3x.55=	1.7
REAGENTS AND UTILITIES TOTAL		779.7

FRESH WATER DISTRIBUTION

FRESH WATER SUPPLY PUMPS	2x7.5=	15.0
FRESH WATER RECIRCULATION PUMP		2.2
POTABLE WATER DISTRIBUTION PUMP		7.5
FRESH WATER DISTRIBUTION TOTAL		24.7

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ELECTRICAL POWER SUMMARY FOR SURFACE -----

CRUSHING	37.0
COARSE ORE RECLAIM	52.0
GRINDING	1355.4
FLOTATION	756.0
DEWATERING	228.0
REAGENTS AND UTILITIES	779.7
FRESH WATER DISTRIBUTION	24.7
SUB TOTAL	3232.8
HEATING /LIGHTING/VENTILATION/MISC	107.2
TOTAL CONNECTED kW	3340.0
DEMAND FACTOR	0.8
DEMAND kW	2672.0
CONSUMPTION FACTOR	0.8
CONSUMPTION kW	2137.6
ANNUAL POWER CONSUMPTION-kWh	18725376
MILL THROUGHPUT/YEAR-TONNES	400000
ANNUAL POWER CONSUMPTION-kWh/TONNE	46.8
CONNECTED kW/TONNE/DAY	3.0
CONSUMPTION kW/TONNE/DAY	1.9
POWER COST-\$/kWh	0.13
ANNUAL POWER COST-\$	2434299
ANNUAL POWER COST-\$/TONNE	6.09

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ELECTRICAL POWER SUMMARY FOR MINING -----

JEWELBOX/GRIBBLER	572.0
DEVELOPMENT-NORTH HILL ZONES	441.0
TOTAL CONNECTED kW	1013.0
DEMAND FACTOR	0.75
DEMAND kW	760.0
CONSUMPTION FACTOR	0.815
DAILY POWER CONSUMPTION-kWh	14866
ANNUAL POWER CONSUMPTION-kWh	5425944
ANNUAL POWER CONSUMPTION-kWh/TONNE	13.6
ANNUAL POWER COST-\$	705373
ANNUAL POWER COST-\$/TONNE	1.76

APPENDIX F

CURRAGH RESOURCES INC.

MT.HUNDERE JOINT VENTURE

DRAFT

APPENDIX "F"

OPEN PIT DEVELOPMENT PLAN AND COST SUMMARY

BY

H.S. Clarke Mining Consultants Ltd.

MT. HUNDERE PROJECT

**OPEN PIT DEVELOPMENT PLAN
AND COST SUMMARY**

Prepared For

CURRAGH RESOURCES INC.

Submitted By

H.S. CLARKE MINING CONSULTANTS LTD.

Site 33, Box 26, RR12

Calgary, Alberta

T3E 6W3

Telephone: (403) 242-6625

DECEMBER, 1989

H.S. CLARKE MINING CONSULTANTS LTD.
Site 33, Box 26, R.R. 12, Calgary, Alberta T3E 6W3

December 7, 1989

Curragh Resources Inc.
95 Wellington Street West
Suite 1900, Box 12
TORONTO, Ontario
M5J 2N7

Attention: Mr. Marvin Pelley
Executive Vice President, Mining

Dear Sir:

Re: Mt. Hundere Project

I am pleased to submit this report on the Mt. Hundere Open Pit Development Plan and Cost Summary. This report provides detailed open pit designs, ore reserve estimates, production schedules, mine equipment selection and capital and operating cost estimates.

If you have any questions, please call me at your earliest convenience.

Respectfully submitted,

H.S. CLARKE MINING CONSULTANTS LTD.



Harvey Clarke
President

**MT. HUNDERE PROJECT
OPEN PIT DEVELOPMENT PLAN
AND COST SUMMARY**

DECEMBER, 1989

TABLE OF CONTENTS

	<u>Page No.</u>
SECTION 1 - INTRODUCTION	1
SECTION 2 - SUMMARY	3
SECTION 3 - MINE PLAN	4
3.1 OPEN PIT ORE RESERVES	4
3.2 MINE DEVELOPMENT PLAN	10
3.3 MINE DESIGN CRITERIA	13
.1 Pit Design	13
.2 Material Densities and Swell	13
3.4 MINING METHODS	14
.1 Drilling	14
.2 Blasting	14
.3 Loading Ore and Waste	15
.4 Hauling Ore and Waste	15
.5 Mine Drainage	16
3.5 MOBILE EQUIPMENT LIST	16
3.6 EQUIPMENT PRODUCTIVITY	19
3.7 MANPOWER REQUIREMENTS	19
SECTION 4 - CAPITAL COST	21
SECTION 5 - OPERATING COST	22
 TABLES	
3-1 Summary - Open Pit Ore Reserves	6
3-2 In-Situ Bench Quantities - Burnick Pit	7
3-3 In-Situ Bench Quantities - Jewel Box Small Pit	8
3-4 In-Situ Bench Quantities - Jewel Box Large Pit	9
3-5 Mine Production Schedule - Main Zone Pit and Jewel Box Small Pit	11
3-6 Mine Production Schedule - Burnick Open Pit	12
3-7 Equipment List - Main Zone Pit and Jewel Box Small Pit	17
3-8 Equipment List - Burnick Pit	18
3-9 Equipment Productivities	19
3-10 Manpower Summary - Main Zone and Jewel Box Pits	19
3-11 Manpower Summary - Burnick Pit	20

MT. HUNDERE PROJECT
OPEN PIT DEVELOPMENT PLAN
AND COST SUMMARY

DECEMBER, 1989

TABLE OF CONTENTS
(Continued)

	<u>Page No.</u>
TABLES, Continued	
4-1 Capital Cost - Main Zone and Jewel Box Pits	21
4-2 Capital Cost - Burnick Pit	21
5-1 Summary of Operating Costs - Main Zone and Jewel Box Pits	22
5-2 Summary of Operating Costs - Burnick Pit	22
5-3 Unit Operating Costs - Main Zone and Jewel Box Pits	23
5-4 Unit Operating Costs - Burnick Pit	24
5-5 Summary of Detailed Costs - Main Zone and Jewel Box Pits	25
5-6 Summary of Detailed Costs - Burnick Pit	26

**MT. HUNDERE PROJECT
OPEN PIT DEVELOPMENT PLAN
AND COST SUMMARY**

DECEMBER, 1989

LIST OF FIGURES

<u>Figure No.</u>	<u>Description</u>
1	Mine Plan - Main Zone Pit
2	Mine Plan - Jewel Box Small Pit
3	Typical Section - Jewel Box Small Pit
4	Mine Plan - Burnick Pit
5	Typical Section - Burnick Pit

SECTION 1 - INTRODUCTION

The Mt. Hundere Project is located 45 km north of Watson Lake, Yukon. The Mt. Hundere Project contains several lead-zinc ore bodies that can be exploited by open pit and underground mining techniques.

At the request of Mr. Marvin Pelley, I was asked to prepare preliminary open pit mine plans for the North Hill and Jewel Box Hill areas. The preliminary mine plans identified ore reserves that could be mined economically with open pit mining methods. As a result of this work, a request was made to complete a detailed mine plan.

The scope of work undertaken to complete the detailed mine plan is listed below.

- a) Assemble and review geological cross-sections and data.
- b) Select a suitable open pit mining method.
- c) Design three open pit plans.
- d) Calculate open pit ore reserves and grades.
- e) Calculate bench volumes of ore and waste on sections spaced 25 m apart for scheduling and planning purposes.
- f) Prepare a development plan for the Jewel Box and North Hill mining areas.
- g) Select the mining equipment.
- h) Calculate equipment productivities.
- i) Estimate capital and operating costs.
- j) Complete a mining report.

The Main Zone Pit used in this mine plan was designed by the Canadian Geoscience Corporation and documented in a report dated October, 1980.

Mr. Greg Jilson and Mr. Doug Brownlee of Curragh Resources Inc. provided assistance in the calculation of open pit ore reserves and grades.

SECTION 2 - SUMMARY

Three open pits have been designed to recover ore on an economical basis. These pits are named Main Zone Pit, Jewel Box Small Pit and Burnick Pit. These pits contain 1,370,950 tonnes of ore at a strip ratio of 8.77:1. The average grade of ore is 2.96% Pb, 11.11% Zn, and 36 G/t Ag.

Based on a production rate of 400,000 tonnes of ore per year, the Main Zone and Jewel Box pits can supply the first eleven months of ore to the concentrator. Underground mining will commence after the first two pits are mined out. At a later date in the mining schedule, the Burnick Pit will deliver 2.5 years of ore.

Dragline and shovel-truck mining methods were investigated. The shovel-truck mining is best suited for the geological conditions and terrain that exists at Mt. Hundere.

The open pits are designed to take advantage of sloping terrain. The waste dumps are located to provide short haul distances and favourable road grades. The hillside terrain has also been utilized to minimize the stripping required to provide access to the bottom of each pit.

Standard mining equipment has been selected for this project. Hydraulic excavators, front end loaders and 36 tonne trucks are used in the Main Zone and Jewel Box pits. Larger 53 tonne trucks can be used in the Burnick Pit.

The major items of mining equipment are summarized below.

Main Zone and Jewel Box Pits

<u>Description</u>	<u>Size</u>	<u>Number</u>
Hydraulic Excavator	4.6 m ³	1
988B Front End Loader	5.4 m ³	1
769C Trucks	36.3 t	3
D9N Dozer	-	1
D8N Dozer	-	1
Robbins Drill	-	1
16 G Grader	-	1

Burnick Pit

<u>Description</u>	<u>Size</u>	<u>Number</u>
Hydraulic Excavator	8.0 m ³	1
988B Front End Loader	5.0 m ³	1
773B Trucks	52.6 t	3
D9N Dozer	-	1
D8N Dozer	-	1
Robbins Drill	-	1
16 G Grader	-	1

The maximum manpower requirements for the Main Zone and Jewel Box pits are seven staff and thirty-three hourly employees. The Burnick Pit requires a maximum of nine staff and forty-five hourly employees.

The capital and operating cost estimates are based on the assumption that a mining contractor will be hired to mine the open pits. Therefore, the capital cost of the mining equipment or the ownership costs are included in the operating costs. The initial capital cost of the Jewel Box area and the Burnick Pit include mobilization, temporary shops, haul road construction and bench development work. The capital cost for the Jewel Box area is \$680,000 and the Burnick Pit is \$1,204,000. The operating cost for the Jewel Box area is \$18.39 per tonne of ore and the Burnick Pit is \$18.82 per tonne of ore.

SECTION 3 - MINE PLAN

3.1 OPEN PIT ORE RESERVES

The Jewel Box Hill and the North Hill areas were examined to assess their potential for open pit mining. As a result of this review, three open pits were designed. The three pits are named Jewel Box Small Pit, Jewel Box Large Pit and Burnick Pit. The Burnick Pit is located in the North Hill area. A fourth pit designed by Canadian Geoscience Corporation in October, 1980 called the Main Zone (Jewel Box area) was also utilized in the mine development plan.

Subsequent economic analysis of the various pits determined the Jewel Box Large Pit to be less competitive. The Jewel Box Large Pit contains 817,000 tonnes of ore at a strip ratio of 13.7:1. The Jewel Box Small Pit is designed within the boundaries of the larger pit and contains 218,350 tonnes of ore at a strip ratio of 9.63:1. The Main Zone Pit designed by Canadian Geoscience Corporation contains 142,200 tonnes of ore at a strip ratio of 3.66:1. The Burnick Pit contains 1,010,400 tonnes at a 9.30:1 strip ratio.

The ore reserves calculated by Canadian Geoscience Corporation include 10 to 20% dilution. The ore reserves calculated in this study for the Jewel Box Small Pit and the Burnick Pit include 5% mining losses and 10% dilution at 0% metal content.

Within each open pit boundary, geological sections (1:500 scale) spaced at 25 m intervals were used to calculate open pit ore reserves. The drillhole spacing on each section is approximately 25 m. A 4% combined lead-zinc grade is used to determine the boundary between ore and waste. The open pit walls were drawn on each section. The ore zone on each section was divided into segments. Each segment represented an area half the distance to the nearest drillhole. These segments or ore blocks were planimetered and used to calculate the area weighted grade of ore. The areas of waste were planimetered as well and used to calculate the quantities of waste. In addition to the volume measurement by section, the open pit quantities were also calculated for each 10 m bench. The bench quantities were used for mine planning and scheduling purposes.

The criteria used for determining open pit ore reserves are listed below.

- .1 Minimum mining thickness is 3 m.
- .2 Mining losses are 5% by weight.
- .3 Dilution is 10% by weight at 0% metal content.
- .4 The average S.G. of the ore is 3.0
- .5 All oxide ore is excluded.

A summary of the open pit ore reserves is provided on Table 3-1 and the bench quantities are shown on Tables 3-2, 3-3 and 3-4. The bench quantities do not include mining losses or dilution.

TABLE 3-1
SUMMARY
OPEN PIT ORE RESERVES

Mining Area	Waste Tonnes	Ore Tonnes	S.R. T/T	% Pb	% Zn	G/t Ag
Main Zone Pit	520,000	142,200	3.66:1	11.88	14.14	61.6
Jewel Box (Small Pit)	2,101,800	218,350	9.63:1	7.48	11.07	40.6
Burnick Pit	9,399,400	1,010,400	9.30:1	0.73	10.69	31.4
Total	12,021,200	1,370,950	8.77:1	2.96	11.11	36.0

TABLE 3-2
IN-SITU BENCH QUANTITIES
BURNICK PIT

Bench	Bench Quantities		Accumulated Bench Quantities	
	Waste t	Ore t	Waste t	Ore t
1440	38,880	-	38,880	-
1430	81,675	-	120,555	-
1420	134,663	-	255,218	-
1410	181,559	-	436,777	-
1400	270,473	-	707,250	-
1390	308,611	-	1,015,861	-
1380	387,923	-	1,403,784	-
1370	437,940	-	1,841,724	-
1360	528,895	1,914	2,370,619	1,914
1350	544,186	7,800	2,914,805	9,714
1340	623,522	35,346	3,538,327	45,060
1330	668,184	70,800	4,206,511	115,860
1320	726,901	81,532	4,933,512	197,392
1310	733,474	92,363	5,666,886	289,755
1300	778,815	86,776	6,445,701	376,531
1290	748,593	52,481	7,194,294	429,012
1280	693,448	35,136	7,887,742	464,148
1270	551,139	63,000	8,438,881	527,148
1260	450,362	113,475	8,889,243	640,623
1250	302,227	114,945	9,191,470	755,568
1240	201,948	102,675	9,393,418	858,243
1230	49,513	89,850	9,442,931	948,093
1220	-	18,789	-	966,882

Weighted Average Grade is 9.80% Pb, 11.76% Zn and 34.5 G/t Ag.

TABLE 3-3
IN-SITU BENCH QUANTITIES
JEWEL BOX SMALL PIT

Bench	Bench Quantities		Accumulated Bench Quantities	
	Waste t	Ore t	Waste t	Ore t
1500	2,363	-	2,363	-
1490	35,235	-	37,598	-
1480	124,606	-	162,204	-
1470	203,749	-	365,953	-
1460	313,875	-	679,828	-
1450	350,663	-	1,030,491	-
1440	346,108	6,225	1,376,599	6,225
1430	303,683	27,825	1,680,282	34,050
1420	258,121	66,825	1,938,403	100,875
1410	120,759	63,825	2,059,162	164,700
1400	52,044	41,025	2,111,206	205,725
1390	-	3,225	-	208,950

Weighted Average Grade is 8.23% Pb, 12.18% Zn and 44.6 G/t Ag.

TABLE 3-4
IN-SITU BENCH QUANTITIES
JEWEL BOX LARGE PIT

Bench	Bench Quantities		Accumulated Bench Quantities	
	Waste t	Ore t	Waste t	Ore t
1510	389	-	389	-
1500	114,161	-	114,550	-
1490	413,952	-	528,502	-
1480	741,572	-	1,270,074	-
1470	955,801	-	2,225,875	-
1460	1,091,345	-	3,317,220	-
1450	1,117,719	-	4,434,939	-
1440	1,165,428	-	5,600,367	-
1430	1,096,228	28,125	6,696,595	28,125
1420	986,667	129,750	7,683,272	157,875
1410	790,022	124,125	8,473,294	282,000
1400	827,822	92,325	9,301,116	374,325
1390	758,364	42,000	10,059,480	416,325
1380	592,382	60,450	10,651,862	476,775
1370	315,632	119,175	10,967,414	595,950
1360	176,783	112,950	11,144,277	708,900
1350	69,661	58,350	11,213,938	767,250
1340	25,583	14,325	11,239,521	781,575

Weighted Average Grade is 7.20% Pb, 9.93% Zn and 78.2 G/t Ag.

3.2 MINE DEVELOPMENT PLAN

The main objective of the mine development plan is to deliver ore to the concentrator by January 1, 1991. The Main Zone Pit will be developed first followed by the Jewel Box Small Pit. These two pits will supply ore to the concentrator for the first eleven months of operation. The two small open pits are scheduled to supply 33,000 tonnes of ore per month. The mine production schedule for these two pits is shown on Table 3-5.

After the two small pits are exhausted of ore, the underground mining operation will commence production. The underground mining in the Jewel Box area will continue until the ore reserves are depleted. The Burnick Pit is scheduled to supply ore after the Jewel Box underground mining is completed.

The Burnick Pit can supply 2.5 years of ore to the concentrator at a rate of 33,000 tonnes per month. The mine production schedule for the Burnick Pit is shown on Table 3-6.

Both the Jewel Box pits and the Burnick Pit require pre-stripping before a continuous supply of ore can be delivered. The ore in the Main Zone Pit outcrops on the surface and approximately 100,000 tonnes of waste pre-stripping is required. However, in the Jewel Box Small Pit, 1,700,000 tonnes of waste rock has to be pre-stripped before the first ore is exposed. This quantity of pre-strip requires the mining equipment to be mobilized and operating on a productive basis by the end of September, 1990.

In the Burnick Pit, 3,000,000 tonnes of waste has to be pre-stripped before the first ore can be mined. This quantity of waste rock requires six months of pre-stripping work.

TABLE 3-5
MINE PRODUCTION SCHEDULE
MAIN ZONE PIT AND JEWEL BOX SMALL PIT

Description	1990 Oct-Dec	1991 Jan-Mar	1991 April-June	1991 July-Sept	1991 Oct-Dec	Total
<u>Ore (tonnes)</u>						
Main Zone Pit	-	100,000	42,200	-	-	142,200
Jewel Box						
Small Pit	-	-	58,000	100,000	60,350	218,350
<u>Waste (tonnes)</u>						
Main Zone Pit	100,000	320,000	100,000	-	-	520,000
Jewel Box						
Small Pit	722,000	480,000	590,000	270,000	39,800	2,101,800

TABLE 3-6
MINE PRODUCTION SCHEDULE
BURNICK OPEN PIT
 (000's)

Description	Year 1		Year 2				Year 3				Year 4		Total
	3Mo	3Mo	3Mo	3Mo	3Mo	3Mo	3Mo	3Mo	3Mo	3Mo	3Mo	3Mo	
Ore (Tonnes)	-	-	100	100	100	100	100	100	100	100	100	110	1,010
Waste (Tonnes)	1,500	1,500	1,400	1,400	1,000	1,000	650	300	300	200	100	49	9,399

Note: The quantities are allocated to three month periods.

3.3 MINE DESIGN CRITERIA

The mine design criteria shown below refers to the open pit design completed in this study. The mine design criteria for the Main Zone Pit are provided in the report by Canadian Geoscience Corporation dated October, 1980.

The open pits are situated on relatively steep terrain. In addition, the quantities that have to be removed are not large. As a result of these factors, the open pits are designed for haulage trucks ranging in size from 35 to 65 tonne capacity. These haulage trucks can travel on haul roads 15 m in width. Narrow road widths are required to minimize the construction costs.

The waste dumps are built in terraces adjacent to the open pits. The waste dumps are designed and located to provide short waste haul distances (350 to 900 m) and flat grades. The hillside terrain has also been utilized to minimize the quantity of stripping necessary for the construction of the ore haul road to the bottom of each pit.

Geotechnical studies have not been completed on the stability of the highwall slopes. Until these studies have been completed, highwall slopes of 56° are utilized in the pit designs.

The mine plan of the Main Zone Pit, Jewel Box Small Pit and the Burnick Pit are shown on Figures 1, 2 and 4 respectively. Typical cross-sections of the Jewel Box Small Pit and the Burnick Pit are shown on Figures 3 and 5.

.1 Pit Design

Waste Dump Slope	= 37°
Overall Pit Slope	= 56°
Rock Face Slope	= 68°
Bench Height	= 10 m
Berm Width (every second bench)	= 5 m
Haul Road Width	= 15 m
Maximum Road Grades	= 8%
Maximum Road Grades (short distance)	= 12%

.2 Material Densities and Swell

<u>Materials</u>	<u>Densities (kg/m³)</u>	<u>Swell (%)</u>
Waste Rock	2.7	50
Ore	3.0	50
Waste Dump Rock	2.7	30

3.4 MINING METHOD

Conventional shovel-truck mining methods are used to remove the ore and waste from the open pits. Front end loaders or hydraulic excavators are used to load ore and waste. The hauling of ore and waste will be accomplished by either 36 tonne or 53 tonne capacity end dump trucks.

In each pit, the mining operation will commence at the highest bench and proceed in sequence down to the lowest bench. There is no efficient or effective method of removing the ore and waste in two cuts rather than one. As the mining progresses, the waste rock is utilized to build roads to the waste dumps and also build access roads to the lower benches. An initial development access road has to be built from the bottom to the top of each pit before productive mining can start.

.1 Drilling

The in-place rock requires drilling and blasting prior to handling. One rotary drill capable of drilling a 251 mm hole has sufficient capacity to provide 12,700,000 tonnes of broken rock per year. A Robbins 10 Drill or a 1R50 Drill are suitable for the conditions at Mt. Hundere. Both drills are designed for pioneering work and can operate on narrow benches.

Drilling Criteria:

Hole Diameter	= 251 mm
Drill Pattern	= 8 m x 8.5 m
Drilling Rate	= 18.7 m/hr
Bench Height	= 10 m
Sub-grade	= 1.5 m
Volume per Hole	= 640 m ³
Production per Metre	= 55.7 m ³
Metres Drilled per Year	= 4,500 hrs x 18.7 m/hr = 84,150 m/yr
Annual Production	= 55.7 m ³ x 84,150 m/yr = 4,687,155 m ³ /yr

.2 Blasting

The operating costs are based on drilling and blasting 100% of the material. The ore is end dumped over a grizzly and therefore good fragmentation is required for this part of the operation. The open pits are located on hillsides and good drainage is expected. The overall powder factor is estimated to be 0.58 kg/m³. Ninety percent of the explosives is ammonium nitrate and the remainder is packaged slurry.

Blasting Criteria:

Blasting Agents	= 90% ANFO
	= 10% Packaged Slurry
Detonating Products	= Primers, Primacord and Blasting Caps
Design Power Factor	= 0.58 kg/m ³

.3 Loading Ore and Waste

The mine has to produce its own power and therefore, it is desirable to eliminate the use of electrically powered equipment and the associated infrastructure. Both hydraulic excavators with shovel fronts and front end loaders can be used effectively at this location to load ore and waste.

A hydraulic excavator with a front end loader as backup are selected to load the ore and waste. For the small Main Zone and Jewel Box pits, a hydraulic excavator with a 4.6 m³ bucket capacity is required. A front end loader with a 5.4 m³ bucket capacity can be used as backup. This equipment is matched to load 36.3 tonne end dump trucks.

The Burnick Pit requires larger equipment to handle the scheduled quantities. A hydraulic excavator with a 8 m³ bucket will load the 52.6 t capacity trucks. A front end loader can be used as backup for this machine as well. The operating costs are based on using the small equipment on the Main Zone and Jewel Box pits and the larger equipment on the Burnick Pit.

Standard loading procedures will be used on the waste operation. However, in the case of loading ore, it will be necessary to be careful in making the separation between ore and waste. Split benches 5 m in height may be required and some dozing is necessary to separate small bands of ore from waste.

Examples of Manufacturer's Models

<u>Description</u>	<u>Bucket Capacity</u>
Komatsu PC 650 Hydraulic Excavator	4.6 m ³
O & K RH 30D Hydraulic Excavator	4.6 m ³
Komatsu PC 1000 Hydraulic Excavator	8.0 m ³
O & K RH 75C Hydraulic Excavator	8.0 m ³
Cat 988B Front End Loader	5.4 m ³
Cat 988B Front End Loader (High Lift)	5.0 m ³

.4 Hauling Ore and Waste

In the Main Zone and Jewel Box pits, three 36.3 tonne capacity trucks are required to haul ore and waste. The haul road grades are generally favourable or flat. The haul distance for

waste varies from 300 to 500 m. The ore is hauled 5 km to an ore pass located at the 1,250 m elevation adjacent to the Burnick Pit. The ore haul grades are favourable over the 5 km. A second alternative is to haul the ore to the 1,100 m elevation. The haul distance in this case is 7 km.

At the Burnick Pit, three 52.6 tonne capacity trucks are required. The haul road grades are favourable here as well. The waste haul distances vary from 600 to 900 m. The ore is hauled to a grizzly located within 500 m of the open pit. A second alternative is to haul the ore to the 1,100 m elevation. The haul distance in this case is 2 km.

The haul roads are 15 m wide and have maximum grades of 8%. At the bottom of the pits, short ramps at 12% are required to recover the remaining ore. A 16 G grader will be purchased to maintain the haul roads.

.5 Mine Drainage

The open pits are located on hillsides and expected to be well drained and dry. Perimeter ditches are required to divert the surface drainage away from the active mining areas. The in-pit water collected below the natural drainage elevations is gathered in sumps on the pit floor. This water is pumped through 100 mm pipelines to collector ditches outside the pit.

3.5 MOBILE EQUIPMENT LIST

The operating costs for the Main Zone Pit and the Jewel Box Small Pit are calculated independently from the Burnick Pit. This has resulted in a different equipment list being provided for each mining area. The equipment list for the Main Zone Pit and the Jewel Box Small Pit is shown on Table 3-7 and the Burnick Pit is shown on Table 3-8.

For information purposes, new purchase prices for the major equipment is provided on these tables. Used prices and some new prices are provided for the support equipment.

TABLE 3-7
EQUIPMENT LIST
MAIN ZONE PIT AND JEWEL BOX SMALL PIT

MAJOR MINING EQUIPMENT

<u>Description</u>	<u>Size</u>	<u>Number</u>	<u>Cost</u>
Hydraulic Excavator	4.6 m ³	1	\$ 580,000
988B Front End Loader	5.4 m ³	1	540,000
769C Cat Trucks	36.3 t	3	1,233,000
D9N Dozer	-	1	534,000
D8N Dozer	-	1	410,000
Robbins Drill (Used)	250 mm	1	250,000
16 G Grader	-	1	420,000
			<u>\$ 3,967,000</u>

SUPPORT EQUIPMENT

<u>Description</u>	<u>Number</u>	<u>Cost</u>
Pickups	3	\$ 50,000
Mechanics Truck	1	30,000
Blasting Truck	1	20,000
Bus	1	45,000
Lube Truck	1	100,000
Water Truck	1	80,000
Weigh Scales	1	30,000
Office Trailer	1	20,000
Maintenance Trailer	1	10,000
Warehouse Trailer	1	10,000
Generator Set 150 kw	1	80,000
Diesel Pump	1	20,000
		<u>\$ 495,000</u>

**TABLE 3-8
EQUIPMENT LIST
BURNICK PIT**

MAJOR MINING EQUIPMENT

<u>Description</u>	<u>Size</u>	<u>Number</u>	<u>Cost</u>
Hydraulic Excavator	8.0 m ³	1	\$ 1,350,000
988B Front End Loader (High Lift)	5.0 m ³	1	565,000
773B Cat Trucks	52.6 t	3	1,713,000
D9N Dozer	-	1	534,000
D8N Dozer	-	1	410,000
Robbins Drill (Used)	250 mm	1	250,000
16 G Grader	-	1	420,000
			<u>\$ 5,260,000</u>

SUPPORT EQUIPMENT

<u>Description</u>	<u>Number</u>	<u>Cost</u>
Pickups	3	\$ 50,000
Mechanics Truck	1	30,000
Blasting Truck	1	20,000
Bus	1	45,000
Lube Truck	1	100,000
Water Truck	1	80,000
Weigh Scales	1	30,000
Office Trailer	1	20,000
Maintenance Trailer	1	10,000
Warehouse Trailer	1	10,000
Generator Set 150 kw	1	80,000
Diesel Pump	1	20,000
		<u>\$ 495,000</u>

3.6 EQUIPMENT PRODUCTIVITY

In order to meet the production schedule specified for the Main Zone and Jewel Box pits, two 10 hour shifts, operating seven days per week are required. The equipment operates nine hours out of a ten hour shift. For the larger Burnick Pit, two 12 hour shifts, operating seven days per week are required. The equipment operates 10.5 hours out of a 12 hour shift. In both cases, the number of crews or shift hours is reduced as the daily stripping requirements drop towards the end of the pit life. This criteria is used in estimating the equipment productivities identified in Table 3-9.

**TABLE 3-9
EQUIPMENT PRODUCTIVITIES**

<u>Equipment Description</u>	<u>Size</u>	<u>Productivity</u>
Hydraulic Excavator (Waste)	8.0 m ³	830 t/hr
Hydraulic Excavator (Waste)	4.6 m ³	640 t/hr
Front End Loader (Ore - Jewel Box)	5.4 m ³	285 t/hr
Front End Loader (Ore - Burnick)	5.0 m ³	644 t/hr
773B Trucks (Waste)	52.6 t	405 t/hr
773B Trucks (Ore - Burnick)	52.6 t	322 t/hr
769C Trucks (Waste)	36.3 t	319 t/hr
769C Trucks (Ore - Jewel Box)	36.3 t	95 t/hr
Robbins Drill	250 mm	1,042 m ³ /hr

3.7 MANPOWER REQUIREMENTS

To operate the Main Zone Pit and the Jewel Box Small Pit, three crews are required. Each crew works eight days on and four days off. Two 10 hour shifts are worked at the mine each day. The manpower requirements at the start of the project are shown in Table 3-10.

**TABLE 3-10
MANPOWER SUMMARY
MAIN ZONE AND JEWEL BOX PITS**

<u>Description</u>	<u>Number</u>
Staff	
Mining Contractor	7
Hourly	
Mine Operations	23
Shop Operations	<u>10</u>
Total	<u>40</u>

The Burnick Pit requires four crews working twelve hour shifts, four days on and four days off. The manpower requirements at the start of this operation are provided in Table 3-11.

TABLE 3-11
MANPOWER SUMMARY
BURNICK PIT

<u>Description</u>	<u>Number</u>
Staff	
Mining Contractor	9
Hourly	
Mine Operations	31
Shop Operations	<u>14</u>
Total	<u>54</u>

SECTION 4 - CAPITAL COST

The capital cost of the open pit operations only includes mobilization and pre-development costs. An assumption has been made that the open pit mining operations will be the responsibility of a mining contractor. Therefore, the capital cost of the mining equipment or ownership costs are included in the operating cost.

In the capital cost for the open pits, allowances are made for mobilization of equipment, set-up costs, temporary shops, haul road construction and bench development work. These costs are summarized in Tables 4-1 and 4-2.

TABLE 4-1
CAPITAL COST
MAIN ZONE AND JEWEL BOX PITS

<u>Description</u>	<u>Cost</u>
Mobilization of Equipment	\$ 120,000
Set-Up Costs for Trailers, etc.	20,000
Temporary Shop, 12 m x 24 m	150,000
Haul Road Construction, 1250 m	250,000
Bench Development Work	140,000
Total	<u>\$ 680,000</u>

TABLE 4-2
CAPITAL COST
BURNICK PIT

<u>Description</u>	<u>Cost</u>
Mobilization of Equipment	\$ 150,000
Set-Up Costs for Trailers, etc.	40,000
Two Temporary Shops, 12 m x 24 m	300,000
Temporary Shop, 12 m x 18 m	100,000
Haul Road Construction, 2900 m	464,000
Bench Development Work	150,000
Total	<u>\$ 1,204,000</u>

SECTION 5 - OPERATING COSTS

The operating costs are estimated on the assumption that a mining contractor will be hired to mine the open pits. The operating costs include the ownership costs for equipment and the contractor's overhead and profit.

The operating costs are broken into two main components. These components are direct and indirect mining costs. The direct costs include drilling, blasting, loading, hauling, road maintenance and mine drainage. The indirect costs include staff salaries, site transportation, office and shop expenses, head office expenses and profit. The operating costs for the two open pit mining operations are summarized in Tables 5-1 and 5-2.

TABLE 5-1
SUMMARY OF OPERATING COSTS
MAIN ZONE AND JEWEL BOX PITS
(360,550 TONNES OF ORE)

Description

Direct Mining Costs	\$ 5,009,000	\$ 13.89	per tonne
Indirect Mining Costs	<u>1,621,000</u>	<u>4.50</u>	per tonne
Total	<u>\$ 6,630,000</u>	<u>\$ 18.39</u>	per tonne

TABLE 5-2
SUMMARY OF OPERATING COSTS
BURNICK PIT
(1,010,400 TONNES OF ORE)

Description

Direct Mining Costs	\$ 14,474,000	\$ 14.33	per tonne
Indirect Mining Costs	<u>4,533,000</u>	<u>4.49</u>	per tonne
Total	<u>\$ 19,007,000</u>	<u>\$ 18.82</u>	per tonne

The direct and indirect mining costs are summarized in detail on Tables 5-5 and 5-6. A labour rate of \$35.00 per hour (includes fringe benefits and travelling time) and a diesel cost of \$0.32 per litre is used to determine the operating costs. The operating costs do not include any camp costs or motel expenses. The equipment rates are based on typical construction rates used in western Canada.

Unit operating costs are shown in Tables 5-3 and 5-4.

TABLE 5-3
UNIT OPERATING COSTS
MAIN ZONE AND JEWEL BOX PITS

<u>Description</u>	<u>Unit Cost</u> <u>\$ Per Tonne</u>
Waste	
Drilling	0.06
Blasting	0.24
Dozing and Road Construction	0.23
Loading	0.29
Hauling	0.41
Dump Maintenance	0.16
Road Maintenance	0.15
Mine Drainage	<u>0.01</u>
Total Waste	<u><u>1.55</u></u>
Ore	
Drilling	0.06
Blasting	0.24
Loading	0.51
Hauling	<u>1.39</u>
Total Ore	<u><u>2.20</u></u>
Indirects	<u><u>0.54</u></u>

TABLE 5-4
UNIT OPERATING COSTS
BURNICK PIT

<u>Description</u>	<u>Unit Cost</u> <u>\$ Per Tonne</u>
Waste	
Drilling	0.06
Blasting	0.24
Dozing and Road Construction	0.15
Loading	0.29
Hauling	0.40
Dump Maintenance	0.11
Road Maintenance	0.14
Mine Drainage	<u>0.01</u>
Total Waste	<u><u>1.40</u></u>
Ore	
Drilling	0.06
Blasting	0.24
Loading	0.23
Hauling	<u>0.51</u>
Total Ore	<u><u>1.04</u></u>
Indirects	<u><u>0.44</u></u>

ITEM: Jewel Box Pit

DESCRIPTION: Summary of Detailed Costs

DATE: Nov. 29/82 BY: WJ

2,621,800 + Waste

QUANTITY: 360,550 ± 0%

PRODUCTION RATE: Oct 1991 to Dec 1992

SHIFT SCHEDULE: 10 hr. shifts

[illegible]

ITEM: Burnick PitDESCRIPTION: Summary of Detailed Costs

Table 5-6

DATE: Dec 4/69BY: -/17QUANTITY: 9,399,400 t Waste1,010,400 t OrePRODUCTION RATE: 36 MonthsSHIFT SCHEDULE: 12 hr. shifts

UNIT 11. SCHEDULE: 12

	HOURS			OPERATING LABOUR		MAINTENANCE							MATERIALS		TOTAL		
						Ownership LABOUR	PARTS		TIRES		F.O.G.						
<u>Directs :-</u>																	
1. Drilling				142	555	183	300	109	280	—		62	322	151	680	649	877
2. Blasting				490	000	—		—		—		—		2 004	712	2 494	712
3. Drilling Rock				386	295	496	650	446	985	—		208	593	—		1 538	523
4. Loading Waste				440	195	905	520	1 018	710	—		396	165	—		2 760	590
5. Hauling Waste				902	144	1 159	400	1 275	890	—		440	762	—		3 778	626
6. Loading Ore				61	285	78	800	630	40	—		26	792	—		229	917
7. Hauling Ore				122	570	157	600	173	360	—		59	888	—		513	418
8. Dump Maint.				771	805	232	025	286	830	—		162	537	—		1 060	197
9. Road Maint.				405	755	277	720	339	521	—		105	830	215	000	1 346	096
10. Mine Drainage & Lighting				—		22	800	34	200	—		24	600	20	000	101	600
Total				3 322	604	3 523	585	3 748	516	—		1 487	482	2 391	322	14 473	566
<u>Indirects</u>																	
21. Salaries				1 393	000	—		—		—		—		—		1 393	000
22. Site Transportation				—		344	500	144	700	—		235	500	—		724	700
23. Office Expenses				—		—		—		—		—		214	000	214	000
24. Demobilization				—		—		—		—		—		165	000	165	000
Total				1 393	000	344	500	144	700	—		235	500	379	000	2 496	700
5 Indirects & Directs																16 970	266
Head Office @ 6%.																1 018	216
Profit @ 6%.																1 018	216
Unit Cost per tonne =																18.81	
TOTAL																19 006	698

CURRAGH RESOURCES INC.

MT.HUNDERE JOINT VENTURE

APPENDIX 'H'

REPORT ON IN-SITU RESERVES

BY

Roscoe Postle Associates Inc.

REPORT ON

IN SITU RESERVES

MT. HUNDERE JOINT VENTURE

OF

CURRAGH RESOURCES INCORPORATED

FOR

KILBORN LIMITED

ROSCOE POSTLE ASSOCIATES INC.

REPORT ON

IN SITU RESERVES

MT. HUNDERE JOINT VENTURE

OF

CURRAGH RESOURCES INCORPORATED

FOR

KILBORN LIMITED

ROSCOE POSTLE ASSOCIATES INC.
Toronto, Ontario

December 1989

ROSCOE POSTLE ASSOCIATES INC.

TABLE OF CONTENTS

	Page
SUMMARY.....	1
INTRODUCTION.....	2
GEOLOGY AND MINERALIZATION.....	3
ROCK TYPES.....	3
STRUCTURE.....	3
ALTERATION.....	4
MINERALIZATION.....	4
RESERVES.....	5
DATABASE.....	5
PROCEDURES.....	6
RESULTS.....	8
COMMENTS.....	8
Correlation and Continuity of Mineralization..	8
Classification of Reserves.....	9
Oxidized Reserves.....	10
Mining Boundaries and Rock Conditions.....	11

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LIST OF FIGURES

Figure 1. Property Map.....	Following Page 3
-----------------------------	---------------------

LIST OF TABLES

Table 1 Reserve Summary.....	Following Page 8
------------------------------	---------------------

APPENDIX

(Figures 2 to 78, Tables 2 to 7)

Figure 2. Main Zone	-Plan, Sections
Figure 3. East Zone	-Plan, Longitudinal Section
Figure 4. East Zone	-DHH Sections, 3+30 W - 3+70 W
Figure 5. East Zone	-DDH Sections, 3+75 W - 4+70 W
Figure 6. Jewelbox Zones	-Plan, JB-1, 1A, 10 x Zones
Figure 7. Jewelbox Zones	-Plan, JB-2, 2A Zones
Figure 8. Jewelbox Zones	-Plan, J-1 Zone.
Figure 9. Jewelbox Zones	-Section, 1200 N
Figure 10. Jewelbox Zones	-Section, 1250 N
Figure 11. Jewelbox Zones	-Section, 1300 N
Figure 12. Jewelbox Zones	-Section, 1325 N
Figure 13. Jewelbox Zones	-Section, 1350 N
Figure 14. Jewelbox Zones	-Section, 1375 N
Figure 15. Jewelbox Zones	-Section, 1400 N
Figure 16. Jewelbox Zones	-Section, 1425 N
Figure 17. Jewelbox Zones	-Section, 1450 N
Figure 18. Jewelbox Zones	-Section, 1475 N
Figure 19. Jewelbox Zones	-Section, 1500 N
Figure 20. Jewelbox Zones	-Section, 1525 N
Figure 21. Jewelbox Zones	-Section, 1550 N
Figure 22. Jewelbox Zones	-Section, 1575 N
Figure 23. Jewelbox Zones	-Section, 1600 N
Figure 24. Jewelbox Zones	-Section, 1625 N
Figure 25. Jewelbox Zones	-Section, 1650 N
Figure 26. Jewelbox Zones	-Long Section
Figure 27. Gribbler Zones	-Plan, G-1 Zone
Figure 28. Gribbler Zones	-Plan, G-2 Zone
Figure 29. Gribbler Zones	-Plan, G-3 Zone
Figure 30. Gribbler Zones	-Section, 360 N
Figure 31. Gribbler Zones	-Section, 390 N
Figure 32. Gribbler Zones	-Section, 420 N
Figure 33. Gribbler Zones	-Section, 470 N
Figure 34. Gribbler Zones	-Section, 530 N
Figure 35. Gribbler Zones	-Section, 580 N
Figure 36. Gribbler Zones	-Section, 680 N
Figure 37. Gribbler Zones	-Section, 790 N

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Figure 38. Gribbler Zones	-Long Section, 120 E
Figure 39. Gribbler Zones	-Long Section, 200 E
Figure 40. Gribbler Zones	-Long Section, 290 E
Figure 42. Attila Zones	-Plan, A-1 Zone
Figure 42. Attila Zones	-Plan, A-2 Zone
Figure 43. Attila Zones	-Plan, A-3 Zone
Figure 44. Attila Zones	-Section, 215 N
Figure 45. Attila Zones	-Section, 240 N
Figure 46. Attila Zones	-Section, 265 N
Figure 47. Attila Zones	-Section, 290 N
Figure 48. Attila Zones	-Section, 315 N
Figure 49. Attila Zones	-Section, 340 N
Figure 50. Attila Zones	-Section, 365 N
Figure 51. Attila Zones	-Section, 395 N
Figure 52. Attila Zones	-Section, 420 N
Figure 53. Attila Zones	-Section, 445 N
Figure 54. Attila Zones	-Section, 470 N
Figure 55. Attila Zones	-Section, 495 N
Figure 56. Attila Zones	-Longitudinal Section
Figure 57. Burnick Zones	-Plan, 1-A Zone
Figure 58. Burnick Zones	-Plan, 1-B Zone
Figure 59. Burnick Zones	-Plan, 1-C Zone
Figure 60. Burnick Zones	-Plan, 2-A Zone
Figure 61. Burnick Zones	-Plan, 2-B Zone
Figure 62. Burnick Zones	-Plan, 2-C Zone
Figure 63. Burnick Zones	-Section, 650 N
Figure 64. Burnick Zones	-Section, 675 N
Figure 65. Burnick Zones	-Section, 700 N
Figure 66. Burnick Zones	-Section, 725 N
Figure 67. Burnick Zones	-Section, 750 N
Figure 68. Burnick Zones	-Section, 775 N
Figure 69. Burnick Zones	-Section, 800 N
Figure 70. Burnick Zones	-Section, 825 N
Figure 71. Burnick Zones	-Section, 850 N
Figure 72. Burnick Zones	-Section, 875 N
Figure 73. Burnick Zones	-Section, 900 N
Figure 74. Burnick Zones	-Section, 925 N
Figure 75. Burnick Zones	-Section, 950 N
Figure 76. Burnick Zones	-Section, 975 N
Figure 77. Burnick Zones	-Long Section, 450 E
Figure 78. Burnick Zones	-Long Section, 500 E

Table 2. Main Zone Reserve Estimate Details

Table 3. East Zone Reserve Estimate Details

Table 4. Jewelbox Zones Reserve Estimate Details

Table 5. Gribbler Zone Reserve Estimate Details

Table 6. Attila Zones Reserve Estimate Details

Table 7. Burnick Zones Reserve Estimate Details

ROSCOE POSTLE ASSOCIATES INC.

SUMMARY

Roscoe Postle Associates Inc. has been retained by Kilborn Engineering to provide an independent estimate of in situ reserves on the Mt. Hundere Joint Venture as part of a Project Definition Study.

The Mt. Hundere Joint Venture is located in the Yukon Territory, 46 km north of Watson Lake, and some 450 km by road from tidewater at Skagway, Alaska.

The mineralization on the property consists of relatively coarse grained sphalerite and galena. The zinc-lead deposits occur in skarn zones, which usually occur at limestone-phyllite contacts. There are a number of known deposits, located in two general areas about 3 km apart: Jewelbox Hill-Gribbler Ridge and North Hill.

In situ reserves estimated by RPA, based on 326 drill holes, are as follows:

	<u>Tonnes</u>	<u>% Pb</u>	<u>% Zn</u>	<u>oz/ton Ag</u>
<u>SULPHIDE RESERVES</u>				
Proven (Jewelbox Hill)	75,000	16.9	18.8	2.6
Probable (Jewelbox, North Hill)	3,909,000	3.9	12.8	1.7
Possible (Jewelbox, North Hill, Gribbler)	1,045,000	5.1	13.1	2.0
<u>OXIDE RESERVES</u>				
Probable	483,000	7.7	11.8	3.2

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- 2 -

INTRODUCTION

Roscoe Postle Associates Inc. (RPA) has been retained by Kilborn Limited (Kilborn) to report on the geology and to provide an independent estimate of in situ reserves, as part of Kilborn's Project Definition Study on the Mt. Hundere Joint Venture of Curragh Resources Incorporated (Curragh).

RPA's reserve estimates geological description and comments are based on data supplied by Curragh and its agents, and a visit to the property by W. M. Little, July 18-20, 1989. To date, 326 holes have been drilled on the Jewelbox Hill, Gribbler Ridge, and North Hill sections of the property. No independent check sampling or assaying were carried out by RPA.

The Mt. Hundere Joint Venture is located in the Yukon Territory, 46 km north of Watson Lake, and some 450 km by road from tidewater at Skagway, Alaska.

During the periods 1967-1980 and 1984-1988, previous owners spent approximately \$3 million on surface exploration, mainly on 186 drill holes. Since acquiring the property in early 1989, Curragh has drilled an additional 140 holes.

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- 3 -

GEOLOGY AND MINERALIZATION

ROCK TYPES

The property covers most of a 9 km x 7 km block of Lower Cambrian sedimentary rocks that has been up-faulted into sedimentary rocks of Devonian and Silurian age (Figure 1).

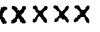
The predominant rock type on the property is a grey to black phyllite. Limestone, which hosts the mineralization, occurs in units up to 100 m thick, but makes up less than 5% of the exposed strata. Narrow, steeply dipping dikes of intermediate to felsic composition are relatively widespread, but form a minor part of the rock package.

STRUCTURE

Although the drilling to date shows that dips are usually fairly consistent and gentle (mostly less than 25°), there are certain exceptions and a number of unexplained complexities. Dips of 45° or more occur locally in the Jewelbox Hill and Burnick deposits, and predominate in the Attila Zones. The situation which creates the most uncertainty involves the rapid disappearance laterally of extensive, 50-100 m thick, limestone bands over a drill hole spacing of 50-100 m. Explanations involving steeply dipping faults, tight (recumbent) folds, and very rapid facies changes have been offered, but to date there is no definite evidence to prove or disprove any of these suggestions.

In the attached drill sections, situations of this type have mostly been interpreted as "facies changes", although

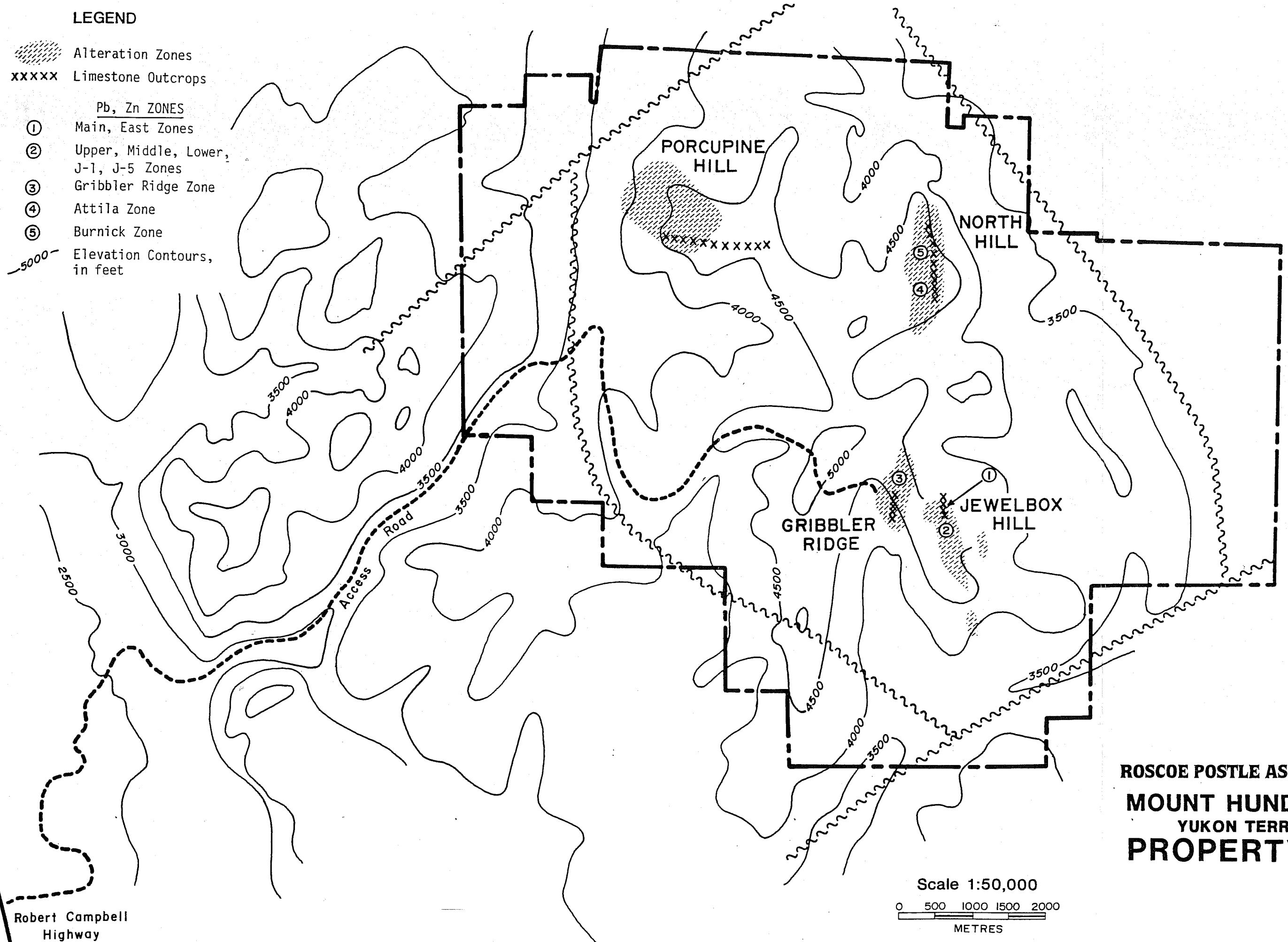
LEGEND

-  Alteration Zones
-  Limestone Outcrops

Pb, Zn ZONES

- ① Main, East Zones
- ② Upper, Middle, Lower, J-1, J-5 Zones
- ③ Gribbler Ridge Zone
- ④ Attila Zone
- ⑤ Burnick Zone

5000-
Elevation Contours,
in feet



ROSCOE POSTLE ASSOCIATES INC.
MOUNT HUNDERE J.V.
YUKON TERRITORY
PROPERTY MAP

Scale 1:50,000
0 500 1000 1500 2000
METRES

Robert Campbell
Highway

FIGURE 1

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- 4 -

the uncertainties of this choice are appreciated. If the role of facies changes can be determined, the effects of folding and faulting can be more readily assessed.

ALTERATION

Prominent alteration zones, up to 2 km long and 1 km wide occur in four locations: Jewelbox Hill, Gribbler Ridge, North Hill and Porcupine Hill (Figure 1). From current information, the alteration pattern appears to be similar in all four areas.

In the alteration zones the phyllite is altered to a mica hornfels over a large vertical distance - at least 300 m. Limestone beds are converted to marble in most cases (the Burnick area is the main exception), and more locally to an actinolite, diopside or garnet skarn. The skarn zones are up to 30 m thick and have lateral dimensions up to several hundreds of meters. They usually occur at or near limestone-phyllite contacts; for example, at the upper and lower contacts of thick limestone units, along phyllite beds within the thicker limestone beds, or in association with thin limestone beds within the phyllites. Zinc-lead-silver mineralization is directly associated with the skarn zones.

MINERALIZATION

The sulphide mineralization is fairly similar throughout the Mt. Hundere Joint Venture. It consists of medium to coarse grained sphalerite and galena (with essentially no iron sulphides) more or less evenly distributed in selected skarn layers. Variable, but minor, amounts of quartz and calcite are commonly present as blebs. The Pb:Zn ratio is generally in the order of 1:2; however, the Burnick Zone at

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- 5 -

North Hill is an exception with a ratio of 1:30.

Silver values are associated with the galena: no separate silver bearing minerals have been identified. The ratio of Ag to Pb, however, is different in different deposits. At Jewelbox Hill an average lead grade of 9% corresponds to 1.6 oz/ton Ag, while in the Burnick Zones 0.4% Pb is associated with 1.2 oz/ton Ag.

Parts of some of the mineralized zones show varying degrees of oxidation. At an early stage, smithsonite develops from sphalerite, and iron and manganese oxides from the skarn silicates. In extreme cases the sphalerite and calc-silicates are completely converted to smithsonite and iron oxides, and the galena to cerusite. Although most of the oxidized mineralization appears to occur in situ, there are a few cases where downward migration has apparently occurred, resulting in smithsonite healed cracks in unaltered limestone in the footwall of oxidized skarn mineralization.

A few drill holes have intersected steeply dipping faults with a different type of mineralization, consisting of drusy quartz, chalcedony, fluorite and calcite over widths up to 10 m. Fluorite is occasionally present with in the Pb-Zn mineralization but is minor.

RESERVES

DATABASE

This in situ reserve estimate is based on the following data, provided by Curragh.

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- 6 -

Drill hole survey information, summarized geological data, and all assay information for holes numbered from 80 to 326 were supplied in digital form using PC-XPLOR software. Mineralized intersections were selected and averaged, and plans and sections were plotted by computer in RPA's Toronto office. Interpretations were carried out independently by RPA, although some Curragh plans and sections were supplied for comparison.

For drill holes 1 to 79, new plans and sections were drawn by hand, based on the original drill logs.

PROCEDURES

In most cases, tonnage and grade estimates were made by RPA using a modified polygon procedure. A cross section method was used for the Main Zone, and portions of the Jewelbox and Burnick Zones where it seemed more appropriate. In most cases, measurements were made on 1:1000 scale plans and sections. The exceptions were the Main and East Zones, where 1:500 figures were used initially for reserve estimation, but reduced to 1:1000 scale for presentation.

The bulk of the grade information is provided by the diamond drilling (mostly NQ size) carried out by the previous property owner, Canamax Resources Inc. (Canamax) from 1985 to 88 and by Curragh in 1989. Assays and specific gravity determinations on Canamax's samples, were carried out by Rossbacher Laboratory Ltd., Burnaby, B.C., and on the Curragh samples by Min-En Laboratory, North Vancouver, B.C. A systematic program of cross checks is planned by Curragh.

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- 7 -

Reserve boundaries were selected on the assumption of a 2 m minimum mining width and a 3 m minimum separation between parallel bands of mineralization, to allow each band to be considered extractable. The classification of reserves into the "Sulphide" and "Oxide" categories was based on the owner's visual observations recorded in the drill logs and data base.

A cut-off grade of 8% combined Pb-Zn was applied in most places, but in certain situations marginal grade material was included if it resulted in a more realistic mining boundary. The 8% combined Pb-Zn cut-off grade provides a revenue which roughly corresponds to anticipated operating costs in the \$60-70 per ton range. In addition, in most places it corresponds to a natural boundary between grades above 8% combined Pb-Zn and grades substantially lower.

For the holes drilled by Canamax and Curragh, specific gravity (s.g.) measurements were made on all assayed samples. In the reserve estimates involving these holes (over 90% of the total), grades were combined on a density weighted basis: sample grades were weighted by length x s.g. to provide intersection averages, and reserve blocks were combined on a volume x s.g. (i.e. tonnage) basis.

For the Main and East Zones at Jewelbox Hill, which were drilled off by earlier property owners, s.g. measurements were restricted to a few character samples. For these deposits, the grades were not density weighted, and overall densities were assumed to be the same as average figures for mineralization of similar grade and character in the other

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- 8 -

deposits at Jewelbox Hill: 3.4 for the high grade Main Zone and 2.9 for the oxidized East Zone mineralization.

RESULTS

Reserve estimates by RPA are listed in Table 1. Data for individual blocks are given in Tables 2 to 7 and Figures 2 to 78 in the Appendix.

In situ reserves are estimated as follows:

	<u>Tonnes</u>	<u>% Pb</u>	<u>% Zn</u>	<u>oz/ton Ag</u>
<u>SULPHIDE RESERVES</u>				
Proven (Jewelbox Hill)	75,000	16.9	18.8	2.6
Probable (Jewelbox, North Hill)	3,909,000	3.9	12.8	1.7
Possible (Jewelbox, North Hill, Gribbler)	1,045,000	5.1	13.1	2.0
<u>OXIDE RESERVES</u>				
Probable	483,000	7.7	11.8	3.2

COMMENTS

Correlation and Continuity of Mineralization

In most cases, individual zones of mineralization can be correlated with a high degree of certainty. Normally, the mineralized skarn layers occur at the borders of relatively thick, easily identified limestone units; or form bands that parallel the contacts of the main limestone bands. In parts of the Jewelbox and Burnick Zones, where there are pronounced structural complexities, correlation is less certain, but the implications regarding tonnage possibilities are probably not too serious. In other words, alternative interpretations provide a similar tonnage in blocks of mineable size.

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TABLE 1
MT. HUNDERE IN SITU RESERVE ESTIMATE

	PROVEN RESERVES				PROBABLE RESERVES				POSSIBLE RESERVES			
	Tonnes	% Pb	% Zn	Oz/S.T. Ag	Tonnes	% Pb	% Zn	Oz/S.T. Ag	Tonnes	% Pb	% Zn	Oz/S.T. A
SULPHIDE RESERVES												
Main Zone	75,000	16.9	18.8	2.6	43,000	7.8	10.8	1.3				
JB Hill					1,431,000	8.3	13.0	2.1	171,000	7.1	10.2	1.1
Gribbler									347,000	11.1	16.1	3.1
Attila					406,000	3.4	12.4	1.8				
Burnick					2,029,000	0.8	12.7	1.4	527,000	0.6	12.0	1.5
	75,000	16.9	18.8	2.6	3,909,000	3.9	12.8	1.7	1,045,000	5.1	13.1	2.0
OXIDE RESERVES												
East Zone					129,000	5.4	7.3	7.2				
J.B. Hill					354,000	8.5	13.5	1.8				
					483,000	7.7	11.8	3.2				

Classification of Reserves

The terms Proven, Probable and Possible Reserves, as used in the present report, are synonymous with the terms Measured, Indicated and Inferred Reserves, respectively.

At the property's present stage of development, Proven Reserves are restricted to the eastern two thirds of the Main Zone at Jewelbox Hill. This is the best defined mineralization on the property, with drilling on 10 m sections, several holes per section, and a series of surface trenches. Boundaries are defined with sufficient accuracy for open pit mining to commence.

Most of the reserves are in the Probable class, although different parts of different zones have a range of confidence levels. The best defined area is in the northeast end of the Jewelbox Hill sulphide mineralization where the JB-1 East Block, the JB-2A Block and the eastern edge of the JB-2 Block contains some 600,000 tons averaging 20-25% combined Pb-Zn. This area has been tested by vertical holes at 25 m centers, and a number of flat holes which cut the mineralization at lower angles. Although the grade and tonnage estimates for this section are probably fairly reliable, the shape of the mineralization is complex, and considerably more drilling will be required to locate boundaries to the accuracy required for mining.

The tonnage and grade figures for the remaining Probable Reserves are somewhat less well defined, but are still within the Probable Reserve category. These situations range from vertical drill holes on 25 m centers with simple to complex geology, to cases of wider spaced drilling where the mineralization correlates particularly well.

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- 10 -

The term Possible Reserves has been used for the Gribbler Zones and parts of the Burnick Deposit because of the limited number of drill holes that are spaced as much as 100 m apart. At the Jewelbox Hill the reserves in the Possible category, involve the poorly defined JB-1 Zone (stratigraphically above the main zones of mineralization) plus the extension possibilities of the JB-1 and JB-1A Zones, which are open to the west for much of their length. Isolated intersections, which do not correlate with the main zones of mineralization were not included in the reserve estimates.

Oxidized Reserves

Based on visual estimates, close to 20% of the Jewelbox mineralization has been oxidized to a significant degree, but the oxidation appears to be mostly restricted to well defined areas. Although minor oxidation is sometimes present elsewhere, in the Main Zone, and the parts of the JB-1 Zone that are close to surface, no problem is anticipated in mining essentially unoxidized material on a selective basis.

Two holes in the JB-1 oxidized area, 81 and 85, showed unusual sections of smithsonite healed fractures in the limestone footwall of the oxidized skarn. Although grades and widths are attractive (6.7 m averaging 40.5% Zn in hole 83, 14.0 m averaging 16.7% Zn in hole 85), the intersections were assumed to be of local significance, and were not included in the estimated reserves.

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- 11 -

Mining Boundaries and Rock Conditions

In most parts of the property, the 8% combined Pb-Zn grade cut-off represents a "natural" boundary between grades well above 8% and rock that is either very weakly mineralized or barren. There should be no problem in selecting these boundaries visually. Although gradational boundaries occur in places they are present in less than 5% of the drill intersections, and the use of a "natural boundary" which includes grades as low as 5% Pb-Zn probably represents something that could be maintained during mining.

As a general comment, the marble, skarn, and hornfels should provide good rock conditions for mining. A somewhat higher dilution rate can be expected for the Burnick area, where the alteration of phyllite to hornfels and limestone to marble is less intense, and a graphitic phyllite sometimes forms the hangingwall of the mineralization.