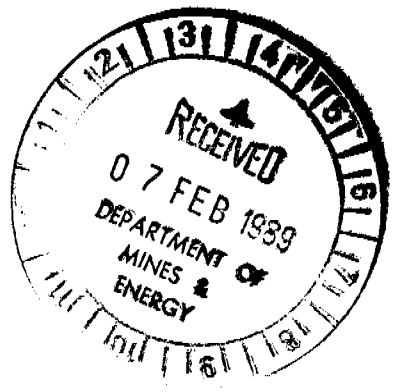
D.G.S

WYRALA PTY LTD
GPO BOX 3908
DARWIN NT 0801

3 February 1989



The Secretary
Department of Mines & Energy
GPO Box 2901
DARWIN NT 0801

Dear Sir,

RE: MCN 423 - FLORA BELLE REPORT

Please find enclosed our report in relation to MCN 423 for your records.

Yours sincerely,

for: JON STARINK
Director

OPEN FILE

CR89/304

FLORA BELLE PROJECT

WYRALA PTY LTD

PREPARED BY:
MINING MANAGEMENT
SERVICES PTY LTD

JANUARY 1989

CONTENTS

1. INTRODUCTION

This report summarizes the work carried out on behalf of Wyrala Pty Ltd on the Flora Belle leases in 1987 and 1988.

The Flora Belle mine is located 21kms NNW of Pine Creek. Access is via the Pine Creek-Mt Wells graded dirt road to approximately 2kms south of Boomleera Siding. A 2km track to the west leads to the mineral lease.

The topgraphy is undulating with the main workings on the crest of a low ridge.

2. SUMMARY OF WORK COMPLETED

1) Evaluation of Previous Date and Site Visit

The reports of previous holders of the licence were examined and the old workings were examined during a site visit.

2) Evaluation of Grade and Tonnage of Dump Material

The old dumps were surveyed with chain and compass and a volume estimated. Samples were collected from cuts made with a front end loader in the dumps.

3) Preliminary Estimate of Capital and Operating Costs

A mining and process engineer was contracted to estimate the capital and operating costs of a 50,000TPA flotation concentrator for the Flora Belle Silver/Lead deposit.

4) Gold Rock Chip Geochemistry

A rock chip sampling programme for gold mineralization was undertaken within the Flora Belle lease.

3. EVALUATION OF PREVIOUS DATA

Reports by Geonorth, Northern Metals, United Uranium Central Pacific Minerals and V J McSweeney were read. The Flora Belle mine was visited and the workings inspected. Discussions were held with Mr J Doyle who was a member of the tributers (1980-81) who last worked the Flora Belle. It is not intended to report the information and conclusions of this report. However in summary the high grade silver lead and gold mineralization is restricted to a number of structurally controlled shutes from 1-1.5m wide within a 6-700m long shear zone, which is part of a major regional structure. Geoff Orridge estimated diluted ore from the mine might average 2%Zn, 5%Pb and 200g/t Ag, which on the data available appears to be a reasonable, conservative estimate. Between the shutes the lode is reduced to a series of thin quartz and limonite veinlets.

From the description of workings, the ore shutes appear to be lenticular in both the horizontal and vertical sense. This means that exploration to define ore reserves would have to be intensive, and due to the high stripping ratio open pit mining would be practical to only a shallow depth.

Rather than persue the exploration of the ore zones it was decided to evaluate the dump reserves and the economic parameters for mine development to obtain some exploration objectives in terms of tonnage and grade.

4. EVALUATION OF GRADE AND TONNAGE OF DUMP MATERIAL

A report "The Feasibility of Flora Belle Lead-Silver Deposit" by S S Nyunt was one of the main reasons Wyrala Pty Ltd became involved in this project.

The estimated (but unsubstantiated) 15,000 tonnes containing 4%Pb and 400gm/t silver in the mine dumps was examined. Geoff Orridge of Geonorth reported that J Doyle achieved a recovered grade of 0.39% Pb and 22g/t Ag from 200 tonnes of dump material processed at the Mt Wells Battery and smelted at Pt Pirie.

Mining Management Services Pty Ltd contracted a geologist, F Mollenuns to survey and sample the dumps. A total of 32 samples were collected from front end loader cuts into 17 dump sites. Lead values ranged from 0.50%-17.0% (mean 3.25%), Zinc from 0.03-0.59% (mean 0.13%), Silver from 3 to 700gms/t (mean 187) and Gold from 0.08-1.31% (mean 0.39%) gm/t Au (Appendix 1).

The weighted average was 824 loose cubic metres at 2.68% Pb and 160.5 g/t Ag. Therefore the dump tonnage was less than 20% of that originally estimated the lead grade 70% of the original estimated grade and the silver grade 40% of the original estimate. The dumps were shown to contain 9% of the original lead reserve estimate and 5% of the original silver reserve estimate.

Assays of the individual samples are included in Appendix 1.

5. PRELIMINARY ESTIMATE OF CAPITAL AND OPERATING COSTS

In order to assess the capital and operating costs of a flotation concentrator, mining and processing engineering consultants, Kingsway Engineering were contracted to carry out an evaluation of these aspects of the project.

The project envisaged transporting ore to an upgraded Mt Wells Battery (then owned by Territory Resources).

It was concluded a 50,000 tpa flotation concentrator could be commissioned by modifying the Mt Wells Battery at a capital cost of $0.5M. It was estimated that the operating cost of such a facility including haulage from the Flora Belle lease would be $25.00 per tonne. The conceptional flowsheet on which these costs have been estimated are shown in Figure 1.

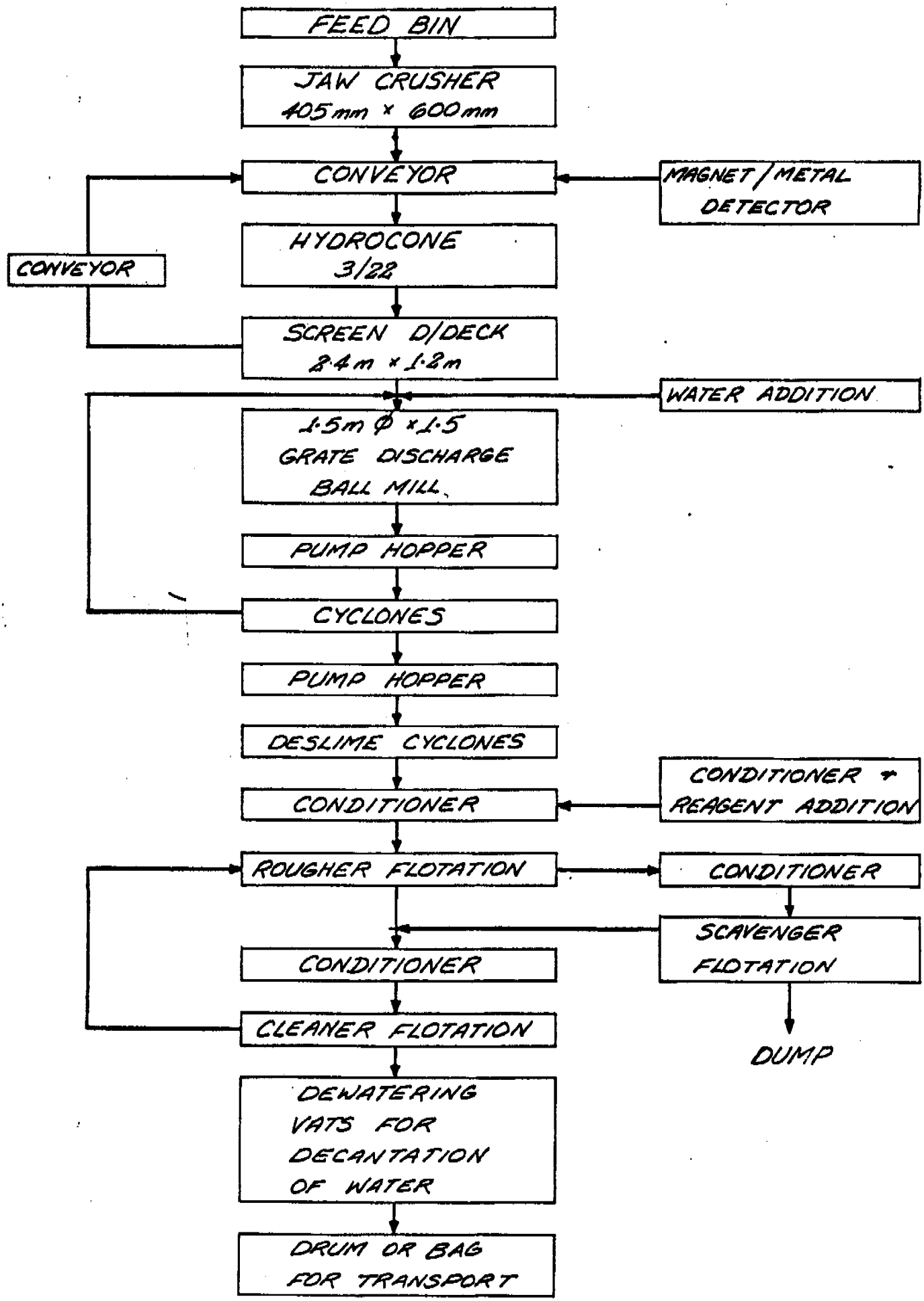


FIGURE 1:
CONCEPTUAL LEAD-SILVER FLOTATION FLOWSHEET

The Kingsway Engineering report is included in Appendix 11.

6. GOLD ROCK CHIP GEOCHEMISTRY

The presence of significant gold mineralization in the Flora Belle Dumps (max 1.3g/t Au), the proximity to the Elizabeth Gold Mine and the presence of extensive quartz veining parallel to the Flora Belle lode led to a rock chip sampling programme for gold to be implemented over the lease area. The results are summarized in the following table:-

Sample No.	General Location	Description	Au g/t
4020	150m SW of main shaft	Weakly Fe milky Qtz in fissile shale	<.008
4021	100m SSW of main shaft	20-30cm gossanous ferruginous boxwork lenze in band of massive grey-green shale	0.208
4022	85m south of main shaft	Milky white iron stained quartz in a fissile green and brown shale	.008
4023	90m SE of main shaft	Ferruginous quartz veined gossan up to 30cms wide. Shallow pits to 0.5m have been sunk on this lode material	0.27

4024	50m SE of Sample 4023	Shallow pit in ferruginous gossan with milky quartz veining	0.90
4025	90m south of Sample 4023	Milky quartz vein	<.008
4026	160m south of Sample 4023	Many milky quartz reefs in this location	<.008
4027	230m south of Sample 4023	Large quartz reefs to 5m wide	<.008
4028	270m south of Sample 4023	1m wide milky quartz vein	0.029

It was concluded that there was gold mineralization in the 0.2-1.0gm/t Au range associated with ferruginous gossanous zones within the Burrell Creek formation. The gold grades and attitudes of the ferruginous zones would suggest they are associated with the Pb-Ag-Au mineralization at Flora Belle. The sampling of the milky quartz reefs failed to produce any significant gold analysis results.

7. CONCLUSION

After an initial evaluation of the data it was concluded that exploration of this type of deposit would be expensive as the lodes were narrow, lenticular and high grade. One possibility examined was to:-

7.1 Haul the high grade 15,000 tonnes of dump material to a refurbished Mt Wells Battery.

7.2 Rather than explore the lode begin mining by open cut those areas with economic widths and grade of ore. The ore produced would be processed in the Mt Wells Battery.

7.3 Develop with underground workings from the bottom of the open cut pits high grade shutes of ore.

While this appeared to be economically possible on the basis of Kingsway Engineering's study testwork showed the dumps had less than 10% of the estimated reserves.

Rock chip sampling for gold mineralization failed to find mineralization of significance.

WYRALA PTY LTD

APPENDIX 1

FLORA BELLE

ASSAYS OF SAMPLES COLLECTED FROM MINE DUMPS

amdel
technology and enterprise

Amdel Limited
(Incorporated in S.A.)
P.O. Box 58
Berrimah, N.T. 5788

Telephone (089) 32 2637
Telex: AA85987

30th October 1987

Our Ref: D449/88

REPORT NUMBER : D449/88

CLIENT :	Greenbushes Limited
CLIENT REFERENCE :	Written Req.
REPORT COMPRISING :	Cover Page Pages 1 & 2
DATE RECEIVED :	20th October 1987

A. Ciplys.

Alan Ciplys
Manager
AMDEL Limited (N.T.)

amdel

ANALYSIS

SAMPLE MARK	Au ppm	Au (ppm) QC CHECKS	Ag ppm	Pb ppm	Zn ppm
FB01	0.18		79	1.05%	1300
FB02	0.15		140	1.55%	610
FB03	0.29		100	1.10%	705
FB04	0.21		98	1.35%	940
FB05	0.20	0.21	120	1.50%	845
FB06	0.09		110	1.35%	455
FB07	0.32		195	5.00%	710
FB08	0.15		135	2.95%	2100
FB09	0.50		195	4.00%	2500
FB10	0.55		195	5.50%	2300
FB11	0.09		70	1.00%	595
FB12	0.24		57	1.35%	1400
FB13	0.47		220	3.90%	1300
FB14	0.22		68	1.80%	290
FB15	0.56		280	5.50%	1200
FB16	0.42	0.56	460	4.15%	820
FB17	0.79		155	3.05%	550
FB18	0.25		135	3.20%	335
FB19	0.62		190	2.25%	645
FB20	0.08		87	2.40%	630
FB21	1.31		700	17.0%	5900
FB22	0.37		140	1.80%	465
FB23	0.64		520	7.60%	1250
FB24	0.94		640	7.80%	550
FB25	0.25	0.20	115	1.90%	1850

METHOD : PM3/2, A1/A2

ANALYSIS

SAMPLE MARK	Au ppm	Au (ppm) QC CHECKS	Ag ppm	Pb ppm	Zn ppm
FB26	1.04		3	0.58%	280
FB27	0.46		64	1.55%	1450
FB28	0.26		46	1.25%	1500
FB29	0.56		48	2.15%	1150
FB30	0.13		31	1.00%	2700
FB31	0.14		560	7.00%	3300
FB32	0.08		40	0.50%	965

METHOD : PM3/2, A1/A2

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APPENDIX 11

KINGSWAY ENGINEERING'S EVALUATION
OF CAPITAL AND PROCESSING COSTS OF
MODIFICATIONS TO THE MT WELLS BATTERY

PRELIMINARY ESTIMATE

of

CAPITAL AND OPERATING COSTS

for a

50000 TPA FLOTATION CONCENTRATOR

for the

FLORA BELLE LEAD SILVER DEPOSIT

Prepared by: Kingsway Engineering
PO Box 14
BALINGUP WA 6253

CONTENTS

SUMMARY

REPORT SCOPE

The project described and costed in this report is the proposed treatment of approximately 15000 tonnes of development ore from a lead-silver deposit located approximately 20 kilometres from the Mt Wells mineral deposits which are located approximately 200 kilometres south of Darwin, Northern Territory.

Ore will be transported under a haulage contract to the feed ramp at the old "Mt Wells Battery" (currently owned by Territory Resources N.L.). It is proposed to modify and recommission the battery to a lead-silver flotation plant. Power supply, water supply and camp infrastructure exist to support the proposed concentrator.

This report is a first estimate of the capital and operating costs which might be expected in recommissioning and operating the concentrator at Mt Wells, to allow evaluation of the proposal to the point where further funds would be allocated for the preparation of a detailed metallurgical and design project report. The information (flow sheets, equipment selection etc) should not be extrapolated beyond this report without confirmation of the detail.

FORMAT

The report is presented in three subsections

- Description of the Concentrator
- Capital Cost Estimate to Commission as a Lead Silver Flotation Concentrator
- Operating Cost Estimate for the Concentrator

The base date for the estimate is November, 1987.
At the time of the report limited metallurgical testwork has been conducted by the Department of Mines(Darwin) which indicates excellent recovery using a standard Xanthate flotation. Preliminary discussions with Territory Mining N.L. has indicated the crushing and grinding circuits in the Mt Wells battery would be available for inclusion in a recommissioned plant.

CONCLUSIONS

By detailed examination of the project capital and operational components it has been established that some $0.5 million will be required to establish a 50,000 tpa flotation concentrator within the existing Mt Wells Battery.

The operating costs associated with this facility will be $2 per tonne for haulage to the processing site and a further $23 to operate the flotation concentrator. This total does not include allowances for any payment to Territory Resources for the use of the Mt Wells Battery and miscellaneous equipment. These figures do not allow for the learning curve for treatment plant operators.

Specifically excluded from these estimates were.

- all offsite management costs.
- the purchase of all mobile equipment or light vehicles as it was considered these would be supplied by Territory Mining NL.
- all shipping and despatch costs of concentrate.
- camp/infrastructure and operating costs for Mt Wells concentrator (at $20/man/day this amounts to $94,662 pa or $1.89/tonne).

It should be noted the crushing section has adequate capacity to handle upward of 16 tph, and thus plant capacity would rise quickly if

(1) ore was found to have a low work index or the milling

capacity was otherwise increased.

(2) the flotation section was increased in capacity.

Since salaries and wages represent 40% of the concentrator costs any increase in capacity will be reflected in a significant decrease in unit operating costs.

PROJECT DESCRIPTION

GENERAL

Ore will be hauled to the Mt Wells Battery by contract.
The battery will be recommissioned as an 8 T.P.H. lead-silver flotation circuit as shown in the conceptual flowsheet (figure 1).
Details of the proposals which have to be costed are outlined in the following descriptive section.

ORE HAULAGE

The development ore from the Lead-Silver deposit has all been mined underground and as such will generally pass through a 150mm square grizzly screen. There is presently some 15000 tonnes of ore stockpiled approximately 20 kilometres from the Mt Wells Battery site.

The ore will be hauled in 28 tonne superlift semitrailers which will be hired in to complete the haulage in an extended campaign.

CRUSHING

There exists at Mt Wells a feed bin which feeds a 16" X 24" DT-RB Jaw Crusher. The bin and crusher are understood to be in operatable condition. Allowance has been made to replace the crusher jaw plates, but no other monies have been allowed.

The jaw crusher product is currently fed to a 3/22 Hydrocone cone crusher (also understood to be operational) and then to a screen in closed circuit with the Hydrocone. Again replacement of wear parts has been allowed, but no overhaul allowance has been included.

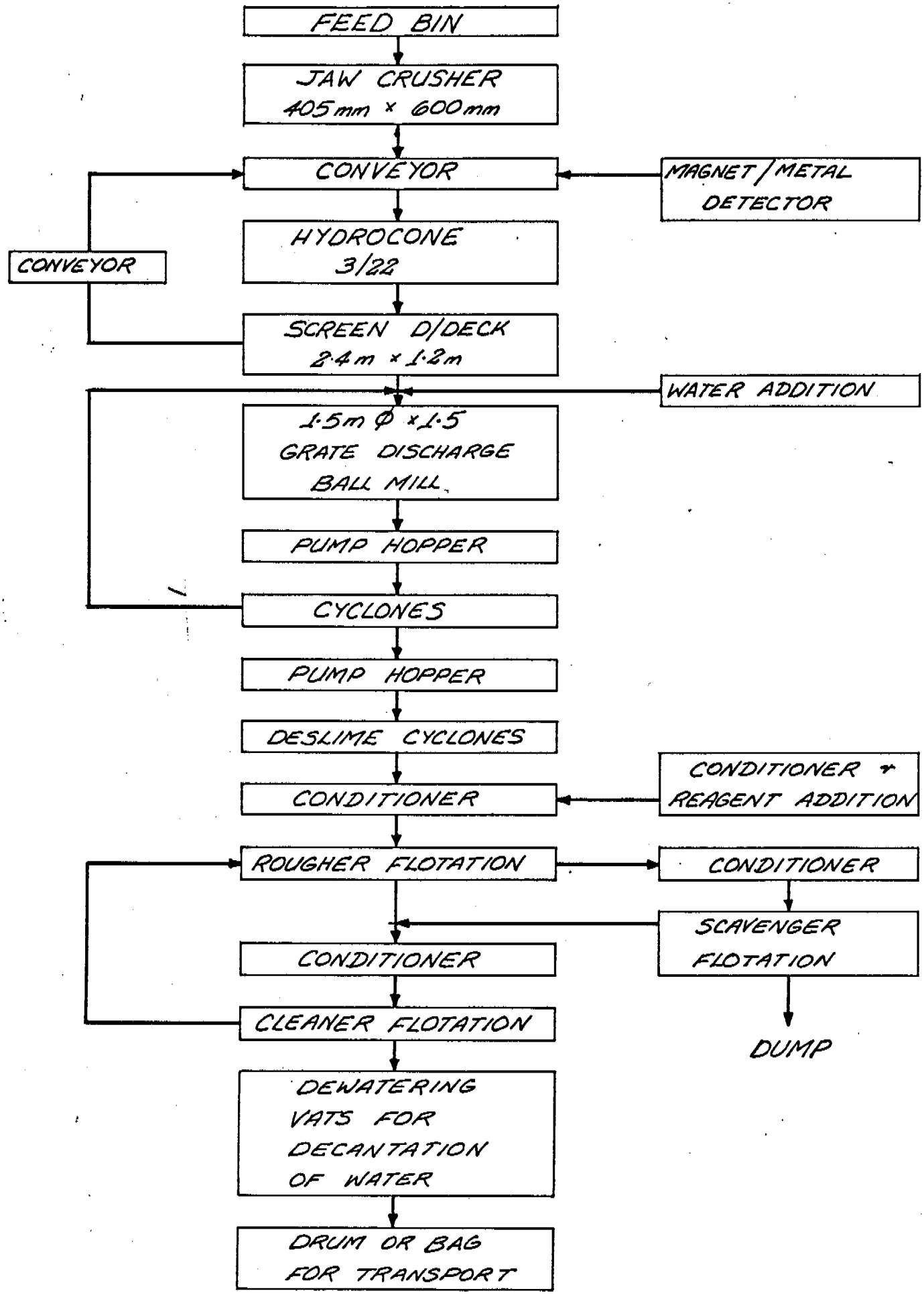

FIGURE 1:
CONCEPTUAL LEAD-SILVER FLOTATION FLOWSHEET.

It is assumed that a tramp metal magnet and detector are also available in the above circuit, and are operatable. These would be essential to avoid damage to the hydrocone by drilling consumables and other tramp metal delivered in the ore.

MILLING

A 1.5m diameter by 1.5m long grate discharge ball mill is available at Mt Wells Battery, an allowance has been made to lift the mill and clean the bearing seats and journals, and to purchase and install a set of mill liners.

Cyclones to effect a sizing at 80 microns will be installed in closed circuit with the mill.

CONDITIONING

No detail on conditioning of the flotation feed, other than a PH=7 is available. It is probable that the water available at the battery will require conditioning and an allowance has been included for conditioning tanks agitators and chemicals.

FLOTATION

A standard rougher-scavenger-cleaner flotation circuit is envisaged with conditioning and reagent addition between banks.

New 4 X 1 cubic metre flotation cell banks have been costed into the proposal. These will give a retention of 15 minutes in each stage of flotation. The pulp density during flotation will be maintained at 30%.

DEWATERING OF CONCENTRATE

It is proposed that concentrate be gravitated to three dewatering vats, rather than installing thickeners and drum filters. The dewatering vats will decant excess water from the concentrate to give a 60-70% pulp density product, which would be pumped to drums or possibly bulka bags. No allowance has been included for bulka bags to contain the concentrate.

SHIPPING

No allowance has been included for freight when shipping the concentrates, nor toll treatment of the concentrates.

CAPITAL COST ESTIMATE

CRUSHING

- Feed bin	$Exists
- Jaw Crusher 16" X 24" DT-RB	$ 3,000
- Conveyor	$Exists
- Overbelt Tramp Metal Magnet	$ N.A.
- Metal Detector	$ N.A.
- Hydrocone Cone Crusher 3/22	$ 6,000
- Screen D/deck 2.4m X 1.2m	$ 2,000
- Allowance to recommission circuit	$10,000
Subtotal	$21,000

MILLING

- Install new mill liners and recommission mill	$50,000
- Purchase cyclones and piping to close mill circuit	$10,000
- Allowance to recondition pumps and existing pipework	$10,000
Subtotal	$70,000

FLOTATION

- deslime cyclones	$ 5,000
- conditioner tank and agitators	$ 10,000
- 3 banks of 4 Agitair 1.1m^3 flotation cells c/w motors launders, rubber lined	$178,000
- blower and ducting to provide air for flotation cells	$ 5,000
- pumps, hoppers and piping	$ 20,000
- allowance for structure, dosing pumps miscellaneous steelwork and piping	$ 40,000
Subtotal	$258,000

DEWATERING

- construction of dewatering vats and piping	$ 20,000

TAILING DISPOSAL

- tailings pump and pipeline	$Exists

POWER SUPPLY

- generating capacity to 350 KVA	$Exists
- electrical installation and modification	$ 40,000
Project Construction Total	$409,000
DESIGN AND PROJECT ENGINEERING	$ 80,000
TOTAL PROJECT COST	$ 489,000

OPERATING COST ESTIMATE

INTRODUCTION

Operating costs for the 8 tph plant were based on operating the plant in 10 day campaigns, 24 hours per day, with a 4 day maintenance and rest period at the conclusion of each 10 day campaign. This equates to 50000 tpa.

The operating cost estimate presented in this report covers the following scope :-

- power
- reagents
- water /
- operations manning
- maintenance manning
- spares and consumables

OPERATING COST SUMMARY

Haulage Contract	$ 100,000
Power	$ 250,000
Reagents	$ 120,000
Water	N.C.
Salaries and Wages	$ 409,500
Spares and Consumables	$ 157,280
Mobile Equipment	$ 104,000
	$1,140,780 p.a.
	($ 87,752 p.p.)

POWER

The power consumption on which the operating cost estimate is based are tabulated below -

	Installed KW	85%
Primary Crushing	25	
Secondary Crushing	40	
Grinding and Classification	120	
Flotation	100	
Mineral Dressing and Misc	30	
	315	268

Supply of electricity would be from portable diesel generating plants - at a cost of 15c/KWhr

Cost per annum

= 268 KW X (10 X 24 X 26) hours X $0.15

= $250,848

REAGENTS

The annual cost of reagents is derived from testwork carried out by the Department of Mines (Darwin).

Unit costs for the supply of reagents were obtained from suppliers for delivery in the metro area.

Reagent	Hourly Consumption Kg/hr	Unit Cost $/Kg	Reagent Cost per Annum	Freight $50/t	Total
Caustic	8	0.80	39936	2500	42,500
Xanthate	1.6	6.00	59904	500	60,500
					100,000
Contingency					20,000
		Total Costs of Reagents			$120,000

WATER

To be supplied by Territory Mining N.L.

MANNING

OPERATING MANNING

Manager	$ 35,000 p.a.	
Clerk/Paymaster	$ 30,000 p.a.	
Staff Subtotal	$ 65,000 p.a.	
On cost factor 0.6	$ 39,000 p.a.	
		$104,000
3 X Shift L/H	$ 30,000	
6 X Operators	$150,000	
Subtotal	$180,000	
On cost factor 0.3 =	54,000	$234,000
		$338,000

MAINTENANCE MANNING

1 X Fitter/Welder	30,000	
1 X T/A	25,000	
	55,000	
On cost factor 0.3	16,500	$ 71,500
		$409,500

N.B. There is no allowance for the manning of the camp facilities.

SPARES AND CONSUMABLES

- Jaw crusher linings	
Allow liner life of 100,000 tonnes	
Cost of installed liners $10,000	
∴ Allow $0.10/tonne	$5,000 p.a.
- Screen cloths -	
Allowing $150 /square metre for steel screen clothes with a life of approximately 500 hours	
Allow 5m^2 screen X 12 per year	$9,000 p.a.
- Grinding media consumed at a rate of 1 kg per 15 Kwhr of installed power	
= 8 kg/hr X 6240 hrs X $1.00/kg	$49,920 p.a.
Cost of liners is approximately 50% of grinding media	24,960 p.a.
- Pump spares	
Allow for	
2 X 4/3 Warman at $1600 p.a.	$3,200
4 X 3/2 Warman at $1300 p.a.	$5,200
- Miscellaneous	
Process piping, valves etc	$25,000
Pumps, hoppers, agitators	$15,000
Rubber repairs to bins, cyclones etc	$20,000
Total Spares and Consumables =	$157,280

MOBILE EQUIPMENT

Small F.E.L. unit to feed plant
Would have quick change attachments
for bucket, fork or crane

$30 /hour	2000 hours	= $ 60,000 p.a.

Vehicles

3 of -	Manager 4 WD	$20,000 p.a.
	Office ute	$12,000 p.a.
	Workshop small truck	$12,000 p.a.
		$104,000 p.a.