

OPEN FILE

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ROSSARDEN TIN MINE

**AN INVESTIGATION OF THE OPEN CUT POTENTIAL OF THE ROSSARDEN
TIN MINE, NORTH - EASTERN TASMANIA.**

JUNE - JULY 1989.

FOR STACPOOLE ENTERPRISES PTY. LTD.

89-3055

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JUKA MINE MANAGEMENT PTY LTD

**C. ROBERTS
M. TEH**

AMG REFERENCE POINTS ADDED

SUMMARY

- * On behalf of Stacpoole Enterprises, Juka Mine Management Pty. Ltd. carried out a compilation and assessment of available data on the Aberfoyle Tin Mine, in north-eastern Tasmania, to determine its potential for open pit mining.
- * A potentially open-cuttable resource, comprising minor cassiterite/wolframite bearing quartz veins, exists in the intervening host rock between previous stopes.
- * Various options were considered for the 550m by 45m main quartz vein swarm, including mining to depths of 70, 110 and 150 metres (2, 4 and 5 levels respectively). The most likely option, to 110m depth (4 level), contained a potential resource of 5.3M tonnes with a waste to ore ratio of 2.6.
- * The major unknown at this stage, is the grade of the resource, though evidence from underground records, drilling and recent mapping of quartz vein densities supports a grade of between 0.20% and 0.25% Combined Metal (CM).
- * Financial modelling of Bulk and Selective mining options, combined with three process options, was carried out on the 4 level pit, at a grade of 0.22% Sn. Variations in head grade, tin price and mining costs were tested, as was a 2 level pit.
- * Modelling suggests that at current metal prices and a grade of 0.22% Sn, the project is likely to be marginal, but that increases in either of these, or decreases in operating costs could make it more attractive.
- * A staged programme to establish more reliable data on the head grade, optimal metallurgical processing and production costs has been proposed. Total cost of this has been estimated at \$310,000 up to detailed mine feasibility/planning stage, providing staged results continue to be successful.
- * Options for Stacpoole Enterprises generally involve introduction of another entity for further expenditure by : joint venture, corporatisation or outright sale, or limited additional work leading to one of the above.

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Chief Geologist.

Juka Mine Management Pty. Ltd.

Martin Tey,
Senior Mining Engineer.

June, 1989.

ABERFOYLE TIN MINE - OPEN PIT APPRAISAL

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1. INTRODUCTION

1.1. JUKA BRIEF

Juka Mine Management Pty. Ltd. was engaged by Stacpoole Enterprises, in June 1989. The brief given was to review and compile information available on the Aberfoyle mine with a view to determining the feasibility of open pit mining and the potential options available for the deposit. A two day visit was made to inspect the site, underground workings and drill core, and search and obtain records.

1.2. LOCATION

The Aberfoyle Mine is situated in north-eastern Tasmania, near the township of Rossarden (Figure 1). Sealed road access is available from Launceston, via Avoca, with respective distances of 102 km and 22 km from the mine.

The area has a history of mining and although untidy on some tailings sites, has an extensive flat area suitable for mining and processing which should not pose environmental problems.

Water, power, and road access provide an existing infrastructure.

1.3. TENEMENTS

Stacpoole Enterprises have three current tenements, as shown on Figure 1.

Mining Lease No. 27M/77	-	33 ha.
Retention Licence. No. 8808	-	3.0 sq km
Exploration Licence Application	-	6.5 sq km

Two leases are held by F.K.Scheppein within 27M/77 (8M/83) and to the south of it.(52M/82)

1.4. HISTORY

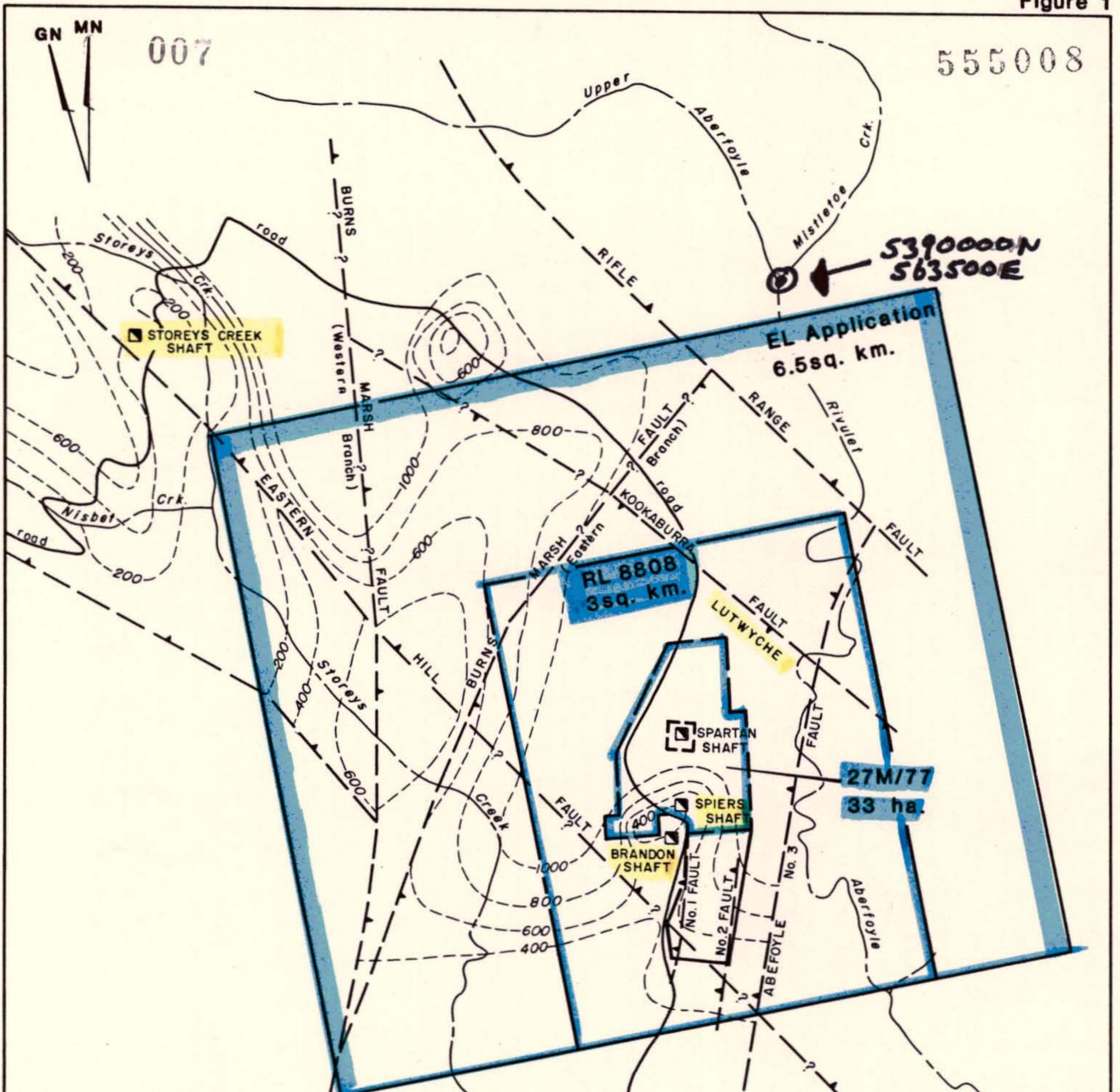
The area contains two major tin and tungsten mines at Storey's Creek and Aberfoyle. The veins of Storey's Creek were mined from the 1890's and at Aberfoyle from 1931. A third major zone of mineralisation was drilled at Lutwyche in the 1960's with some subsequent development and mining. Recorded production from the Aberfoyle underground mine until 1980, shortly before its closure, was 2.1 million tonnes at 0.91% Sn, 0.28% WO₃.

All mines in the area closed in the early 1980's.

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EL Application
6.5sq. km.

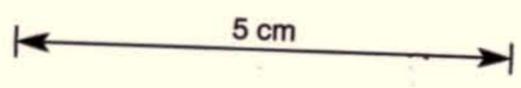
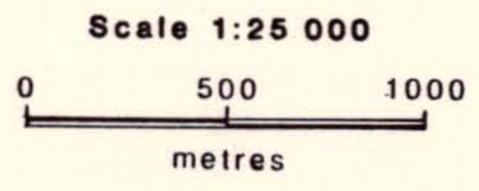
RL 8808
3sq. km.

27M/77
33 ha.

LOCATION



Rossarden Township



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Rossarden NE Tasmania

AMG REFERENCE POINTS ADDED ABERFOYLE TIN-TUNGSTEN MINE

LOCATION MAP

- top granite contour (depth below surface interval 200 metres)
- major fault

2. GEOLOGY

2.1. REGIONAL

Aberfoyle is one of three intense quartz-cassiterite-wolframite-sulphide vein swarms known to occur in close proximity, within Permian Mathinna Group, steeply dipping sediments. All three areas - Aberfoyle, Storey's Creek and Lutwyche are regional-fault controlled and are apparently related to aplitic cupola highs in an underlying source, Devonian granite (Figures 1 and 4).

2.2. POTENTIAL RESOURCES

It is not considered that the Aberfoyle Mine underground workings constitute a resource for underground mining. Known reserves have been exhausted and there is little indication of economic additional resources. The condition of the workings and timbering, at least on the 4 level, have deteriorated rapidly since closure and would be prohibitive to rehabilitate for known ore remnants.

There are a number of other potential resources in addition to the Aberfoyle Open Pit zone, which are summarised below (see also Table 1).

2.2.1. Coarse Jig Tailings (Figure 2)

This stockpile comprises float rejects from the heavy media circuit and jig tailings of Rossarden and Storey's Creek mines. Sampling analysis has estimated the following recoverable reserves of -12mm material on a combined metal (CM) basis :-

Rossarden	489,000 t @ 0.136% CM
Storey's Creek	<u>81,000 t @ 0.130% CM</u>
Total	<u>570,000 t @ 0.135% CM</u>

Metallurgical studies indicate that approximately 51% of the combined metal can be recovered from the indicated reserve of 770 tonnes. (Robinson & Worth, 1980).

This reserve is not considered economic to treat as it stands; however, it could be an additional resource should a mine be developed.

2.2.2. Slime Tailings (Figure 3)

The five slime dams are estimated to contain about 198,000 tonnes (dry) grading 0.39% Sn and 0.35% WO₃, based on auger drill holes by Aberfoyle Ltd. and Wheal Lutwyche Ltd. Testing of the slime tailings show a 40% overall recovery. (Stacpoole, 1985).

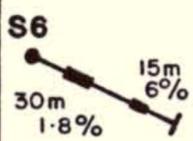
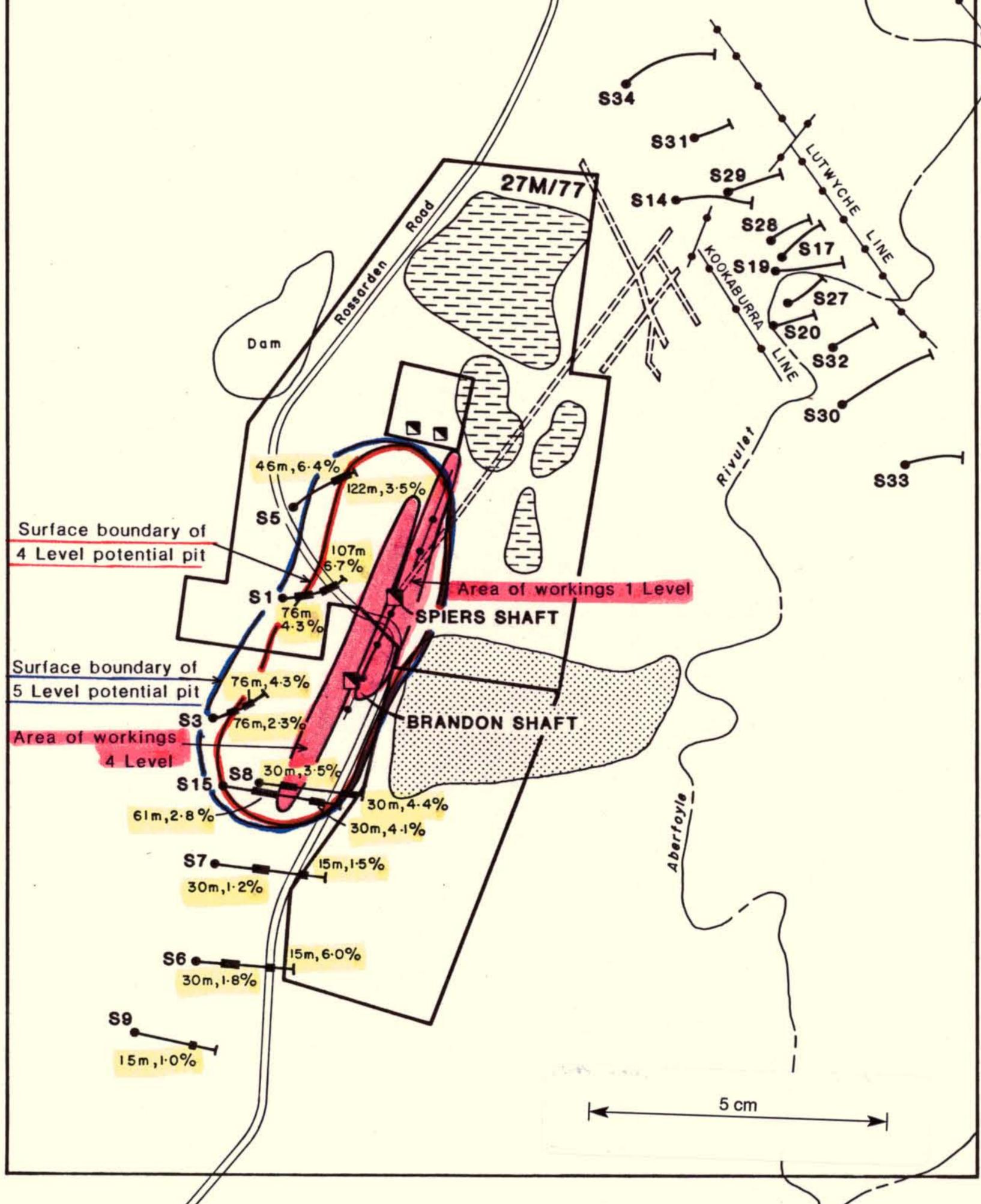
The economics on a stand-alone basis, even at this level of recovery, were apparently attractive at the 1985 prices of tin (\$145/unit) and tungsten (\$114/unit). The project could be a valuable adjunct to an established operation.

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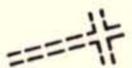
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RL 8808

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Previous deep drilling depth (metres) with quartz volume percentage projected to surface



Development to Lutwyche at 13 Level



Slime dams



Quartz vein



Tailings dump

JUKA MINE MANAGEMENT PTY LTD
 Rossarden NE Tasmania
 ABERFOYLE & LUTWYCHE MINES
 DRILL HOLE, DEVELOPMENT
 & LEASE LOCATIONS

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2.2.3. Lutwyche/Kookaburra Lines of Mineralisation

In 1980, Aberfoyle carried out a feasibility study of fully developing the Lutwyche mineralisation, with the raise boring of a 3.35m diameter vertical shaft. Although extensively drilled, access for mining was only via a 650m long drive from the Aberfoyle Mine on level 13. (Figure 2)

A total ore potential of 1,080,000 tonnes was estimated at the time with an insitu grade of approximately 0.90% CM. Little actual mining was carried out before the operations in the area were closed down shortly after.

The economics at the time of the feasibility study, using a tin price of \$M31.4/kg and a Wolfram price of \$US 140/mtu, were estimated to give a DCFIROR of 15.9%.

Although grades near surface are reputedly too low to permit open pitting of Lutwyche, it still remains a significant resource which with further assessment and/or rises in metal prices, may be utilised by an operation in the area. Further reserves are likely if the deposit can be developed.

2.2.4. Storey's Creek Tailings

Although not within the current Stacpoole Enterprises tenements, this material does constitute an additional potentially economic resource for an established operation in the area.

Work carried out in 1987 to test these tailings by pitting and channel sampling demonstrated that grades were patchy, but up to 0.36% Sn and 0.51% WO₃ over 2.2 metres, and with depths varying up to 3.1 metres and averaging 1.5 metres.

Tonnage estimates were not quoted but widths in the creek bed varied up to 60 metres.

2.2.5. Exploration Potential

Exploration potential does exist on a regional scale, using known mineralisation controls, but is more immediately relevant in proximity to the Aberfoyle main zone, to the north and west, and possibly the Storey's Creek Mine.

TABLE 1
RESOURCE SUMMARY COMPARISON

	Tonnage (M)	Grade		Recovery %	Value*	
		% Sn	% WO ₃		\$/t	\$M
Aberfoyle Open Pit						
2 Level	2.6	0.20	0.02	60	16.47	43
4 Level	5.5	0.20	0.02	60	16.47	91
5 Level	7.5	0.20	0.02	60	16.47	124
Coarse Jig Tailings	0.6	0.07	0.07**	51	7.23	4
Slime Tailings	0.2	0.39	0.35	40	30.42	6
Lutwyche/Kookaburra Line (Underground)	1.1	0.45	0.45	72	65.58	72

* Gross Insitu Value at Sn \$M 26.00 (\$A 13.00/kg) \$A = \$M2
 WO₃ \$US 5.5/kg (\$A 7.24/kg) \$A = \$US0.76

** Assumed 50/50.

2.3. ABERFOYLE MINE

2.3.1. Mineralisation

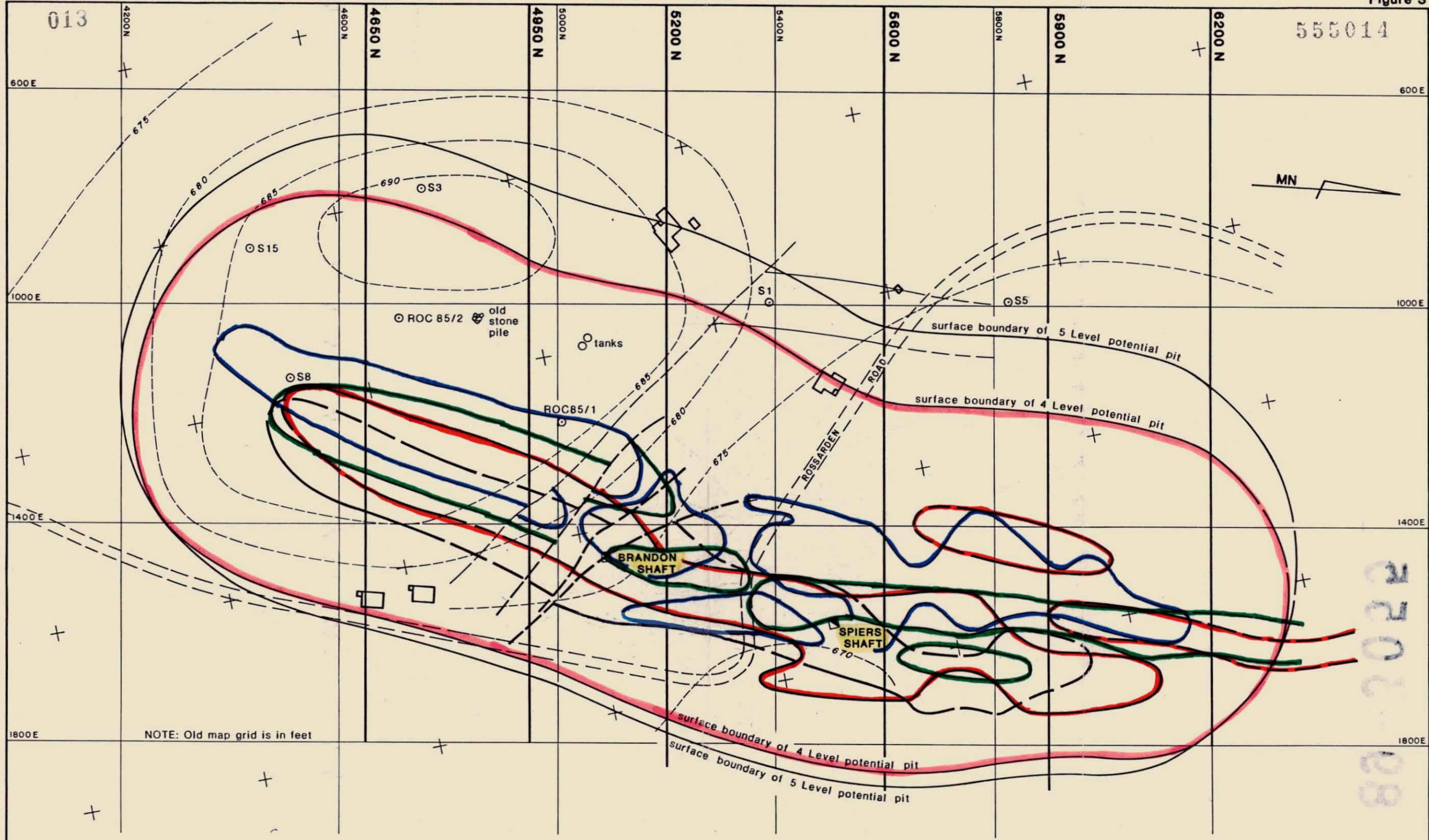
Mineralisation occurs mainly as cassiterite and wolframite within a swarm of steeply dipping quartz veins, striking northerly. Veins pinch and swell vertically and horizontally. The larger, (over 0.3 m wide) have been mined by underground means. Estimated production in the top four levels is 300,000 tonnes.

The remaining resource is comprised of the minor veining in the intervening host sediments. Many of these veins carry rich, visible, coarse mineralisation and occur with a density in excess of 3% within the zone defined by underground mapping on levels 1-4, (Figures 3-14), by Summons, 1985. This zone averages approximately 40m wide over a strike length in excess of 550m.

Historical information suggests a zoning of mineralisation vertically and laterally from the underlying aplitic granite cupola, with combined metal (CM) values in quartz veins increasing from 3% to 5-6% from 4 level and above and Sn : WO₃ ratio averaging 10 : 1 above 4 level. (Summons, 1983)

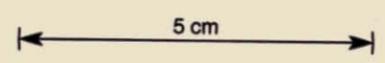
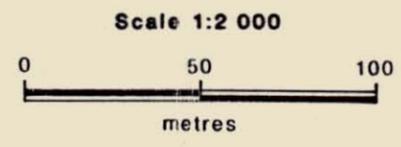
2.3.2. Previous Testwork

- Deep drilling of a number of diamond drill holes, the 'S' series, was carried out by Aberfoyle in 1948-49. The more relevant of these are shown on Figures 2,3 and 4. Figure 2 illustrates the presence of high concentrations of quartz veining intersected in these holes both within the main zone and a parallel zone to the west, within the pit-waste.
- Shallower percussion drilling by Aberfoyle in 1980 (Palmer, 1980), to test open pit potential over the main zone of workings. Nine (9) holes were drilled, of which only two achieved their planned target, the others intersecting stopes or bad ground. Sample collection was also reportedly poor (Palmer, 1980). In spite of this, an intercept of up to 0.18% Sn over 11m was recorded with a weighted average of 0.12% Sn for the seven holes which intersected some mineralisation. It has not been possible to locate information on the positions or actual logs of these holes from either Aberfoyle or the Tasmanian Department of Mines.
- Holes marked Spartan, are shown by Summons to the north of the workings though no records of these have been located.
- Underground Quartz Vein Mapping - by Summons in 1985. Summons produced a series of detailed quartz vein % contour plans at 1:480 scale from past underground mapping, previous cover-drilling logs and from check re-mapping the twenty-five percent of workings still accessible. This showed substantial areas containing in excess of 3% mineralised quartz veining.



NOTE: Old map grid is in feet

- 3% Quartz Vein Contour
- 1 LEVEL
- 2 LEVEL
- 3 LEVEL
- 4 LEVEL
- Surface contours (m)
- + New surface grid
- ROC85/2 Deep diamond drill collar
- S3
- 5200 N Cross section line



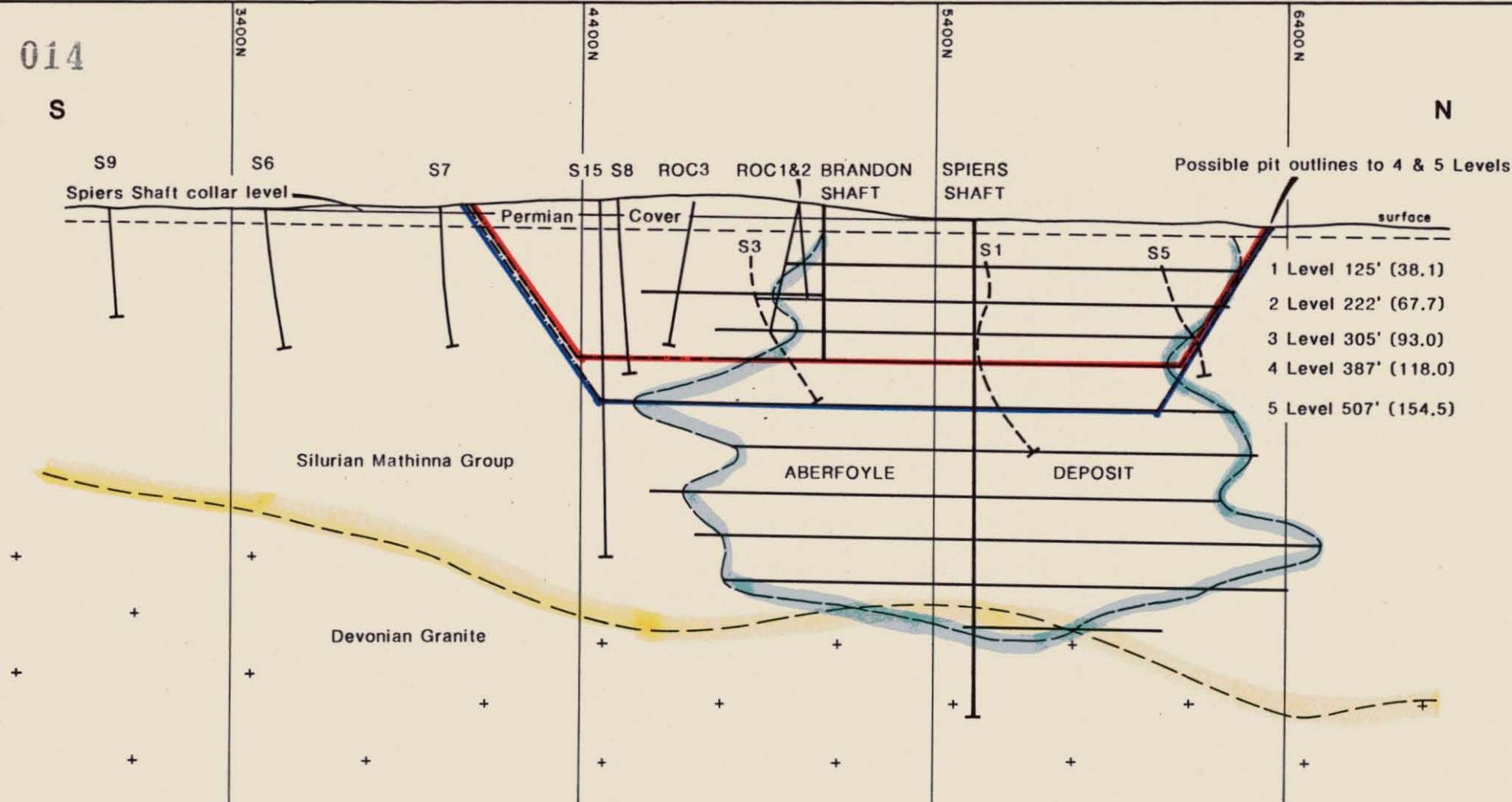
JUKA MINE MANAGEMENT PTY LTD
 Rossarden NE Tasmania
 ABERFOYLE TIN-TUNGSTEN MINE
 PRELIMINARY OPEN PIT
 FOR FEASIBILITY ESTIMATES

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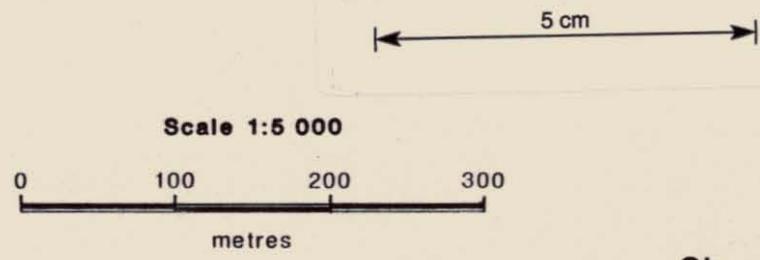
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N



NOTE: Old map grid is in feet
 Level depths are in feet (and metres)

- Drillholes on section
- Drillholes projected to section



JUKA MINE MANAGEMENT PTY LTD
 Rossarden NE Tasmania
ABERFOYLE TIN-TUNGSTEN MINE
LONGITUDINAL SECTION
 Showing Deep Drilling and Development
 (to 1960) and Possible Open Pit Limits

Author: C.Roberts, June 1989

555015

Figure 4

- Wheal Lutwyche drilled three (3) diamond cored holes ROC 85 1-3 in 1985 at the southern end of workings to test the level of quartz veining for potential open cutting (Stacpoole, 1986). These holes confirmed the existence of significant zones of in excess of 3% quartz veining (Figures 9 and 10) and have been incorporated into the contour plans by Juka (Figures 5 to 8). Intervals and percentages are tabulated in Appendix 1.

2.3.3. Quartz/Grade Relationship

Summons (1983) analysed historical production data to determine a relationship between ore grades (OG), quartz vein volumes (QV) and quartz vein grades (QG), whereby :

$$OG \times QG = QV \times QG \quad \text{QV expressed as \%}$$

The mine utilised this relationship for grade control with a Visual Grade Estimation Ready Reckoner (Figure 1, Appendix 2).

One of the difficulties of grade analysis was the "nugget nature" of the coarse cassiterite and wolfram mineralisation, hence the use of averaging visual estimation techniques.

Summons' calculations indicated that major veins (> 25cm) had constituted 6% by volume of the dyke swarm zone mined, and that minor veins could be expected to form between 3% and 9% of the same zone with an apparent average also of 6%.

Summons' later underground mapping and quartz vein percentage data compilation supported this work with a consistent zone of greater than 3% quartz volume enclosing the workings.

The historical data on ore grades suggested that the top four levels had a combined modal quartz grade (representing approximately 85% of the major veins) between 5% and 7% CM and that this was not an artefact of "high-grading". The average Sn:WO₃ ratio for the major period of mining of these levels, up to 1945, was 10:1 (Figure 2, Appendix 2).

Combining the cutoff value of 3% Quartz Volume with 5% Quartz Grade gives an Ore Grade of 0.15% CM.

If the average Quartz Volume was 5% or greater as suggested by drill hole ROC 85 - 1 (Figure 10) and the contoured level plans, then an Ore Grade in excess of 0.25% CM may be present or be obtained by more selective mining.

Alternatively, if the 3% QV cutoff was accepted as the average for veins in excess of 6mm thick as suggested by drilling and mapping (Palmer, 1980) but was combined with the estimated grade of in excess of 8% CM for fine veining in the upper levels, an Ore Grade of 0.24% applies.

The only empirical data available concerning bulk mining of the minor veining refers to :-

- (a) " a parcel of ore (?) taken from 4 level in 1980, and consisting only of stringer veins, has an in situ grade of 0.36% CM;" (Summons, 1983).
- (b) Milling by Aberfoyle of mullock from development at Brandon's shaft was reportedly upgraded to 1.08% CM by simple screening at -50mm (Figure 3, Appendix 2).
- (c) Summon's (1983) reported that "screening of ore (?) from the 4 level drive between Brandon and Spiers Shafts, resulted in the rejection of 70% of the material as waste (oversize) i.e. the ore was preconcentrated by a factor of 100/30, approximately = 3. This apparently ties the above two reports together so that a headgrade of 0.36% Sn by 3 times concentration, gives a product grade of 1.08% Sn with 100% recovery.

2.3.4. Testing Required

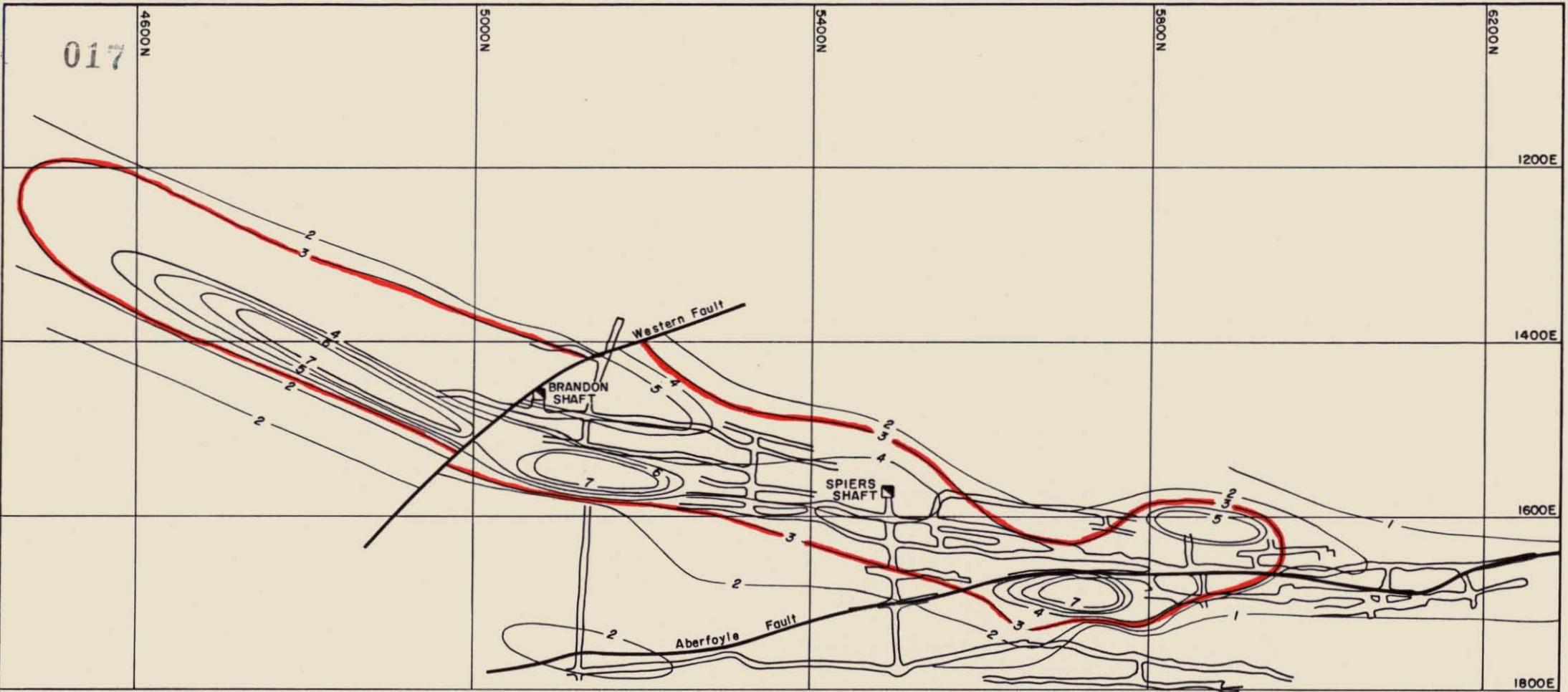
The prime consideration is the establishment of recoverable grades for the open pittable resource in the Aberfoyle Mine.

Financial modelling suggests that the deposit could be attractive at a grade of 0.25% CM or at a 20% higher tin price. For both of these reasons it is justifiable to establish the insitu grades and to firm up production costs and recoveries.

The existence of extensive underground development makes this deposit differ from normal exploration projects, which would be based on drill testing, without the luxury of mined bulk samples.

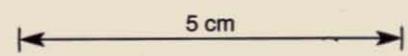
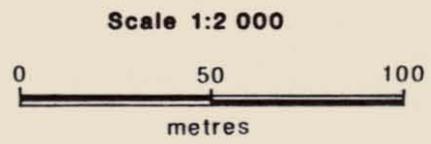
Although some degree of drilling is required in this instance, it may be possible to use drilling for ore delimiting, rather than as the primary assessment tool.

Other resources, though potentially economic, could best be corporately utilised on the back of an open pit operation.



NOTE: Old mine grid is in feet

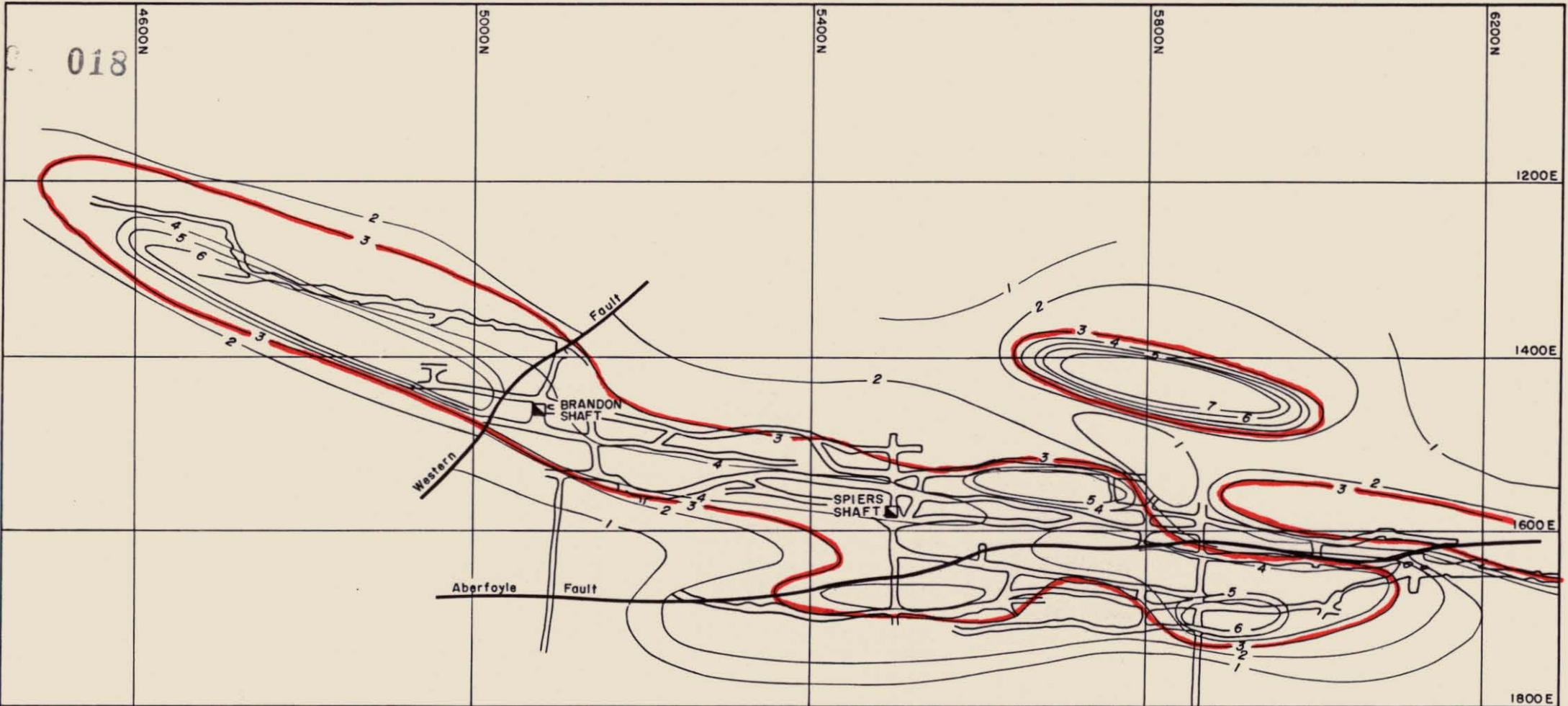
 Existing workings



JUKA MINE MANAGEMENT PTY LTD
 Rossarden NE Tasmania
 ABERFOYLE TIN-TUNGSTEN MINE
 1 LEVEL
 Quartz Vein Measured
 Percentage Contours

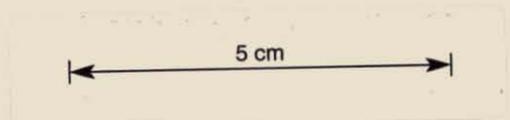
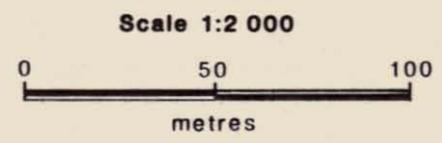
June 1989 Author: C.Roberts, 1989

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 Figure 5



NOTE: Old mine grid is in feet

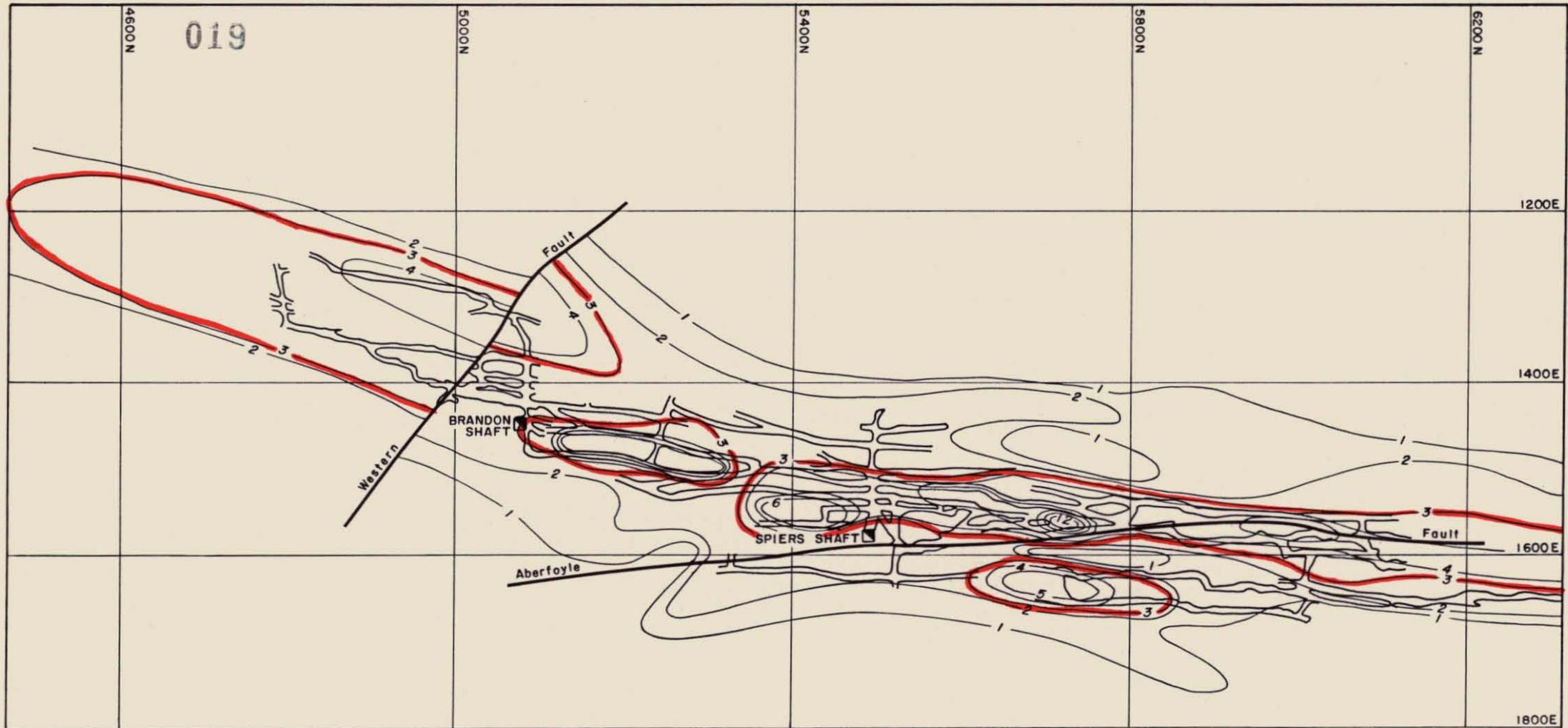
 Existing workings



JUKA MINE MANAGEMENT PTY LTD
 Rossarden NE Tasmania
 ABERFOYLE TIN-TUNGSTEN MINE
 2 LEVEL
 Measured Quartz Vein
 Percentage Contours

Author: C.Roberts, June 1989

555019 Figure 6

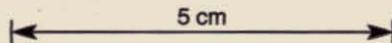
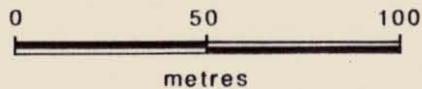


NOTE: Old mine grid is in feet



Existing workings

Scale 1:2 000

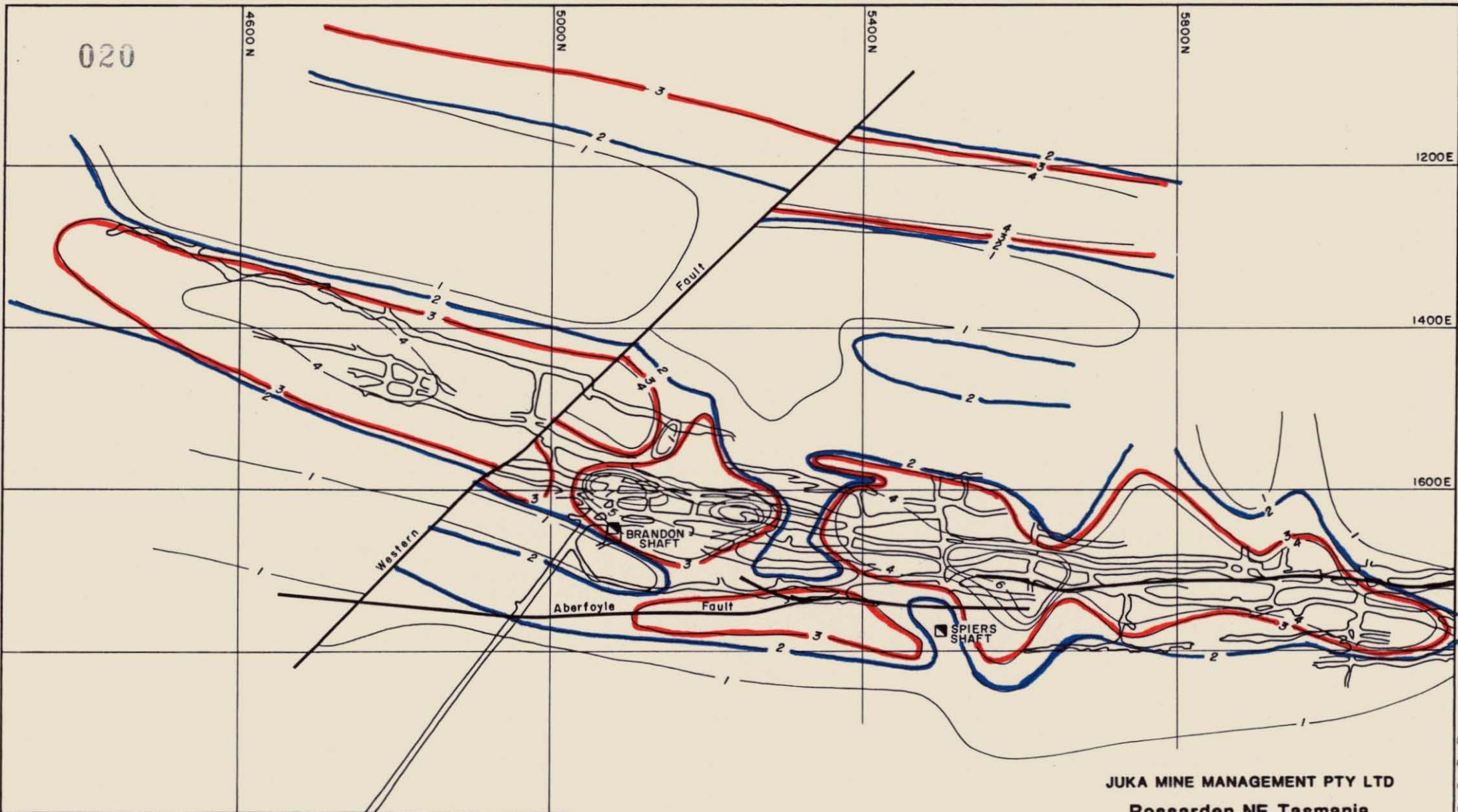


JUKA MINE MANAGEMENT PTY LTD
 Rossarden NE Tasmania
 ABERFOYLE TIN-TUNGSTEN MINE
 3 LEVEL
 Measured Quartz Vein
 Percentage Contours

Author: C.Roberts, June 1989

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Figure 7

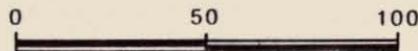


NOTE: Old mine grid is in feet

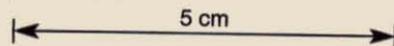


Existing workings

Scale 1:2 000



metres



5 cm

JUKA MINE MANAGEMENT PTY LTD
 Rossarden NE Tasmania
ABERFOYLE TIN-TUNGSTEN MINE
4 LEVEL
 Measured Quartz Vein
 Percentage Contours

Author: C.Roberts, June 1989

555021 Figure 8

3. RESOURCE

For the purposes of this assessment, Juka utilised and compiled existing geological data, assuming this to be correct.

3.1. CONSTRAINTS, ASSUMPTIONS AND POTENTIAL

3.1.1. Tonnages

A simple pit was designed to take in the previously contoured zone of 3% or greater quartz volume, as defined on the plans of levels 1-4, to allow waste to ore calculations.

A set of cross sections, drawn up to tie the level plans together, was measured for waste and ore areas which were calculated to volumes by using half the distance between adjacent sections and a common S.G. of 2.6. End sections were allocated 70% of their volume to allow for end of pit slopes.

Overall pit angle used was 55°.

The pit was designed to remove 100% of ore in the main zone as defined - no attempt at optimisation being made.

Tonnages were calculated for pits to 4 level and 5 level and a comparative estimate was made for a 2 level pit (Figure 11). Level 5 ore zone was derived by extrapolation down dip from the higher four levels.

The possibility of mining to a 2% quartz volume is illustrated on Figure 10.

4 and 5 Level Pits :

Table 2 gives the tonnages obtained for pits to levels 4 and 5 which are summarised as follows :-

TABLE 2

<u>Pit Base</u>	<u>Level 4</u>	<u>Level 5</u>
Strike Length (metres)	555	555
Ore (M tonnes)	5.5	7.5
Waste (M tonnes)	14.6	24.3
Waste/Ore Ratio	2.64	3.25

2 Level Pits :

Section 5200N (Figure 11) was measured for a pit to 2 level for the full ore zone and for a possibly higher-grade half-the-width ore zone.

TABLE 3

<u>2 Level Pit</u>	<u>Full Ore Zone</u>	<u>1/2 Ore Zone</u>
Ore % of 4 Level Pit Tonnage (%)	52.6	26.3
Waste % of 4 Level Pit Tonnage(%)	34.2	29.0
Ore for Full Pit (M tonnes)	2.6	1.32
Waste for Full Pit (M tonnes)	3.6	3.10
Waste/Ore Ratio	1.38	2.35

A comparative analysis of the above Full Ore Pit estimate was modelled in section 6.2.

3.1.2.Grades

As discussed under Quartz/Grade Relationship, there is at present only indirect evidence as to the grade of the above tonnages. The evidence available does, however, support the possibility of a quartz volume of 5%, with a quartz grade of 5% CM, yielding a 0.25% CM bulk grade.

Economic modelling has been run at a grade of 0.22% with two checks at 0.25% and 0.20% CM. No allowance for a lesser price of Wolfram has been made in the CM value, but at a 10:1 ratio and \$55/unit value this amounts to a decrease in value of 5% currently.

Potential exists for improved tonnage and grades in the following areas :-

- unmined pillars - estimated at between 10% and 25% by previous writers.
- unmined major (+25cm) veins.
- Stope fill which reputedly ran between 1% and 3% Sn for the -50mm fraction tested by Aberfoyle in four areas. (P. McGushin pers. comm).The recovery for this fraction is unknown though.
- Drilled parallel zones of quartz veining in the hanging wall pit waste zones, to the west of the main mineralisation. (Figure 2).
- Unknown potential to the north of the workings, toward the Lutwyche/Kookaburra Lines of mineralisation.

TABLE 4

RESERVE CALCULATIONS-ABERFOYLE MINE, ROSSARDEN - TONNAGES 23/6/89

SECTION NO.	4650	4950	5200	5600	5900	6200	TOTALS
STRIKE LENGTH (M)	90	85	95	105	90	90	555
4 LEVEL PIT							
ORE	751,140	1,208,870	1,494,350	1,273,545	725,400	381,186	5,534,491
OVERBURDEN (PERM)	899,262	987,870	1,022,580	607,425	477,360	322,686	4,317,183
OVERBURDEN (MATH)	1,326,780	1,692,860	2,152,605	2,059,785	1,802,970	1,274,364	10,309,364
OVERBURDEN TOTAL	2,226,042	2,680,730	3,175,185	2,667,210	2,280,330	1,597,050	14,626,547
WASTE ORE RATIO	2.96	2.22	2.12	2.09	3.14	4.19	2.64

5 LEVEL PIT							
ORE	991,926	1,637,610	1,993,290	1,729,455	987,480	525,798	7,465,559
OVERBURDEN (PERM)	1,122,030	1,292,850	1,323,920	831,285	623,610	417,690	5,611,385
OVERBURDEN (MATH)	2,427,516	3,080,740	3,795,155	3,774,225	3,268,980	2,328,417	18,675,033
OVERBURDEN TOTAL	3,549,546	4,373,590	5,119,075	4,605,510	3,892,590	2,746,107	24,286,418
WASTE ORE RATIO	3.58	2.67	2.57	2.66	3.94	5.22	3.25

PARAMETERS:

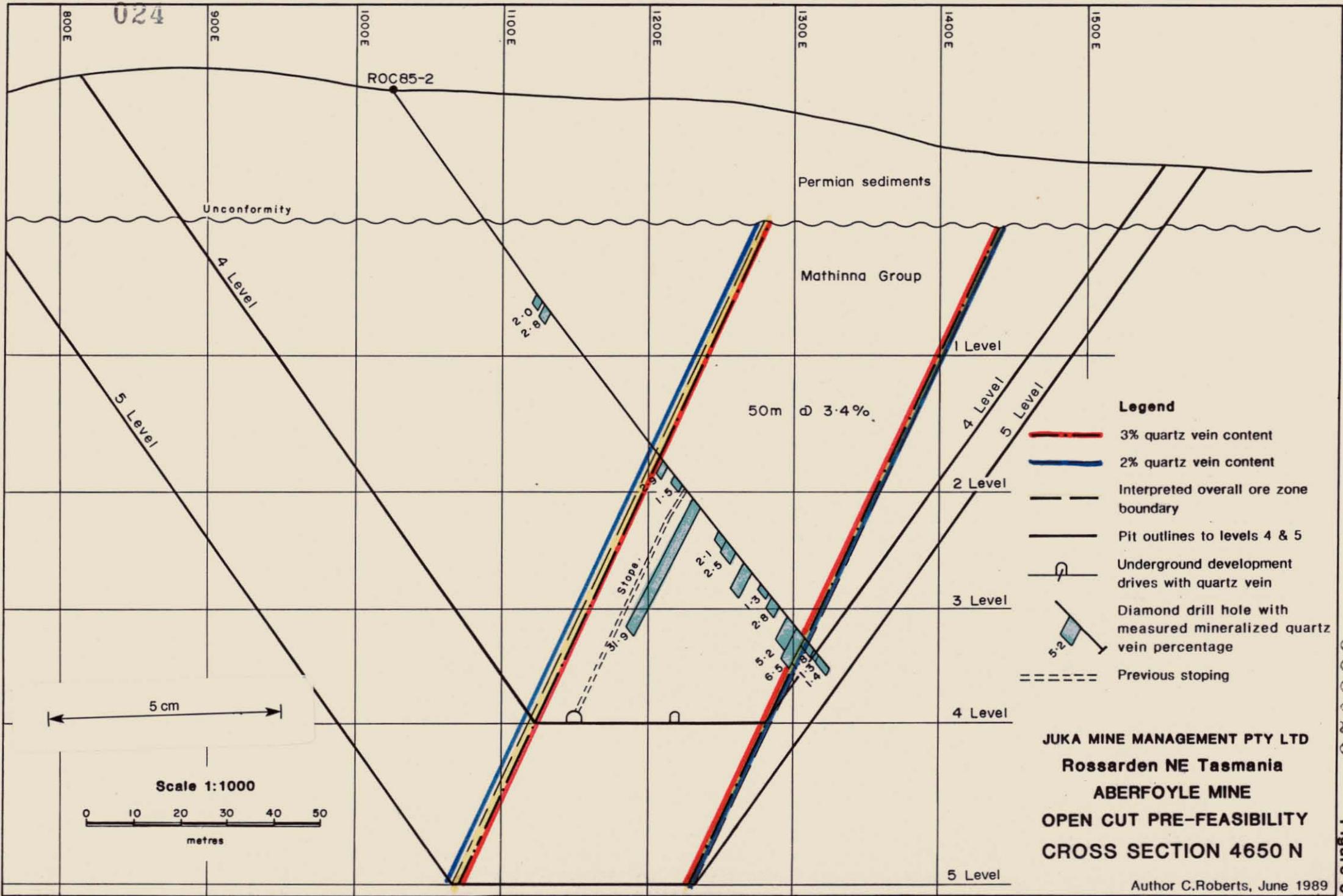
* PIT SLOPE OVERALL - 55 DEGREES

** S.G. - 2.6 FOR ALL MATERIAL.

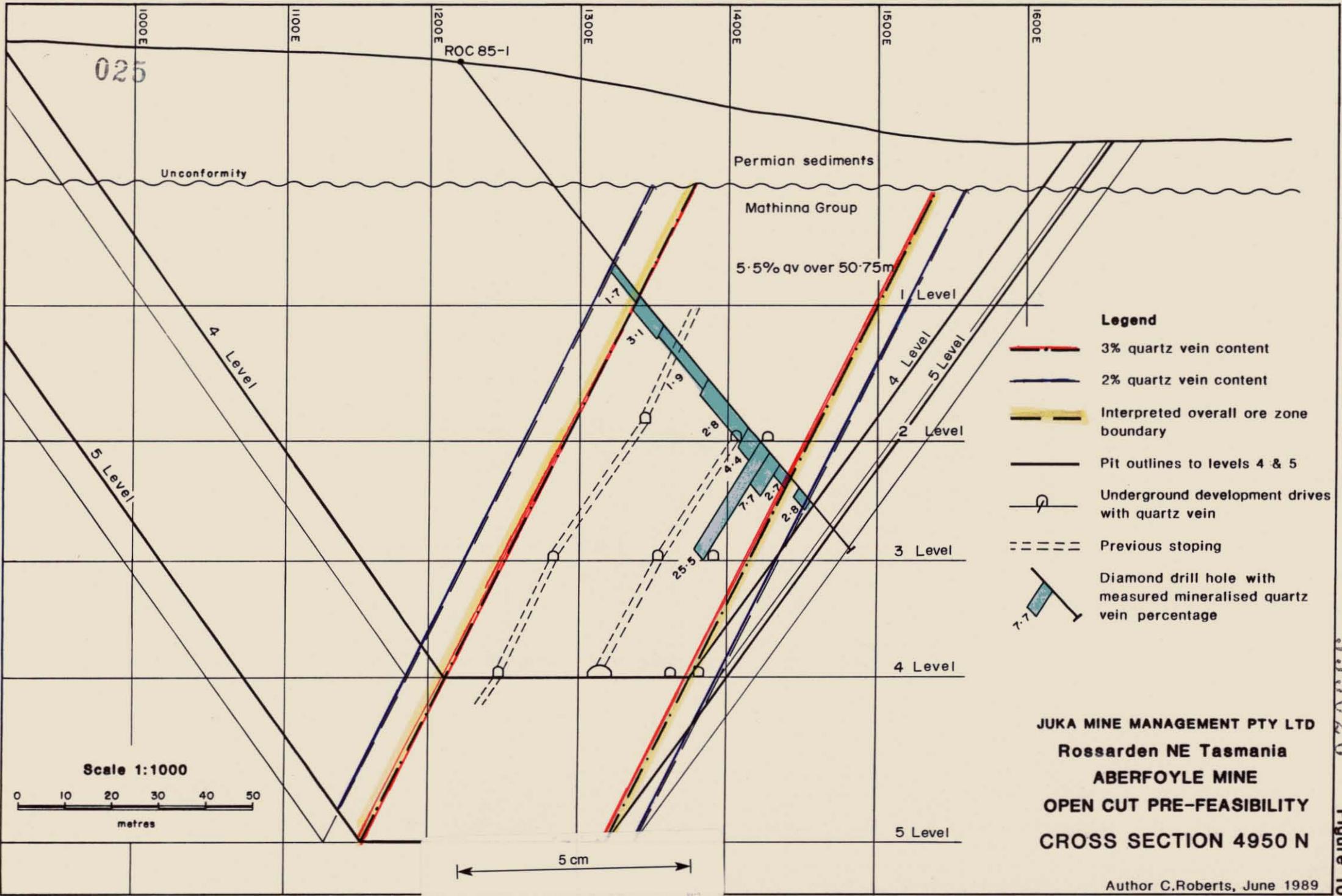
*** 60% FACTOR USED AT PIT ENDS TO ALLOW FOR SLOPE AND CURVATURE.

**** 300,000 TONNES DEDUCTED FOR PREVIOUS MINING IN LEVEL 4 PIT ORE CATEGORY.

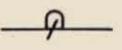
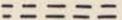
***** 400,000 TONNES DEDUCTED FOR PREVIOUS MINING IN LEVEL 5 PIT ORE CATEGORY.



555025 Figure 9



Legend

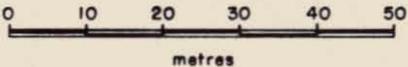
-  3% quartz vein content
-  2% quartz vein content
-  Interpreted overall ore zone boundary
-  Pit outlines to levels 4 & 5
-  Underground development drives with quartz vein
-  Previous stopping
-  Diamond drill hole with measured mineralised quartz vein percentage

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Rossarden NE Tasmania
ABERFOYLE MINE
OPEN CUT PRE-FEASIBILITY
CROSS SECTION 4950 N

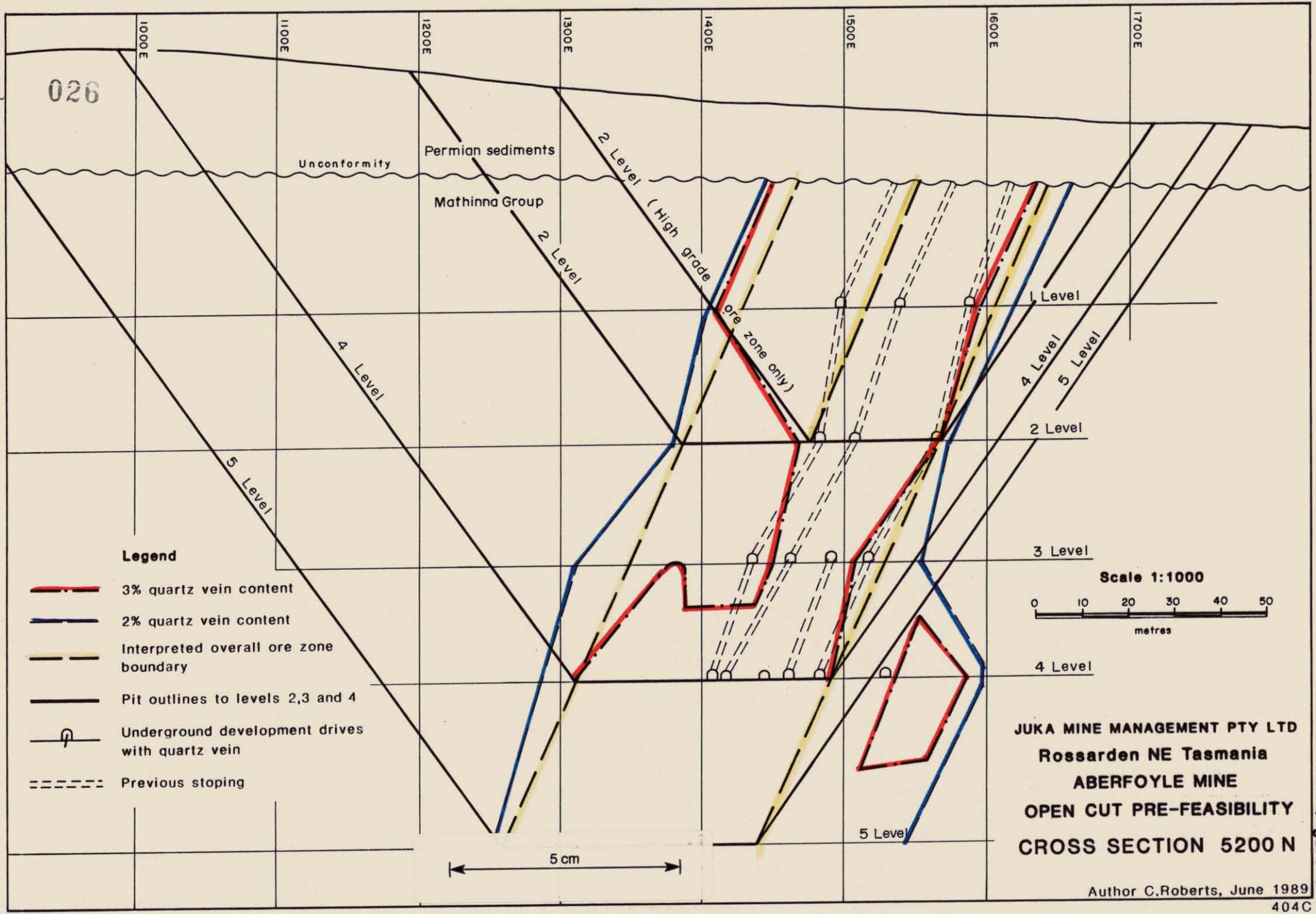
Author C.Roberts, June 1989

555026 Figure 10

Scale 1:1000

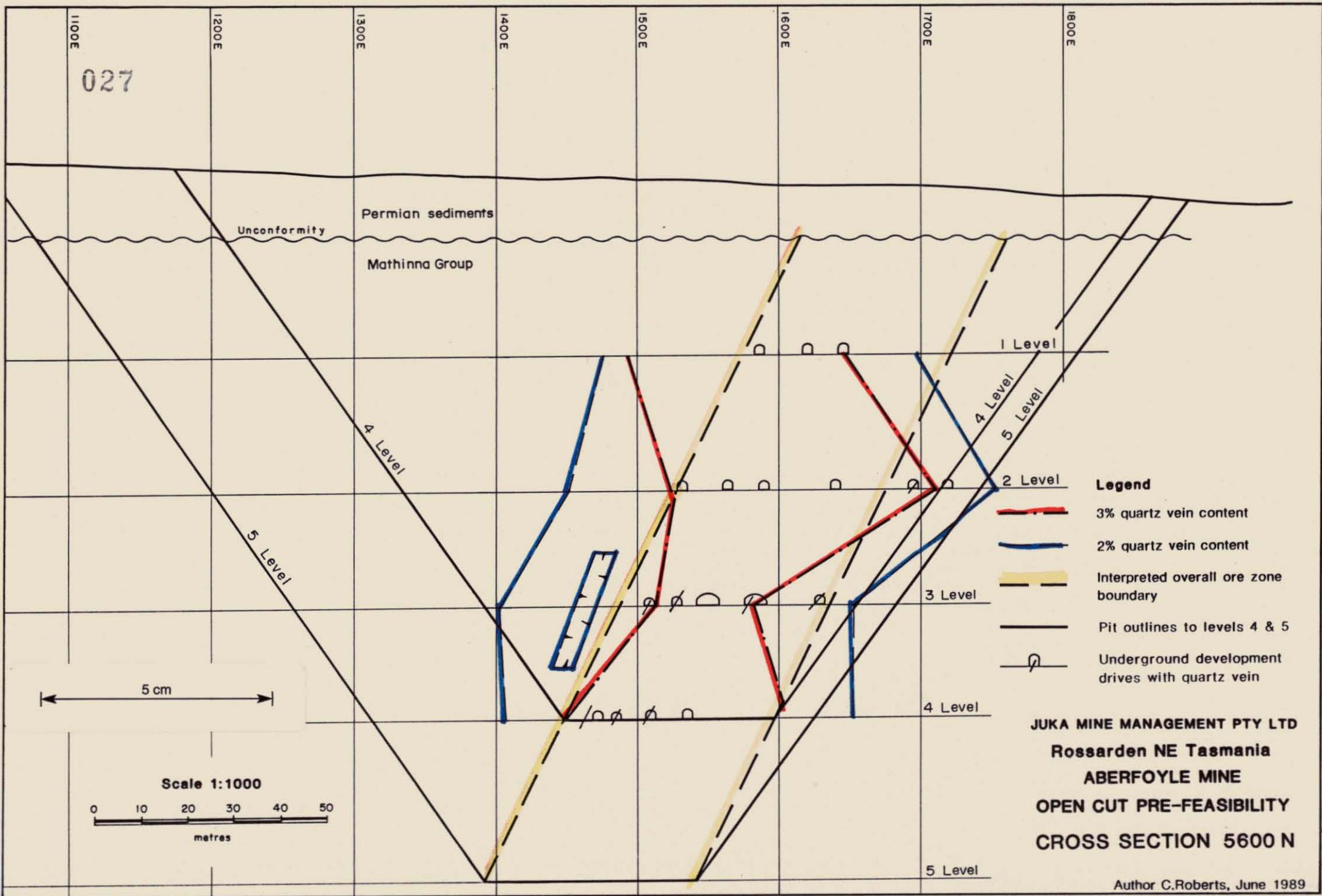


5 cm



555027

Figure 11



555028
Figure 12

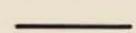
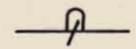
028

1200E 1300E 1400E 1500E 1600E 1700E 1800E

Unconformity
Permian sediments
Mathinna Group

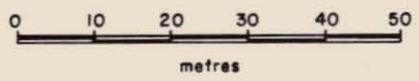


Legend

-  3% quartz vein content
-  2% quartz vein content
-  Interpreted overall ore zone boundary
-  Pit outlines to levels 4 & 5
-  Underground development drives with quartz vein

5 cm

Scale 1:1000

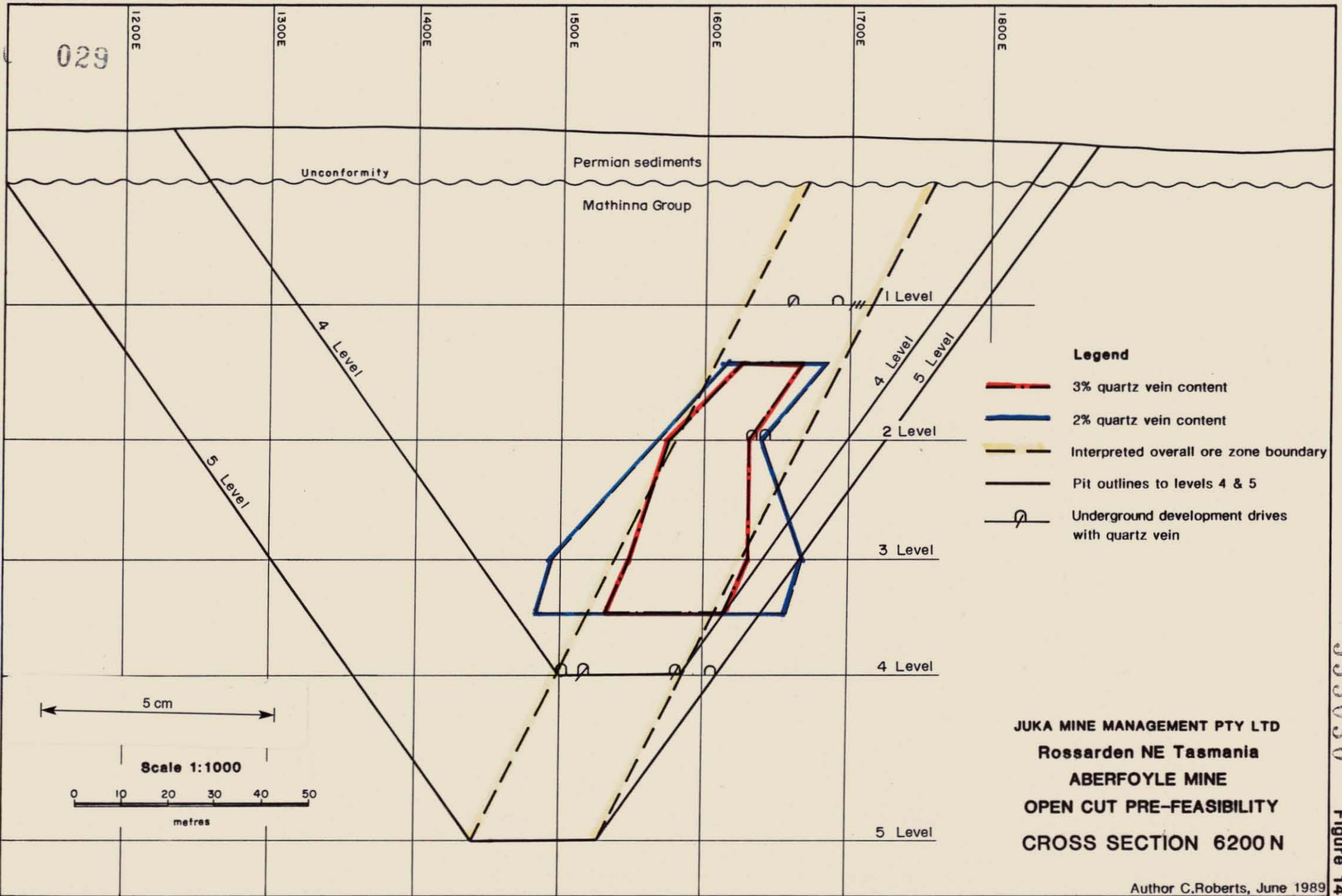


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 OPEN CUT PRE-FEASIBILITY
 CROSS SECTION 5900 N

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555029
Figure 13



555030 Figure 14

4. MINING

4.1. METHODS

Standard open-pit techniques refined in the gold mining resurgence in recent years would be used, carried out by contractors under company supervision.

The large tonnages under consideration - 3.6 Mt per year - lend themselves to large scale mining, utilising hydraulic excavators, FED's and 50 tonne off-highway trucks.

Waste removal would require paddock blasting.

Ore extraction would be by 2m-3m bench heights with fracture blasting and parallel or perpendicular-to-strike face orientations, depending on the degree of grade control possible.

Grades would be optimised in-pit, with prior grade control drilling and face mapping, to achieve a 10-15% upgrade.

Haulage routes for ore and waste are short.

4.2. COSTS

Comparitive indicative mining operating costs for similar scale operations, including blasting, are :-

TABLE 5

	Metana, WA (WA)	Roche, Tas (Tas)	BHP Gold (E & WA)
Oxidised, soft material (S.G.2) (\$/t)	1.00	2.00	1.50
Fresh basalts (S.G.2.6) (\$/t)	2.00	2.50	
Wet material (\$/t)			2.50
Grade Control (\$/t ore)	1-4.00		1.00
Crushing ROM - 50mm			1.20
Crushing ROM - 12mm			2.00

A figure of \$1.50/t for bulk mining and \$2.00/t for crushing was used in modelling, with a check of the most likely process route (option 2) at \$2.00/t for mining.

Project supervision and management costs for mining amount to \$540,000 p.a. (\$0.54/t ore) as detailed in the Manpower section.

031

5. TREATMENT

5.1. PROCESSING

Economic mining of the Aberfoyle open cut will, to a large extent, depend on the ability to reject waste material from the tin bearing quartz veins as early as possible after blasting. This can be in its simplest form screening or size sorting. Additional waste can also be rejected after crushing/grinding using heavy media methods or the more sophisticated optical ore-sorters. The ultimate aim is to prepare significantly up-graded material to the final concentrator.

Two mining options have been compared; Bulk and Selective (with a 25% tonnage reduction and +10% grade increase) as shown in Figures 15 and 16).

These have been combined with three processing options:

- (a) Screen upgrade and direct process (Options 1 & 4),
- (b) screen upgrade, heavy media upgrade and final process (Options 2 & 5), and
- (c) direct heavy media upgrade followed by processing (Options 3 & 6). Figures 15 and 16 give a diagrammatic representation of this.

Although not the highest in overall recovery, the second option (2), is probably the most feasible in terms of metallurgy and tonnage processing costs.

The schematic processing flowsheet (Figure 17) incorporates results of previous test-work undertaken by Aberfoyle Mining to reduce losses in the jig tailings and tabling circuits. Magnetic methods would be utilised to separate the wolfram from tin, and undesirable sulphides would be floated-off from flotation circuits. Metallurgical recovery of up to 85% in the final concentrator can be achieved.

Based on past records it is envisaged that final concentrates will assay 75% Sn with no punitive impurities.

5.2. PRECONCENTRATION

Methods

(i) Screening Upgrade

Previous reports state that considerable upgrading is effected by crushing and screening due to the brittle nature of the cassiterite and wolframite and the sharp mineralised quartz vein contacts with host rocks.

As discussed under Quartz/Grade Relationship, there is evidence that a three times upgrade from 0.36% to 1.1% CM was produced by screening at -50mm. Although 1,895 tonnes were produced it is not known how many tonnes were treated and hence the recovery.

032

Lindsay (1978), quoted that the heavy media preparation screening at -1.5mm, collected 20% of the ROM ore containing 50% of the tin and wolfram.

It is felt that this may provide a simple, cheap and effective first-pass upgrade for a large scale mining operation, particularly if crushed to yield 40% passing 20mm.

(ii) Optical Ore Sorters (M16)

Test work in 1978 indicated the following results on -50 + 18mm ore :-

Reject %	72.5 - 90.7% of feed
Quartz % in Reject	6.0 at 0.002 % Sn
+22mm -40mm	= 50tph ~ 90,000 tpa
Quartz Recovery in Accept fraction	94.0% at 0.28% Sn

Budgeted Capital Cost \$856,000 in 1978 / \$1,848,000 in 1989 (@ 8% p.a. inflation)

Operating Cost \$0.75/t 1978/ \$1.75 in 1989 (@ 8% p.a. inflation)

This option has not been pursued further at this stage, because ROM ore from open pitting may produce finer quartz veining, with poorer recoveries than quoted above, for underground ROM ore. Capital costs may be obviated however by use of mothballed machines at Poseidon's Mt. Carbine Mine in Queensland.

(iii) Heavy Media Cyclone

Previous work by Aberfoyle Mining indicated the following salient results :-

Feed	=	50 t.p.h. (-12mm +0.8mm)
Recovery	=	80%
Reject Vol	=	72% (by WT)

The HMC is an improvement over the heavy media bath system, due to its ability to upgrade finer fractions and consequently upgrade feed to the final concentrator. Unit operating cost is also marginally lower.

Capital cost of HMC plant and ancillaries is A\$200,000 each.

The Heavy Media method gives high preconcentration and recoveries at an early stage, provided that it can cope with the low head grades and high tonnages.

(iv) Tri-Flo Separator

This is the logical improvement of the heavy media cyclone. The additional feature is that two stages of separation are carried out in one vessel, generating two sink products and one float product.

033

The Tri-Flo Separator improves recovery of the finer sizes down to 1.5mm, increases the overall reject rate and is cost effective. It is simple to operate and the start-up time required is about 1/3rd of the old heavy medium drum type. Tri-Flo systems have, since 1983, been installed at Geevor Tin Mines in Cornwall, England and average improvements in performance achieved during the first six months of operation were as follows -:

		From	To	Change%
Capacity	t/h	38	50	+32
Coarse Reject before milling	t/h	10.5	21	+100
Grade of reject	%Sn	0.1	0.05	-50
Cost of medium	\$/t	0.09	0.07	-22
Overall power	kWh/t	40.1	34.9	-13

Prices of Tri-Flo's can be obtained from the manufacturers, Inpromin Ltd, of Southampton, England.

5.3. RECOVERIES

Recoveries by the various processes and at differing head grades have been estimated from past records. These are shown diagrammatically in Figures 16 and 17.

The fact that extensive processing of ore from the deposit was carried out in the past with established recovery levels, is a strong factor in the proposed project's favour.

The major unknown at this stage is the initial upgrade from a large tonnage, lower than previous head grade of around 0.2% CM, to a smaller tonnage for final concentration. This area requires improved data to decide on the most economic method.

Previous concentrator recoveries for differing head grades are illustrated in Figure 4, Appendix 2.

5.4. SMELTING OF TIN ORES

Malaysia Smelting Corporation (MSC) at Penang, Malaysia has indicated its ability to smelt all the tin-ore from the mine. Smelting charges, deductions, etc are as per the attached fax (Appendix 3).

MSC has also offered to make advance payments equivalent to 80% of estimated nett value seven (7) days after receipt of tin-ores ex-Works. Balance would be paid promptly upon finalisation of weights and assays.

Freight (inland and sea), insurance and port handling charges are estimated to cost \$5,000 per 20 tonne container (or \$0.25/kg ore).

034

5.5. CAPITAL COSTS

5.5.1. Summary of Treatment/Milling Equipment

1. Primary Crusher (125-150tph)	
2. Cone Crusher (60-80tph)	\$1,500,000
3. Vibrating Screens/Grizzly	
4. Heavy Media Separators (50tph)	200,000
5. Storage Bins	100,000
6. Final Concentrator Equipment (400tpd)	1,000,000
7. Plant Structure	300,000

Figures above include a 20% Establishment and Commissioning cost and 10% Contingency cost.

These figures have been varied where appropriate, to reflect different tonnage rates in the options considered (refer to Figures 15 and 16).

5.5.2. Capital Cost of Treatment / Milling Equipment

TABLE 6

For Final Concentrator To Process 400 TPD (140,000 TPA)

<u>Equipment</u>	<u>Unit Cost \$</u>	<u>Total Cost \$</u>
1. Primary Jigs	16,000	32,000
2. Secondary Jigs	16,000	16,000
3. Tertiary Jigs	8,500	17,000
4. Vibrating Screens	5,000	10,000
5. Shaking Tables	9,000	90,000
6. Flotation Table	11,000	22,000
7. Ball Mill		100,000
8. Magnetic Separators	45,000	90,000
9. Rotary Dryers	25,000	50,000
10. Hydrosizer	4,500	13,500
11. Hydrocyclones	1,000	12,000
12. Rubberlined Pumps(1 1/2-3")		75,000
13. Willoughby Classifiers	800	8,000
14. Sumps and Valves	1,000	12,000
15. Flotation Cells & Conditioner	12,000	36,000*
16. Spirals (Twin Start)	5,000	50,000*
17. Piping		30,000*
18. Conveyors	4,000	16,000
19. Dewatering Cover	11,000	22,000
		<u>711,500</u>
Contingency 5%		<u>35,575</u>
TOTAL		<u>747,075</u>
		Say <u>\$750,000</u>

* Estimates

Quoted Malaysian costs (Refer Appendix 4)
 \$M costs left as \$A costs to cover transport, import duties etc.
 (\$A = 2\$M)

035

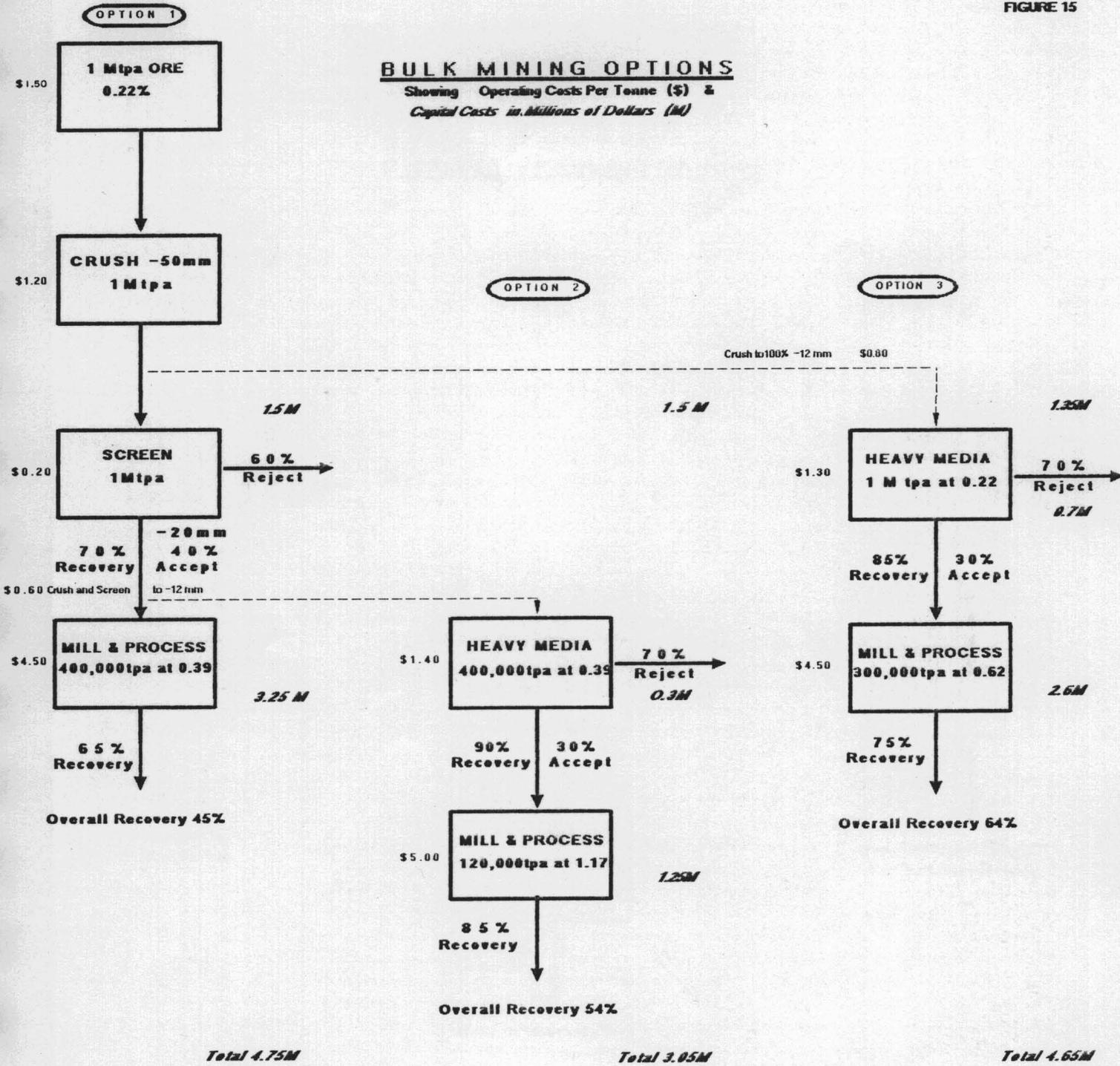
5.6. OPERATING COSTS

Estimated operating costs are shown diagrammatically in Figure 15 and vary slightly to reflect varied tonnage throughputs.

FIGURE 15

BULK MINING OPTIONS

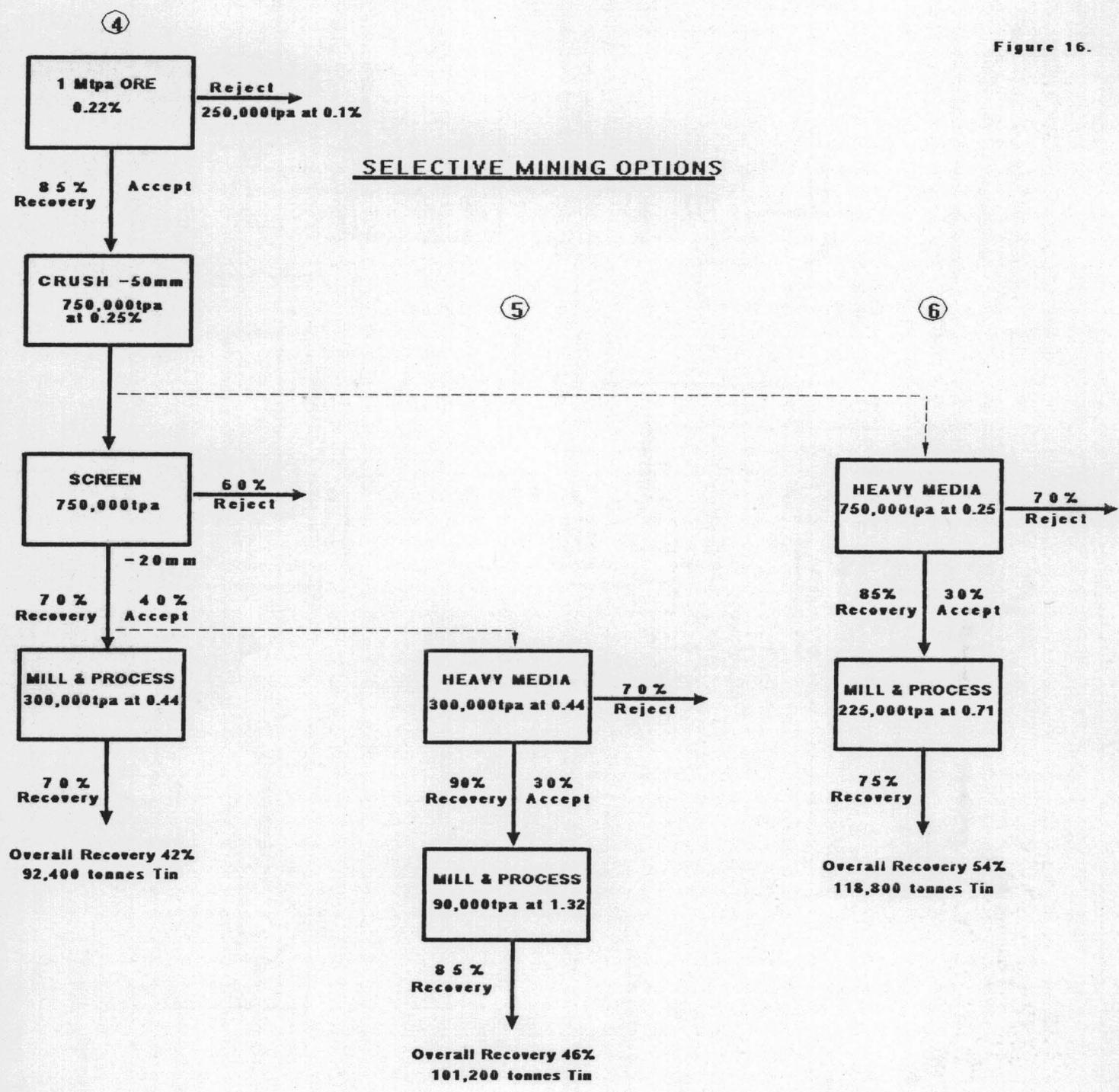
Showing Operating Costs Per Tonne (\$) & Capital Costs in Millions of Dollars (M)



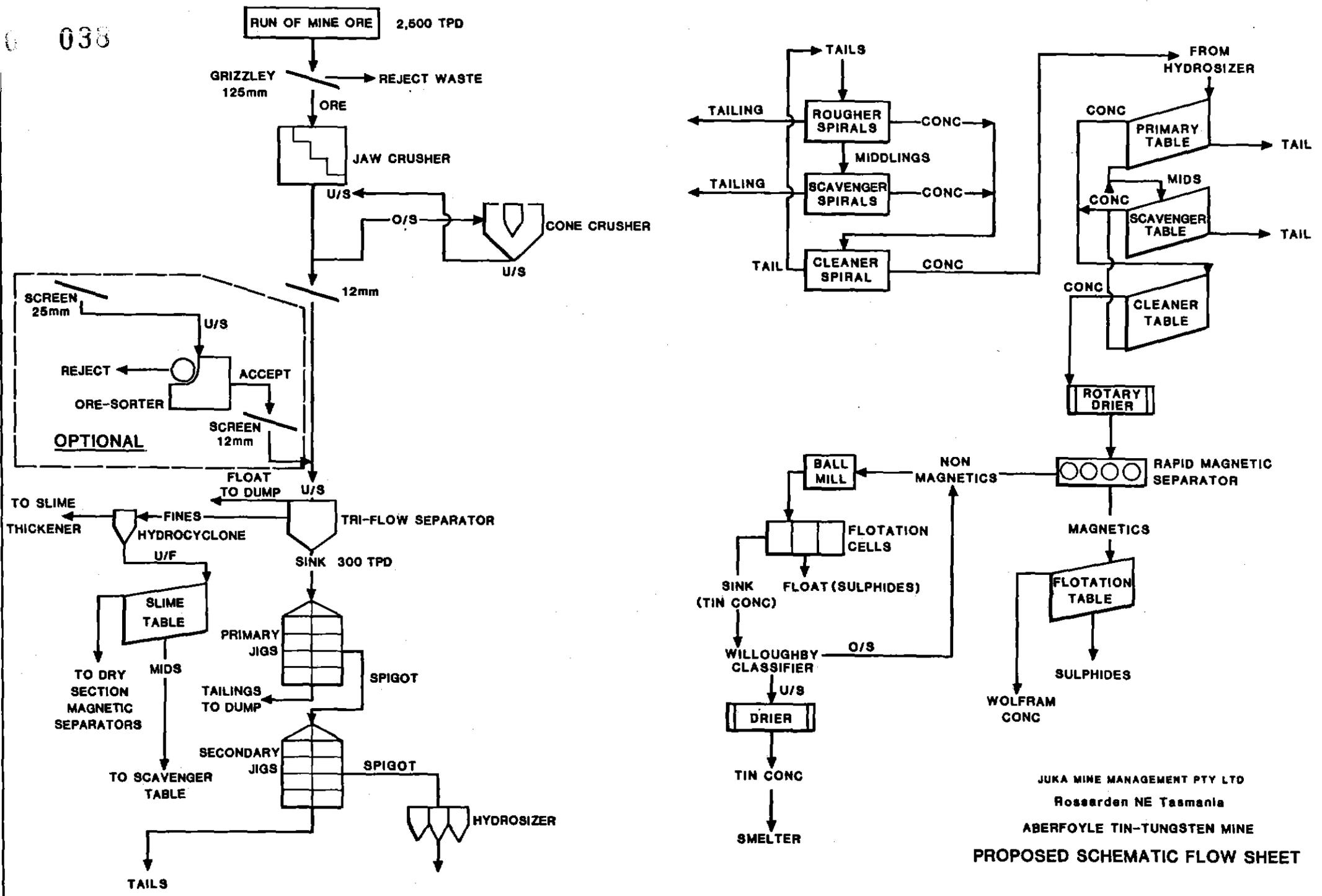
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Figure 16.

SELECTIVE MINING OPTIONS



038



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 Roserden NE Tasmania
 ABERFOYLE TIN-TUNGSTEN MINE
PROPOSED SCHEMATIC FLOW SHEET

039

6. MANPOWER AND MANAGEMENT

The project is viewed as most satisfactorily operated by a small management group on site, conducting processing and supervising contract mining, to minimize capital costs.

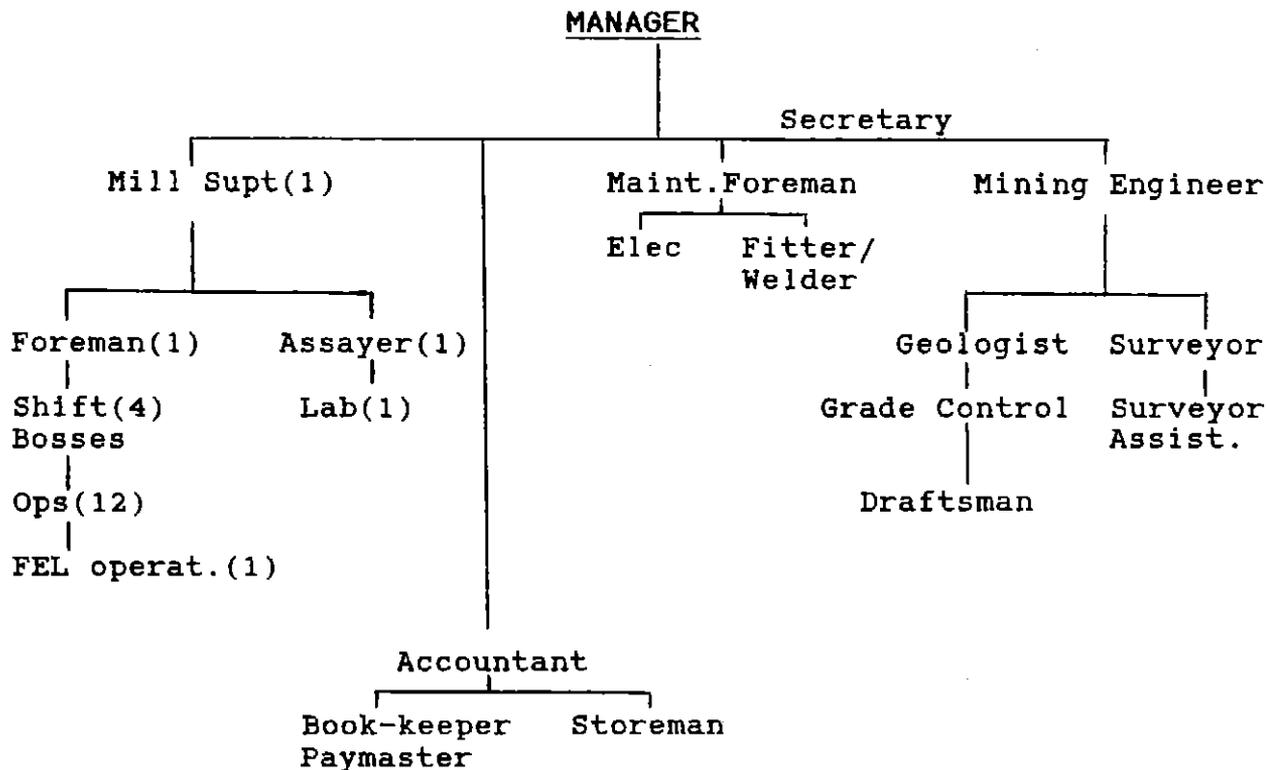
Management structure is illustrated and costs are detailed on the following pages.

Administration and mining costs are modelled as discrete costs, whilst processing and maintenance have been included within the per tonne figures.

It is assumed that no additional local housing, beyond the existing Manager's house and possibly several local houses in Rossarden, would be required. All other personnel would be transported from Launceston and closer towns.

040

TABLE 7



Milling : assumes 3 shift continuous roster, i.e. 4 shifts.

041

TABLE 8

SALARIES

<u>Administration</u>	<u>\$</u>	<u>Mining - Owner</u>	<u>\$</u>
Site Manager	100,000	Mining Engineer	60,000
Secretary	25,000	Geologist	50,000
Accountant	50,000	Surveyor	35,000
Book-keeper	35,000	Grade Control/ 2 Assistants	60,000
Storeman	30,000	Draftsman	35,000
Purchasing/Pay Officer	35,000		
Change House	25,000		
	<u>300,000</u>		<u>240,000</u>
+40%	<u>120,000</u>	+40%	<u>100,000</u>
	420,000		340,000
Materials	<u>300,000</u>	Materials	<u>200,000</u>
	720,000		540,000
	\$0.72/T Ore		\$0.54/T Ore
<u>Milling</u>		<u>Maintenance</u>	
Mill		Maint. Foreman	40,000
Superintendent	60,000	Fitters	60,000
Foreman	40,000		
Shift Bosses	120,000		
Operators	240,000		
FEL Operator	<u>20,000</u>		
	480,000		100,000
+ 40%	<u>125,000</u>	+ 40%	<u>40,000</u>
Materials	<u>200,000</u>	Materials	<u>100,000</u>
	805,000		240,000
	\$0.64/T Ore		\$0.24/T Ore

Milling and Maintenance have been included in the overall approximate \$8.40/t ore cost of crushing and processing.

042

7. ECONOMICS

7.1. TIN MARKET

Overview

Three years after the tin crisis of October 1985, the tin market finally began to show signs of recovery from the chronic oversupply and weak prices. The market's recovery was attributed to the painstaking efforts of the Association of Tin Producing Countries (ATPC) which advocated the orderly disposal of the resultant overhang stocks under its Supply Rationalization Scheme (SRS).

As at end March 1989, it was estimated that between 6,000 - 10,000 tonnes of surplus metal remained (above normal level). With the current rate of depletion it is unlikely that the SRS will be in operation beyond February, 1990.

Prices on the Kuala Lumpur Tin Market (KLTM) reflected the stock position and recorded dramatic rises during the first four months of 1989. From the A\$10.00/kg level in January, it was traded to previous International Tin Council's supported price of A\$14.60/kg during April. In May, the price was traded between the range of A\$13-A\$14/kg.

Consumption

The overall consumption pattern during 1988 has followed a similar trend to that of the previous year. Western world consumption of about 160,000 mta is projected to rise by about 1% p.a. over the next three years. Consumption will mainly be within the major useage areas of tin plating, tin chemicals and solders.

Production

In 1987, western world production totalled 135,000 mt and was expected to increase to attain 145,000 mt in 1988. The higher production is accounted for mainly by Brazil's increased output, which elevated it to the world's top position.

Production in 1989 is expected to be in the region of 152,000 mt with Malaysia, Thailand and Indonesia maintaining their aggregate production. The bulk of the increased production will again be attributed to Brazil. Future production will undoubtedly be dependent upon Brazil's tin industry.

Outlook

The availability of ready metal to the market is expected to remain tight during 1989/90 as ITC-creditors' stocks held by major banks/traders are pursued through legal courses. Much will also depend on Brazil's policy and its intention or otherwise to be a member of the ATPC.

In the medium term prices on the KLTM will be less volatile and should stabilise in the A\$13.00 - A\$13.50/kg range. It is unlikely to fall below A\$12.50/kg, albeit by currency factors. The reopening of futures contract on the London Metal exchange in June, 1989, will give an added fillip to the tin industry.

7.2. PROJECT CASH FLOWS

A model was set up for mining a five (5) million tonne resource at a grade of 0.22% CM with a waste to ore ratio of 2.6.

This was run at a rate of one million tonnes of ore per year for five years.

Two mining options of Bulk and Selective Mining were considered.

Each of these was considered in three alternative processing lines (Figures 15 and 16) :-

- (1) initial simple screen upgrading followed directly by concentration (Options 1 & 4),
- (2) screen upgrading, heavy media concentration and final concentration (Options 2 & 5),
- (3) heavy media concentration and final processing (Options 3 & 6).

In addition, trials were run on the chosen most likely route, Options 2, for varying parameters as tabulated over the page (Table 9).

A final variation was a 2 Level pit, which was also run on option 2 and at a 0.25% tin price. Total tonnage was 2.6M with a WOR of 1.4.

Some account was made for differing processing rates in capital and operating costs (refer to Figure 15). Also service charges for electricity were varied and Owner Costs for Selective Mining were raised by \$1.00/tonne of ore utilised, to reflect the increased cost of grade control drilling and analysis. (Bulk Mining was assumed to be grade controlled on the basis of prior ore-definition drilling and visually).

Since processing tonnages varied widely, the owner costs of supervision and management in the area of concentration and maintenance were incorporated within the per tonne treated costs.

Detailed cost studies follow and are summarised below :-

TABLE 9

Option	Process	Recovery (%)	Total Cash Margin (\$M)
Option 1	Bulk Mine/Screen/Concentrate		- 4.4
Option 2	Bulk Mine/Screen/H.M./Concentrate		10.0
Option 3	Bulk Mine/H.M./Concentrate		10.3
Option 4	Selective/Screen/Concentrate		- 11.9
Option 5	Selective/Screen/H.M./Concentrate		0.6
Option 6	Selective/H.M./Concentrate		1.7
Option 2	@ 0.25% Sn Head Grade		19.1
Option 2	@ +20% Tin Price		23.6
Option 2	@ -20% Tin Price (M\$ 21.00/kg)		- 4.2
Option 2	@ M\$ 24.00 Tin Price		4.6
Option 2	@ Higher Mining Cost (\$2.00/t)		- 4.2
Option 2	@ 0.2% Sn Head Grade		
Option 2	Combined Best Options (0.25%Sn, +20% Tin Price)		33.9
Option 2	For Level 2 Pit		- 1.3
Option 2	For Level 2 Pit @ 0.25% Sn		3.4

On the available figures the deposit would be profitable, though not highly, on a 0.22% tin head grade at current prices. However it could be more attractive if costs were reduced and/or grades were marginally improved insitu or in processing, by further work.

8. OPTIONS

8.1. JOINT VENTURE

For Stacpoole Enterprises to seek an incoming partner to fund the next stage of testing to establish whether viable grades exist and acceptable metallurgical recoveries are achievable.

There is sufficient information to provide a tantalising target at this stage but the deposit does not look robust enough at the current tin prices to attract a "sellers market" or to exact a high funding-through-to-production penalty from incoming parties.

8.2. PUBLIC COMPANY

Integration of the deposit into a Public Company, particularly a Tasmanian one such as Beagold, provides an alternative means of funding further testing and could provide the Public Company with a future, fundable cash-flow producer.

8.3. SALE/TENDER

This may free Stacpoole Enterprises from further financial involvement in the project but loses any future upside which may be realised from it.

The major detraction is that tin prices are still felt to be a bit thin and erratic and it will take a company which feels it has prescience or an increase in tin prices to make buyers fight for the right to buy.

8.4. FURTHER WORK

Knowledge of the deposit at this stage is tantalising. The value of the deposit could be significantly upgraded by the collection of at least the first stages of information on insitu grades and metallurgical recoveries, as recommended under Further Work.

However this does also run the danger of removing the upside of the project if it is regarded as a future sale, or of downgrading it.

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 1 - Bulk Mine/Screen/Concentrate.

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a	540
Tin price(A\$/Kg)		\$13.00	Crush/Screen #1 \$/t	1.40
Conc. price @75% Sn(A\$/Kg)		\$8.74	Crush/Screen #2 \$/t	0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t	1.40
- ore(000t/a)		1000	Processing \$/t	4.50
- total (000t/a)		3600	Mine admin. '000\$/a	720
Head grade(% Sn)		0.22	Mine services '000\$/a	813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg	0.25
Precon. head(%Sn)				
Precon. tonnes(000/a)				
Process head grade(% Sn)	70.00%	0.38		
Process tonnes (000/a)	40.00%	400		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2600	2600	2600	2600	2600	13000
Vol ore '000 t	1000	1000	1000	1000	1000	5000
Vol processed '000 t	400	400	400	400	400	2000
Accept grade % Sn	0.38	0.38	0.38	0.38	0.38	0.38
Metallurgical recovery %	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%

Tin metal produced tonnes	1001	1001	1001	1001	1001	5005
Tin conc @ 75%Sn tonnes	1335	1335	1335	1335	1335	6673

Revenue

Conc. price \$/Kg	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg	8.49	8.49	8.49	8.49	8.49	8.49

Gross revenue '000 \$	11333	11333	11333	11333	11333	56667
Value/t ore \$/t	11	11	11	11	11	19

Operating Costs '000 \$**Site**

Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	540	540	540	540	540	2700
Milling - Crushing	1640	1400	1400	1400	1400	7240
-Pre-con	0	0	0	0	0	0
-Processing	1800	1800	1800	1800	1800	9000
Administration	720	720	720	720	720	3600
Services	813	813	813	813	813	4065
Royalty	0	0	6	13	13	32

Total site cost	10913	10673	10679	10686	10686	53637
Crushed ore \$/t	10.91	10.67	10.68	10.69	10.69	10.73

Offsite

Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600

Total offsite costs	200	200	200	200	200	1000
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TOTAL OPERATING COST	11113	10873	10879	10886	10886	54637
Operating Margin '000\$	220	460	454	447	447	2029
\$/t	0.22	0.46	0.45	0.45	0.45	0.41

CAPITAL '000\$

Plant & Equipment	4750	500	150	0	0	5400
Infrastructure	500	250	100	0	0	650
Ongoing	0	0	0	100	100	200

Total capital	5250	750	250	100	100	6450
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TOTAL CASH COSTS BIT	16363	11623	11129	10986	10986	61087
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TOTAL CASH MARGIN	-5030	-290	204	347	347	-4421
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Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	-3.97	-1.51	-1.52	-2.03	-2.78	

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ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 2 - Bulk Mine/Screen/HH/Conc.⁶

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial					Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t					1.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a					540
Tin price(A\$/Kg)		\$13.00	Crush/Screen #1 \$/t					1.40
Conc. price @75% Sn(A\$/Kg)		\$8.74	Crush/Screen #2 \$/t					0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t					1.40
- ore(000t/a)		1000	Processing \$/t					5.00
- total (000t/a)		3600	Mine admin. '000\$/a					720
Head grade(% Sn)		0.22	Mine services '000\$/a					813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg					0.25
Precon. head(%Sn)	70.00%	0.38						
Precon. tonnes(000/a)	40.00%	400						
Process head grade(% Sn)	90.00%	1.16						
Process tonnes (000/a)	30.00%	120						
Year			1	2	3	4	5	TOTAL
Production								
Vol waste '000 t		2600	2600	2600	2600	2600	2600	13000
Vol ore '000 t		1000	1000	1000	1000	1000	1000	5000
Vol processed '000 t		120	120	120	120	120	120	600
Accept grade % Sn		1.16	1.16	1.16	1.16	1.16	1.16	1.16
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes		1178	1178	1178	1178	1178	1178	5891
Tin conc @ 75%Sn tonnes		1571	1571	1571	1571	1571	1571	7854
Revenue								
Conc. price \$/Kg		8.74	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg		8.49	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$		13338	13338	13338	13338	13338	13338	66692
Value/t ore \$/t		13	13	13	13	13	13	19
Operating Costs '000 \$								
Site								
Mining - Contractor		5400	5400	5400	5400	5400	5400	27000
- Owner		540	540	540	540	540	540	2700
Milling - Crushing		1640	1400	1400	1400	1400	1400	7240
-Pre-con		560	560	560	560	560	560	2800
-Processing		600	600	600	600	600	600	3000
Administration		720	720	720	720	720	720	3600
Services		813	813	813	813	813	813	4065
Royalty		0	112	136	143	143	143	534
Total site cost		10273	10145	10169	10176	10176	10176	50939
Crushed ore \$/t		10.27	10.15	10.17	10.18	10.18	10.18	10.19
Offsite								
Corporate - Marketing		80	80	80	80	80	80	400
- Management		120	120	120	120	120	120	600
Total offsite costs		200	200	200	200	200	200	1000
TOTAL OPERATING COST		10473	10345	10369	10376	10376	10376	51939
Operating Margin '000\$		2865	2993	2969	2962	2962	2962	14753
\$/t		3	3	3	3	3	3	3
CAPITAL '000\$								
Plant & Equipment		3050	500	150	0	0	0	3700
Infrastructure		500	250	100	0	0	0	850
Ongoing		0	0	0	100	100	100	200
Total capital		3550	750	250	100	100	100	4750
TOTAL CASH COSTS BIT		14023	11095	10619	10476	10476	10476	56689
TOTAL CASH MARGIN		-685	2243	2719	2862	2862	2862	10003
Interest Rate %		20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$		5.09	10.81	10.73	10.16	9.33		

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 3 - Bulk Mine/HM/Concentrate.

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a	540
Tin price(A\$/Kg)		\$13.00	Crushing \$/t	2.00
Conc. price @75% Sn(A\$/Kg)		\$8.74	Pre-concentration \$/t	1.40
Mining - waste (000t/a)		2600	Processing \$/t	4.50
- ore(000t/a)		1000	Mine admin. '000\$/a	720
- total (000t/a)		3600	Mine services '000\$/a	813
Head grade(% Sn)		0.22	Trans/Ship/Ins \$/Kg	0.25
Reject tonnes(000/a)	70.00%	700		
Precon. head(%Sn)	100.00%	0.22		
Precon. tonnes(000/a)	100.00%	1000		
Process head grade(% Sn)	85.00%	0.62		
Process tonnes (000/a)	30.00%	300		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2600	2600	2600	2600	2600	13000
Vol ore '000 t	1000	1000	1000	1000	1000	5000
Vol processed '000 t	300	300	300	300	300	1500
Accept grade % Sn	0.62	0.62	0.62	0.62	0.62	0.62
Metallurgical recovery %	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%
Tin metal produced tonnes	1403	1403	1403	1403	1403	7013
Tin conc @ 75%Sn tonnes	1870	1870	1870	1870	1870	9350
Revenue						
Conc. price \$/Kg	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$	15879	15879	15879	15879	15879	79396
Value/t ore \$/t	16	16	16	16	16	19
Operating Costs '000 \$						
Site						
Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	540	540	540	540	540	2700
Milling - Crushing	2000	2000	2000	2000	2000	10000
-Pre-con	1400	1400	1400	1400	1400	7000
-Processing	1350	1350	1350	1350	1350	6750
Administration	720	720	720	720	720	3600
Services	813	813	813	813	813	4065
Royalty	0	125	148	156	156	584
Total site cost	12223	12948	12371	12379	12379	61699
Crushed ore \$/t	12.22	12.35	12.37	12.38	12.38	12.34
Offsite						
Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600
Total offsite costs	200	200	200	200	200	1000
TOTAL OPERATING COST	12423	12548	12571	12579	12579	62699
Operating Margin '000\$	3456	3331	3308	3301	3301	16696
\$/t	3.46	3.33	3.31	3.30	3.30	3.34
CAPITAL '000\$						
Plant & Equipment	4650	500	150	0	0	5300
Infrastructure	500	250	100	0	0	850
Ongoing	0	0	0	100	100	200
Total capital	5150	750	250	100	100	6350
TOTAL CASH COSTS BIT	17573	13298	12821	12679	12679	69049
TOTAL CASH MARGIN	-1694	2581	3058	3201	3201	10346
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	4.98	11.83	11.61	10.88	9.85	

ROSSARDEN TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 4 - Selective Mine/Screen/Concentrate.

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial					Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t					1.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a					1290
Tin price(A\$/Kg)		\$13.00	Crush/Screen #1 \$/t					1.40
Conc. price @75% Sn(A\$/Kg)		\$8.74	Crush/Screen #2 \$/t					0.60
Mining - waste (000t/a)		2850	Pre-concentration \$/t					1.40
- ore(000t/a)		750	Processing \$/t					4.50
- total (000t/a)		3600	Mine admin. '000\$/a					720
Head grade(% Sn)		0.25	Mine services '000\$/a					700
Reject tonnes(000/a)	60.00%	450	Trans/Ship/Ins \$/Kg					0.25
Precon. head(%Sn)								
Precon. tonnes(000/a)								
Process head grade(% Sn)	70.00%	0.44						
Process tonnes (000/a)	40.00%	300						
Year			1	2	3	4	5	TOTAL
Production								
Vol waste '000 t		2850	2850	2850	2850	2850	2850	14250
Vol ore '000 t		750	750	750	750	750	750	3750
Vol processed '000 t		300	300	300	300	300	300	1500
Accept grade % Sn		0.44	0.44	0.44	0.44	0.44	0.44	0.44
Metallurgical recovery %		65.00%	65.00%	65.00%	65.00%	65.00%	65.00%	65.00%
Tin metal produced tonnes		853	853	853	853	853	853	4266
Tin conc @ 75%Sn tonnes		1137	1137	1137	1137	1137	1137	5687
Revenue								
Conc. price \$/Kg		8.74	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg		8.49	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$		9659	9659	9659	9659	9659	9659	48295
Value/t ore \$/t		13	13	13	13	13	13	19
Operating Costs '000 \$								
Site								
Mining - Contractor		5400	5400	5400	5400	5400	5400	27000
- Owner		1290	1290	1290	1290	1290	1290	6450
Milling - Crushing		1230	1050	1050	1050	1050	1050	5430
-Pre-con		0	0	0	0	0	0	0
-Processing		1350	1350	1350	1350	1350	1350	6750
Administration		720	720	720	720	720	720	3600
Services		700	700	700	700	700	700	3500
Royalty		0	0	0	0	0	0	0
Total site cost		10690	10510	10510	10510	10510	10510	52730
Crushed ore \$/t		14.25	14.01	14.01	14.01	14.01	14.01	14.06
Offsite								
Corporate - Marketing		80	80	80	80	80	80	400
- Management		120	120	120	120	120	120	600
Total offsite costs		200	200	200	200	200	200	1000
TOTAL OPERATING COST		10890	10710	10710	10710	10710	10710	53730
Operating Margin '000\$		-1231	-1051	-1051	-1051	-1051	-1051	-5435
\$/t		-1.64	-1.40	-1.40	-1.40	-1.40	-1.40	-1.45
CAPITAL '000\$								
Plant & Equipment		4750	500	150	0	0	0	5400
Infrastructure		500	250	100	0	0	0	850
Ongoing		0	0	0	100	100	100	200
Total capital		5250	750	250	100	100	100	6450
TOTAL CASH COSTS BIT		16140	11460	10960	10810	10810	10810	60180
TOTAL CASH MARGIN		-6481	-1801	-1301	-1151	-1151	-1151	-11885
Interest Rate %		20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$		-8.42	-8.40	-8.28	-8.64	-8.64	-9.21	

ROSSARDEN TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 5 - Selective Mine/Screen/HM/Conc.

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$/)		\$2.00	- Owner '000\$/a	1290
Tin price(A\$/Kg)		\$13.00	Crush/Screen #1 \$/t	1.40
Conc. price @75% Sn(A\$/Kg)		\$8.74	Crush/Screen #2 \$/t	0.60
Mining - waste (000t/a)		2850	Pre-concentration \$/t	1.40
- ore(000t/a)		750	Processing \$/t	5.00
- total (000t/a)		3600	Mine admin. '000\$/a	720
Head grade(% Sn)		0.25	Mine services '000\$/a	700
Reject tonnes(000/a)	60.00%	450	Trans/Ship/Ins \$/Kg	0.25
Precon. head(%Sn)	70.00%	0.44		
Precon. tonnes(000/a)	40.00%	300		
Process head grade(% Sn)	90.00%	1.31		
Process tonnes (000/a)	30.00%	90		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2850	2850	2850	2850	2850	14250
Vol ore '000 t	750	750	750	750	750	3750
Vol processed '000 t	90	90	90	90	90	450
Accept grade % Sn	1.31	1.31	1.31	1.31	1.31	1.31
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes	1004	1004	1004	1004	1004	5020
Tin conc @ 75%Sn tonnes	1339	1339	1339	1339	1339	6694
Revenue						
Conc. price \$/Kg	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$	11368	11368	11368	11368	11368	56840
Value/t ore \$/t	15	15	15	15	15	19
Operating Costs '000 \$						
Site						
Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	1290	1290	1290	1290	1290	6450
Milling - Crushing	1230	1050	1050	1050	1050	5430
-Pre-con	420	420	420	420	420	2100
-Processing	450	450	450	450	450	2250
Administration	720	720	720	720	720	3600
Services	700	700	700	700	700	3500
Royalty	0	16	42	49	49	159
Total site cost	10210	10048	10072	10079	10079	50489
Crushed ore \$/t	13.61	13.40	13.43	13.44	13.44	13.46
Offsite						
Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600
Total offsite costs	200	200	200	200	200	1000
TOTAL OPERATING COST	10410	10248	10272	10279	10279	51489
Operating Margin '000\$	958	1120	1096	1089	1089	5351
\$/t	1.28	1.49	1.46	1.45	1.45	1.43
CAPITAL '000\$						
Plant & Equipment	3050	500	150	0	0	3700
Infrastructure	500	250	100	0	0	850
Ongoing	0	0	0	100	100	200
Total capital	3550	750	250	100	100	4750
TOTAL CASH COSTS BIT	13960	10998	10522	10379	10379	56239
TOTAL CASH MARGIN	-2592	370	846	989	989	601
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	-0.54	2.19	2.25	1.86	1.24	

ROSSARDEN TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 6 - Selective Mine/HM/Concentrate.

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial					Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t					1.50
Exchange rate(A\$/)		\$2.00	- Owner '000\$/a					1290
Tin price(A\$/Kg)		\$13.00	Crushing \$/t					2.00
Conc. price @75% Sn(A\$/Kg)		\$8.74	Pre-concentration \$/t					1.40
Mining - waste (000t/a)		2850	Processing \$/t					4.50
- ore(000t/a)		750	Mine admin. '000\$/a					720
- total (000t/a)		3600	Mine services '000\$/a					700
Head grade(% Sn)		0.25	Trans/Ship/Ins \$/Kg					0.25
Reject tonnes(000/a)	70.00%	525						
Precon. head(%Sn)	100.00%	0.25						
Precon. tonnes(000/a)	100.00%	750						
Process head grade(% Sn)	85.00%	0.71						
Process tonnes (000/a)	30.00%	225						
Year			1	2	3	4	5	TOTAL
Production								
Vol waste '000 t		2850	2850	2850	2850	2850	2850	14250
Vol ore '000 t		750	750	750	750	750	750	3750
Vol processed '000 t		225	225	225	225	225	225	1125
Accept grade % Sn		0.71	0.71	0.71	0.71	0.71	0.71	0.71
Metallurgical recovery %	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%	75.00%
Tin metal produced tonnes		1195	1195	1195	1195	1195	1195	5977
Tin conc @ 75%Sn tonnes		1594	1594	1594	1594	1594	1594	7969
Revenue								
Conc. price \$/Kg		8.74	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg		8.49	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$		13533	13533	13533	13533	13533	13533	67667
Value/t ore \$/t		18	18	18	18	18	18	19
Operating Costs '000 \$								
Site								
Mining - Contractor		5400	5400	5400	5400	5400	5400	27000
- Owner		1290	1290	1290	1290	1290	1290	6450
Milling - Crushing		1500	1500	1500	1500	1500	1500	7500
-Pre-con		1050	1050	1050	1050	1050	1050	5250
-Processing		1013	1013	1013	1013	1013	1013	5063
Administration		720	720	720	720	720	720	3600
Services		700	700	700	700	700	700	3500
Royalty		0	51	76	83	83	83	292
Total site cost		11673	11723	11748	11756	11756	11756	58655
Crushed ore \$/t		15.56	15.63	15.66	15.67	15.67	15.67	15.64
Offsite								
Corporate - Marketing		80	80	80	80	80	80	400
- Management		120	120	120	120	120	120	600
Total offsite costs		200	200	200	200	200	200	1000
TOTAL OPERATING COST		11873	11923	11948	11956	11956	11956	59655
Operating Margin '000\$		1661	1610	1585	1578	1578	1578	8012
\$/t		2.21	2.15	2.11	2.10	2.10	2.10	2.14
CAPITAL '000\$								
Plant & Equipment		4650	500	150	0	0	0	5300
Infrastructure		500	250	100	0	0	0	850
Ongoing		0	0	0	100	100	100	200
Total capital		5150	750	250	100	100	100	6350
TOTAL CASH COSTS BIT		17023	12673	12198	12056	12056	12056	66005
TOTAL CASH MARGIN		-3489	860	1335	1478	1478	1478	1662
Interest Rate %		20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$		-0.23	3.88	3.80	3.22	3.22	2.39	

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 2 - Bulk Mine/Screen/RM/Conc

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial					Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t					1.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a					540
Tin price(A\$/Kg)		\$13.00	Crush/Screen #1 \$/t					1.40
Conc. price @75% Sn(A\$/Kg)		\$8.74	Crush/Screen #2 \$/t					0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t					1.40
- ore(000t/a)		1000	Processing \$/t					5.00
- total (000t/a)		3600	Mine admin. '000\$/a					720
Head grade(% Sn)		0.25	Mine services '000\$/a					813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg					0.25
Precon. head(%Sn)	70.00%	0.44						
Precon. tonnes(000/a)	40.00%	400						
Process head grade(% Sn)	90.00%	1.31						
Process tonnes (000/a)	30.00%	120						
Year			1	2	3	4	5	TOTAL
Production								
Vol waste '000 t		2600	2600	2600	2600	2600	2600	13000
Vol ore '000 t		1000	1000	1000	1000	1000	1000	5000
Vol processed '000 t		120	120	120	120	120	120	600
Accept grade % Sn		1.31	1.31	1.31	1.31	1.31	1.31	1.31
Metallurgical recovery %		85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes		1339	1339	1339	1339	1339	1339	6694
Tin conc @ 75%Sn tonnes		1785	1785	1785	1785	1785	1785	8925
Revenue								
Conc. price \$/Kg		8.74	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg		8.49	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$		15157	15157	15157	15157	15157	15157	75787
Value/t ore \$/t		15	15	15	15	15	15	19
Operating Costs '000 \$								
Site								
Mining - Contractor		5400	5400	5400	5400	5400	5400	27000
- Owner		540	540	540	540	540	540	2700
Milling - Crushing		1640	1400	1400	1400	1400	1400	7240
-Pre-con		560	560	560	560	560	560	2800
-Processing		600	600	600	600	600	600	3000
Administration		720	720	720	720	720	720	3600
Services		813	813	813	813	813	813	4065
Royalty		0	112	136	143	143	143	534
Total site cost		10273	10145	10169	10176	10176	10176	50939
Crushed ore \$/t		10.27	10.15	10.17	10.18	10.18	10.18	10.19
Offsite								
Corporate - Marketing		80	80	80	80	80	80	400
- Management		120	120	120	120	120	120	600
Total offsite costs		200	200	200	200	200	200	1000
TOTAL OPERATING COST		10473	10345	10369	10376	10376	10376	51939
Operating Margin '000\$		4684	4812	4788	4781	4781	4781	23847
\$/t		5	5	5	5	5	5	5
CAPITAL '000\$								
Plant & Equipment		3050	500	150	0	0	0	3700
Infrastructure		500	250	100	0	0	0	850
Ongoing		0	0	0	100	100	100	200
Total capital		3550	750	250	100	100	100	4750
TOTAL CASH COSTS BIT		14023	11095	10619	10476	10476	10476	56689
TOTAL CASH MARGIN		1134	4062	4538	4681	4681	4681	19097
Interest Rate %		10.00%	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$		10.53	19.18	18.95	18.20	17.16		

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 2 - Bulk mine/Screen/Hrt/Conc.

053

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$31.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a	540
Tin price(A\$/Kg)		\$15.50	Crush/Screen #1 \$/t	1.40
Conc. price @75% Sn(A\$/Kg)		\$10.47	Crush/Screen #2 \$/t	0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t	1.40
- ore(000t/a)		1000	Processing \$/t	5.00
- total (000t/a)		3600	Mine admin. '000\$/a	720
Head grade(% Sn)		0.22	Mine services '000\$/a	813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg	0.25
Precon. head(%Sn)	70.00%	0.38		
Precon. tonnes(000/a)	40.00%	400		
Process head grade(% Sn)	90.00%	1.16		
Process tonnes (000/a)	30.00%	120		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2600	2600	2600	2600	2600	13000
Vol ore '000 t	1000	1000	1000	1000	1000	5000
Vol processed '000 t	120	120	120	120	120	600
Accept grade % Sn	1.16	1.16	1.16	1.16	1.16	1.16
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes	1178	1178	1178	1178	1178	5891
Tin conc @ 75%Sn tonnes	1571	1571	1571	1571	1571	7854
Revenue						
Conc. price \$/Kg	10.47	10.47	10.47	10.47	10.47	8.74
N.S.R. \$/Kg	10.22	10.22	10.22	10.22	10.22	8.49
Gross revenue '000 \$	16050	16050	16050	16050	16050	80250
Value/t ore \$/t	16	16	16	16	16	19
Operating Costs '000 \$						
Site						
Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	540	540	540	540	540	2700
Milling - Crushing	1640	1400	1400	1400	1400	7240
-Pre-con	560	560	560	560	560	2800
-Processing	600	600	600	600	600	3000
Administration	720	720	720	720	720	3600
Services	813	813	813	813	813	4065
Royalty	0	108	132	139	139	517
Total site cost	10273	10141	10165	10172	10172	50922
Crushed ore \$/t	10.27	10.14	10.16	10.17	10.17	10.18
Offsite						
Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600
Total offsite costs	200	200	200	200	200	1000
TOTAL OPERATING COST	10473	10341	10365	10372	10372	51922
Operating Margin '000\$	5577	5709	5685	5678	5678	28328
\$/t	6	6	6	6	6	6
CAPITAL '000\$						
Plant & Equipment	3050	500	150	0	0	3700
Infrastructure	500	250	100	0	0	850
Ongoing	0	0	0	100	100	200
Total capital	3550	750	250	100	100	4750
TOTAL CASH COSTS BIT	14023	11091	10615	10472	10472	56672
TOTAL CASH MARGIN	2027	4959	5435	5578	5578	23578
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	13.21	23.30	23.00	22.17	21.02	

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 2 - Bulk Mine/Screen/HM/Conc

054

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$21.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$/)		\$2.00	- Owner '000\$/a	540
Tin price(A\$/Kg)		\$10.50	Crush/Screen #1 \$/t	1.40
Conc. price @75% Sn(A\$/Kg)		\$7.02	Crush/Screen #2 \$/t	0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t	1.40
- ore(000t/a)		1000	Processing \$/t	5.00
- total (000t/a)		3600	Mine admin. '000\$/a	720
Head grade(% Sn)		0.22	Mine services '000\$/a	813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg	0.25
Precon. head(%Sn)	70.00%	0.38		
Precon. tonnes(000/a)	40.00%	400		
Process head grade(% Sn)	90.00%	1.16		
Process tonnes (000/a)	30.00%	120		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2600	2600	2600	2600	2600	13000
Vol ore '000 t	1000	1000	1000	1000	1000	5000
Vol processed '000 t	120	120	120	120	120	600
Accept grade % Sn	1.16	1.16	1.16	1.16	1.16	1.16
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes	1178	1178	1178	1178	1178	5891
Tin conc @ 75%Sn tonnes	1571	1571	1571	1571	1571	7854
Revenue						
Conc. price \$/Kg	7.02	7.02	7.02	7.02	7.02	8.74
N.S.R. \$/Kg	6.77	6.77	6.77	6.77	6.77	8.49
Gross revenue '000 \$	10627	10627	10627	10627	10627	53134
Value/t ore \$/t	11	11	11	11	11	19
Operating Costs '000 \$						
Site						
Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	540	540	540	540	540	2700
Milling - Crushing	1640	1400	1400	1400	1400	7240
-Pre-con	560	560	560	560	560	2800
-Processing	600	600	600	600	600	3000
Administration	720	720	720	720	720	3600
Services	813	813	813	813	813	4065
Royalty	96	241	265	272	272	1146
Total site cost	10369	10274	10298	10305	10305	51551
Crushed ore \$/t	10.37	10.27	10.30	10.30	10.30	10.31
Offsite						
Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600
Total offsite costs	200	200	200	200	200	1000
TOTAL OPERATING COST	10569	10474	10498	10505	10505	52551
Operating Margin '000\$	58	153	129	122	122	583
\$/t	0	0	0	0	0	0
CAPITAL '000\$						
Plant & Equipment	3050	500	150	0	0	3700
Infrastructure	500	250	100	0	0	850
Ongoing	0	0	0	100	100	200
Total capital	3550	750	250	100	100	4750
TOTAL CASH COSTS BIT	14119	11224	10748	10605	10605	57301
TOTAL CASH MARGIN	-3492	-597	-121	22	22	-4167
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	-3.38	-2.23	-2.08	-2.38	-2.88	

055

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$24.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$1)		\$2.00	- Owner '000\$/a	540
Tin price(A\$/Kg)		\$12.00	Crush/Screen #1 \$/t	1.40
Conc. price @75% Sn(A\$/Kg)		\$8.05	Crush/Screen #2 \$/t	0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t	1.40
- ore(000t/a)		1000	Processing \$/t	5.00
- total (000t/a)		3600	Mine admin. '000\$/a	720
Head grade(% Sn)		0.22	Mine services '000\$/a	813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg	0.25
Precon. head(%Sn)	70.00%	0.38		
Precon. tonnes(000/a)	40.00%	400		
Process head grade(% Sn)	90.00%	1.16		
Process tonnes (000/a)	30.00%	120		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2600	2600	2600	2600	2600	13000
Vol ore '000 t	1000	1000	1000	1000	1000	5000
Vol processed '000 t	120	120	120	120	120	600
Accept grade % Sn	1.16	1.16	1.16	1.16	1.16	1.16
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes	1178	1178	1178	1178	1178	5891
Tin conc @ 75%Sn tonnes	1571	1571	1571	1571	1571	7854
Revenue						
Conc. price \$/Kg	8.05	8.05	8.05	8.05	8.05	8.74
N.S.R. \$/Kg	7.80	7.80	7.80	7.80	7.80	8.49
Gross revenue '000 \$	12254	12254	12254	12254	12254	61269
Value/t ore \$/t	12	12	12	12	12	19
Operating Costs '000 \$						
Site						
Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	540	540	540	540	540	2700
Milling - Crushing	1640	1400	1400	1400	1400	7240
-Pre-con	560	560	560	560	560	2800
-Processing	600	600	600	600	600	3000
Administration	720	720	720	720	720	3600
Services	813	813	813	813	813	4065
Royalty	0	112	136	143	143	534
Total site cost	10273	10145	10169	10176	10176	50939
Crushed ore \$/t	10.27	10.15	10.17	10.18	10.18	10.19
Offsite						
Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600
Total offsite costs	200	200	200	200	200	1000
TOTAL OPERATING COST	10473	10345	10369	10376	10376	51939
Operating Margin '000\$	1781	1909	1885	1878	1878	9330
\$/t	2	2	2	2	2	2
CAPITAL '000\$						
Plant & Equipment	3050	500	150	0	0	3700
Infrastructure	500	250	100	0	0	850
Ongoing	0	0	0	100	100	200
Total capital	3550	750	250	100	100	4750
TOTAL CASH COSTS BIT	14023	11095	10619	10476	10476	56689
TOTAL CASH MARGIN	-1769	1159	1635	1778	1778	4580
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	1.85	5.83	5.83	5.37	4.66	

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 2 - Bulk Mine/Screen/HM/Conc.³

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial					Values
Tin Price (M\$/Kg)		\$24.00	Mining - Contractor \$/t					2.00
Exchange rate (A\$/)		\$2.00	- Owner '000\$/a					540
Tin price (A\$/Kg)		\$12.00	Crush/Screen #1 \$/t					1.40
Conc. price @75% Sn (A\$/Kg)		\$8.05	Crush/Screen #2 \$/t					0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t					1.40
- ore (000t/a)		1000	Processing \$/t					5.00
- total (000t/a)		3600	Mine admin. '000\$/a					720
Head grade (% Sn)		0.22	Mine services '000\$/a					813
Reject tonnes (000/a)	60.00%	600	Trans/Ship/Ins \$/Kg					0.25
Precon. head (% Sn)	70.00%	0.38						
Precon. tonnes (000/a)	40.00%	400						
Process head grade (% Sn)	90.00%	1.16						
Process tonnes (000/a)	30.00%	120						
Year		1	2	3	4	5	TOTAL	
Production								
Vol waste '000 t		2600	2600	2600	2600	2600	13000	
Vol ore '000 t		1000	1000	1000	1000	1000	5000	
Vol processed '000 t		120	120	120	120	120	600	
Accept grade % Sn		1.16	1.16	1.16	1.16	1.16	1.16	
Metallurgical recovery %		85.00%	85.00%	85.00%	85.00%	85.00%	85.00%	
Tin metal produced tonnes		1178	1178	1178	1178	1178	5891	
Tin conc @ 75% Sn tonnes		1571	1571	1571	1571	1571	7854	
Revenue								
Conc. price \$/Kg		8.05	8.05	8.05	8.05	8.05	8.74	
N.S.R. \$/Kg		7.80	7.80	7.80	7.80	7.80	8.49	
Gross revenue '000 \$		12254	12254	12254	12254	12254	61269	
Value/t ore \$/t		12	12	12	12	12	19	
Operating Costs '000 \$								
Site								
Mining - Contractor		7200	7200	7200	7200	7200	36000	
- Owner		540	540	540	540	540	2700	
Milling - Crushing		1640	1400	1400	1400	1400	7240	
-Pre-con		560	560	560	560	560	2800	
-Processing		600	600	600	600	600	3000	
Administration		720	720	720	720	720	3600	
Services		813	813	813	813	813	4065	
Royalty		0	60	84	91	91	327	
Total site cost		12073	11893	11917	11924	11924	59732	
Crushed ore \$/t		12.07	11.89	11.92	11.92	11.92	11.95	
Offsite								
Corporate - Marketing		80	80	80	80	80	400	
- Management		120	120	120	120	120	600	
Total offsite costs		200	200	200	200	200	1000	
TOTAL OPERATING COST		12273	12093	12117	12124	12124	60732	
Operating Margin '000\$		-19	160	137	130	130	537	
\$/t		-0	0	0	0	0	0	
CAPITAL '000\$								
Plant & Equipment		3050	500	150	0	0	3700	
Infrastructure		500	250	100	0	0	850	
Ongoing		0	0	0	100	100	200	
Total capital		3550	750	250	100	100	4750	
TOTAL CASH COSTS BIT		15823	12843	12367	12224	12224	65482	
TOTAL CASH MARGIN		-3569	-590	-113	30	30	-4213	
Interest Rate %		20.00%	20.00%	20.00%	20.00%	20.00%		
NPV Million \$		-3.42	-2.23	-2.09	-2.39	-2.90		

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - ION 2 - Bulk Mine/Screen/HK/Conc.

057

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$1)		\$2.00	- Owner '000\$/a	540
Tin price(A\$/Kg)		\$13.00	Crush/Screen #1 \$/t	1.40
Conc. price @75% Sn(A\$/Kg)		\$8.74	Crush/Screen #2 \$/t	0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t	1.40
- ore(000t/a)		1000	Processing \$/t	5.00
- total (000t/a)		3600	Mine admin. '000\$/a	720
Head grade(% Sn)		0.2	Mine services '000\$/a	813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg	0.25
Precon. head(%Sn)	70.00%	0.35		
Precon. tonnes(000/a)	40.00%	400		
Process head grade(% Sn)	90.00%	1.05		
Process tonnes (000/a)	30.00%	120		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2600	2600	2600	2600	2600	13000
Vol ore '000 t	1000	1000	1000	1000	1000	5000
Vol processed '000 t	120	120	120	120	120	600
Accept grade % Sn	1.05	1.05	1.05	1.05	1.05	1.05
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes	1071	1071	1071	1071	1071	5355
Tin conc @ 75%Sn tonnes	1428	1428	1428	1428	1428	7140
Revenue						
Conc. price \$/Kg	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$	12126	12126	12126	12126	12126	60629
Value/t ore \$/t	12	12	12	12	12	19
Operating Costs '000 \$						
Site						
Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	540	540	540	540	540	2700
Milling - Crushing	1640	1400	1400	1400	1400	7240
-Pre-con	560	560	560	560	560	2800
-Processing	600	600	600	600	600	3000
Administration	720	720	720	720	720	3600
Services	813	813	813	813	813	4065
Royalty	0	52	75	82	82	292
Total site cost	10273	10085	10108	10115	10115	50697
Crushed ore \$/t	10.27	10.08	10.11	10.12	10.12	10.14
Offsite						
Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600
Total offsite costs	200	200	200	200	200	1000
TOTAL OPERATING COST	10473	10285	10308	10315	10315	51697
Operating Margin '000\$	1653	1841	1818	1810	1810	8932
\$/t	2	2	2	2	2	2
CAPITAL '000\$						
Plant & Equipment	3050	500	150	0	0	3700
Infrastructure	500	250	100	0	0	850
Ongoing	0	0	0	100	100	200
Total capital	3550	750	250	100	100	4750
TOTAL CASH COSTS BIT	14023	11035	10558	10415	10415	56447
TOTAL CASH MARGIN	-1897	1091	1568	1710	1710	4182
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	1.60	5.49	5.50	5.03	4.33	

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 2 - Bulk Mine/Screen/HM/Conc.

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial	Values
Tin Price (M\$/Kg)		\$31.00	Mining - Contractor \$/t	1.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a	540
Tin price(A\$/Kg)		\$15.50	Crush/Screen #1 \$/t	1.40
Conc. price @75% Sn(A\$/Kg)		\$10.47	Crush/Screen #2 \$/t	0.60
Mining - waste (000t/a)		2600	Pre-concentration \$/t	1.40
- ore(000t/a)		1000	Processing \$/t	5.00
- total (000t/a)		3600	Mine admin. '000\$/a	720
Head grade(% Sn)		0.25	Mine services '000\$/a	813
Reject tonnes(000/a)	60.00%	600	Trans/Ship/Ins \$/Kg	0.25
Precon. head(%Sn)	70.00%	0.44		
Precon. tonnes(000/a)	40.00%	400		
Process head grade(% Sn)	90.00%	1.31		
Process tonnes (000/a)	30.00%	120		

Year	1	2	3	4	5	TOTAL
Production						
Vol waste '000 t	2600	2600	2600	2600	2600	13000
Vol ore '000 t	1000	1000	1000	1000	1000	5000
Vol processed '000 t	120	120	120	120	120	600
Accept grade % Sn	1.31	1.31	1.31	1.31	1.31	1.31
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes	1339	1339	1339	1339	1339	6694
Tin conc @ 75%Sn tonnes	1785	1785	1785	1785	1785	8925
Revenue						
Conc. price \$/Kg	10.47	10.47	10.47	10.47	10.47	8.74
N.S.R. \$/Kg	10.22	10.22	10.22	10.22	10.22	8.49
Gross revenue '000 \$	18239	18239	18239	18239	18239	91193
Value/t ore \$/t	18	18	18	18	18	19
Operating Costs '000 \$						
Site						
Mining - Contractor	5400	5400	5400	5400	5400	27000
- Owner	540	540	540	540	540	2700
Milling - Crushing	1640	1400	1400	1400	1400	7240
-Pre-con	560	560	560	560	560	2800
-Processing	600	600	600	600	600	3000
Administration	720	720	720	720	720	3600
Services	813	813	813	813	813	4065
Royalty	101	250	274	281	281	1188
Total site cost	10374	10283	10307	10314	10314	51593
Crushed ore \$/t	10.37	10.28	10.31	10.31	10.31	10.32
Offsite						
Corporate - Marketing	80	80	80	80	80	400
- Management	120	120	120	120	120	600
Total offsite costs	200	200	200	200	200	1000
TOTAL OPERATING COST	10574	10483	10507	10514	10514	52593
Operating Margin '000\$	7664	7756	7732	7725	7725	38601
\$/t	8	8	8	8	8	8
CAPITAL '000\$						
Plant & Equipment	3050	500	150	0	0	3700
Infrastructure	500	250	100	0	0	850
Ongoing	0	0	0	100	100	200
Total capital	3550	750	250	100	100	4750
TOTAL CASH COSTS BIT	14124	11233	10757	10614	10614	57343
TOTAL CASH MARGIN	4114	7006	7482	7625	7625	33851
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	19.36	32.73	32.27	31.24	29.86	

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - SECTION 2 FOR LEVEL 2 PIT

059

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial			Values
			3	4	5	TOTAL
Tin Price (M\$/Kg)		\$26.00				
Exchange rate(A\$/1)		\$2.00				
Tin price(A\$/Kg)		\$13.00				
Conc. price @75% Sn(A\$/Kg)		\$8.74				
Mining - waste (000t/a)		728				
- ore(000t/a)		520				
- total (000t/a)		1248				
Head grade(% Sn)		0.22				
Reject tonnes(000/a)	60.00%	312				
Precon. head(%Sn)	70.00%	0.38				
Precon. tonnes(000/a)	40.00%	208				
Process head grade(% Sn)	90.00%	1.16				
Process tonnes (000/a)	30.00%	62.4				
Year			1	2	3	4
Production						
Vol waste '000 t		728	728	728	728	3640
Vol ore '000 t		520	520	520	520	2600
Vol processed '000 t		62	62	62	62	312
Accept grade % Sn		1.16	1.16	1.16	1.16	1.16
Metallurgical recovery %		85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes		613	613	613	613	3063
Tin conc @ 75%Sn tonnes		817	817	817	817	4084
Revenue						
Conc. price \$/Kg		8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg		8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$		6936	6936	6936	6936	34680
Value/t ore \$/t		13	13	13	13	19
Operating Costs '000 \$						
Site						
Mining - Contractor		3120	3120	3120	3120	15600
- Owner		300	300	300	300	1500
Milling - Crushing		1300	1300	1300	1300	6500
-Pre-con		333	333	333	333	1664
-Processing		374	374	374	374	1872
Administration		500	500	500	500	2500
Services		450	450	450	450	2250
Royalty		0	0	9	16	40
Total site cost		6377	6377	6386	6393	31926
Crushed ore \$/t		12.26	12.26	12.28	12.29	12.28
Offsite						
Corporate - Marketing		60	60	60	60	300
- Management		70	70	70	70	350
Total offsite costs		130	130	130	130	650
TOTAL OPERATING COST		6507	6507	6516	6523	32576
Operating Margin '000\$		429	429	420	413	2104
\$/t		0.82	0.82	0.81	0.79	0.81
CAPITAL '000\$						
Plant & Equipment		1900	500	150	0	2550
Infrastructure		300	250	100	0	650
Ongoing		0	0	0	100	200
Total capital		2200	750	250	100	3400
TOTAL CASH COSTS BIT		8707	7257	6766	6623	35976
TOTAL CASH MARGIN		-1771	-321	170	313	-1296
Interest Rate %		20.00%	20.00%	20.00%	20.00%	20.00%
NPV Million \$		-1.32	-0.34	-0.08	-0.27	-0.64

ROSSARDEN PRIMARY TIN DEPOSIT OPEN CUT ASSESSMENT - OPTION 2 FOR LEVEL 2 PIT @ 0.25% Sn

PARAMETERS

Commercial/Technical	Recovery%	Values	Financial			Values
=====			=====			=====
Tin Price (M\$/Kg)		\$26.00	Mining - Contractor \$/t			2.50
Exchange rate(A\$/1)		\$2.00	- Owner '000\$/a			300
Tin price(A\$/Kg)		\$13.00	Crushing \$/t			2.50
Conc. price @75% Sn(A\$/Kg)		\$8.74	Pre-concentration \$/t			1.60
Mining - waste (000t/a)		728	Processing \$/t			6.00
- ore(000t/a)		520	Mine admin. '000\$/a			500
- total (000t/a)		1248	Mine services '000\$/a			450
Head grade(% Sn)		0.25	Trans/Ship/Ins \$/Kg			0.25
Reject tonnes(000/a)	60.00%	312				
Precon. head(%Sn)	70.00%	0.44				
Precon. tonnes(000/a)	40.00%	208				
Process head grade(% Sn)	90.00%	1.31				
Process tonnes (000/a)	30.00%	62.4				
Year	1	2	3	4	5	TOTAL
Production						
=====						
Vol waste '000 t	728	728	728	728	728	3640
Vol ore '000 t	520	520	520	520	520	2600
Vol processed '000 t	62	62	62	62	62	312
Accept grade % Sn	1.31	1.31	1.31	1.31	1.31	1.31
Metallurgical recovery %	85.00%	85.00%	85.00%	85.00%	85.00%	85.00%
Tin metal produced tonnes	696	696	696	696	696	3481
Tin conc @ 75%Sn tonnes	928	928	928	928	928	4641
Revenue						
=====						
Conc. price \$/Kg	8.74	8.74	8.74	8.74	8.74	8.74
N.S.R. \$/Kg	8.49	8.49	8.49	8.49	8.49	8.49
Gross revenue '000 \$	7882	7882	7882	7882	7882	39409
Value/t ore \$/t	15	15	15	15	15	19
Operating Costs '000 \$						
=====						
Site						
Mining - Contractor	3120	3120	3120	3120	3120	15600
- Owner	300	300	300	300	300	1500
Milling - Crushing	1300	1300	1300	1300	1300	6500
-Pre-con	333	333	333	333	333	1664
-Processing	374	374	374	374	374	1872
Administration	500	500	500	500	500	2500
Services	450	450	450	450	450	2250
Royalty	0	0	9	16	16	40
Total site cost	6377	6377	6386	6393	6393	31926
Crushed ore \$/t	12.26	12.26	12.28	12.29	12.29	12.28
Offsite						
Corporate - Marketing	60	60	60	60	60	300
- Management	70	70	70	70	70	350
Total offsite costs	130	130	130	130	130	650
TOTAL OPERATING COST	6507	6507	6516	6523	6523	32576
Operating Margin '000\$	1375	1375	1366	1359	1359	6833
\$/t	2.64	2.64	2.63	2.61	2.61	2.63
CAPITAL '000\$						
=====						
Plant & Equipment	1900	500	150	0	0	2550
Infrastructure	300	250	100	0	0	650
Ongoing	0	0	0	100	100	200
Total capital	2200	750	250	100	100	3400
TOTAL CASH COSTS BIT	8707	7257	6766	6623	6623	35976
TOTAL CASH MARGIN	-825	625	1116	1259	1259	3433
Interest Rate %	20.00%	20.00%	20.00%	20.00%	20.00%	
NPV Million \$	1.50	4.01	4.19	3.91	3.43	

061

555062

APPENDIX 1

REFERENCES

- Aberfoyle Limited March, 1980. Lutwyche Mine Task Force Report. Draft # 1. A Feasibility Study of Mining the Lutwyche Prospect at 380 Tonnes Per Operating Day from A 3.35 Metre Diameter Vertical Shaft.
- Lindsay, N.L. October, 1978. Photometric Sorting - Aberfoyle Memo.
- Ore Sorters (Aust) Pty. Ltd. September, 1978. Photometric Sorting Testwork Report.
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- Palmer, K.G. December, 1980. 2nd Preliminary Assessment of The Viability of the Aberfoyle Open Cut - Memo to M.L. Houston Aberfoyle Ltd.
- Robinson R.J. & J.K. Worth July, 1980. Retreatment of Jig Tailings at Aberfoyle Tin Limited. Aberfoyle Limited Central Metallurgical Services.
- Stacpoole, H.J. May, 1985. EL 59/83, Annual Report For the Year Ended 5th June, 1985.
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- Stacpoole, H.J. July, 1987. Exploration Licence 59/83 Annual Report for the Year Ending 5th June 1987. Wheel Lutwyche Pty. Ltd.
- Summons, T.G. July/August 1983. Proposed Aberfoyle Open Pit & Quartz Grades in the Aberfoyle Deposit ML 27M/77, Rossarden District, Northeast Tasmania.
- Summons, T.G. May 1985. In Stacpoole 1986.

DRILL HOLE Roc 85/1 QUARTZ VEIN PERCENTAGES.

FROM M	TO M	INTERVAL M	MIN .Q.V. M	%	
56.91	65.25	8.34	0.014	0.17	
65.25	65.52	0.27	0.270	100.00	
65.25	74.00	8.75	0.270	3.09	
74.00	74.26	0.26	0.260	100.00	
74.00	88.43	14.43	0.280	1.94	
88.43	102.60	14.17	0.390	2.75)
102.60	104.00	1.40	0.144	10.29))
104.00	107.00	3.00	0.080	2.67)>) 10.4M @ 11.8%
107.00	110.00	3.00	0.770	25.67)>)> 27.57M @ 6.1%
110.00	113.00	3.00	0.230	7.67))
113.00	116.00	3.00	0.080	2.67)
116.00	119.00	3.00	0.000	0.00	
119.00	122.00	3.00	0.085	2.83	

65.25-116.00M = 50.75M @ 5.5% QV.

064

DRILLHOLE Roc 85/2 QUARTZ VEIN PERCENTAGES.

FROM M	TO M	INTERVAL M	MIN .Q.V. M	%	
53.20	55.80	2.60	0.052	2.00	
56.90	58.90	2.00	0.045	3.00	
58.90	66.80	7.90	0.000	0.00	
66.80	71.40	4.60	0.010	0.22	
71.40	74.40	3.00	0.030	1.00	
74.40	98.94	24.54	0.005	0.02	
98.94	100.10	1.16	0.034	2.93)
100.10	103.20	3.10	0.004	0.13)
103.20	106.20	3.00	0.044	1.47) 13.26M @ 8.1% + STOPE FILL & PILLARS.
106.20	109.10	2.90	STOPE)	
109.10	112.20	3.10	0.990	31.94)
112.20	115.20	3.00	0.035	1.17)
115.20	119.20	4.00	0.035	0.88)
118.20	121.20	3.00	0.064	2.13)
121.20	124.20	3.00	0.075	2.50)
124.20	127.20	3.00	0.000	0.00)
127.20	130.20	3.00	0.175	5.83)
130.20	133.00	2.80	0.024	0.86)
133.00	136.00	3.00	0.040	1.33) 29.8M @ 2.7%
136.00	139.00	3.00	0.083	2.77)
139.00	142.00	3.00	0.000	0.00)
142.00	145.00	3.00	0.156	5.20)
145.00	148.00	3.00	0.195	6.50)
148.00	151.00	3.00	0.055	1.83)
151.00	154.00	3.00	0.040	1.33)
154.00	156.00	2.00	0.028	1.40)

98.94M-148.00M GIVES 50M @ 3.4% QV. THIS INCLUDES ALL VEINS, DOWN TO MMS.

065

DRILL HOLE ROC 85/3 QUARTZ VEIN PERCENTAGES.

FROM M	TO M	INTERVAL M	MIN .Q.V. M	%
43.00	46.00	3.00	0.089	2.97
46.00	49.00	3.00	0.010	0.33
49.00	52.00	3.00	0.000	0.00
52.00	82.00	30.00	0.000	0.00
82.00	85.00	3.00	STOPE	
85.00	88.00	3.00	0.013	0.43
88.00	91.00	3.00	0.160	5.33
91.00	94.00	3.00	0.020	0.67
94.00	97.00	3.00	0.131	4.37
97.00	100.00	3.00	0.000	0.00
100.00	103.00	3.00	1.300	43.33

FAILED TO REACH TARGET DEPTH, THROUGH STOPE COLLAP

066

555067

APPENDIX 2

067

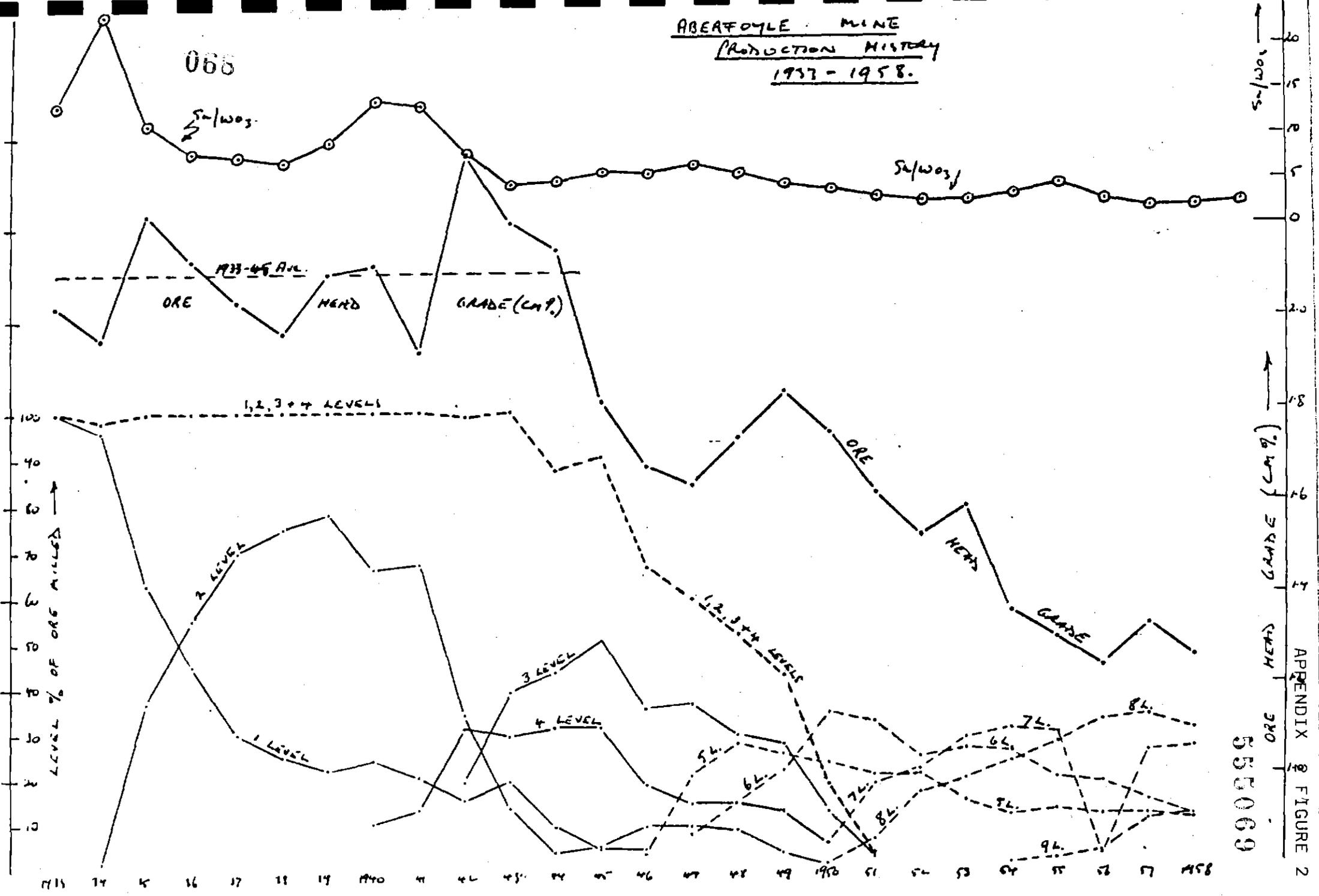
VISUAL GRADE ESTIMATION — READY RECKONER

METAL WIDTH IN mm	SLOPE WIDTH IN METRES																						
	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7
2	0.81	0.65	0.55	0.48	0.42	0.38	0.33	0.31	0.29	0.27	0.25	0.23	0.22	0.21	0.20	0.19	0.18	0.18	0.17	0.16	0.15	0.14	0.14
4	1.55	1.30	1.11	0.95	0.83	0.75	0.69	0.62	0.58	0.52	0.49	0.45	0.42	0.40	0.38	0.37	0.35	0.33	0.31	0.30	0.29	0.28	0.27
6	2.25	1.90	1.64	1.43	1.28	1.14	1.03	0.94	0.86	0.80	0.75	0.70	0.65	0.61	0.58	0.55	0.52	0.49	0.47	0.45	0.43	0.41	0.40
8	3.0	2.45	2.14	1.88	1.68	1.51	1.38	1.26	1.15	1.07	1.00	0.94	0.88	0.83	0.78	0.74	0.70	0.67	0.64	0.61	0.58	0.55	0.53
10	3.7	3.0	2.67	2.31	2.09	1.88	1.70	1.57	1.45	1.35	1.26	1.17	1.10	1.04	0.98	0.93	0.89	0.85	0.81	0.78	0.75	0.71	0.68
15	5.3	4.5	3.9	3.4	3.05	2.75	2.50	2.30	2.12	1.98	1.84	1.73	1.63	1.55	1.48	1.40	1.34	1.28	1.22	1.16	1.11	1.07	1.03
20	7.0	5.8	5.1	4.5	4.0	3.6	3.3	3.03	2.80	2.61	2.43	2.30	2.17	2.04	1.93	1.84	1.76	1.68	1.61	1.55	1.49	1.43	1.38
25	8.4	7.2	6.2	5.5	4.9	4.5	4.1	3.8	3.6	3.25	3.03	2.84	2.68	2.53	2.41	2.30	2.19	2.10	2.01	1.93	1.85	1.78	1.72
30	9.8	8.4	7.4	6.5	5.8	5.3	4.9	4.5	4.1	3.8	3.6	3.4	3.2	3.04	2.88	2.72	2.60	2.50	2.40	2.30	2.20	2.14	2.06
35	11.3	9.6	8.4	7.5	6.7	6.0	5.5	5.1	4.8	4.5	4.2	4.0	3.7	3.5	3.3	3.2	3.02	2.89	2.77	2.66	2.55	2.45	2.36
40	12.4	10.8	9.4	8.3	7.5	6.9	6.3	5.8	5.4	5.0	4.7	4.4	4.2	4.0	3.8	3.6	3.4	3.3	3.2	3.04	2.90	2.80	2.70
45	13.7	11.9	10.4	9.2	8.3	7.6	7.0	6.5	6.0	5.6	5.3	5.0	4.7	4.4	4.2	4.0	3.8	3.7	3.5	3.4	3.3	3.15	3.03
50	15.0	13.0	11.5	10.1	9.1	8.3	7.6	7.1	6.6	6.2	5.8	5.4	5.1	4.9	4.7	4.4	4.2	4.1	3.9	3.7	3.6	3.5	3.3

555068

ABERFOYLE MINE
PRODUCTION HISTORY
 1933 - 1958.

066



555069

069

555070

A B E R F O Y L E T I N L T D .

-2" RECLAIMED ORE FROM BRANDON SHAFT SURFACE AREA TREATED AT
THE ABERFOYLE MILL.

<u>WEEK ENDED.</u>	<u>EST. TONNES MILLED.</u>	<u>HEAD GRADE.</u>	
		<u>%Sn</u>	<u>%WO₃</u>
8. 7.80	170	0.69	0.13
15. 7.80	525	0.84	0.12
22. 7.80	250	1.05	0.20
29. 7.80	374	1.25	0.24
5. 8.80	151	0.86	0.14
12. 8.80	184	0.92	0.19
19. 8.80	241	0.65	0.12
<u>TOTALS.</u>	1895	0.92	0.16

1.08

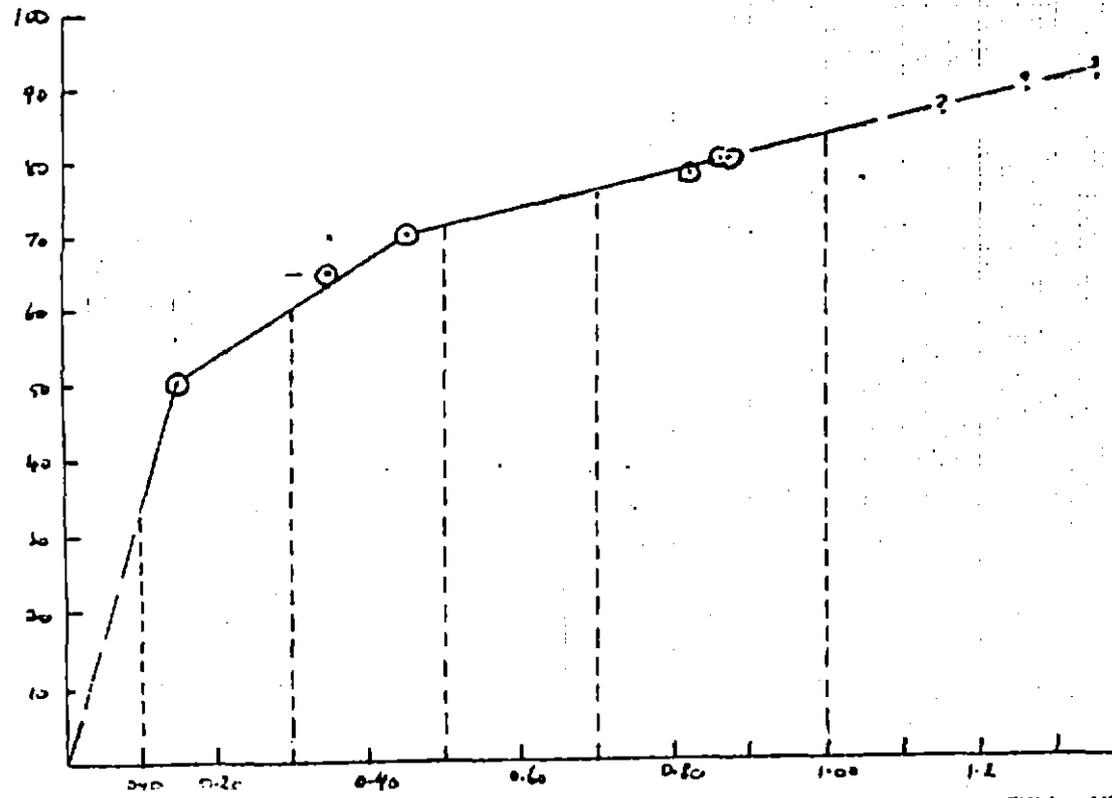
070

ARARFOYLE AND STOREY'S CREEK MINES

APPROXIMATE METAL RECOVERY

VERSUS

MILL HEADS GRADE



- SOURCES:
- (1). Ararfoyle & Storey's Creek Mines Production data 1978, 79
 - (2). Ararfoyle Mines Ore Reserve 1981 (October)
 - (3). ATL memo from M. Houston dated Sept. 1980.
 - (4). ATL memo from K.G. Palmer dated Dec. 1980

T.G. Sweeney July 1983.

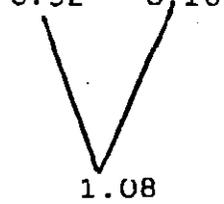
MILL HEADS GRADE, % Cu; ARARFOYLE + STOREY'S CREEK

555072

ABERFOYLE TIN LTD.

-2" RECLAIMED ORE FROM BRANDON SHAFT SURFACE AREA TREATED AT
THE ABERFOYLE MILL.

<u>WEEK ENDED.</u>	<u>EST. TONNES MILLED.</u>	<u>HEAD GRADE.</u>	
		<u>%Sn</u>	<u>%WO₃</u>
8. 7.80	170	0.69	0.13
15. 7.80	525	0.84	0.12
22. 7.80	250	1.05	0.20
29. 7.80	374	1.25	0.24
5. 8.80	151	0.86	0.14
12. 8.80	184	0.92	0.19
19. 8.80	241	0.65	0.12
<u>TOTALS.</u>	1895	0.92	0.16



1.08

072

ABERFOYLE TIN LTD.

555073

MEMORANDUM

Date 5th June, 1980

Ref

To P. McGushin

From I. Keyes

At Rossarden

At Rossarden

Copies to PJR, RAH, AJT.

Keep

Subject - ABERFOYLE MINE PRODUCTION RECORDS

While searching through old geological records from Storeys Creek I found the production history of the Aberfoyle Mine up to 1971. I have filled in the tonnage milled since that time, however, the grade is uncertain due to the combined milling of Aberfoyle and Storeys Creek ore.

The value of this information is mainly historical, but it provides a basis for comparison of the Lutwyche deposit.

Over 47 years of mining the Aberfoyle Mine has yielded up 2.1 million tonnes at a grade of 0.91% Sn and 0.28% WO_3 . The head grade since 1972 has been assumed to be 0.50% Sn and 0.3% WO_3 . Slight discrepancies in these figures would only affect the overall grade very slightly.

Recovery has been assumed to be 80%. Early recoveries were probably less than this, which makes the overall head grade slightly conservative.

Ian W. Keyes

Ian W. Keyes
Production Geologist.

Att.

ABERFOYLE MINE PRODUCTION HISTORY

Year	Milled		Metal		Recovered Grades			Head Grades		
	long tons	tonnes	Sn long tons	WO ₃ long tons	Sn%	WO ₃ %	OM%	Assuming 80% Recovery		
								Sn%	WO ₃ %	OM%
1933 (mth)	9067	9212	137	9.86	1.51	0.11	1.62	1.89	0.14	2.03
1934	10234	10398	154	7.01	1.50	0.06	1.56	1.88	0.08	1.95
1935	13218	13430	217	18.94	1.64	0.14	1.78	2.05	0.18	2.23
1936	14791	15028	226	26.83	1.52	0.18	1.70	1.90	0.23	2.13
1937	13289	13502	193	24.25	1.45	0.18	1.63	1.81	0.23	2.04
1938	13686	13905	189	26.05	1.38	0.19	1.57	1.73	0.24	1.97
1939	14725	14961	224	23.13	1.52	0.16	1.68	1.90	0.20	2.10
1940	16327	16589	248	18.04	1.58	0.11	1.69	1.98	0.14	2.12
1941	16270	16531	232	18.68	1.43	0.11	1.54	1.79	0.14	1.93
1942	16732	17000	271	43.32	1.62	0.26	1.88	2.03	0.33	2.36
1943	16503	16767	241	49.82	1.46	0.30	1.76	1.83	0.38	2.21
1944	16553	16818	236	47.51	1.43	0.29	1.72	1.79	0.36	2.15
1945	19191	19499	241	40.88	1.25	0.21	1.46	1.56	0.26	1.82
1946	21443	21787	244	43.03	1.14	0.20	1.34	1.43	0.25	1.68
1947	27829	28275	317	48.56	1.14	0.17	1.31	1.43	0.21	1.64
1948	28002	28451	331	60.07	1.18	0.21	1.39	1.48	0.26	1.74
1949	25362	25769	306	65.12	1.21	0.26	1.47	1.51	0.33	1.84
1950	29579	30054	328	86.33	1.11	0.29	1.40	1.39	0.36	1.75
1951	33228	33761	325	103.18	0.98	0.31	1.29	1.23	0.39	1.62
1952	36784	37374	326	124.24	0.88	0.34	1.22	1.10	0.43	1.53
1953	44847	45566	418	153.06	0.93	0.34	1.27	1.16	0.43	1.59
1954	52875	53723	444	130.34	0.84	0.25	1.09	1.05	0.31	1.36
1955	60353	61321	515	118.02	0.85	0.19	1.04	1.06	0.24	1.30
1956	63452	64470	454	170.03	0.72	0.27	0.99	0.90	0.34	1.24
1957	59452	60406	418	212.15	0.70	0.36	1.06	0.88	0.45	1.33
1958	66555	67623	458	211.50	0.69	0.32	1.01	0.86	0.40	1.26
1959	76118	77339	580	224.74	0.76	0.29	1.05	0.95	0.36	1.31
1960	76898	78132	582	239.93	0.76	0.31	1.07	0.95	0.39	1.34
1961	65510	66561	537	204.22	0.82	0.31	1.13	1.03	0.39	1.41
1962	78654	79916	577	176.83	0.73	0.22	0.95	0.91	0.28	1.19
1963	77690	78937	518	322.98	0.67	0.16	0.83	0.84	0.20	1.04
1964	79562	80838	480	87.55	0.60	0.11	0.71	0.75	0.14	0.89
1965	85960	87339	436.59	103.00	0.51	0.12	0.63	0.64	0.15	0.79
1966	89910	91352	425.80	122.50	0.47	0.14	0.61	0.59	0.18	0.77
1967	89064	90493	416.02	116.10	0.47	0.13	0.60	0.59	0.16	0.75
1968	88049	89462	415.45	83.53	0.47	0.09	0.56	0.59	0.11	0.70
1969	94037	95546	404.17	120.67	0.43	0.13	0.56	0.54	0.16	0.70
1970	82968	84299	347.89	130.55	0.42	0.16	0.58	0.53	0.20	0.73
	Aberfoyle tonnes	Storeys Creek t.	C o m b i n e d P r o d u c t i o n							
1971	74038	8861	305.20	174.01	0.37	0.21	0.58	0.46	0.26	0.72
1972	69568	58003	324.73	556.58	0.25	0.44	0.69	0.31	0.55	0.86
1973	54275	49604	336.26	555.61	0.32	0.53	0.85	0.40	0.66	1.06
1974	28067	14399	202.67	151.50	0.48	0.36	0.84	0.60	0.45	1.05
1975	28567	24037	185.68	224.95	0.35	0.43	0.78	0.44	0.54	0.98
1976	22732	17416	131.61	188.89	0.33	0.47	0.80	0.41	0.59	1.00
1977	23750	16848	120.65	139.73	0.30	0.34	0.64	0.38	0.43	0.81
1978	22405	14150	106.01	135.25	0.29	0.37	0.66	0.38	0.46	0.84
1979	30225	12844	133.51	129.21	0.31	0.30	0.61	0.40	0.39	0.79

074

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APPENDIX 3

075

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MALAYSIA SMELTING CORPORATION BERHAD27, JALAN PANTAI, P.O. BOX 2, 12700 BUTTERWORTH, MALAYSIA.
TEL: 04 342100 TELEK: TIMAH MA 47566 FAX: 04-317405Via **TELEFAX**

To : JUKA MINE MANAGEMENT PTY LTD From : ONG KEE BENG

ATTN : MR MARTIN TEH

Date : 9 JUNE 89

Fax No. : (03) 725 6988

No. of pages: 4
(Incl this page)

Your Ref :

Our Ref : 778 /89

Time of Transmission:

AUSTRALIAN TIN ORES

Reference your fax 5.6.89 and our telephone conversation this morning I am pleased to give the following indicative terms in response to your request.

Treatment Charge: M\$470 per tonne ore basis 70% Sn, increasing/decreasing by M\$5 per 1% below/above 70%, fractions pro rata.

Unit deduction: Flat 1.2 units down to 70% Sn, increasing by 0.05 unit per 1% below 70%, fractions pro rata.

Impurity Charges: As per MSC Schedule B effective 1.1.87 (enclosed) except for Fe.

Fe Penalty: 10% of Fe content chargeable as deduction from Gross Sn assay.

Pricing: Basis KLTM quotations on days nominated by supplier. Normally not more than 10 tonnes should be sold each market day. Sales subject to market ability to transact business and may be subject to rationing. Pricing instructions have to reach us by 10.00 a.m. Malaysian time on the date of sale.

Payment: 90% of estimated nett value to be remitted by TT to supplier 7 days after receipt of ores at MSC Works. Balance promptly after finalisation of weights and assays and upon completion of pricing.

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PLEASE INFORM US IF YOU DO NOT RECEIVE ALL PAGES CLEARLY.

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Packing: Preferably in 44 gallon steel drums or sound canvas bags. If you ship more than 15 tonnes each time we strongly recommend shipping in FCL containers to prevent loss through pilferage and seepage.

Port of Delivery: Butterworth

Basis of Delivery: Into MSC Works at Butterworth, Malaysia. We can take delivery from CIF Penang and charge cost to supplier (currently at M\$11 per tonne).

As for freight rates our enquiries show Aust \$1,650 per 20' container for Tasmania/Penang and Aust \$1,575 per 20' container for Sydney/Penang. Insurance varies from firm to firm but an indicative rate is 0.34 cents per cent. We think it is better for you to approach underwriters in Australia for insurance cover.

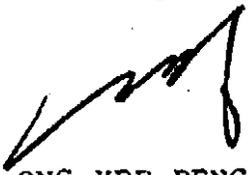
On impurity limits we would normally not like to receive material containing impurities in excess of the following levels:

As	0.5%
Pb	0.1%
Bi	0.1%
Sb	0.1%
Cu	0.1%

The KLTM price seems to be stabilising at M\$27.00 - M\$27.50 per kg but it could move up sharply again. In the short term tightness for metal will continue and prices will be volatile. In the medium term prices should ease back to lower levels, perhaps at around M\$26 per kg. But I could be totally wrong.

As requested I fax you a copy of our Schedule B (for impurity charges) and tin prices for May 1989.

Best regards



ONG KEE BENG

Enc

SCHEDULE B

555078

077

MALAYSIA SMELTING CORPORATION BERHAD

CHARGES FOR IMPURITIES

EFFECTIVE 1.1.1987

SULPHUR	Less than 0.50%	Free
	0.50% to 0.99%	M\$ 5.00 per tonne ore
	1.00% to 1.49%	M\$10.00 per tonne ore
	1.50% to 1.99%	M\$15.00 per tonne ore
	2.00% to 2.49%	M\$20.00 per tonne ore
	2.50% and above	M\$25.00 per tonne ore
ARSENIC	M\$150 per tonne ore for every 1% contained, fractions pro-rata. (Where both sulphur and arsenic are present only the higher charge will be made.)	
COMBINED METALLICS	(Combined Copper, Zinc, Antimony, Silver and Cobalt) M\$150 per tonne ore for every 1% contained, fractions pro-rata.	
LEAD	M\$150 per tonne ore for every 1% contained, fractions pro-rata.	
BISMUTH	M\$400 per tonne ore for every 1% contained, fractions pro-rata.	
IRON AND MANGANESE COMBINED	Unit Deduction :	
	Not over 2.5%	Free
	Over 2.5% but not over 5.0%	Additional 0.2% from the Gross Tin Assay
	" 5.0% " " " 10.0%	" 0.3% " " " " "
	" 10.0% " " " 15.0%	" 0.4% " " " " "
	" 15.0% " " " 20.0%	" 0.5% " " " " "
" 20.0% " " " 25.0%	" 0.6% " " " " "	
WOLFRAM (WO ₃)	Unit Deduction :	
	Not over 2.5%	Free
	Over 2.5% but not over 5.0%	Additional 0.2% from the Gross Tin Assay
	" 5.0% " " " 10.0%	" 0.3% " " " " "
	" 10.0% " " " 15.0%	" 0.4% " " " " "
	" 15.0% " " " 20.0%	" 0.5% " " " " "
" 20.0% " " " 25.0%	" 0.6% " " " " "	

NOTE: The Company reserves the right to reject or apply special terms to concentrates containing more than one percent (1%) lead and bismuth.

078

ROTTERDAM PRICES

KUALA LUMPUR PRICES

MESH GRADE

Date	Spot Range	Mean of High Spot Price	KLTH Price (Per kg)	Exchange Rate (TI Buying US Dollars)	Equiv US Dollars Per kg Ex-Works	Exchange Rate (TI Buying Sterling Pounds)	Equiv Sterling Per tonne Ex-Works	Equiv CIF LME Warehouse	KL Premium Over Previous Mean of High Grade Spot Price	KL Turnover (Tonnes)	
1											
2	£ 6,350.00 TO	£ 6,355.00	£ 6,362.50	\$ 28.43	2.6975	10.56	4.5165	£ 6,294.70	£ 6,444.70	116	
3	6,280.00 TO	6,295.00	6,287.50	28.26	2.6875	10.52	4.5000	6,280.00	6,430.00	80	
4	6,195.00 TO	6,225.00	6,210.00	27.98	2.6815	10.43	4.5005	6,217.09	6,367.09	39	
5	6,255.00 TO	6,270.00	6,262.50	27.96	2.6860	10.42	4.5039	6,213.64	6,363.64	38	
6											
7											
8	6,225.00 TO	6,225.00	6,285.00								
9	6,310.00 TO	6,325.00	6,317.50								
10	6,255.00 TO	6,275.00	6,265.00	27.86	2.6820	10.37	4.4670	6,236.85	6,384.85	127	
11	6,290.00 TO	6,310.00	6,300.00	28.00	2.6835	10.63	4.4825	6,246.51	6,396.51	110	
12	6,235.00 TO	6,260.00	6,247.50	27.94	2.6790	10.43	4.4830	6,288.54	6,438.54	51	
13											
14											
15	6,350.00 TO	6,370.00	6,360.00	27.86	2.6830	10.39	4.4305	6,292.74	6,442.74	195.24	
16	6,280.00 TO	6,310.00	6,295.00	27.30	2.6790	10.19	4.3815	6,250.74	6,398.74	28.74	
17	6,330.00 TO	6,345.00	6,337.50	27.30	2.6760	10.20	4.3655	6,225.06	6,375.06	80.06	
18	6,350.00 TO	6,360.00	6,355.00	27.10	2.6720	10.12	4.3020	6,292.98	6,442.98	109.98	
19	6,365.00 TO	6,380.00	6,372.50								
20											
21											
22	6,425.00 TO	6,440.00	6,482.50	27.15	2.6790	10.13	4.2835	6,338.77	6,488.77	115.77	
23	6,505.00 TO	6,520.00	6,512.50	27.30	2.6805	10.18	4.1935	6,510.08	6,660.08	177.58	
24	6,430.00 TO	6,460.00	6,445.00	27.30	2.6790	10.19	4.1630	6,557.77	6,707.77	195.27	
25	6,260.00 TO	6,290.00	6,275.00	26.90	2.6695	10.09	4.2190	6,375.92	6,525.92	80.92	
26	6,285.00 TO	6,215.00	6,210.00	26.23	2.6785	9.79	4.2520	6,167.41	6,317.41	42.41	
27											
28											
29	6,225.00 TO	6,215.00	6,210.00	26.07	2.6830	9.72	4.1825	6,235.11	6,385.11	123.11	
30	6,320.00 TO	6,380.00	6,350.00	26.05	2.7025	9.64	4.1965	6,207.55	6,357.55	147.55	
31	6,425.00 TO	6,440.00	6,457.50	26.43	2.7005	9.79	4.2350	6,243.80	6,393.80	43.80	
AVERAGE	£ 6,314.57	£ 6,337.95	£ 6,326.14	\$ 27.34		10.19		£ 6,286.91	£ 6,436.94	£ 110.80	1,510

cc MEMBERS

NO CIRCULATION

* Plus 1150 per tonne to LME Warehouse.

MALAYSIA SMELTING CORPORATION BERHAD

[Signature]
Accounting & Finance Manager.

Job
5th June 1989

JUL 09 '89 13:56 M.S.C. BUTTERWORTH 04 317405

M.S.C. BUTTERWORTH

P.474

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Packing: Preferably in 44 gallon steel drums or sound canvas bags. If you ship more than 15 tonnes each time we strongly recommend shipping in FCL containers to prevent loss through pilferage and seepage.

Port of Delivery: Butterworth

Basis of Delivery: Into MSC Works at Butterworth, Malaysia. We can take delivery from CIF Penang and charge cost to supplier (currently at M\$11 per tonne).

As for freight rates our enquiries show Aust \$1,650 per 20' container for Tasmania/Penang and Aust \$1,575 per 20' container for Sydney/Penang. Insurance varies from firm to firm but an indicative rate is 0.34 cents per cent. We think it is better for you to approach underwriters in Australia for insurance cover.

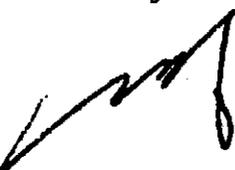
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Cu	0.1%

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As requested I fax you a copy of our Schedule B (for impurity charges) and tin prices for May 1989.

Best regards



ONG KEE BENG

Enc

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APPENDIX 4

081

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PERANGSANG ENGINEERING AND SERVICES SDN. BHD.

(A member of Kumpulan Perangsang Selangor Bhd)

PERANGSANG ENGINEERING
& SERVICES SDN BERHAD

Tingkat 15 Plaza Perangsang

Persiaran Perbandaran

40000 Shah Alam

Tel: 5503362, Fax: 5503642

Tlx: 38669 KEKAL MA

Peti Surat 12591

50782 Kuala Lumpur

Malaysia.

Telepon: 2923179

Surat Tuan.

Surat Kami:

~~Kemari KEKAL KUALA LUMPUR~~

~~Telex KEKAL MA 31315~~

TO : MARTIN TEH / DAVID CHOU
C/O JUKA MINE MANAGEMENT

FAX: 007 613 - 7256988

FROM : TAN IT BONG.

RE : QUOTATIONS FOR MINERAL PROCESSING EQUIPMENT

RE YOUR FAX OF 8th AND 23rd JUNE '89.

ATTACHED ARE SOME QUOTATIONS FOR ABOVE.

YOU WILL NOTE THAT SOME OF THE SPECS DO NOT FULLY COMPLY WITH YOUR REQUIREMENTS AND WOULD NEED FURTHER CLARIFICATIONS WITH THE MANUFACTURER. ALL ITEMS AS QUOTED CAN BE FABRICATED IN MALAYSIA. PRICES ARE EX FACTORY (IPDA). THEREFORE, FOR BUDGET PURPOSE YOU NEED TO MARK UP AT LEAST 30% FOR FREIGHT & INSURANCE (15%), AGENCY FEES AND CONTINGENCIES (15%). (IMPORT DUTIES NOT INCLUDED)

BEST REGARDS.

Tan It Bong

23/6/89.

(4 PAGES INCLUDING THIS PAGE)

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JOTAN ENGINEERING
21-A, Jalan Kledang Raya 18,
Taman Alkaff, 30100 Ipoh,
Perak, Malaysia.
Tel: 05-265662
Fax: 05-260168

Ref: 304/89

20th June, 1989

QUOTATION

Perangsang Engineering & Services Sdn Bhd
Peti Surat 12591
50782 Kuala Lumpur.

Attention : Mr Tan It Beng

Dear Sirs,

RE: MINERAL PROCESSING EQUIPMENT

We refer to your enquiry, and are pleased to offer as follows :

Item	Qty.	Description	Unit Price	Total
-----	-----	-----	-----	-----
A. SCREENING				

i.	1 unit	18" Hydrocyclone c/w rubberlining. Capacity 25 Tonne/hr at 20% solid.	1,800.00	1,800.00
ii.	1 unit	Vibrating Screen, 4ft. x 8 ft. inclined deck c/w 3 HP motor, high tensile screen and eccentric drive assembly.	5,000.00	5,000.00
iii.	1 unit	Vibrating screen, 3 ft. x 6 ft. inclined deck c/w 2 HP motor, high tensile screen and eccentric drive assembly.	4,000.00	4,000.00
iv.	1 unit	Hydrosizer with 4 compartments. Capacity 4 tonne/hr.	4,500.00	4,500.00
B. YUBA JIGS				

i.	1 unit	48" x 48" Twin Bank Four Cell Primary & Secondary Yuba Jig c/w Pulsator Box, stainless steel jig screen, and 7.5 HP gearmotor.	16,000.00	16,000.00
ii.	1 unit	46" x 48" Twin Bank Two Cell Tertiary Yuba Jig c/w Pulsator Box, stainless steel jig screen, and 3 HP gear- motor.	8,500.00	8,500.00

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JOTAN ENGINEERING
 21-A, Jalan Kledang Raya 18,
 Taman Alkaff, 30100 Ipoh,
 Perak, Malaysia.
 Tel: 05-265662
 Fax: 05-260168

Ref:304/89

20th June, 1989

Item	Qty.	Description	Unit Price	Total
C. SHAKING TABLES				
i.	1 unit	Diester type shaking table,c/w full size wooden deck rubberlined with sand riffles, all steel supporting structure, wooden feed launder and 2 HP drive motor.	9,000.00	9,000.00
iii.	1 unit	Diester type full size flotation table c/w all steel supporting structure, wooden feed launder and 2 HP drive motor.	11,000.00	11,000.00
D. GRINDING MILLS				
i.	1 unit	Ball Mill, 5ft. dia. x 10ft. long continuous overflow discharge type, c/w manganese steel liner, cast steel gears and trunnions, trunnion bearings lined with anti-friction metal. Less grinding balls, 100 HP drive motor and motor starter.	180,000.00	180,000.00
ii.	1 unit	Rod Mill, 4ft. dia. x 8ft. long continuous overflow discharge type, c/w manganese steel liner, cast steel gears and trunnions, trunnion bearings lined with anti-friction metal. Less rod charges, 60 HP drive motor and motor starter.	120,000.00	120,000.00
E. MAGNETIC SEPARATOR				
ii.	1 unit	1-D magnetic separator c/w 2 HP drive motor, magnetic coil and magnetic blocks assembly.	18,000.00	18,000.00
iv.	1 unit	Magnetic Separator, MS15-418 c/w 3 HP drive motor, 5"dia. x 18"long roll arranged one above the other to give 4 stages of separation.	24,000.00	24,000.00

084

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JOTAN ENGINEERING
21-A, Jalan Kledang Raya 18,
Taman Alkaff, 30100 Ipoh,
Perak, Malaysia.
Tel: 05-265662
Fax: 05-260168

Ref:304/89

20th June, 1989

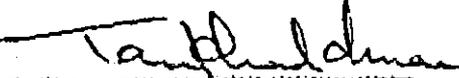
Item	Qty.	Description	Unit Price	Total
G. ROTARY DRYERS				
i.	1 unit	Rotary Dryer. 30"dia. x 20ft. long c/w combustion chamber, drying shell, exhaust fan, dust cyclone, feed screw, drive motor, burner and temperature controller.	21,000.00	21,000.00
ii.	1 unit	Rotary Dryer. 30"dia. x 16ft. long c/w combustion chamber, drying shell, exhaust fan, dust cyclone, feed screw, drive motor, burner and temperature controller.	25,000.00	25,000.00

The Price : In Malaysian Ringgit. Ex-Ipoh.

Delivery Period : 5 months after receipt of confirmation order.

Terms of Payment : cash upon delivery.

Yours faithfully,
JOTAN ENGINEERING



K.C. Tan
Manager