RAZORBACK TIN MINE, TASMANIA

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RAZORBACK TIN MINE, TASMANIA

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RAZORBACK TIN MINE, TASMANIA

In late October 1969 a visit was made to the Razorback Tin Mine, recently optioned from W.J. Hodge by the M.T.B. Syndicate, to assess as far as possible the prospect from the viewpoint of a modest-sized syndicate, as opposed to the requirements of a major mining company. In particular, the contention that approximately 100,000 tons of 0.8% Sn exists in the oxidized zone, potentially workable by an open pit operation, was brought under scrutiny.

Two days were spent on the property, inspecting the surface features and examining most of the still accessible adits and drives in the orebody, and in discussions with Jack Hodge. Subsequently the Mines Department in Hobart and the Mines Department laboratory in Launceston were visited, and a flight was made over the property to obtain some oblique aerial photographs.

Placer Exploration, who have carried out extensive work on the property in the years 1964 to 1966, estimated that some 90,000 tons of 0.7% Sn existed in the oxidized zone, over a distance of little more than 500 feet and to a depth of up to 150 feet from the surface. The sections show the assumed disposition of the southerly-plunging orebody in relation to an open pit far more succinctly than any description, but it must be emphasized that the bulk of Placer's work was directed at the sulphide zone and to date no real attempt to evaluate the economic material available from grass roots has been made. Recent activity by Jack Hodge and his partner shows that good grade ore is available to the north of the area defined by Placer, and it seems fairly certain that some economic grade material is available to the south also. Some of the superficial material must include elluvial tin, so that some of the initial cuts of an open pit operation would be likely to be fairly profitable, before waste material is encountered. With these considerations in mind 100,000 tons is easy to envisage, but with a grade at best little higher than 0.7%.

Placer's summary of the Razorback Prospect as a whole gave 589,000 tons at an average mineable grade of 0.84% Sn, with 725 tons per vertical foot. The conclusions recommended that the mine be brought into production (R.P.J. Weedon, 8th October 1965). No suggestion of prohibitive metallurgical difficulties has emerged, and it seems clear that the reason why this recommendation was not acted upon relates solely to size.

The work relating to the mine as a whole is voluminous and would take a lengthy study to evaluate independently, if Placer were agreeable to allowing it to be copied. However, the indications relating to the oxidized zone potential are fairly clear, and confirmatory checks can easily be made before the expiry of the option period.

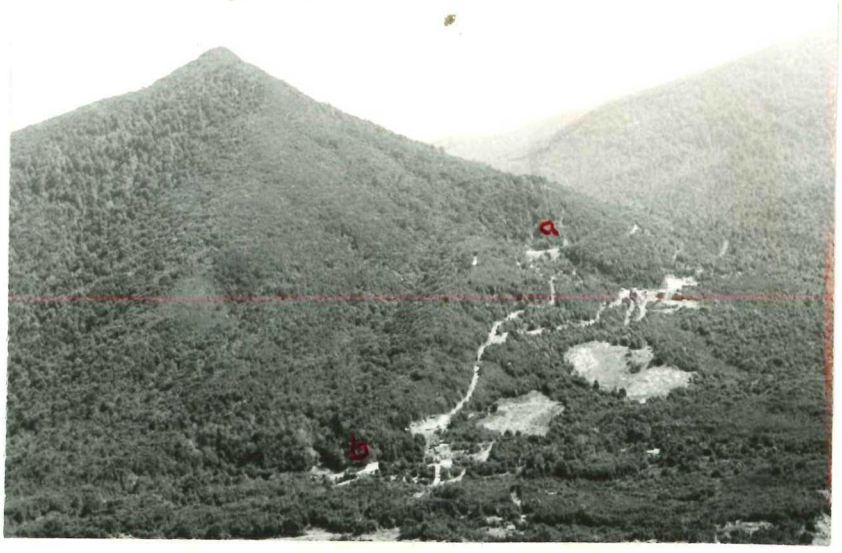


Plate 1 - Razorback, from the south (a) is the open cut (b) is the vein exposure in Dundas Creek

1. LOCATION AND ACCESS

The Razorback Mine is located on a spur on the east slope of Razorback Mountain, about 9 miles east of Zeehan, and south of Renison Bell. The topography is steep and the vegetation consists of heavy rain forest.

2. HISTORY

The history of mining at Razorback goes back fifty years, for the last twenty of which Jack Hodge has been associated with the project, operating a small mill which processes up to 3 tons of oxidized material to produce a few pounds of tin per day. Hodge holds four leases over the mine area, which are shown on Fig. 2. (Note incomplete coverage, between the two southernmost leases).

In recent years the Aberfoyle Tin Partnership investigated the property; subsequently Clutha Development, followed by Placer Explorations, carried out extensive testing including 3,000 feet of driving, 14 surface and 23 underground diamond drill holes. At various times C.R.A. and Newmont have also held options over the Razorback, but with the possible exception of Aberfoyle, the indicated potential appears to have been too small for any of these companies to reach a favourable decision. (Aberfoyle are said to have been over-extended at the time of their option).

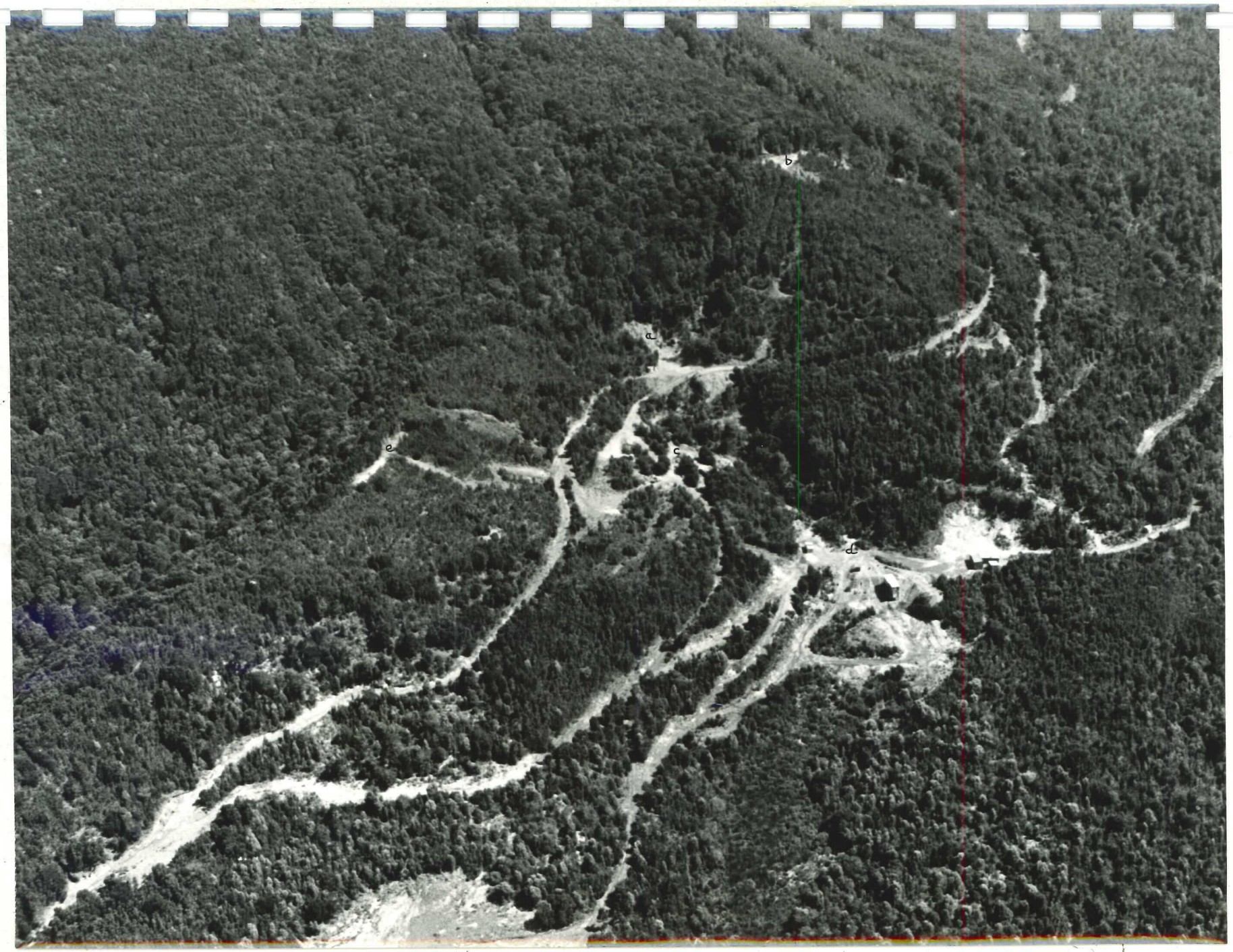


PLATE II Aerial view of the Razorback Tin Mine workings, looking from the south-east. a is the open cut, b is Hodge's present working (defined reserves lie between these two points), c is the mill, d is the portal of the 700-level adit, e is in the area where Aberfoyle are said to have obtained fair tin values

3. DESCRIPTION OF THE OCCURRENCE

3.1 Geological Setting

The lode occurs in the Middle Cambrian Dundas Group, on or near the contact between serpentine on the east, and intraformational shales and grit/conglomerate on the west. The surface rocks are deeply weathered and lateritic material occurs over much of the serpentine. The tin ore occurs generally within a north-south belt of dolomitized rock; the lode occupies a fault zone attributed to the original serpentinization, and hydrothermal fluids associated with the mineralisation have extensively altered the surrounding rock, and may have been responsible for the dolomitization. Tin values are to be found in the adjacent rock types also, but the lode at depth consists of well defined massive sulphides and is limited in width. Oxidation extends to a depth of a little over 100 feet. Within the oxidized zone the tin bearing material is not necessarily particularly distinctive and the body is not very clearly defined, so that its limits are ascertainable only by sampling.

The lode generally dips steeply eastwards, except at its northern extremity where the dip is towards the west.

3.2 Extent

Placer's longitudinal section shows the orebody's linear extent confined between co-ordinates 2000N and 2800N: i.e. its maximum length is of the order of 800 feet. It attains a maximum width of 50 feet in the centre, but it diminishes in both dimensions with depth until by reference level 500 feet it is shown as only 150 feet in length and about 10 feet in width. Placer obviously felt that they had blocked out a too small, too-low-grade orebody, plunging southwards and shrinking conspicuously with depth, and for evident reasons felt no inclination to test the northern and southern extremities of an occurrence with this sort of configuration. In their eyes there would appear to be a scant chance of finding additional tonnages in the amounts required by them. Otherwise, the limited strike length tested by Placer might be considered surprising. The Tasmanian Department of Mines previously drilled some holes about 1,000 feet to the north-east (see Fig. 2) but they admit that these did not contribute much meaningful information.

3.3 Reserves

Placer's reserves, as quoted by Weedon, totalled 589,000 tons overall. The following table gives a total of only about half this but it is understood that the remainder occurs in the northern part (referred to by Placer as 'Brock's'). See sections 10 to 14

Above Placer Adit R.L. 700 (assumes 1 long ton at +0.9% Sn within 12 cu. ft. of ore)

Section No.	Plane section area ft^2	Mean section area ft^2	Horiz.dist between sections ft.	(Vol.cu.ft)	Tons
1.	2,800				
2.	3,200	3,000	42	126,000	10,500
3.	3,800	3,500	52	182,000	15,100
4.	8,200	6,000	45	270,000	22,500
5.	5,000	6,600	70	462,000	38,500
6.	5,400	5,200	58	301,600	25,100
7.	2,000	3,700	70	259,000	21,500
8.	7,600				
9.	7,000	7,300	150	1,095,000	91,200
	Below adit total is 73,100 tons			Total	224,400

Sainsbury's estimate of oxide ore is 90,200 tons of 0.7%; the cross sections in this report are taken from those accompanying his calculations. His estimate of sulphide ore is 143,000 tons, which gives a total close to that arrived at in the table.

The data in our possession is not adequate to make a complete independent computation, but there is no doubt that Placer's figures are reliably conservative.

3.4 Possible Additional Extent and Reserves

In point of fact there is evidence that the ore extends north and south sufficiently to provide significantly more oxidized ore for a superficial opencut operation with limited tonnage requirements.

(a) The opencut where Hodge is now working is fully 100 feet north of Placer's northern limit of the orebody; material of up to 3% is coming out of here. (This might be an elluvial spill-off down the northern slope, and have negligible persistence with depth).

(b) Adit No. 4 (about 200 feet south of No. 3) is shown as having a trace of tin only where, according to Hodge, Aberfoyle's bulk sampling gave 50 feet of 0.5% Sn, and one percent material was obtained from the raise. (See map). Hodge maintains that in several cases where Placer's results gave a trace only, reasonably good tin is present; if he is right this might enlarge the potential significantly.

The ridge cut by No. 4 adit runs 2,000 feet to the south, where a sulphide vein carrying 1 percent tin is exposed in the stream bed. This suggests that the vein may continue for the length of the ridge and provide room for further easily accessible tonnage. (See Plate 1, which shows the clear topographical expression of this ridge).

(c) Furthermore, given significantly greater strike length, there is a possibility of other wider bodies plunging in an enechelon relationship to the one already blocked out, and it is perhaps surprising that Placer did not test this.

3.5 Testing for Additional Extent

Areas shaded red on the longitudinal section show where it appears most desirable to prove up additional extent, and notations in red point out where Placer may possibly have restricted the orebody on inadequate grounds.

If reference is made to the cross sections, the large volumes of waste material to be moved in order to get to the ore is conspicuously evident in several cases. The red shaded area a on the longitudinal section represents much of this (see cross sections 8, 9 & 10) and appears to have been defined as non-economic on too slender grounds. It is to be hoped that open-pitting this material from surface would in fact disclose some tin. This appears to be a likely possibility and should be tested.

It is recommended that some extensive clearing and heavy bulldozer trenching be carried out to test some of these from-surface possibilities, as outlined in the attached schedule (recommendations below). In addition it would be desirable to resample Adit No. 4 and possibly some of the northern workings.

If this testing were to be carried out with satisfactory results, and if a satisfactory cost-estimate on a suitable mill is obtained before the option falls due, it should be possible to establish an operation which would serve as a base and a source of finance for additional exploration in the vicinity over a period of years, with the hopeful outcome of something on the scale of Renison Bell.

4. CONCLUSIONS

These possibilities hinge on the feasibility of a modest-scale operation which need not necessarily proceed beyond the oxide ore to nett a worthwhile amount.

Location and topography are favourable, and a water supply (on which there are no other claims) of 3,000 gallons per minute from nearby Dundas Creek should prove adequate for the mill. The rock is relatively soft and should be easily worked; it might in fact be practicable to rip a proportion of it. No royalties are payable. Major problems are likely to relate to the managerial and technical control of an operation.

5. RECOMMENDATIONS

During the option period the bulldozer clearing and costeaning should be carried out. As far as possible this should involve clearing and excavating down the centre line of the surface trace of the ore-blocking-out of polygon (coloured yellow on Fig. 1) and at right angles on Section lines 4, 6, 9, 11, 13. In addition, the longitudinal trench should attempt to follow the lode south of 2000N along the 875-foot contour to Adit No. 4 and cut exploratory cross trenches in this area. These trenches should be sampled at 10-foot intervals. It is desirable that a bulldozer capable of cutting a deep trench (up to 20 feet) should be used, but it is obvious that local topography will necessitate modifications to the plan outlined. The essential aim of assessing the extent and nature of material in which an open pit would start should be remembered when this is the case. As much concurrent clearing and stripping as can be accomplished within the budget is desirable. When the clearing and trenching has been completed, indications might suggest some vertical test holes further to assess the material, particularly if a picture significantly different from that suggested by work up until now emerges.

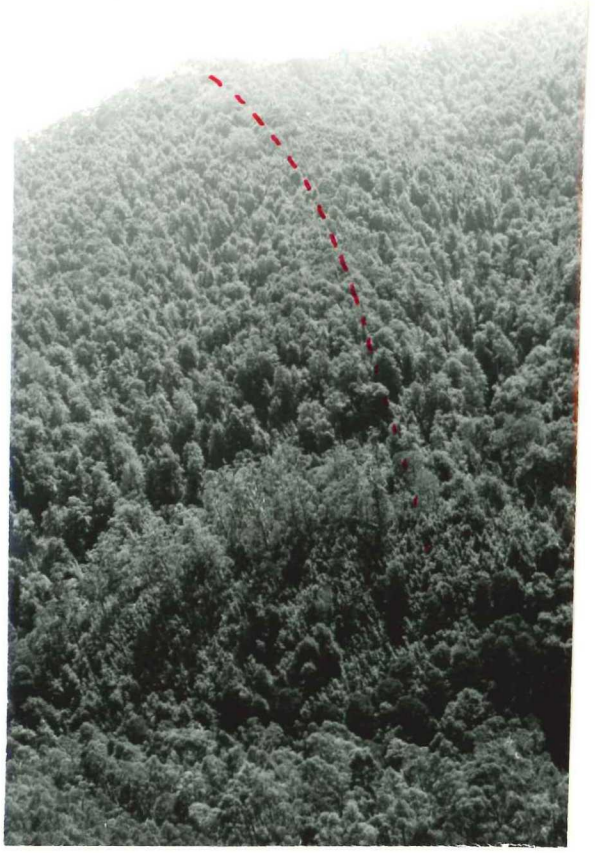
APPENDIX 1

NOTES ON THE GRAND PRIZE MINE

A day was spent on the Grand Prize about 1 mile north of the Razorback in the company of Jack Hodge and Bob Clarke, underground foreman at Renison Bell, who has an interest in the property. The occurrence is a generally narrower fissure vein striking north-south and outcropping over a steep hill which is covered with dense rain forest on the southern slope and open eucalypt on the northern slope. It is evident that previous workers have formed the occurrence hard to assess: it is difficult to add more than the information contained on the geological map (Fig. 2) showing both the Razorback and the Grand Prize. However, it is quite possible that potential of significance to the sort of operation that might make a successful go of the Razorback may exist here. Attention is drawn to a note in Placer's report that the potential of the mine is 4,000 tons per vertical foot.

Plate 3

GRAND PRIZE LODE
looking north



Dotted line shows the estimated position of the lode beneath the cover of rain forest

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CALCULATIONS ON RAZORBACK TIN MINE ASSUMING 100 TON PER DAY MILL

1. RESERVES

1.1 Oxidized
82,000 long tons @ 0.8% Sn
+ 10% dilution @ 0.125% Sn

Total 90,200 long tons @ 0.733% Sn

1.2 Sulphide
143,000 tons @ 0.70% Sn

2. VALUE OF ORE (From Evans report)
(With tin @ $3,000; £S 1,200 per ton)

2.1 Oxidized
65% Sn; 1% S; 1% As

Sulphide
65% Sn; 1% S; 1% As

2.2 Smelter Schedule

Metal Deduction - Deduct 1 unit of Sn plus 0.01 unit for each 0.1% variation in assay below 74.0% Sn.

- 1.9% Sn	- 1.9% Sn
63.1% Sn	63.1% Sn

Money Deduction

(i) For each long dry ton of conc. deduct $21.68 plus $0.048 for each 0.2% below 74%
(21.68 + 2.16) = $23.84 $23.84

(ii) Returning charge
Deduct $14.00 per long dry ton of conc.
$14.00 $14.00

	OXIDIZED	SULPHIDES
Assaying charge:	Deduct $6.30 per long dry ton of conc.	
	$6.30	$6.30
Freight charges:	Deduct $28 per long ton of conc. shipped	
	$28.00	$28.00
Total money charges	$72.14	$72.14

Penalties

Sulphur:	Less than 0.15% free Greater than 0.15%; $5.00 per long dry ton		
		$5.00	$5.00
Arsenic:	Less than 0.1% free Greater than 0.1%; $0.50 per long dry ton for each 0.1% with a minimum of $7.50 per long dry ton where combined As & S would not aggregate $7.50		
		$5.00	$5.00
Total penalties		$10.00	$10.00

		OXIDIZED	SULPHIDES
2.3	Gross value of 63.1% tin conc.		
2.4	Charges	$1,900.00 72.14 $1,827.86	$1,900.00 72.14 $1,827.86
2.5	Penalties	10.00	10.00
2.6	NET VALUE	$1,817.86	$1,817.86
2.7	Recovery	80%	65%
	lbs of tin per ton of ore	16.4	15.7
	lb of tin per ton ore rec.	13.1	10.2
2.8	Tons of ore to give 1 ton of conc.		
	$\left(\frac{2,240}{13.1} \times \frac{65}{100}\right) = 111$ tons		$\left(\frac{2,240}{10.2} \times \frac{65}{100}\right) = 143$
2.9	Net value per ton of ore		
	$\left(\frac{1,817.86}{111}\right) = \$16.30$		$\left(\frac{1,817.86}{143}\right) = \$12.70$

3. CAPITAL EXPENDITURES 100 T/DAY PLANT

3.1 Required at beginning of first year for 100 T/day oxide plant.

Mill (inc. design fee)	$280,600
Surface building	16,500
Machine shop, power lines, etc.	23,800
Site preparation, roads (5 mi. @ $8,000)	40,000
Housing & general expenditure	80,000
Main water supply (inc. Res. holding 10 hrs.supply)	20,000
Vehicles	10,000
	$470,900

3.2 Required at beginning of second year.
Working capital & stores (to be recovered in final year of operation) 86,000

3.3 Required at end of fourth year.
(To convert mill to sulphides, and go into U/g mining) 200,000

4. OPERATING COSTS

4.1 Overhead

Manager	$10,000
Accountant/Paymaster	8,000
Mill Superviser	6,000
Electrical Engineer	6,000
Mechanical Engineer	6,000
*Underground Manager	6,000
*Mining Engineer	5,000
*Surveyor	3,500
Assayer	3,500
*Geologist	5,000
Typist	2,000
Storeman	2,500
Clerk	2,500
Office operating	4,000
Power general	2,000
Assaying expenses	3,000
Miscellaneous	5,000
	$80,000

Mining rate 100 T/day for 350 days/year = 35,000 T/year

Overhead = $2.28 per ton

4.2 Milling Costs (Oxide & Sulphide)

(See Razorback report, modified by D.D.) $4.52 per ton

4.3 Mining Costs

4.3.1 Oxidized portion (See Evans report P.3-34)

1st year of production	$2.00 per ton
2nd year of production	$6.00 per ton
3rd year of production	$9.00 per ton

4.3.2 Sulphide portion (See Razorback report) $1.59 per ton

Evans figure of $6.00 per ton (page 3-17)

Split difference and say mining costs $4.00 per ton.

Year	Capital Exp.	Annual Value	Depreciation Claimed	Tax 34%
1	471	-	-	-
		35,000 x (16.30-8.80)		
2	86	$263,000	$263,000	-
		35,000 x (16.30-12.80)		
3	-	$122,500	$122,500	-
		20,000 x (16.30-15.80)		
4	176.1	$10,000	$ 10,000	-
		35,000 (12.70-10.80)		
5	-	$66,500	$ 66,500	-
6	-	$66,500	$ 66,500	
7	-	$66,500		
8	-	$152,500		

RAZORBACK TIN PROSPECT - DUNDAS, TASMANIA - ECONOMIC STUDY

1. INTRODUCTION

The Razorback tin prospect was brought to the attention of Newmont and Engelhard by Mr. Bruce Thomas late in January 1969. Leases over the prospect are currently held by Mr. W.J. Hodge of Zeehan. These leases are located about 5 miles north east of Zeehan in semi-mountainous country (see attached map). A 2-mile long gravel road connects the prospect with the Murchison Highway at a point 4 miles from Zeehan and 7 miles from Renison Bell.

Mr. Hodge has granted a one-month option to look at the mine and examine all available reports. The option period terminated March 1. An extension has been requested following late arrival of copies of maps and reports from the Tasmanian Mines Department.

Mr. Paul Anthony and the writer examined maps and reports at the Tasmanian Mines Department in Hobart on February 12, and later inspected the Razorback workings with Mr. Hodge on February 13.

Placer Exploration obtained a special prospecting licence (S.P.L. No. 11) surrounding Mr. Hodge's leases in March 1964. An option over the Razorback leases was negotiated with Mr. Hodge at that time.

Two adit levels were driven by Placer to test the lode beneath the oxidised outcrop. About 3,000 feet of underground development was completed.

Placer drilled 14 surface and 23 underground diamond drill holes to further explore the prospect.

The S.P.L. was relinquished in December 1966 and is now held by Renison Ltd.

2. OBJECTIVE OF ECONOMIC STUDY

This study contains estimates of earnings for several different-sized operations at Razorback based on listed assumptions. Return on investment is calculated in each case. Targets for ore tonnage and grade are estimated to enable a minimum acceptable return to be earned on invested capital.

3. SUMMARY

At an ore reserve grade of 0.8% tin and a selling price for tin of Stg. £1300 per ton a 6-million ton orebody mined over 10 years would give an estimated 13% return on invested capital of $13.5 million on a D.C.F. basis. Annual cash flow is estimated at $2.47 million in this case. An increase in ore reserve grade to 0.9% tin or an increase of Stg. £100 in the market price for tin enables the ore reserve target to be lowered to about 5 million tons.

For a tin marketing price of Stg. £1300 and 60% recovery of the tin in a 60% tin concentrate the following tonnage/grade combinations would give an estimated 15% D.C.F. return on invested capital over a 10-year life for the mine.

3.0 million tons @ 1.01% tin
4.0 " " @ 0.96% tin
5.0 " " @ 0.90% tin
6.0 " " @ 0.84% tin

A 15% D.C.F. return in this case is equivalent to repayment of invested capital in 10 years plus an annual 10% net profit on invested capital.

4. METALLURGY

In a laboratory test of Razorback sulphide ore made by the Tasmanian Mines Department a 50% tin concentrate was produced at a metallurgical recovery of 66% of the tin.

The test work consisted of grinding followed by flotation of the sulphides (mainly pyrrhotite) and tabling of the flotation tailing.

Higher recoveries of tin could be obtained by using more sophisticated recovery techniques than those used in the tests.

For the purpose of estimating return on investment a recovery rate of 60% of the tin is used in the following calculations.

5. ECONOMICS

5.1 Assumptions

(a) Ore mineable by underground method using diesel-powered rubber-tyred equipment.

(b) Milling and concentration of ore on site to produce a concentrate containing 60% metallic tin at a metallurgical recovery of 60%.

(c) Housing of project personnel at Zeehan.

(d) Capital requirements

300,000 t.p.y. rate		$7.5 mill.
400,000	" "	$10.0 mill.
500,000	" "	$12.0 mill.
600,000	" "	$13.5 mill.

(e) Operating costs

300,000	" "	$7.50 per ton
400,000	" "	$7.00 per ton
500,000	" "	$6.50 per ton
600,000	" "	$6.00 per ton

(f) Life of mine - 10 years.

(g) Testing and feasibility - 1½ years.
Construction and development - 1½ years.

(h) Grade of ore in situ 0.80% tin. At 10% dilution head grade of ore treated 0.72% tin.

5.2 Value of Ore

Consider three market prices for tin metal.

Sterling price (per ton)	£1,200	£1,300	£1,400
Australian equivalent per ton	$2,568	$2,782	$3,010
per unit	$25.68	$27.82	$29.96
Smelter payment for 60% concentrate		96% of contained tin	
Smelter charge		$25 per ton of concentrate	
Freight charge		$25 per ton of concentrate	
Net return per ton of 60% con.	$1,429	$1,552	$1,675
Net return per unit	$23.82	$25.87	$27.93
Units of tin recovered per ton of ore treated	0.432	0.432	0.432
Net return per ton of ore treated	$10.29	$11.18	$12.06

5.3 Annual Cash Flow

Assume a price for tin of Stg. £1,300 per ton.

Ore treatment rate (tons per year)	300,000	400,000	500,000	600,000
Net return per ton of ore treated ($)	$11.18	$11.18	$11.18	$11.18
Annual revenue ($ millions)	3.35	4.46	5.58	6.70
Annual costs ($ millions)	2.25	2.80	3.25	3.60
Annual operating profit ($ millions)	1.10	1.66	2.33	3.10
Annual depreciation ($ millions)	0.75	1.00	1.20	1.35
Annual net income before tax ($ millions)	0.35	0.66	1.13	1.75
Annual net income after tax ($ millions) (36% tax rate)	0.22	0.42	0.72	1.12
Annual cash flow ($ millions)	0.97	1.42	1.92	2.47

5.4 Return on Investment

The discounted rate of return of the investment under any set of the above conditions is that rate which makes the present value of the annual cash flowd equal to the present value of the investment.

Assuming capital is spent in a single amount at the end of the third year, i.e. commencement of first production year.

Ore treatment rate (tons per year)	300,000	400,000	500,000	600,000
Return on investment D.C.F. basis	5%	7%	10%	13%

5.5 Sensitivity Analysis

A graphical solution for determining return on investment for a range of ore grade/tonnage combinations for the Razorback project is appended to this study.

5.5.1 Ore Grade - An increase in ore grade from 0.8% tin to 0.9% tin gives the following improvements in return on investment.

Metal price: Stg. £1,300 per ton.

Ore treatment rate (tons per year)	300,000	400,000	500,000	600,000
Return on investment	10%	12%	15%	18%

All other assumptions as in 5.1.

5.5.2 Metal Price - An increase of £100 in the sterling price of tin from £1,300 to £1,400 gives the following increases in return on investment.

Ore grade: 0.8% tin (ore reserve grade)

Ore treatment rate (tons per year)	300,000	400,000	500,000	600,000
Return on investment (D.C.F. basis)	8%	10%	13%	16%

All other assumptions as in 5.1

5.5.3 Metallurgical Recovery - An increase of 1% in recovery of tin from 60% to 61% lifts the net return per ton of ore treated by about 1½%. Return on investment is increased by about 3/4% for each 1% increase in recovery.

Metal price: Stg. £1,300 per ton.

Ore treatment rate (tons per year)	300,000	400,000	500,000	600,000
Return on investment (D.C.F. basis)	5½%	7½%	10½%	13½%

All other assumptions as in 5.1.

The test work described in Section 4 suggests that careful metallurgical control might enable recovery of tin to be lifted to 70%. In this case return on investment becomes:

Metal price: £Stg. £1,300 per ton.

Ore treatment rate (tons per year)	300,000	400,000	500,000	600,000
Return on investment (D.C.F. basis)	12%	15%	18%	20%

TASMANIAN DEPARTMENT OF MINES

LAUNCESTON 18/1/66

ORE DRESSING INVESTIGATION NO. R483

Sample of gossan provided by Clutha Development from the Razorback Tin Mine

The sample assayed:

Sn	2.4%
Pb	1.2%
Cu	0.2%

The sample was crushed to 10 mesh and then wet-screened. Tests showed reduction below 100 mesh was necessary to release SnO_2 satisfactorily. Primary table concentrates were made from +200 mesh and -200 mesh fractions of original screening. +100 mesh fraction was stage-ground to pass 100 and then sized on 200. Secondary table concentrates were made from these two fractions. All +200 mesh tailings were combined and stage-ground to pass 200 mesh. This was tabled to produce secondary concentrate.

					% distribution		
Total conc.	Wt.	Sn	Pb	Cu	Sn	Pb	Cu
	1.23	25.2	2.1	0.2	76.3	14.0	6.3

CONCLUSIONS

Tabling recovered 76% as a 25% concentrate which also contained 2.1% Pb and 0.2% Cu. No significant concentration of Pb and Cu by tabling was obtained.

TASMANIAN DEPARTMENT OF MINES

LAUNCESTON 27/2/69

ORE DRESSING INVESTIGATION NO. R584

Razorback Sulphide Tin Ore Concentration Test

At the request of Mr. N.L. Lindsay of Newmont (Australia) Pty. Ltd., preliminary tin concentration tests were carried out on a sample of sulphide ore prepared from samples taken by Placer Prospecting Pty. Ltd., to determine the recovery of tin.

The sample was made from -18 mesh portions from the following samples:

Mines Department Reg. No.	Placer Prospecting Pty. Ltd. No.
663590	6064
663591	6067
663592	6069

These portions were thoroughly mixed to form the sample for testing. This sample was riffled to provide a head sample for assay, and 2,000 gram samples for concentration tests. The head sample assayed as follows:

Cassiterite	Sn	3.2%
Soluble	Sn	0.18%
	Cu	0.22%
	Zn	0.14%
	Pb	0.13%

Note 1 No responsibility will be accepted for the results shown in this report insofar as they apply to the sample tested.

Note 2 All screens used were from the British Standard Screen Series.

Note 3 Make-up water used in tests was Launceston town supply.

Test Work In the first test (Ni) a 2,000 gm. sample was ground in a Warman laboratory 8" x 8" ball mill for 5 minutes at 70% solids. The pulp was transferred to a Denver "Sub-A" laboratory flotation machine model D-2 and make-up water was added to bring the pulp to the desired level for flotation. After thorough mixing of the pulp, the pulp was allowed to settle and a sample of water was drawn off and the pH was found to be 4.4. It was decided that no acid addition was required at this pH level for satisfactory flotation of the pyrrhotite.

The pulp was conditioned for 15 minutes with 1 lb/ton of copper sulphate. 0.5 lbs/ton of sodium ethyl xanthate and 0.04 lb/ton of cresylic acid were then added with conditioning for one minute.

The pyrrhotite floated very readily. After 7 minutes flotation, a further 0.5 lb/ton of sodium ethyl xanthate was added. However, a secondary lift in flotation rate was not evident and flotation was stopped after a total time of 10 minutes.

The flotation tail was screened on an 85 mesh screen, and the screen oversize and undersize were tabled separately on the Deister laboratory table using the sand deck. A concentrate, a middling and a tailing were produced in each case.

In the second test, N2, the 2,000 gram sample was ground for 10 minutes. In order to reduce the rate of froth removal, the initial sodium ethyl xanthate addition was reduced to 0.3 lb/ton. After 7 minutes flotation, a further 0.2 lb/ton of sodium ethyl xanthate was added. This addition increased the rate of froth formation at this stage, and it was necessary to float for a total of 15 minutes in order to bring flotation to completion. The purpose of the less vigorous flotation in the second test was to reduce the possibility of mechanical entrainment of cassiterite particles in the flotation froth.

The flotation tail from the second test was screened on a 120 mesh screen, and the screen products were tabled separately on the Deister laboratory table, using the sand deck. The details for the conditions of the two tests are as follows:

		N1	N2
Grinding time	Minutes	5	10
pH		4.4	not determined
Copper sulphate	lbs/ton	1.0	1.0
Conditioning time	Minutes	5	5
Cell speed	r.p.m.	1,800	1,800
Cresylic acid	lbs/ton	0.04	0.04
Sodium ethyl xanthate	lbs/ton	0.5	0.3
Conditioning time	Minutes	1	1
Sodium ethyl xanthate after 7 minutes flotation	lbs/ton	0.5	0.2
Flotation time	Minutes	10	15
Flotation tailings screened on mesh		85	120

The flotation concentrate and each of the table products were assayed for cassiterite Sn and soluble Sn. The results are as follows:

Test	Product	Weight (%)	Assay % C.Sn	Assay % S.Sn	Distribution % C.Sn	Distribution % S.Sn
N1	FC	70.2	0.84	0.20	17.8	89.8
	+85 mesh FT,TC	1.9	28.2	0.15	16.2	1.9
	TM	0.2	5.55	0.03	0.3	0.0
	TT	11.3	1.04	0.06	3.6	4.5
	-85 mesh FT,TC	2.8	59.5	0.06	50.4	1.3
	TM	3.3	2.60	0.03	2.6	0.6
	TT	10.3	2.93	0.03	9.1	1.9
	F/D (calculated)	100.0	3.31	0.16	100.0	100.0
N2	FC	71.7	0.64	0.20	14.4	93.4
	+120 mesh FT,TC	0.9	44.2	0.12	12.5	0.7
	TM	2.0	3.40	0.11	2.1	1.3
	TT	8.0	0.70	0.04	1.7	1.9
	-120 mesh FT,TC	3.0	56.9	0.03	53.5	0.7
	TM	2.9	1.75	0.02	1.6	0.7
	TT	11.5	3.95	0.02	14.2	1.3
	F/D (calculated)	100.0	3.19	0.15	100.0	100.0
	F/D (assay)		3.21	0.18		

C.Sn = Cassiterite tin. S.Sn = acid soluble tin, e.g. stannite.

A summary of the cassiterite Sn recovery in concentrates is as follows:

Test	Product	Assay	Recovery
N1	Table Concentrates	46.9	66.6
N2	Table Concentrates	54.0	66.0

CONCLUSIONS

It is possible to produce a tin concentrate assaying 50% tin with recovery of 66%.

Some 70% of the ore occurs as sulphides, chiefly pyrrhotite, which is readily flotable.

Stannite tin is present in minor amounts.

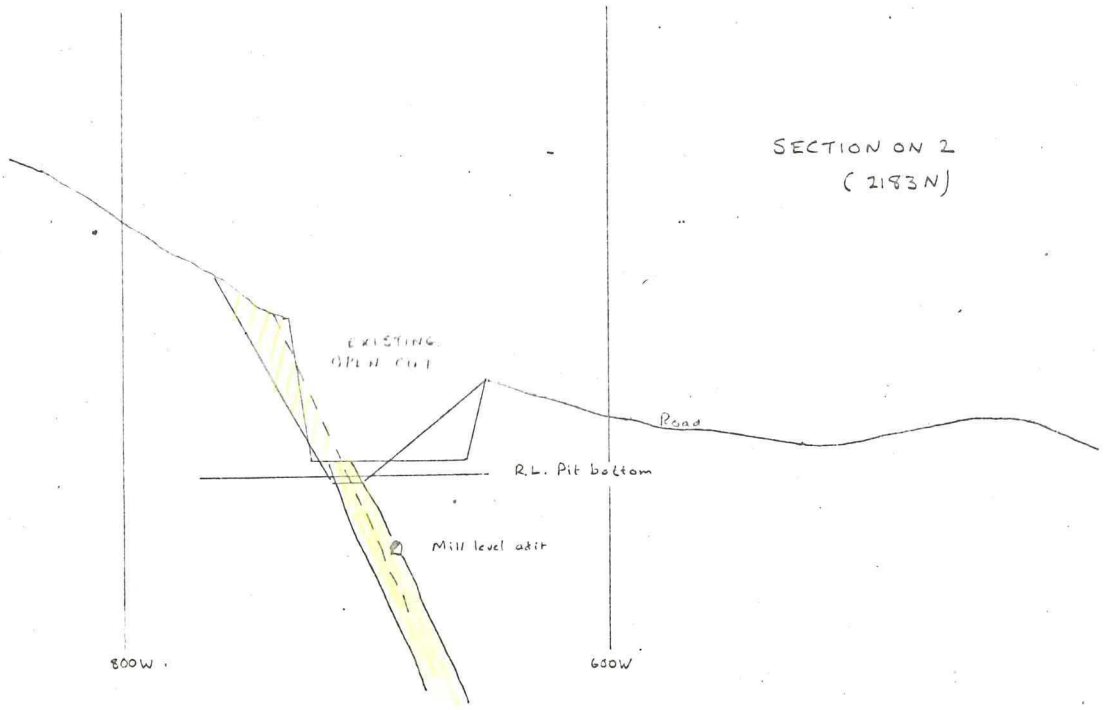
There appears to be only a minor middling problem. In test N1 only 2.9% of the tin appeared in the middling fractions. In test N2 3.7% of the tin appeared in the middling fractions.

Higher tin recovery should be achieved by retreatment of the middlings, by cleaning of the sulphide concentrate, and by more sophisticated recovery techniques than was attempted in these tests.

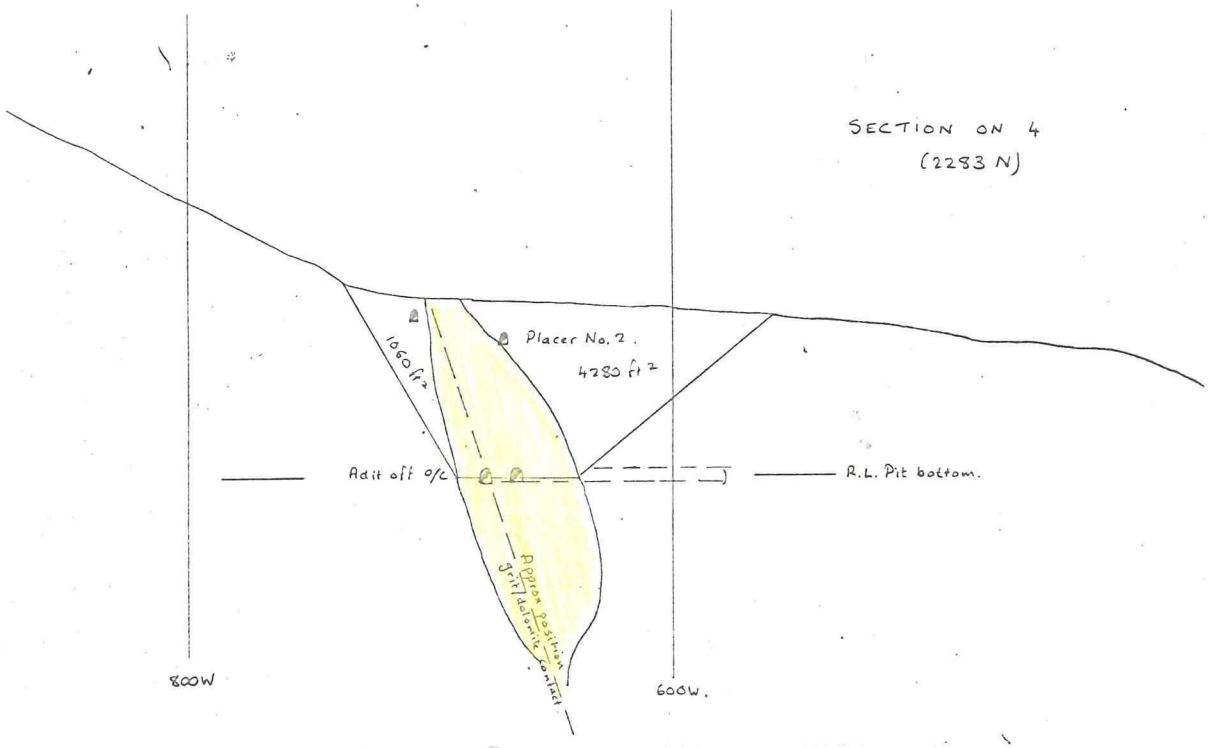
Abbreviations used

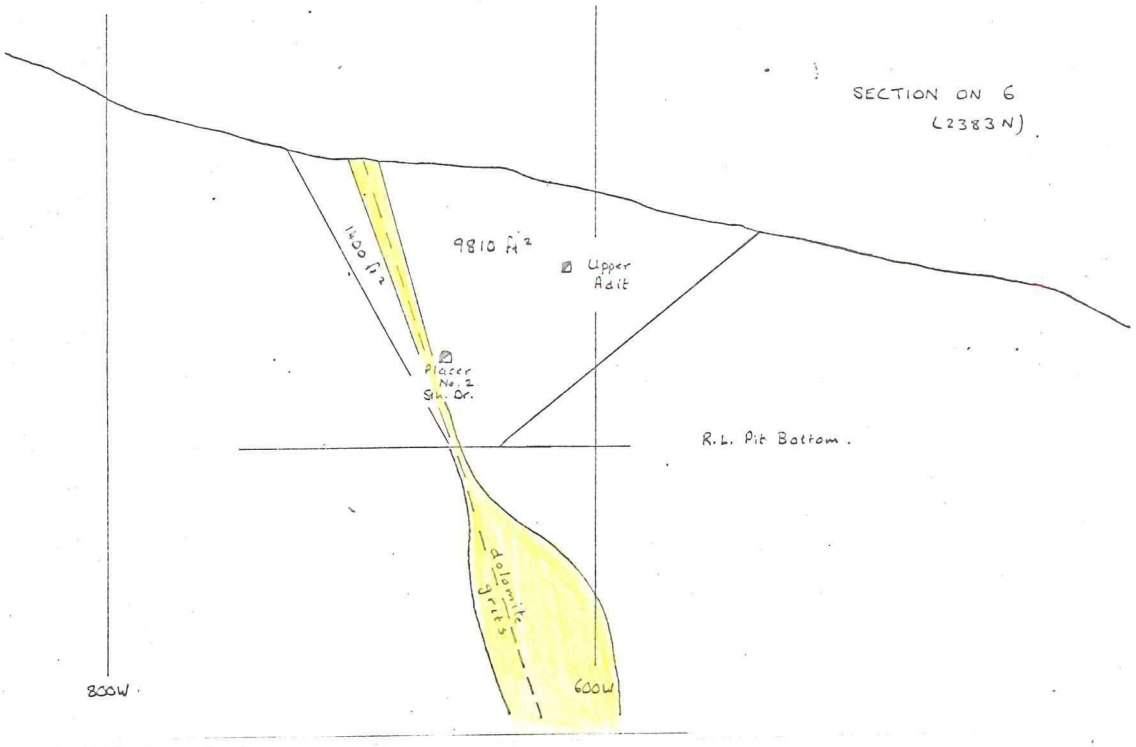
FC	Flotation Concentrate
FT	Flotation Tailing
TC	Table Concentrate
TM	Table Middling
TT	Table Tailing
F/D	Feed

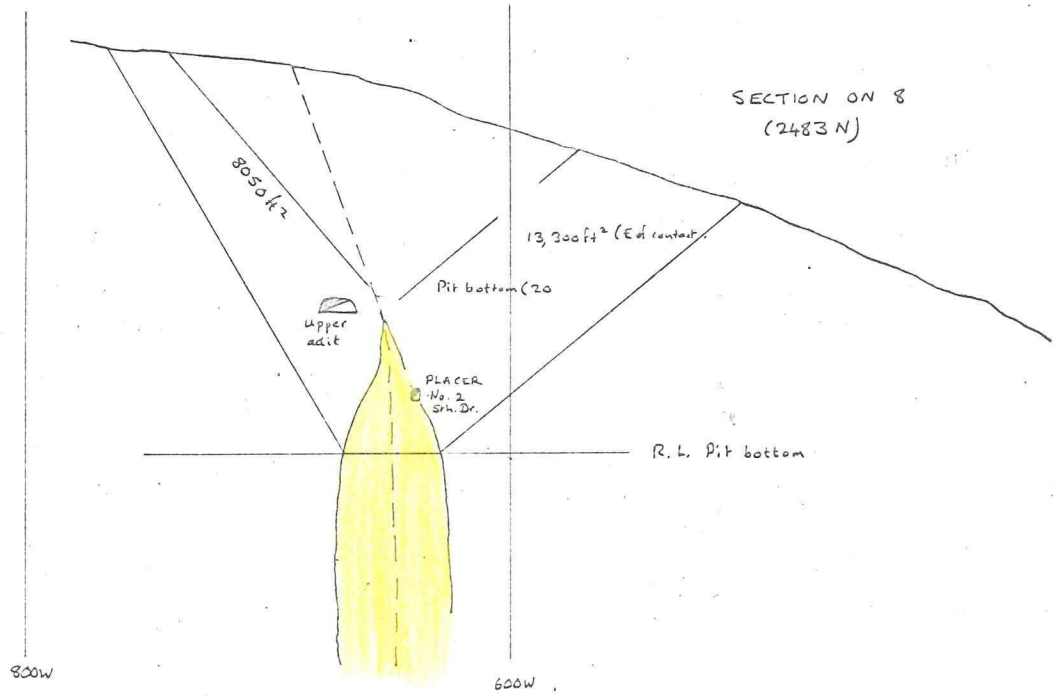
SECTION ON 2
(2183 N)

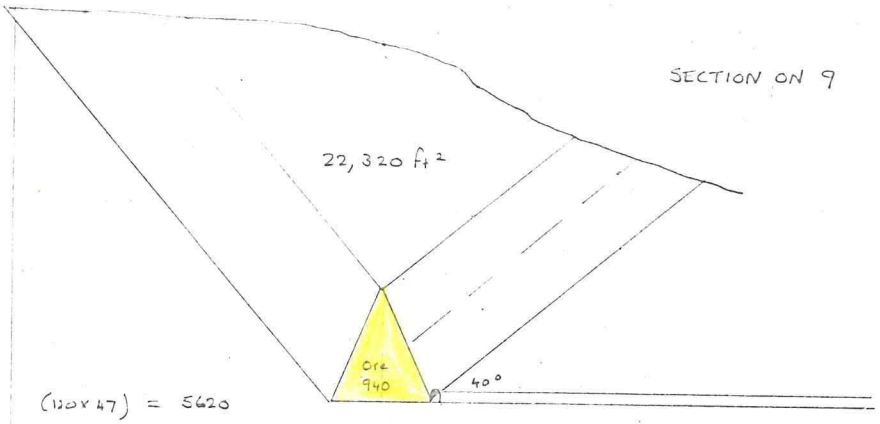


SECTION ON 4
(2283 N)




SECTION ON 6
(2383 N)
1400 ft²
9810 ft²
Upper Adit
Placer No. 2 Sth. Dr.
R.L. Pit Bottom.
dolomite
jrits
800W
600W

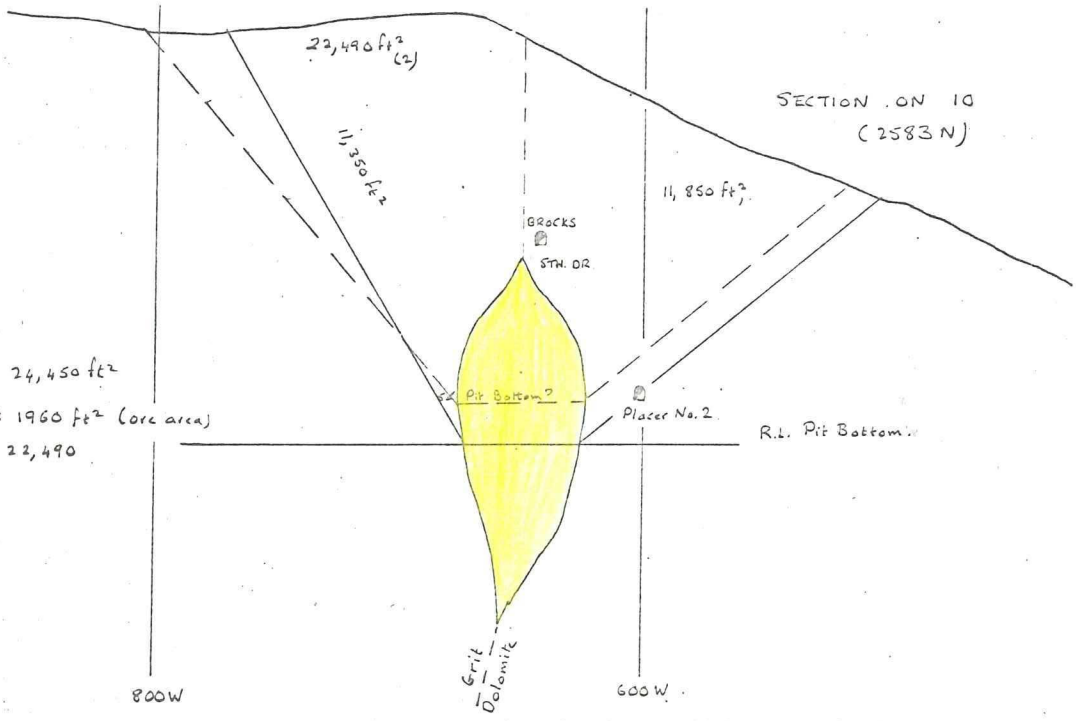

SECTION ON 8
(2483 N)
8050 ft²
13,300 ft² (Est contact.
Pit bottom (20
Upper adit
PLACER
No. 2
Sth. Dr.
R.L. Pit bottom
800W
600W

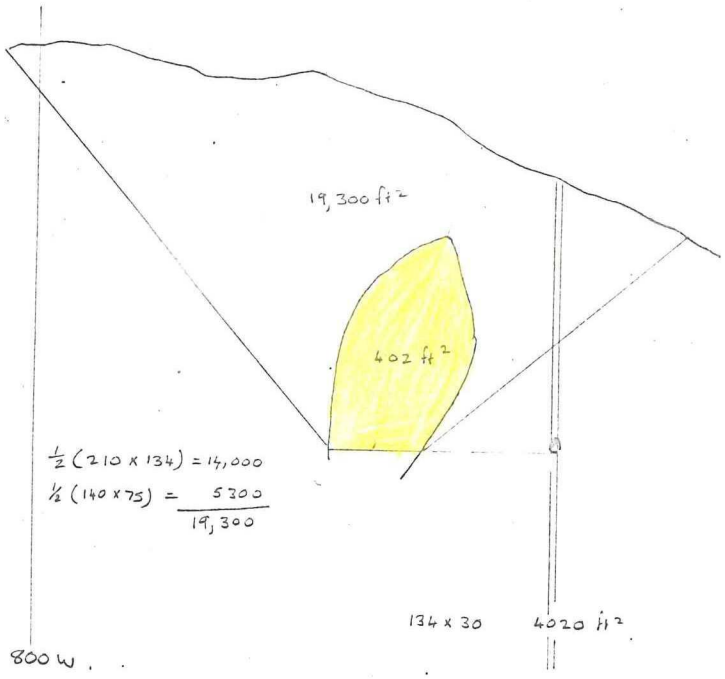


(120 × 47) = 5620
(178 × 46) = 8200
½(182 × 93) = 8500
22,320

½(4 × 47) : 940

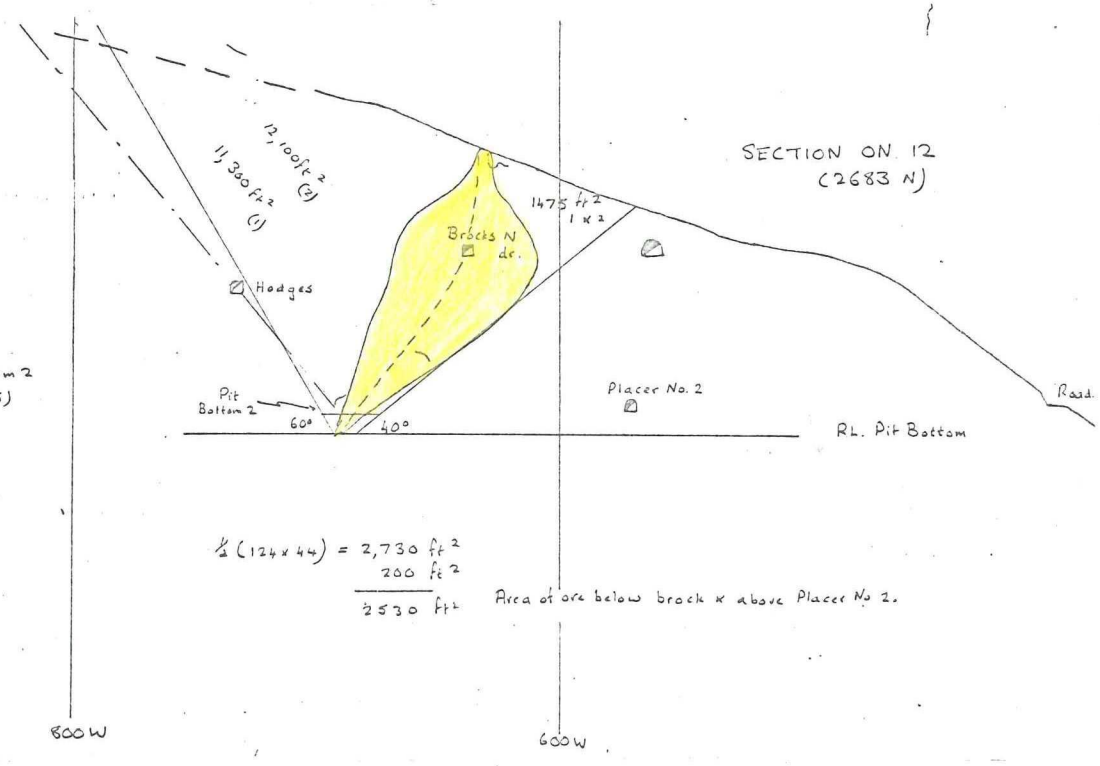
800W





SECTION ON 11

$\frac{1}{2}(210 \times 134) = 14,000$
$\frac{1}{2}(140 \times 75) = 5300$
$19,300$

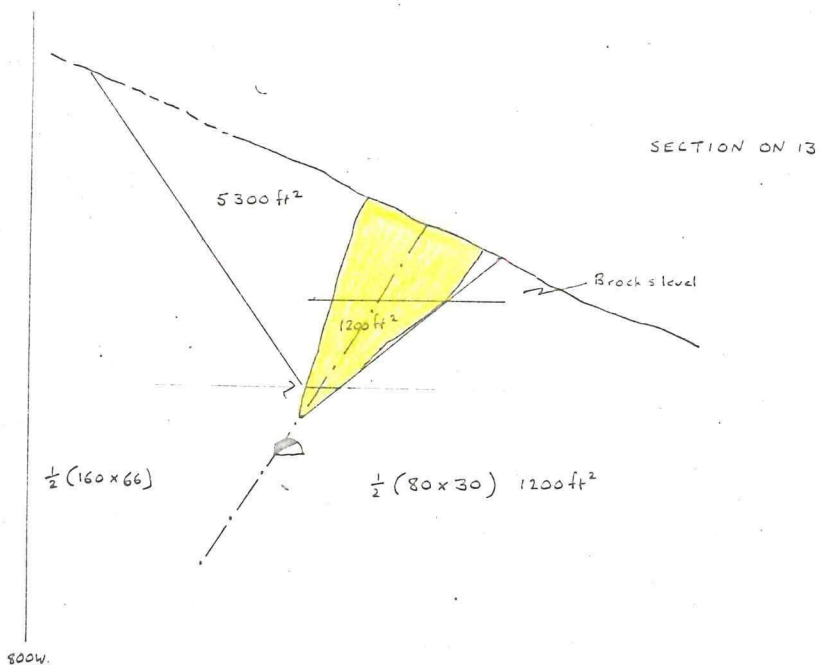


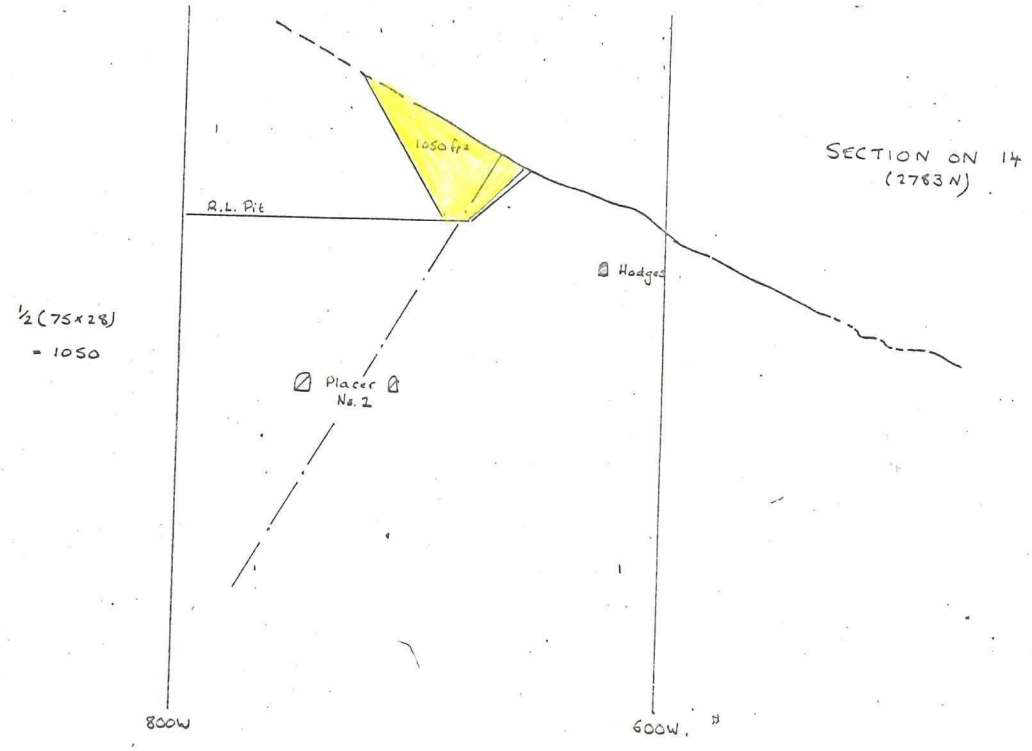
SECTION ON 12
(2683 N)

Pit bottom 2
$\frac{1}{2}(210 \times 15)$
$= 12,100$
1475
$13,575$

$\frac{1}{2}(124 \times 44) = 2,730 \text{ ft}^2$
200 ft^2
2530 ft^2

Area of ore below brock x above Placer No 2.


SECTION ON 13
5300 ft²
Brock's level
1200 ft²
½ (160 × 66)
½ (80 × 30) 1200 ft²
800W.


SECTION ON 14
(2763 N)
1050 ft²
R.L. Pit
Hodges
½ (75 × 28)
= 1050
Placer
No. 2
800W
600W.

Revis

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING					%				
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.	Sn	Pb	As	Cu	Ni
0·00	2·50	Dolomite rubble (bulldozed overburden)	0·00	2·50	0·21										
2·50		SERPENTINITE Olive green partially decomposed to clays. -	2·50	4·00	0·72										
		- fracturing and presence of clays account for poor recovery.	4·00	7·00	2·70										
		46·00 - 49·00 No core recovered - advance by weight of rods - mud?	7·00	10·00	0·49										
		52·00 - Serpentinite becoming less weathered with local cellular	10·00	13·00	0·90										
		leached textures - occassional fractures with minor sericite.	13·00	16·00	0·46										
		54·56 - Serpentinite relatively fresh - fine texture with < 1mm	16·00	19·00	0·16										
		grains and threads of magnetite - minor calcite veining.	19·00	22·00	0·52										
		57·00 NQ cased off - commenced BQ.	22·00	25·00	1·02										
		57·76 - 57·92 Serpentinite leached with cellular texture.	25·00	28·00	1·60	RZS-1	57·76	57·92	0·16		<0·01	<0·01	<0·01	<0·01	0·34
		58·66 - 60·71 Serpentinite leached with cellular texture - gossan-like but	28·00	31·00	0·18	RZS-2	58·66	59·40	0·74		<0·01	<0·01	<0·01	<0·01	0·46
		no evidence of sulphides - moderately magnetic after magnetite.	31·00	34·00	0·39	RZS-3	59·40	60·71	1·31		<0·01	<0·01	<0·01	<0·01	0·41
		68·30 300 mm leached serpentinite.	34·00	37·00	0·40										
		68·89 - 69·03 Leached serpentinite.	37·00	40·00	0·63										
		69·03 Serpentinite grades to dolomite - a gradual compositional	40·00	43·00	0·92										
	69·03	change over a few centimetres without evidence of structural break.	43·00	46·00	0·52										
69·03		DOLOMITE Grey-green to cream color with local pink lenses -	46·00	49·00	0·00										
		- mottled texture similar to serpentinite immediately above -	49·00	52·00	0·87										

DRILL HOLE RECORD PROPERTY RAZORBACK 6M/77. DRILLED BY A.D.D. COMMENCED 7-3-78 COMPLETED 13-3-78 DEPTH 128·40m RECOVERY 66·7%

LOGGED BY C.E. LAYDEN CO-ORDINATES 4607·28N. 2836·12E. COLLAR R.L. 272·39 BEARING 287°GRID 269°00' MAG. DIP -70° HOLE No. RZS-1

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
		– marbled texture is well developed at 71.00 – magnetite	52.00	55.0	1.53										
		content rapidly reduces with depth – fine grained chromite	55.0	57.0	1.90										
		moderately abundant with minor pyrite associated with chromite	57.0	59.4	1.96										
		grains – irregular splashes and veinlets of calcite common.	59.4	62.4	2.59										
		72.74 – 72.81 Splashes of cream calcite	62.4	65.4	2.65										
		76.50 – 77.40 Dolomite laminated at 30° T.C.A. *	65.4	68.4	2.87										
		80.11 15mm calcite vein at 58° T.C.A.	68.4	71.4	2.41										
		81.11 5mm calcite vein at 61° T.C.A.	71.4	74.4	3.00										
		81.67 Irregular splashes of calcite at ≃ 60° T.C.A.	74.4	77.4	2.97										
		82.31 Irregular 5mm vein of calcite with minor pyrrhotite	77.4	80.4	2.96										
		and chromite at ≃ 32° T.C.A.	80.4	83.4	3.09										
		82.45 Irregular patchy 30mm pyrrhotite vein bounded by	83.4	86.4	3.00										
		calcite at ≃ 30° T.C.A.	86.4	89.4	3.00										
		83.50 Irregular calcite.	89.4	92.4	3.00										
		83.85 Irregular 5mm calcite vein with 25% pyrrhotite at ≃ 42° T.C.A	92.4	95.4	3.00										
		83.97 25mm patchy pyrrhotite with calcite at ≃ 50° T.C.A.													
		89.78 5mm fracture with calcite and pyrite infilling at 12° T.C.A.													
	93.29	90.09 Calcite veinlets at 48° T.C.A.													

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-1 P 2 of 4 8

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING					%				
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.	Sn	Pb	As	Cu	Ni
93·29		BRECCIA with quartz and calcite cementing with occassional recognizeable sediment pebbles – Razorback Shear – lineation at ≃ 40° T.C.A. with pyrrhotite streakings													
		93·29 10mm pyrrhotite vein with very minor pyrite at 38° T.C.A.				RZS-4	93·29	94·50	1·21		0·14	0·04	<0·01	0·04	0·08
		93·39 3mm irregular pyrrhotite vein at ≃ 32° T.C.A.				RZS-5	94·5	95·5	1·0		0·59	0·09	0·03	0·04	<0·01
		93·65 25mm pyrrhotite vein with minor pyrite and sphalerite at 40° T.C.A.				RZS-6	95·5	96·5	1·0		2·30	0·31	0·43	0·13	0·01
			95·4	98·4	3·00	RZS-7	96·5	97·5	1·0		0·01	<0·01	<0·01	0·01	0·01
		95·61 – 96·10 Brecciation intense with calcite, quartz, pyrrhotite				RZS-8	97·5	98·54	1·04		0·17	0·04	0·07	0·07	0·01
	96·10	and minor pyrite.									Total Sn	Acid Sol. Sn			
96·10		GREYWACKE CONGLOMERATE				* RZS-5C	94·50	95·50			0·60	0·03			
		96·10 – 99·26 Fine grained grey-green greywacke with ≃ 1% finely	98·4	101·4	3·00	* RZS-6C	95·50	96·50			2·79	0·11			
		disseminated pyrite and local narrow irregular bands of				** RZS-5D	94·50	95·50							
		conglomerate pebbles.				** RZS-6D	95·50	96·50							
		99·26 – Predominantly Conglomerate – pebbles range to 50mm													
		diameter with a fine greywacke matrix – pebbles primarily													
		siltstone, quartzite and chert – well rounded – poorly sorted –													
		occassional bands of greywacke at 62° T.C.A. – local fine													
		quartz and pyrite on fracture planes.													

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-1.

* ASSAYS BY RENISON LTD ** ASSAYS BY AMDEL. OTHER ASSAYS BY DEPT OF MINES.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
	104.31	83m.m calcite vein at 74° T.C.A.	101.4	107.4	3.00					
	104.40	13m.m calcite vein at 81° T.C.A.								
	106.38	Irregular 10m.m quartz vein at 71° T.C.A.								
	106.55	5 m.m Quartz vein at 71° T.C.A.								
	101.98	Bedding at 42° T.C.A.								
	107.15 - 107.19	Irregular calcite as fracture infilling / 107.18 6mm calcite vein at 78° T.C.A.	107.4	110.4	3.00					
	107.25 - 110.72	Occasional (< 1%) isolated euhedral ≤ 1mm sphalerite grains within the conglomerate matrix - very minor (< 1%) ≤ 0.05mm pyrite grains interstitially within the matrix.								
	107.29	Irregular calcite vein (8mm - 16mm) approximately perpendicular to Bedding (42° T.C.A.)								
	108.66	22 mm calcite vein at 46° T.C.A; approx at b/c to bedding at 44° - calcite includes conglomerate fragments and very minor (< 1%) knots ≤ 1mm of pyrite.								
	108.89	10mm calcite vein with included conglomerate								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-1

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
		fragments and very minor (<1%) grains of pyrite and sphalerite - vein at 74° T.C.A.													
		109.35 Bedding at 41° T.C.A.													
		109.87 - 109.94 Irregular calcite splashes with minor (<1%) euhedral (<1mm) sphalerite grains.													
		110.20 Bedding at 56° T.C.A.													
		110.22 - 115.00 Grey wacke conglomerate with calcite - quartz - pyrrhotite veinlets and pyrrhotite interstitially within the matrix. Macroscopically the pyrrhotite is present as disseminations within the matrix; as rims around pebbles; as partial replacements of pebbles; as 'massive' veinlets; as aggregates within the calcite-quartz veinlets and as veinlet extensions along fractures away from the calcite - quartz veinlets. The veinlets are all approximately perpendicular to the bedding planes. The pebble size and composition of the conglomerate appears to be similar to the conglomerate elsewhere but the matrix appears to have a higher carbonate content.													

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-1

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.	
		110.30 3mm irregular pyrrhotite (60%) - calcite veinlet at approx 58° T.C.A.				RZS-44	110.20	111.50			
						RZS-45	111.5	112.56			≈ 8% Pyrrhotite
		110.33 12 mm pyrrhotite (60%) calcite-quartz vein at 58° T.C.A. (order of crystallisation is probably 1. quartz 2 calcite 3. pyrrhotite)	110.4	113.4	3.00	RZS-46	112.50	113.50			≈ 12% Pyrrhotite
						RZS-47	113.50	114.20			
						RZS-48	114.20	115.08			
		(Sphalerite is not observed intimately associated with the pyrrhotite but is present very occasionally as euhedral grains within the conglomerate matrix)									
		110.52 6 mm pyrrhotite (70%) - calcite - quartz veinlet at 55° T.C.A.									
		110.72 20 mm quartz - calcite - pyrrhotite vein at 62° T.C.A.									
		110.80 Bedding at 50° T.C.A.									
		110.96 12 mm quartz - calcite - pyrrhotite vein at 69° T.C.A.									
		111.30 10 mm pyrrhotite vein at 72° T.C.A.									
		111.32 pyrrhotite - quartz - calcite vein at 72° T.C.A. (fracture displacement ≈ 10 mm.)									
		111.70 5 mm pyrrhotite veinlet at 63° T.C.A.									
		111.76 4 mm irregular pyrrhotite veinlet at ≈ 77° T.C.A.									
		112.07 3 cm patchy interstitial pyrrhotite and minor pyrite									

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-1

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		112.13 5mm quartz-pyrrhotite veinlet at 79°.								
		112.28 - 112.33 Irregular patchy quartz with aggregates of pyrrhotite.								
		112.51 - 112.80 pyrrhotite interstitially within conglomerate matrix and constitutes approx 10% by volume.								
		112.91 - 113.08 pyrrhotite interstitially within conglomerate matrix and constitutes approx. 15% by volume - pyrrhotite partially replaces some pebbles.								
		113.12 - 113.24 Interstitial pyrrhotite approx 10%								
		113.77 - 113.88 Irregularly bounded massive pyrrhotite with ≈ 8% chalcopyrite and 20% Quartz. - very little carbonates.	113.40	116.40	3.00					
		113.88 - 115.02 25% pyrrhotite as fracture infillings, interstitially within conglomerate matrix and as partial replacement of pebbles.								
		115.10 Bedding at 45° T.C.A.	116.40	119.40	3.00					
		117.62 15mm calcite vein at 66° T.C.A. at ≈ 6 to bedding at 35° T.C.A.	119.40	122.40	3.00					
		120.13 Conglomerate passes conformably to black shale -								
	120.73	conglomerate slightly coarser above shale.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-1

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
0.00		SERPENTINITE Weathered yellow-olive green in color-locally	0.0	3.0	2.00										
		decomposed to clays - abundant magnetite grains and	3.0	6.0	1.62										
		threads.	6.0	9.0	1.78										
	19.08	Irregular fracture with iron staining at ≃ 20° T.C.A. *	9.0	12.0	1.60										
	22.30	Irregular fracture with iron staining at ≃ 20° T.C.A.	12.0	15.0	1.71										
	25.28 - 27.00	Serpentinite decomposed to light-green clay -	15.0	18.0	2.79										
		- poor recovery.	18.0	21.0	1.69										
	27.00 -	Serpentinite fresher - olive green with moderate	21.0	24.0	1.62										
		magnetite.	24.0	27.0	1.61										
	42.00 - 51.50	Serpentinite very broken with clay bands -	27.0	30.0	3.00										
		- poor recovery - Magnetite abundant as < 5mm	30.0	33.0	3.00										
		grains and splashes.	33.0	36.0	3.00										
	52.00 -	Serpentinite light olive-green in color - soft with	36.0	39.0	3.00										
		decomposition to clays - poor recovery.	39.0	42.0	2.85										
	69.00 - 81.00	Abundant bands and threads of magnetite	42.0	45.0	1.86										
		(probable cause of I.P. anomaly).	45.0	48.0	0.51										
			48.0	51.0	1.01										
			51.0	54.0	0.40										

DRILL HOLE RECORD PROPERTY RAZORBACK 6M/77 DRILLED BY A.D.D. COMMENCED 14-3-78 COMPLETED 22-3-78 DEPTH 121.40 m. RECOVERY 55.18%

LOGGED BY C.E. LAYDEN CO-ORDINATES 4122.82N 2895.23E. COLLAR R.L 225.32 BEARING 270° GRID DIP -34° HOLE No. RZS-2

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	From	To	Length	Rec.	% Sn	% Pb	% As	% Cu	% N
		81.00 - 90.00 Fawn-brown serpentinite clays with alterations	54.0	57.0	0.61										
		to talc - very poor recovery due to clays.	57.0	60.0	0.80										
		84.00 - 87.00 No core recovered — hole advanced by weight	60.0	63.0	1.37										
		of drillrods — clays?	63.0	66.0	1.12										
		90.00 110mm quartz - cellular texture with talc and	66.0	69.0	1.54										
		iron staining.	69.0	72.0	1.28										
		101.86 - 103.00 Gossan? vuggy quartz with pyrite / Blissett	72.0	75.0	1.78	RZS-9	101.86	103.00	1.14		0.05	0.08	0.01	0.01	
		'chert' as exposed on Lewis Ridge and bank of	75.0	78.0	1.87	RZS-10	103.00	104.00	1.00		0.02	0.23	0.02	0.13	
		Dundas Rivulet).	78.0	81.0	1.32	RZS-11	104.00	105.00	1.00		0.01	0.08	0.01	0.09	
		103.00 - 103.71 Massive pyrite.	81.0	84.0	0.71	RZS-12	105.00	106.00	1.00		<0.01	0.04	<0.01	<0.01	
		103.71 - 106.90 Cellular quartz with pyrite.	84.0	87.0	0.00	RZS-13	106.00	106.90	0.90		<0.01	0.12	<0.01	0.02	
	106.90	106.34 70mm pyrite fracture infilling.	87.0	90.0	0.48										
106.90		SHALE (Hodgo Slate) Black fine grained well bedded shale.	90.0	93.0	0.49										
		107.00 Bedding at 58° T.C.A.	93.0	96.0	0.30										
		109.40 Bedding at 70° T.C.A.	96.0	99.0	0.10										
		113.00 Bedding at 48° T.C.A.	99.0	102.0	0.28										
		115.00 Bedding at 20° T.C.A.	102.0	103.0	0.89										
		116.50 Bedding at 37° T.C.A.	103.0	106.4	2.19										

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-2

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		119.00 Bedding at 18° T.C.A	106.4	109.4	2.81					
	121.40	121.00 Bedding at 16° T.C.A.	109.4	112.4	3.00					
			112.4	115.4	3.00					
		Hole Completed at 121.40 metres.	115.4	118.4	3.00					
			118.4	121.4	3.00.					
		Drill Hole Surveys (Reunison Ltd's Borehole Camera).			66.99.					
		Depth. Dip Bearing.								
		40 -35.5° - (In Casing)								
		80 -37° - (In Casing)								
		121 -37° 243° Magnetic (260° Grid).								
		* T.C.A. denotes to core axis.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-2

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING								
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.	Sn	Cu		
0.00		SERPENTINITE. Olive green fine textured serpentinite with	0.0	3.0	1.25									
		numerous threads of magnetite	3.0	3.4	0.32									
		C Core Size. 0.00 - 3.00 HQ; 3.00 - NQ)	3.4	4.9	1.44									
		4.90 - 5.40 Abundant asbestos fibres at ≈ 25° T.C.A *.	4.9	6.4	1.50									
		9.17 - 9.25 Laminations of serpentinite at 47° T.C.A.	6.4	7.9	1.50									
		36.20 - 38.15 Serpentinite becoming increasingly decomposed.	7.9	9.4	1.36									
		38.15 - 60.40 Soft olive green serpentinite clays.	9.4	10.9	1.38									
		48.85 - 49.20 Abundant magnetite as threads and grains.	10.9	12.4	1.27									
		60.40 - 62.20 Brown clays after serpentinite.	12.4	13.9	1.50									
		62.20 - 70.00 Blue-grey talc carbonate - weakly magnetic -	13.9	15.4	1.50									
		- very broken with clay bands - hole caving.	15.4	16.9	1.50									
		70.00 - 70.60 Brown clays.	16.9	18.4	1.05	RZS-14	70.0	70.6	0.60	0.32	.185	<.01		
		70.60 - 71.20 No Core - brown clays being flushed from hole	18.4	19.9	1.50									
		by water return.	19.9	21.4	1.02									
		71.20 - 71.70 Brown - black Fe gossan with minor quartz.	21.4	22.9	1.50	RZS-15	71.20	72.40	1.20		.165	<.01		
		71.70 - 72.52 Iron stained talc-carbonate with gossan(?) bands.	22.9	24.4	1.50	RZS-16	72.40	73.00	0.60		.11	.11		
	72.52	72.52 - 74.30 'Chert' or quartzite with abundant pyrrhotite	24.4	25.9	1.50	RZS-17	73.00	73.70	0.70		.12	.10		
		pyrite and minor chalcopyrite - sulphides constitute	25.9	27.4	1.50	RZS-18	73.70	74.30	0.60		.01	<.01		

DRILL HOLE RECORD PROPERTY RAZORBACK DRILLED BY A.D.D. COMMENCED 28-3-78 COMPLETED 8-4-78 DEPTH 120.20m. RECOVERY 85.32 %

LOGGED BY C.E. LAYDEN CO-ORDINATES 436.28N. 2848.42E COLLAR R.L. 260.32 BEARING 270°GRID 250° MAG. DIP -50° HOLE No. RZS-3 P 1 of

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		approximately 60% by volume. - lineations at 40° T.C.A.	27.4	28.9	1.50					
72.52		'CHERT' - QUARTZITE. Highly siliceous blue-grey coarse textured	28.9	30.4	1.50					
		quartzite - numerous veinlets of quartz - non-magnetic -	30.4	31.9	1.50					
		- very hard; drilling rate approx. 0.65m per hour - rock	31.9	33.4	1.16					
		unit equivalent to Blissett chert as exposed on	33.4	34.9	1.50					
		Lewis Ridge, Vendas Rivulet and hole RZ5-2.	34.9	36.4	1.40					
		75.75 10mm leached sulphide vein at 70° T.C.A.	36.4	37.9	0.73					
		77.50 - 79.00 Quartzite broken with suggestion of shearing.	37.9	39.4	0.96					
		79.00 - Quartzite as broken - very hard - finer grained	39.4	40.0	0.58					
		than above with a blotchy texture - no suggestion	40.0	40.1	0.46					
		of bedding but laminations at ± 26° T.C.A. -	40.6	41.2	0.60					
		- minor pyrite on fractures.	41.2	42.4	0.76					
		83.57 10mm Quartz vein at 38° T.C.A.	42.4	43.0	0.65					
		88.35 - 89.10 Minor pyrrhotite on fractures.	43.0	43.6	0.53					
		89.25 Blobs of pyrite.	43.6	44.2	0.48					
	92.13	91.00 - 91.32 Minor pyrite on fractures.	44.2	44.8	0.22					
92.13		SHALE Hodgo Slate. Black fine grained well bedded shale	44.8	45.4	0.48					
		with lenses of fine grained conglomerate	45.4	46.0	0.37					

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZ5-3

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		Boundary between quartzite and shale concheidal	46·0	46·6	0·37					
		with 30mm of irregularly laminated quartzite – may be	46·6	47·2	0·59					
		a shear.	47·2	47·8	0·43					
		Shale is much distorted with fine fracture displacement	47·8	48·4	0·20					
		of ≤ 5mm.	48·4	49·0	0·40					
92·13	92·27	Irregular lenses of greywacke with pyrite blebs	49·0	49·2	0·20					
		within shale.	49·2	49·8	0·60					
94·36		80 mm calcite-quartz vein with included shale	49·8	50·8	1·00					
		fragments infilling a minor shear at 42° T.C.A.	50·8	51·4	0·49					
94·65	94·89	10 mm width irregular lens of conglomerate	51·4	52·6	0·80					
		at 10° T.C.A.	52·6	53·2	0·50					
95·15		Bedding at 20° T.C.A.	53·2	53·8	0·20					
95·39	95·55	Irregular lenses of fine grained conglomerate at	53·8	54·4	0·06					
		≥ 37° T.C.A.	54·4	55·0	0·08					
96·12		15mm of irregular conglomerate lens.	55·0	55·6	0·34					
96·75		10 mm conglomerate lens at 20° T.C.A.	55·6	56·2	0·46					
98·98	99·18	Irregular lenses of fine grained - well sorted	56·2	56·8	0·15					
		conglomerate	56·8	57·4	0·60					

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZ5-3

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
	99.34	Bedding at 33° T.C.A.	57.4	58.0	0.60					
101.00		Bedding at 38° T.C.A.	58.0	58.6	0.60					
102.45		Bedding at 12° T.C.A.	58.6	59.6	0.67					
103.00	105.50	Bedding at 5° T.C.A.	59.6	60.4	0.80					
106.00		Bedding at 7° T.C.A. with gradual steepening	60.4	61.0	0.52					
		to:	61.0	61.6	0.38					
108.00		Bedding at 36° T.C.A. with rapid flattening to:	61.6	62.2	0.32					
108.20	110.00	Bedding sub parallel to core axis	62.2	62.8	0.10					
109.61		Minor bedded pyrite.	62.8	62.9	0.10					
109.67	109.86	Irregular fracture infilling with quartz-calcite-shale fragments with minor pyrite.	62.9	63.4	0.40					
			63.4	64.0	0.10					
111.00		Bedding at 9° T.C.A.	64.0	64.6	0.26					
112.00		Bedding at 9° T.C.A.	64.6	65.2	0.18					
113.00		Bedding at 16° T.C.A.	65.2	65.8	0.10					
115.00		Bedding at 5° T.C.A.	65.8	66.4	0.30					
117.11		2mm Calcite-quartz vein with minor pyrite at 30° T.C.A parallel to bedding.	66.4	67.0	0.17					
			67.0	67.6	0.20					
118.00		Bedding wavy-irregular	67.6	68.2	0.23					

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZ5-3 P 4 of

From	To	GEOLOGICAL DESCRIPTION
		118.98 8mm calcite-quartz vein at 65° T.C.A.
		119.00 Bedding at 46° T.C.A.
		120.00 Bedding at 25° T.C.A.
		Hole Terminated at 120.20m.
		Drill Hole Surveys (Reflex Ltd. Bore Hole Camera).
		Depth Dip Bearing
		31 -49.5° - (In Casing)
		63 -51° - (In Casing)
		98 -51° 244° Mag. (269° Grid)
		* T.C.A. denotes: to core axis.

DRILLING		
From	To	Rec.
68.2	68.8	0.20
68.8	69.4	0.25
69.4	70.0	0.50
70.0	70.6	0.32
70.6	71.2	—
71.2	71.8	0.36
71.8	72.4	0.38
72.4	73.0	0.6
73.0	73.7	0.7
73.7	74.3	0.09
74.3	75.0	0.25
75.0	75.3	0.30
75.3	76.3	0.72
76.3	77.5	1.20
77.5	78.4	0.62
78.4	79.0	0.10
79.0	79.4	0.90
79.4	80.1	0.20

SAMPLING					
Sample No.	From	To	Length	Rec.	

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. A75-3.

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
			80.1	83.0	2.96										
			83.0	86.0	3.00										
			86.0	89.0	3.00										
			89.0	92.0	3.00										
			92.0	95.0	3.00										
			95.0	98.0	3.00										
			98.0	101.0	3.00										
			101.0	104.0	3.00										
			104.0	107.0	3.00										
			107.0	110.0	3.00										
			110.0	113.0	3.00										
			113.0	116.0	3.00										
			116.0	119.0	3.00										
			119.0	120.2	3.00										
					102.58										

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. R25-3

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
0.00		SERPENTINITE Olive green serpentinite mainly decomposed	0.00	8.0	0.68										
		to olive green clays – moderately magnetic	8.0	9.8	1.50										
		Near surface ie between 0.00 - 7.50 190mm	9.8	11.3	0.30										
		of ferruginous laterite recovered.	11.3	12.8	0.96										
		(core recovery very poor due to presence of clays	12.8	13.4	0.34										
		– drilling very difficult – triple tube system	13.4	14.9	0.96										
		attempted but unsuccessful due to swelling of	14.9	15.8	0.68										
		clays and blocking of water circulation –	15.8	17.3	0.27										
		normal wire-line drilling results in clays being	17.3	18.8	0.28										
		flushed from hole with consequential poor recovery)	18.8	19.4	0.44										
		(0.00 – 8.00 HQ. 8.00 – NQ).	19.4	20.6	0.44										
		± 24.00 – 41.00 Serpentinite fresher as rubble – ground broken	20.6	21.0	0.28										
		with leakage of clays.	21.0	21.8	–										
		41.00 Serpentinite more consolidated with consequential	21.8	22.4	–										
		better recoveries – serpentinite olive to yellow green	22.4	23.0	0.14										
		with waxy lustre – moderately magnetic – magnetite	23.0	23.6	0.22										
		as threads, veinlets and fine grains.	23.6	24.8	0.57										
		(Note At 47.00 NQ rods were withdrawn from	24.8	25.2	0.30										

DRILL HOLE RECORD PROPERTY RAZORBACK DRILLED BY A.D.D. COMMENCED 13-4-78 COMPLETED 22-4-78 DEPTH 116.30m. RECOVERY 84.68%.

LOGGED BY C.E. LAYDEN CO-ORDINATES 4595.5N 2837.4E COLLAR R.L. 273.5 BEARING 280° GRID DIP – 60° HOLE No. RZS-4

267°30' MAG.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		hole to replace bit; on re-entering hole coring	25·2	26·0	0·48					
		recommenced at approximately 35·00 with full recovery	26·0	27·8	0·13					
		retrieved at 37·50. A flushed cavity must exist	27·8	29·0	0·30					
		at approximately 35·00 causing deflection of hole	29·0	30·8	0·17					
		Geological and core recovery logging recommenced	30·8	32·0	0·08					
		at 37·50m)	32·0	32·6	0·20					
37·50	–	Relatively fresh olive green serpentinite with	32·6	33·8	0·20					
		numerous threads of calcite on minor shear planes.	33·8	34·4	0·20					
39·60		10mm wedged veinlet of calcite at 13° T.C.A*	34·4	35·0	0·23					
46·12		3mm calcite veinlet at 25° T.C.A.	35·0	35·6	0·24					
47·14		5mm calcite veinlet at 32° T.C.A.	35·6	36·2	0·15					
47·50		15mm calcite veinlet with abundant magnetite	36·2	36·8	0·23					
		at 37° T.C.A.	36·8	37·4	0·57					
47·95		5mm calcite veinlet at 31° T.C.A.	37·4	38·0	0·58					
48·07		5mm calcite veinlet at 30° T.C.A.	38·0	39·3	1·30					
49·43		500mm magnetite concentration with 8mm of central	39·3	40·4	1·10					
		calcite at 12° T.C.A.	40·4	41·0	0·44					
49·50	– 54·50	Numerous threads of calcite-magnetite	41·0	42·0	0·96					

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-4

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
		52.57 - 52.67 Irregular concentration of magnetite	42.0	42.8	0.76										
	54.47	bounded by magnetite veinlets.	42.8	44.0	1.20										
54.47		DOLOMITE Transition from serpentinite to dolomite	44.0	45.2	1.10										
		by increased calcite veining between 54.20 - 55.20	45.2	45.8	0.39										
		At 54.47 predominantly dolomite with	45.8	46.4	0.56										
		laminations at 44° T.C.A.	46.4	47.0	0.50										
		54.89 - 55.09 Dolomite softer with iron staining - laminations	37.5	39.2	1.70										
		at 38° T.C.A.	39.2	39.8	0.60										
		55.21 Dolomite blue grey with pink splashes -	39.8	41.3	1.50										
		lineations at 35° T.C.A.	41.3	42.8	1.40										
		Magnetite abundant to ≈ 56.50 but reduces	42.8	44.3	1.50										
		in abundance below. Chromite abundant	44.3	45.8	1.30										
		usually as cores of pink and grey splashes.	45.8	47.3	1.50										
		Dolomite mottled with Textures after serpentinite	47.3	48.8	1.46										
		55.34 8mm Calcite vein at 76° T.C.A.	48.8	50.3	1.50										
		55.45 10mm Calcite vein at 51° T.C.A.	50.3	51.8	1.50										
		55.62 10mm Calcite vein at 75° T.C.A.	51.8	53.3	1.50										
		55.70 8mm Calcite vein at 75° T.C.A.	53.3	54.8	1.50										

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.	SAMPLING
		55·88 - 55·97 Calcite infilling of minor shear - several	54·8	56·3	1·50						
		small horses of dolomite within calcite at 61° T.C.A	56·3	57·8	1·50						
		57·51 31 mm magnetite veinlet at 81° T.C.A.	57·8	59·3	1·50						
		59·30 End NQ Commence BQ Core Size.	BQ 59·3	62·3	3·00						
		70·34 - Dolomite grades to grey-black talc-carbonate	62·3	65·3	3·00						
		laminations at 60° T.C.A. - numerous	65·3	68·3	3·00						
		fine irregular crenulated carbonate veinlets	68·3	71·3	3·00						
		- non magnetic	71·3	74·3	3·00						
		From approximately 75·00 talc carbonate	74·3	77·3	3·00						
		becomes lighter in color with more frequent	77·3	80·3	3·00						
		carbonate veining and grades to dolomite									
		- correspondingly hardness increases.									
		At approximately 78·00 the color and texture									
		of the dolomite is similar to that above 70·34									
		but has a higher talc content and is consequently									
		softer.									
		78·55 - 81·00 ≈ 10% Pyrrhotite finely disseminated within talc				R25-19	78·55	79·40	-	-	0·11
	81·00	rich dolomite									

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. R25-4. P 4 of

* Assays by Dept of Mines - Launceston : ½ Core.

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING							Remission Ltd.	
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.	Sn.		Total Sn.	Acid Sol Sn.
81.00		BRECCIA. Zone of brecciation with recognisable conglomerate pebbles.	80.3	83.3	3.00	RZS-20	79.40	80.40	1.00		1.60			
			83.3	86.3	3.00	RZS-21	80.40	81.40	1.00		0.82			
	81.78	81.00 – 81.32 20% Pyrrhotite on irregular lineation at 34° T.C.A.	86.3	89.3	3.00	RZS-22	81.40	82.29	0.89		0.05*			
81.78		GREYWACKE CONGLOMERATE. Blue-grey conglomerate composed of siltstone, quartzite and chert pebbles < 400mm set within a fine pebble and greywacke matrix. Pebbles are sub angular and poorly sorted – quartz and calcite veining common	89.3	92.3	3.00	RZS-20C	79.40	80.40	1.00				1.57	<0.01
						RZS-21C	80.40	81.40	1.00				0.80	<0.01
						RZS-20B	79.40	80.40	1.00		Cu% 0.12	Zn% 0.004	1.69	<0.01
						RZS-21B	80.40	81.40	1.00		0.13	0.003	0.73	<0.01
						RZS-20D	79.40	80.40	1.00		0.079	0.007	1.66	<0.01
		83.19 Minor pyrite – pyrrhotite on lineations at 66° T.C.A.				RZS-21D	80.40	81.40	1.00		0.095	0.006	0.84	<0.01
		84.17 Bedding? at 39° T.C.A.												
		84.91 5mm calcite – pyrrhotite veinlet at 31° T.C.A.												
		85.48 – 86.84 ≈ 15% Pyrrhotite with minor pyrite infilling fractures.				RZS-23	85.46	86.84	0.38		Sn. 0.25		Total Sn.	Acid Sol Sn.
						RZS-30	82.29	82.94	0.65		Cu% 0.093	Zn% 0.175	0.092	0.01
		86.84 5mm calcite veinlet at 17° T.C.A.				RZS-31	82.94	83.56	0.62		0.01	0.125	0.062	0.01
		89.57 – 89.76 ≈ 2% Pyrrhotite disseminated in conglomerate.				RZS-32	83.56	83.94	0.38		Tr	0.023	0.002	<0.01
		90.30 – 90.51 ≈ 1% Pyrrhotite disseminated in conglomerate.				RZS-33	83.94	84.70	0.76		0.002	0.32	0.005	<0.01
		90.35 6mm pyrite – pyrrhotite veinlet at 33° T.C.A.				RZS-34	84.70	85.46	0.76		0.002	0.22	0.01	<0.01
		90.75 Pebble orientation at 52° T.C.A.				RZS-35	86.84	87.84	1.00		0.013	0.05	0.030	0.15

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-4. P 5 of

⊗ Assays by Dept. of Mines, Launceston: ½ Core. * Assays by Remission Ltd: D.M.C residues. ** Assays by Amdel: ¼ core. xxx Assays by Amdel: D.M.C residues.
o Assays by Amdel: ¼ core.

From	To	GEOLOGICAL DESCRIPTION
		91.59 - 92.49 ± 2% Pyrrhotite disseminated and as threads in conglomerate
		92.17 Irregular minor pyrrhotite - pyrite veinlet at 29° T.C.A
		93.12 - 93.32 ± 1% Pyrrhotite disseminated in conglomerate.
		95.60 - 95.62 ± 1% Pyrrhotite disseminated in conglomerate with pebble orientation at 50° T.C.A.
		95.89 30mm drusy quartz vein at 65° T.C.A.
		95.92 - 96.01 Minor disseminated pyrrhotite.
	96.38	96.36 Pebble orientation at 41° T.C.A.
96.38		HEDGE SLATE Conglomerate passes conformably to shale. Shale is black, fine grained and well bedded. Conformity at 48° T.C.A.
		99.00 Bedding at 49° T.C.A.
		100.40 - 100.57 Conglomerate lens at 46° T.C.A.
		103.00 Bedding at 27° T.C.A
		104.00 Bedding at 26° T.C.A.
		104.15 15mm quartz vein at 77° T.C.A.
		107.30 Bedding at 30° T.C.A.

DRILLING			SAMPLING									
From	To	Rec.	Sample No.	From	To	Length	Rec.	Total Sn %	Acid Sol Sn	Cu%	Zn%	
92.3	95.3	3.00	RZS-36	87.84	88.84	1.00		0.007	<0.01	0.003	0.37	
95.3	98.3	3.00	RZS-37	88.84	89.84	1.00		0.19	0.01	0.013	0.52	
98.3	101.3	3.00	RZS-38	89.84	90.84	1.00		0.18	0.01	0.013	0.057	
101.3	104.3	3.00	RZS-39	91.57	92.50	0.93		0.16	0.01	0.016	0.125	
104.3	107.3	3.00	RZS-41	92.50	93.50	1.00		0.185	0.01	0.012	0.64	
			RZS-42	95.55	95.75	0.20		0.495	0.02	0.042	0.50	

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L BEARING DIP HOLE No. RZS-4 P 6 of

o Assayed by Hunter : ½ Core.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		110.00 Bedding at 27° T.C.A	107.3	110.3	3.00					
		111.08 - 111.39 Numerous quartz threads - no dominant attitude	110.3	113.3	3.00					
		111.62 10mm wedge lens of conglomerate with minor disseminated pyrite.	113.3	116.3	3.00					
		111.35 - 112.50 Conglomerate lens with minor disseminated pyrite								
		113.00 Bedding at 35° T.C.A.								
		114.35 - 114.59 Irregular wedge lenses of fine grained conglomerate (tuff?)								
		116.00 Bedding at 26° T.C.A.								
		Hole Completed at 116.30m.			98.48					
		Drill Hole Survey (Reflex Lidi Bore Hole Camera)								
		Depth Dip Bearing								
		40 -57° - (In casing)								
		80 -57° 255° Magnetic - local psycholite								
		110 -51.5° 265.5 Magnetic - shale. (287.56rid)								
		* T.C.A. denotes to core axis.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. AZS-4

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
0·00		SERPENTINITE Fresh fine textured olive-green serpentinite -	0.0	3·6	0·86										
		moderately magnetic; magnetite as fine threads and	3·6	3·9	0·30										
		grains - occasional threads of calcite.	3·9	5·4	1·38										
		19·32 5 mm asbestos vein at 45° T.C.A +	5·4	6·9	1·20										
		26·214 Minor asbestos.	6·9	8·4	1·50										
		35·37 - 35·49 Asbestos at 28° T.C.A.	8·4	9·9	1·50										
		45·57 8 mm asbestos at 40° T.C.A.	9·9	11·4	1·50										
		46·94 - 47·09 Minor slip planes with asbestos at 30° T.C.A.	11·4	12·9	1·45										
		50·57 - 50·64 40 mm calcite-magnetite laminations at 37° T.C.A.	12·9	14·4	1·50										
		77·18 10 mm magnetite vein at 39° T.C.A.	14·4	15·9	1·48										
		86·50 - 88·13. Serpentinite color changes from olive to apple	15·9	17·4	1·48										
		green.	17·4	18·9	1·50										
	88·13	88·13 Serpentinite grades to talc carbonate.	18·9	20·4	1·42										
88·13		TALC CARBONATE Grey-black, fine textured, non magnetic	20·4	21·9	1·50										
		talc carbonate with local dolomite development -	21·9	23·4	1·50										
		occasional veinlets of calcite and pink carbonate	23·4	24·9	1·50										
		flecks. - local minor disseminated pyrite.	24·9	26·4	1·50										
		± 104·00 Grey talc carbonate mottled with white calcite -	26·4	27·9	1·50										

DRILL HOLE RECORD PROPERTY RAZORBACK DRILLED BY A.D.D COMMENCED 28-4-78 COMPLETED 9-5-78 DEPTH 455·40m. RECOVERY 97·23%.

LOGGED BY C.E. LAYDEN CO-ORDINATES 4354·54N 2860·22E COLLAR R.L. 253·7 BEARING 270° GRID 254°20' MAG. DIP - 62° HOLE No. RZ5-5

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
		- occasional veinlets of calcite and minor quartz.	27.9	29.1	1.20										
		Hardness gradually increasing with depth.	29.1	30.3	1.20										
		110.25' Minor pyrite on calcite concentration.	30.3	30.9	0.58										
		117.03 - 117.60 Minor irregular pyrite veinlets.	30.9	32.4	1.50										
		≈ 121.50 - 122.50 talc content reduces and rock grades	32.4	33.9	1.50										
	122.50	to predominantly dolomite	33.9	35.4	1.50										
122.50		DOLOMITE Dark grey dolomite with white calcite	35.4	36.9	1.48										
		blotches - medium to fine textured and non magnetic	36.9	38.4	1.35										
		- local talc rich developments.	38.4	39.9	1.47										
		122.60 Minor irregular pyrite.	39.9	47.9	3.00										
		123.20 Dolomite grades to 'siliceous rock' by increase in	47.9	44.4	1.50										
		silica content. - compositional change is gradual and	44.4	45.9	1.35										
	123.20	visually not obvious.	45.9	47.4	1.50										
123.20		'SILICEOUS ROCK' Dark grey cherty quartz, dull lustre	47.4	48.9	1.50										
		hard and non magnetic - occasional calcite veining	48.9	50.4	1.50										
		and blotching.	50.4	51.9	1.38										
		125.4 Minor fracture making moderate water pressure.	51.9	53.4	1.50										
		129.30 - 129.49 Minor pyrite.	53.4	54.9	1.50										

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZ5-5

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		134.30 Minor pyrite.	54.9	56.4	1.50					
		135.31 - 136.16 Minor pyrite.	56.4	57.9	1.50					
	136.16	135.90 - 136.16 Moderate brecciation.	57.9	59.4	1.50					
136.16		HODGE SLATE Black fine grained well bedded shale	59.4	60.9	1.50					
		with occasional minor lenses of conglomerate -	60.9	62.4	1.17					
		occassional veinlets of quartz and calcite	62.4	63.9	1.50					
		136.69 - 136.89 Conglomerate lenses - pebbles compose siltstone	63.9	65.4	1.48					
		and chert up to 10mm in diameter - minor	65.4	66.9	1.37					
		pyrite.	66.9	to						
		138.52 - 139.31 Conglomerate lenses at = 54° T.C.A.		155.4	100%					
		Pebble orientation within lenses is irregular.			Core Rec.					
		144.78 - 145.24 Conglomerate lenses - pebble orientation								
		irregular - included shales' bedding is sub parallel								
		to core axis	0	3.6	HQ.					
		148.35 Bedding at 8° T.C.A.	3.6	84.0	NQ.					
		151.81 Bedding at 16° T.C.A.	84.0	155.4	BQ.					
		154.68 Bedding at 10° T.C.A.								
		Hole Completed at 155.40 metres.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-5

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
		Drill Hole Surveys (Reminant Ltd's Bore Hole Camera).													
		Depth. Dip Bearing.													
		48 -61° - (Un Casing)													
		99 -58° 243° Mag. 268° grid													
		150 -57° 242° Mag. 267° grid.													
		* T.C.A. denotes ∠ to core axis.													

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-5 P 4 of

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING					
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.	
0.00		SERPENTINITE	Core Recovery								
		Fresh dark olive green serpentinite – moderately	100% unless								
		magnetic – magnetite as fine grains (≤1mm) and	otherwise stated:								
		threads – abundant calcite veinlets and threads with	0.00	3.50	152						
		a dominant orientation at 33° to core axis.	3.50	5.00	134						
		0.00 – 6.00 core very broken due to surface weathering.	8.50	10.00	146						
		47.50 – 49.00 Serpentinite soft and crumbly resulting in	10.00	11.50	140						
		30% core loss.	11.50	13.00	136						
		70.50 – 70.84 Minor shear.	13.00	14.50	093						
		71.00 – 71.14 Distortion in serpentinite texture – minor shear?	23.00	25.00	138						
		92.00 – 93.36 Serpentinite a light olive green with 10%	26.50	28.00	130						
		sub spherical grey carbonate splashes.	38.50	40.00	147						
		94.47 2 m.m. Calcite veinlet at 62° to core axis	40.00	41.50	147						
		95.11 10 m.m. Calcite veinlet at 38° to core axis	41.00	47.50	146						
		95.52 15 m.m. Calcite veinlet at 50° to core axis.	47.50	49.00	125						
		95.56 2 m.m. Calcite veinlet at 59° to core axis	53.00	56.00	250						
		96.37 8 m.m. Calcite veinlet at 58° to core axis	59.00	62.00	245						
		96.82 8 m.m. Calcite veinlet at 58° to core axis	68.0	71.0	296						

DRILL HOLE RECORD PROPERTY RADDAGACK 6M/11. DRILLED BY A.D.D. COMMENCED 22-6-78 COMPLETED 12-7-78 DEPTH 287 metres RECOVERY 98.23%

LOGGED BY C.E. LAYDEN CO-ORDINATES 4528.19N 2902.32E COLLAR R.L. 257.64 BEARING 293°30G (270°30° MAG) DIP −68° HOLE No. RZS-6.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		97.09 8 m.m. Calcite veinlet at ° to Core Axis.	71.0	74.0	230					
		97.66 8 m.m. Calcite veinlet at ° to core axis	81.0	85.50	270					
		101.38 - 107.87 Numerous calcite veinlets with minor associated magnetite with attitudes 38°-50° to core axis	Continuous at	122.10						
		107.77 - 107.87 Calcite - magnetite veining at 35° to core axis								
		111.00 - 113.50 Fine (≤ 1 m.m.) veinlets of calcite at 20°-25° to core axis - intensity increasing with depth								
		113.50 - 115.80 Serpentinite grades to dolomite by increasing carbonate content. Transitional serpentinite - dolomite is grey-green, sub translucent with serpentinite textures.								
	115.80									
115.80		DOLOMITE								
		Blue-grey-green medium to fine grained dolomite with remanant serpentinite textures. Numerous irregular calcite veinlets and splashes. Calcite veining occasionally displays fine magnetite selvedges.								
	123.86									
123.86	124.62	SERPENTINITE Weathered olive green serpentinite								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-6

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING					
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.	
124.62		DOLOMITE Grey to cream fine grained dolomite with local pinkish hue – numerous irregular carbonate veinlets.			100% ↓						
		(132.65 Core fractured)									
		(138.60 Core fractured – 20% water return loss)									
		141.74 – 144.13 Intense irregular calcite veining with some iron staining – probably calcite infilled crush zone									
		144.13 – ± 149.00 Grey dolomite with clear fine calcite veining orientated at 40° to core axis.									
		154.63 8 m.m. Quartz vein at 73° to core axis									
		154.67 – 155.64 Very minor (<1%) interstitial pyrite grains < 1 m.m. diameter.									
		157.71 Dolomite lineation at 38° to core axis									
		163.50 – 164.65 Dolomite with pinkish hue – lineations at 40° to core axis	164.0	167.0	2.78						
		169.90 Calcite lineations at 16° to core axis.									
		169.91 – 172.95 Minor patches (<1%) of pyrite (grains < 4 m.m.)									

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-6

Samples	½ Core: Amdel	Remainder of RZS-: Rennie	Hunter
RZS-24B	24C		24D
25B			
26B	26C		26D
27B			
28B	28C		28D
29B.	29C		29D

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	From	To	Length	Rec.	Total Sn. %	Acid Sol. Sn	Sn as SnO_2	Co%
		with in grey dolomite.			100%									
		172.95 - 173.06 110 m.m. true width Quartz - Calcite - Pyrrhotite vein at 38° to core axis - 10% sulphides.			↓									
		173.87 - 177.24 Pyrrhotite - upper selvedge 24mm cream carbonate with irregular (± 44°) contact with dolomite. Pyrrhotite flecked with carbonate and quartz granules ≤ 2 m.m.				RZS-24	173.87	174.87	1.00		0.21		0.05	
						RZS-25	174.87	175.87	1.00		0.17		0.01	
						RZS-26	175.87	176.87	1.00		0.61		0.05	
						RZS-27	176.87	177.24	0.37		0.13		0.01	
		175.98 5 m.m. irregular vein let of sphalerite at approx. 35° To core axis.												
		176.04 15 m.m. galena vein let at 55° to core axis.												
		177.24 - 177.36 Irregular cream carbonate selvedge with approx. 30° contact with dolomite.												
		177.36 - 182.99 Grey dolomite with very minor pyrite as grains ≤ 3 m.m.				RZS-40	180.17	180.55	0.38		0.05₂	0.01		0.015
		182.99 - 184.22 Pyrrhotite - massive with 10% carbonates as grains and splashes. Upper contact @ 76° to core axis - lower grading to disseminated contact at approx 35° To core axis.				RZS-28	182.99	183.60	0.61		0.28		0.18	
						RZS-29	183.60	184.27	0.67		0.28		0.05	

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED / COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-6 P 4

* Assays by Dept. of Mines Launceston : ½ core. ** Assays by Amdel : ½ Core.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		184.30 Calcite lineations within dolomite at 35° to core axis.			100%					
		185.75 20 mm pyrrhotite vein at 66° to core axis.								
		187.50 Dolomite lineations at 38° to core axis								
		188.29 10 mm quartz veinlet at 56° to core axis.								
		191.60 Dolomite lineation at 46° to core axis								
		198.80 Dolomite lineation at 34° to core axis								
		200.52 Laminated calcite at 40° to core axis parallel to dolomite lineations.								
		206.13 – 206.32 Laminated calcite at 50° to core axis								
		206.23 ≈ 10 mm irregular sphalerite								
		206.24 – 206.29 minor pyrrhotite on dolomite laminations								
	207.34									
207.34		GREYWACKE CONGLOMERATE.								
		207.34 – 207.54 sediments laminated with calcite at 57° to core axis with slickensides indicating shear at 72° to core axis.								
		Greywacke conglomerate composed of rounded								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-6 P 5

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		and sub angular siltstone and occasional grey and red chert pebbles set within a fine grey mudic matrix - very minor (<1%) interstitial pyrite - calcite abundant as fracture infillings and irregular veinlets.			100% ↓					
		216.2 25 mm calcite-quartz vein as minor shear infilling at 40° to core axis.								
		225.30 Bedding at 46° to core axis (minor calcite veinlets usually normal to bedding)								
		237.85 Bedding at 40° to core axis.								
		240.25 15 mm quartz veinlet at 55° to core axis								
		244.44 18 mm quartz veinlet with minor chalcopyrite at 68° to core axis								
		248.84 Pebble orientation: 43° to core axis								
		250.93 Pebble orientation: 56° to core axis								
		254.10 5 - 8 mm calcite wedge at ≈ 72° to core axis								
		255.64 17 mm irregular calcite veinlet at ≈ 78° to core axis								
		256.12 Pebble orientation at 38° to core axis								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. R25-6

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING								
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.				
		262.48 Pebble orientation at 38° to core axis			100% ↓									
		283.33 Bedding at 54° to core axis.												
	287+.	286.80 Pebble orientation at 44° to core axis.												
		HOLE COMPLETED AT 287 metres.												
		DRILL HOLE SURVEYS (RENISON LTD'S BORE HOLE CAMERA).												
		DEPTH. DIP. BEARING.												
		96 m. -69.5° 255° Mag. (Serpentinite)												
		150 m. -69.5° 260° Mag. (Dolomite).												
		179 m. -69° 298° Mag. (near Sulphides).												
		233 m -69° 257° Mag. (Conglomerate).	270° Grid											
		286 m -68.7° 255° Mag. (Conglomerate).	273° Grid											

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZ5-6.

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING					
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.	
0.00		SERPENTINITE Dark olive green serpentinite with occassional banding of calcite and threads of magnetite.	Recovery 100% unless otherwise stated.								
		0.00 – 16.00 Core very fractured due to surface weathering – much core loss.	0.00	3.5	1.05'						
			3.50	5.30	0.90						
16.00		Minor shear plane with asbestos at 30° T.C.A.*	5.30	6.50	0.70						
19.25		Fine carbonate threads orientated at 22° T.C.A.	6.5	8.3	1.37						
20.00		Minor shear with asbestos at 12° T.C.A.	9.5	11.3	1.30						
21.55		Minor shear with asbestos at 27° T.C.A.	11.3	11.5	0.25'						
22.45		Minor shear with asbestos at 28° T.C.A.	11.5	14.3	0.60						
23.40 – 23.65		Core very broken.	14.3	15.5	0.60						
24.40 – 26.25		Numerous minor slip planes with asbestos generally orientated 30° – 47° T.C.A.	15.5	16.8	0.95'						
			16.8	18.5	1.50						
28.35		Slip plane with asbestos at 61° T.C.A.	20.10	21.50	1.38						
28.85		Slip plane with asbestos at 15° T.C.A.	23.00	23.65	0.50						
29.00		Slip plane with asbestos at 76° T.C.A.	23.65	26.0	2.25						
29.53		Slip plane with asbestos at 25° T.C.A.	26.0	29.0	2.94						
32.15		Lineations in serpentinite at 52° T.C.A.	29.0	32.0	2.93						
			32.0	35.0	2.65'						

DRILL HOLE RECORD PROPERTY RADARBACK DRILLED BY A.D.D. COMMENCED 13-7-78 COMPLETED 26-7-78 DEPTH 205 Metres RECOVERY 94.26%.

LOGGED BY C.E. LAYDEN CO-ORDINATES 4528.19N 2902.52E COLLAR R.L. 257.64 BEARING 275°40' GRID DIP −46° HOLE No. RZS-7

254°30' MAG.

P 1. of

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		(34.45 - 34.80 Core very broken - core loss).	38.0	41.0	2.95					
		35.54 Asbestos lineations at 38° T.C.A.	41.0	44.0	2.90					
		43.90 100 mm Sheared serpentinite with asbestos at 47° T.C.A.	44.0	47.0	2.70					
		47.32 - 47.57 Sheared serpentinite with minor asbestos and magnetite threads at 43° T.C.A.	47.0	50	2.90					
			50.0	53.0	2.85					
		(54.80 - 55.00 Core very broken)	53.0	55.0	1.80					
		56.40 - 56.60 Sheared serpentinite with minor asbestos and magnetite threads at 32° T.C.A.	55.0	57.2	1.80					
			57.2	59.0	1.65					
		(62.60 - 62.90 Core broken)	59.0	62.0	2.80					
		71.85 Slip plane with asbestos at 19° T.C.A.	65.0	68.0	2.75					
		(77.60 - 73.10 Core broken)	68.0	71.0	2.90					
		85.25 Minor shear with asbestos at 26° T.C.A.	71.0	73.1	2.90					
		85.56 Minor shear with asbestos at 25° T.C.A.								
		86.50 Minor shear with asbestos at 25° T.C.A.								
		90.15 Lineation in serpentinite at 36° T.C.A.								
		92.00 Minor shear with asbestos and magnetite at 56° T.C.A.								
		92.90 Minor shear with asbestos and magnetite at 20° T.C.A.								
		95.45 Minor shear with asbestos and magnetite at 21° T.C.A.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-7 P 2 of

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		(96.20 - 96.40 Core broken)			100%					
		(97.10 - 97.20 Core broken)			↓					
		(97.60 - 97.80 Core broken)								
		99.91 Minor shear with asbestos and minor galena at 78° T.C.A.								
		100.86 Minor shear with asbestos at 39° T.C.A.								
		105.40 Lineation in serpentinite at 38° T.C.A.								
		107.35 Minor shear with asbestos at 45° T.C.A.								
		108.46 Minor shear with asbestos at 22° T.C.A.								
		110.25 Minor shear with asbestos at 42° T.C.A.								
		112.80 Lineations in serpentinite with minor asbestos at 72° T.C.A.								
		115.50 Lineation in serpentinite at 30° T.C.A.								
		116.00 Minor shear with asbestos at 53° T.C.A.	Commence		BQ					
		≈ 118.50 Dark olive green serpentinite becomes lighter	at 117m.							
		green at ≈ 119.00 to 121.80 serpentinite light	117.0	119.0	1.61					
	121.80	~~[illegible]~~ cream-green with local clay bands.	119.0	122.0	2.72					
121.80		DOLOMITE. At 121.80 serpentinite rapidly grades to			100%					
		dark blue-black dense dolomite with occasional			↓					
		flecks of flesh-pink carbonates.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. A25-7 P 3 of

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		131.53 Slip plane at 41° T.C.A.								
		134.23 16 mm calcite vein at 40° T.C.A.								
		136.27 22 mm calcite vein with very minor pyrite and suspended dolomite fragments at 30° T.C.A.								
		139.54 Dolomite with minor interstitial pyrite								
		144.55 - 147.40 Dolomite with very minor interstitial pyrite (<1%)								
		153.61 → Light grey dolomite with ≈ 3% chromite grains ≤ .05 mm diameter - some chromite crystals display arsenopyrite cores - distribution of chromite reduces with depth and becomes finer. - local apple-green carbonates.								
		155.68 Irregular conchoidal slip plane with minor pyrite at approx 49° T.C.A.								
		167.00 → Irregular calcite veining becomes intense - average orientation approximate 40°-50° T.C.A. Dolomite becomes dark olive green to ≈ 164.50 then becomes lighter green.								
		166.47 Minor shear with white carbonate pug infilling								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

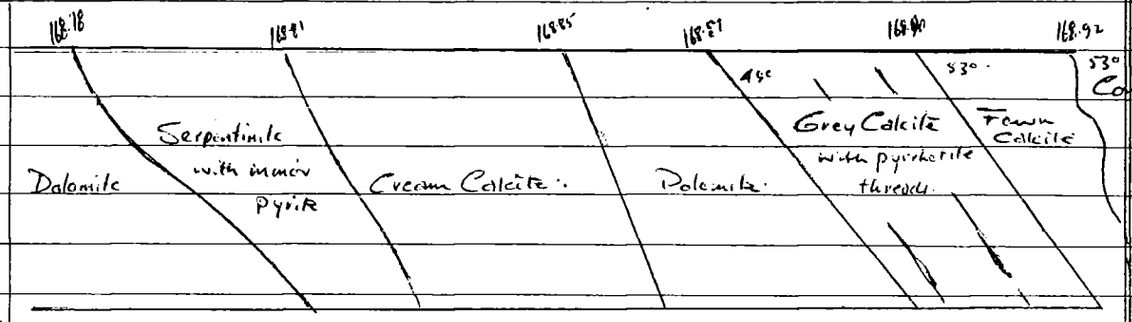
LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-7

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	From	To	Length	Rec.	Total Sn%	Acid Sol. Sn.	Cu%	Zn%.
		and with drusy quartz covering on upper contact												
		167.00 10 m m quartz-carbonate vein at 50° T.C.A.												
		167.14 20 m.m Quartz vein at 61° T.C.A.												
		167.26 - 167.53 Irregular wedge of calcite.												
		168.16 - 168.22 Irregular calcite - quartz development at 55° T.C.A												
		168.50 - 168.65 Fine laminations at 72° T.C.A of grey-black dolomite and blue-grey calcite with fine pyrrhotite (3%) as interstitial infillings and splashes accompanied by sphalerite grains (1%) of < 1 m.m diameter.												
		168.74 - 168.90 Dolomite laminated with calcite at 33° T.C.A												
		168.78 - 168.81 Wedge of dark green serpentinite with irregular boundaries to calcite — minor pyrite on slip planes.												
		168.90 - 168.93 30mm intense calcite laminations with lenses, threads and interstitial pyrrhotite (≃ 3%) at 49° T.C.A.				RZS-43	168.74	168.97	0.23		0.086	0.01	0.18	0.01₂

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. P 5 of

o Assays by Amdel : ½ core.

GEOLOGICAL DESCRIPTION			DRILLING			SAMPLING									
From	To		From	To	Rec.	Sample No.	From	To	Length	Rec.					
															
	168.95														
168.95		GREYWACKE CONGLOMERATE.													
		168.95 – 169.47 Pebble conglomerate with a dolomite matrix with threads of calcite.													
		169.07 – 169.15 50mm fine with quartz-calcite vein at 53° T.C.A. at approx ⊥ to bedding.													
		169.47 – 169.15 Fine bedded black slate at 51° T.C.A.													
		169.65 → Greywacke Conglomerate composed of grey siltstone, and grey-pink chert pebbles ≤ 20mm within a fine pebble and greywacke matrix.													
		169.85 Bedding at 56° T.C.A.													
		170.08 26mm Calcite-quartz vein at 45° T.C.A and													

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-7

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		approx. perpendicular to bedding at 58° T.C.A. - minor sericite on lower contact.								
171.22		45 m.m Calcite-quartz vein at 35° T.C.A. at ± ⊥ to bedding - very minor (<1%) pyrrhotite, pyrite and (sphalerite?) as ≤ 2 m.m blebs within calcite.								
171.78		7 m.m calcite with quartz centre vein at 34° T.C.A.								
172.33		Bedding at 45° T.C.A.								
172.46		5 m.m Calcite-quartz vein at 45° T.C.A. ± ⊥ to bedding								
174.28		5 m.m. irregular calcite-quartz vein at 45° T.C.A								
174.42		12 m.m. calcite ± drusy quartz vein at 42° T.C.A.								
174.49		8 m.m. Calcite-quartz vein at 38° T.C.A ± ⊥ to bedding.								
174.77		Bedding at 42° T.C.A.								
175.12	175.40	Brecciated zone of conglomerate fragments in calcite-quartz matrix - Upper contact at 40° T.C.A Lower contact at 53° T.C.A. approx.ly perpendicular to bedding								
175.70		15 m.m. Calcite-quartz vein at 36° T.C.A.								
176.00		30 m.m. Calcite-quartz vein at 36° T.C.A.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		176.05 - 177.59 Predominantly fine bedded black shale with conglomerate inclusions - bedding at 43° T.C.A.								
		176.40 - 176.64 Conglomerate lens ≈ 60mm true width at 22° T.C.A								
		176.45 22 mm Calcite - quartz vein at 35° T.C.A approx. ⊥ to bedding. - vein margins display clean breaks through conglomerate pebbles								
		176.88 - 177.03 Conglomerate lens - 90mm true width with minor levels of interstitial pyrrhotite (≈1%) - bedding at 50° T.C.A. - pebble distributions suggests that up hole is lower in sequence								
		177.09 14 mm Calcite quartz vein at 28° T.C.A. - fragments of shale suspended in calcite - minor pyrite (≈3%) present - vein margins display clean breaks through local conglomerate lens.								
		177.52 Bedding at 59° T.C.A.								
		177.59 - 182.07 Grey wacke Conglomerate.								
		178.43 Irregular fracture encrusted with minor pyrite								
		178.54 Calcite - quartz vein at 38° T.C.A.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-7.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		178.86 6m.m. Calcite vein at 63° T.C.A.								
		179.45 8m.m. Calcite vein at 41° T.C.A.								
	182.07	181.62 6m.m. Calcite vein at 44° T.C.A.								
182.07		BLACK SHALE (Hodge Slate) Predominantly fine bedded black shale with inclusive conglomerate lenses and local bedded pyrite - shale conglomerate contact displays sulphide with minor concordant pyrite.								
		182.07 10 m.m. irregular calcite vein at 60° T.C.A.								
		182.20 Bedding at 74° T.C.A.								
		182.37 - 182.42 Conglomerate lens at 59° T.C.A.								
		182.54 - 182.92 Conglomerate lens at 59° T.C.A.								
		183.52 14 m.m. Calcite vein at 54° T.C.A and approx ¼ to ½ bedding at 61° T.C.A								
		183.76 - 183.98 Conglomerate lens								
		183.85 6 mm calcite vein at 52° T.C.A.								
		184.20 Bedding at 53° T.C.A.								
		184.30 - 184.64 Conglomerate lens								
		184.77 Fine bedded pyrite at 50° T.C.A.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-7.

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		185.20 Fine bedded pyrite at 62° T.C.A.								
		185.30 Fine beddal pyrite at 62° T.C.A.								
		185.96 – 186.04 Conglomerate lens.								
		186.50 Bedding at 46° T.C.A.								
		187.22 10 m.m bedded pyrite at 32° T.C.A.								
		188.00 Bedded pyrite at 34° T.C.A.								
		189.06 Bedded pyrite at 39° T.C.A.								
		189.24 Bedded pyrite at 37° T.C.A.								
		189.67 0.50 m.m. pyrrhotite veinlet at 40° T.C.A oblique to bedding.								
		190.27 Bedded pyrite at 39° T.C.A.								
		190.50 Bedded pyrite at 36° T.C.A.								
		191.03 Fine grit lens carrying ± 40% pyrite at 42° T.C.A								
		192.66 8 m.m conglomerate lens with 25% pyrite within matrix and partial replacement of pebbles at 43° T.C.A.								
		193.60 Fine bedded pyrite at 40° T.C.A.								
		194.33 – 194.46 Several fine (< 1 mm) irregular fractures with pyrite								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-7 P 10 of

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		194.80 - 195.01 Conglomerate lens with minor (<1%) pyrite.								
		195.57 Bedding with pyrite at 48°								
		196.00 Fine bedded pyrite at 30°								
		196.82 3mm irregular calcite-quartz veinlet with 60% pyrrhotite at 35° T.C.A., obligue to bedding								
		197.11 Fine bedded pyrite at 53°								
		197.27 1mm calcite veinlet with ≥ 50% pyrrhotite-pyrite at 43° T.C.A., obligue to bedding								
		197.40 1mm calcite veinlet with 40% pyrrhotite-pyrite at 55° T.C.A., obligue to bedding.								
		198.55 - 198.62 Conglomerate lens with minor pyrite								
		198.86 3mm dislocated calcite veinlet with 30% pyrrhotite at 46° T.C.A. obligue to bedding.								
		199.13 - 199.40 Several fine (<1mm) calcite veins with 40% pyrrhotite at 39° to 59° T.C.A. obligue to bedding at 39° T.C.A.								
		200.35 Fine bedded pyrite at 39° T.C.A.								

DRILL HOLE RECORD PROPERTY DRILLED BY COMMENCED COMPLETED DEPTH RECOVERY

LOGGED BY CO-ORDINATES COLLAR R.L. BEARING DIP HOLE No. RZS-7

From	To	GEOLOGICAL DESCRIPTION	DRILLING From	DRILLING To	DRILLING Rec.	SAMPLING Sample No.	SAMPLING From	SAMPLING To	SAMPLING Length	SAMPLING Rec.
		201.20 10mm bedded pyrite at 38° T.C.A.*								
		202.00 Bedding at 36° T.C.A.								
		202.61 1mm calcite veinlet with 30% pyrrhotite at 33° T.C.A. oblique to bedding.								
		202.66 – 202.72 Conglomerate lens.								
		203.00 Bedding at 32° T.C.A.								
		HOLE TERMINATED AT 203 Metres.								
		DRILL HOLE SURVEYS (RENISHAW LIDS BOREHOLE CAMERA)								
		DEPTH DIP BEARING								
		90 m −44.5° In Casing								
		150 m −44° 239° Mag.								
		201 m −40° 239.5° Mag.								
		* T.C.A. denotes: to core axis.								

DRILL HOLE RECORD PROPERTY Razorback 6m/77 DRILLED BY A.O.D. COMMENCED COMPLETED 19-7-78 DEPTH 203 m. RECOVERY

LOGGED BY C.E. LAYDEN CO-ORDINATES A528.19N 2902.32E COLLAR R.L. 2576.4 BEARING 275°40' GRID DIP −46° HOLE No. RZ5-7. P 12 o

2800E.

2900E.

R.L. 300.

R.L. 200.

R.L. 100.

4600N.

Esc

Eu

Razorback Shear.

SECTION ALONG HOLE

E-W SECTION 4607·3N.

Serpentinite.

69·03

Dolomite.

96·10

Pyrrhotite veinlets
93·29 - 98·54
110·20 - 115·00.

Conglomerate.

120·73

Shale.

E.O.H. 128·40

ASSAYS:

NUMBER	FROM	TO	Sn	Cu	Pb	As	Ni	Zn. %
RZS - 1	57·76	57·92	<0·01	<0·01	<0·01	<0·01	0·34	
" - 2	58·66	59·40	<0·01	<0·01	<0·01	<0·01	0·46	
" - 3	59·40	60·71	<0·01	<0·01	<0·01	<0·01	0·41	
" - 4	93·29	94·50	0·14	0·04	0·04	0·01	0·08	
" - 5	94·50	95·50	0·59	0·04	0·09	0·03	<0·01	
" - 6	95·50	96·50	2·30	0·13	0·31	0·43	0·01	
" - 7	96·50	97·50	0·01	0·01	<0·01	<0·01	0·01	
" - 8	97·50	98·54	0·17	0·07	0·04	0·07	0·01	
RZS - 5C	94·50	95·50	0·60					
" - 6C	95·50	96·50	2·79					
RZS - 5D	94·50	95·50	0·60					
" 6D	95·50	96·50	2·70					
RZS - 44	110·20	111·50	0·36	0·03				0·08
" 45	111·50	112·50	0·10	0·04				0·09
" 46	112·50	118·50	0·096	0·03				0·01
" 47	113·50	114·20	0·04	0·08				0·008
" 48	114·20	115·00	0·01	0·06				0·008

DRILL HOLE SURVEYS:

Depth	Dip	Bearing
32	-73°	— (in casing)
79	-74·2°	268° mag.
127	-70·2°	288° mag. 306° grid.

RZS-1. PLAN.

RZS-1.
Co-ordinates: 4607·3 N. 2836·1E.
Bearing: 288° Grid.
Dip: -70°.
R.L. 272·4.

MINOPS PTY. LTD. RAZORBACK MINE.

DIAMOND DRILL HOLE: RZS-1

SCALE 1:500. Metres.

5 cm

2800E.

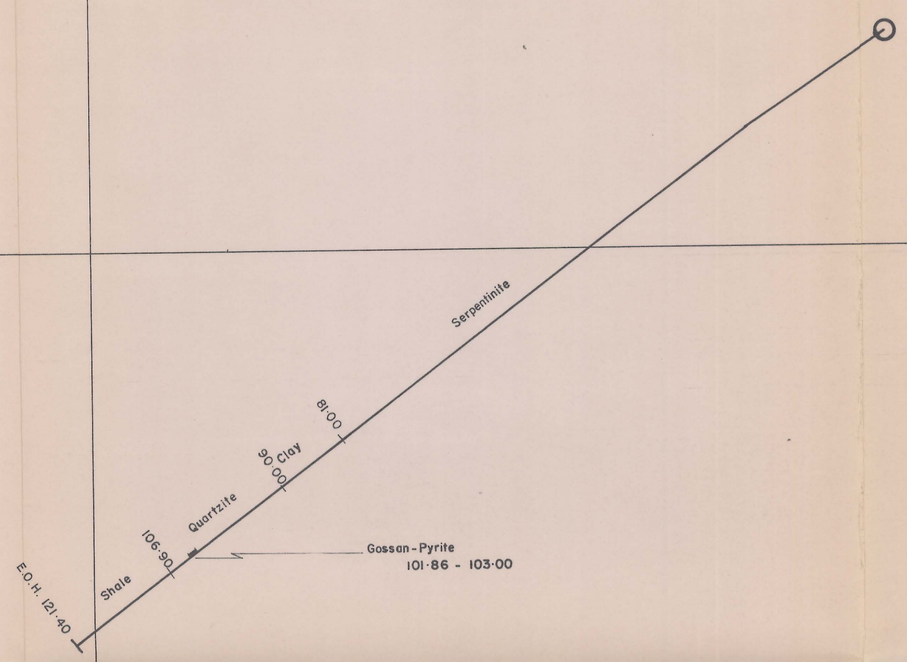
2900E.

R.L. 300.

R.L. 200.

R.L. 100.

4100N



ASSAYS

NUMBER	FROM	TO	Sn.	Pb.	As.	Cu.	Ni %
RZS-9	101·86	103·00	0·05	0·08	0·01	0·01	0·14
RZS-10	103·00	104·00	0·02	0·23	0·02	0·13	0·49
RZS-11	104·00	105·00	0·01	0·08	0·01	0·09	0·31
RZS-12	105·00	106·00	0·01	0·04	0·01	0·01	0·12
RZS-13	106·00	106·90	0·01	0·12	0·01	0·02	0·19

DRILL HOLE SURVEYS :

Depth	Dip	Bearing
40	−35·5°	- (in casing)
80	−37°	- (in casing)
121	−37°	243° mag. 267° grid.

RZS-2.
Co-ordinates: 4122·8N. 2895·3E.
Bearing: 270° Grid.
Dip: -34°.
R.L. 225·3.

MINOPS PTY. LTD. RAZORBACK MINE.

DIAMOND DRILL HOLE: RZS-2.

SCALE 1:500.

5 cm

2800E.

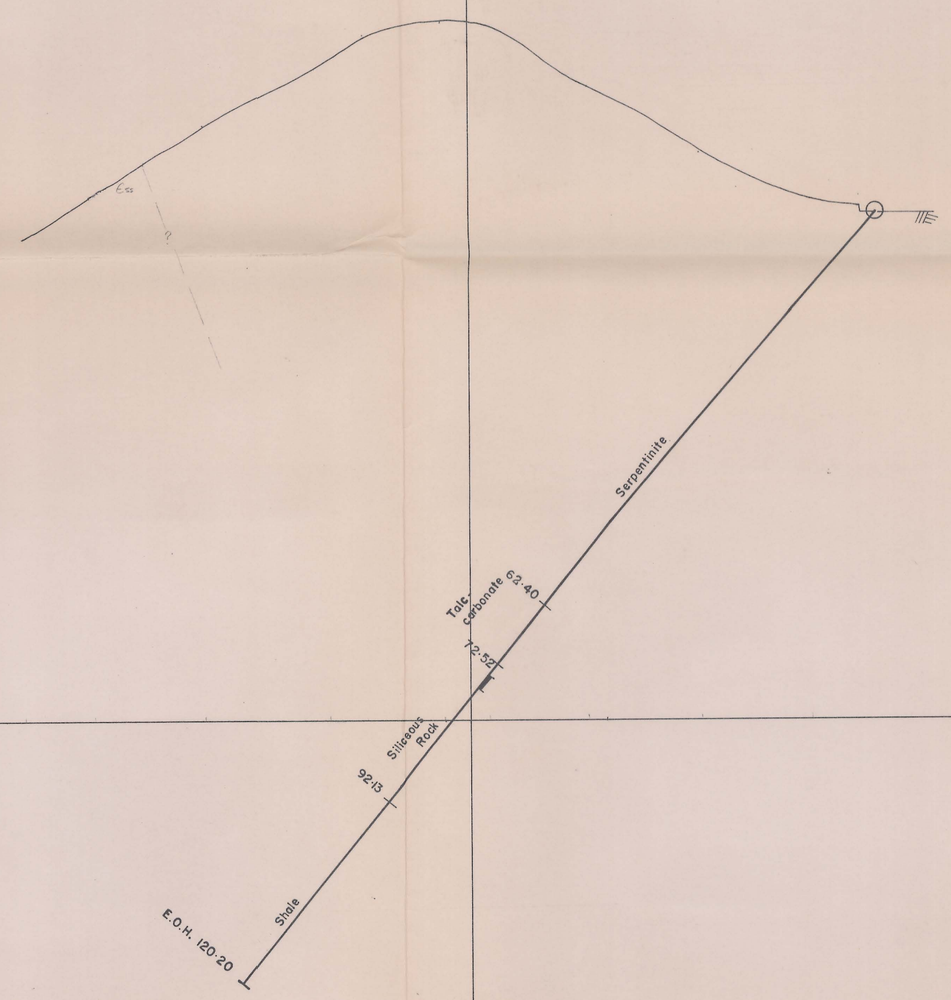
2900E.

R.L. 300.

R.L. 200.

R.L. 100.

4300 N.



ASSAYS:

NUMBER	FROM	TO	Sn	Cu %
RZS - 14	70·00	70·60	0·35	<0·01
RZS - 15	71·20	72·40	0·05	<0·01
RZS - 16	72·40	73·00	0·11	0·11
RZS - 17	73·00	73·70	0·12	0·10
RZS - 18	73·70	74·30	0·01	< 0·01

DRILL HOLE SURVEYS:

Depth	Dip	Bearing
31	- 49·5°	– (in casing)
63	- 51°	– (in casing)
98	- 51 °	244° mag. 269° grid.

RZS - 3

Co-ordinates: 4365·3 N. 2848·9 E.

Bearing: 270° Grid.

Dip: - 50 °.

R.L. 260·3.

MINOPS PTY. LTD. RAZORBACK MINE.

DIAMOND DRILL HOLE: RZS - 3.

SCALE 1:500.

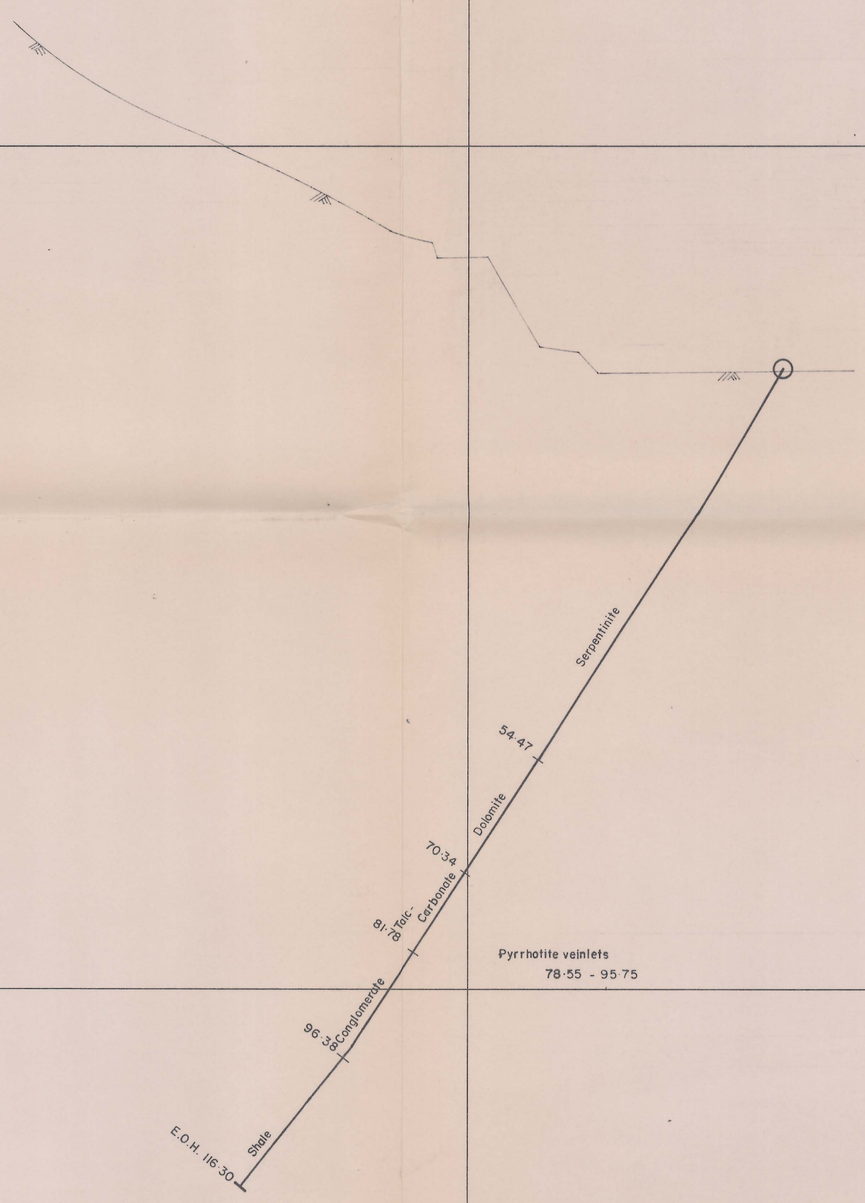
5 cm

2800E.

2900E.

R.L. 300.

R.L. 300.



R.L. 200.

R.L. 200.

ASSAYS:

NUMBER	FROM	TO	Sn. %	Cu %	Zn %
RZS-19	78·55	79·40	0·11		
RZS-20	79·40	80·40	1·60		
RZS-21	80·40	81·40	0·82		
RZS-22	81·40	82·29	0·05		
RZS-23	85·46	86·84	0·25		
RZS-30	82·29	82·94	0·09	0·09	0·17
RZS-31	82·94	83·56	0·06	0·01	0·12
RZS-32	83·56	83·94	0·003	0·00	0·02
RZS-33	83·94	84·70	0·005	0·00	0·32
RZS-34	84·70	85·46	0·01	0·00	0·22
RZS-35	86·84	87·84	0·03	0·01	0·11
RZS-36	87·84	88·84	0·007	0·00	0·37
RZS-37	88·84	89·84	0·19	0·01	0·52
RZS-38	89·84	90·84	0·18	0·01	0·06
RZS-39	91·57	92·50	0·16	0·02	0·12
RZS-41	92·50	93·50	0·18	0·01	0·64
RZS-42	95·55	95·75	0·49	0·04	0·50

R.L. 100.

R.L. 100.

DRILL HOLE SURVEYS:

Depth	Dip	Bearing
40	-57°	- (in casing)
80	-57°	255° mag.
110	-51·5°	265·5° mag. 282·5° grid.

4600 N.

4600 N.

RZS-4.
Co-ordinates: 4595·5N. 2837·5E.
Bearing: 280° Grid.
Dip: -60°.
R.L. 273·5.

2800E.

2900E.

MINOPS PTY. LTD. RAZORBACK MINE.

DIAMOND DRILL HOLE: RZS-4

SCALE 1:500. *Metres.*

5 cm

2800E.

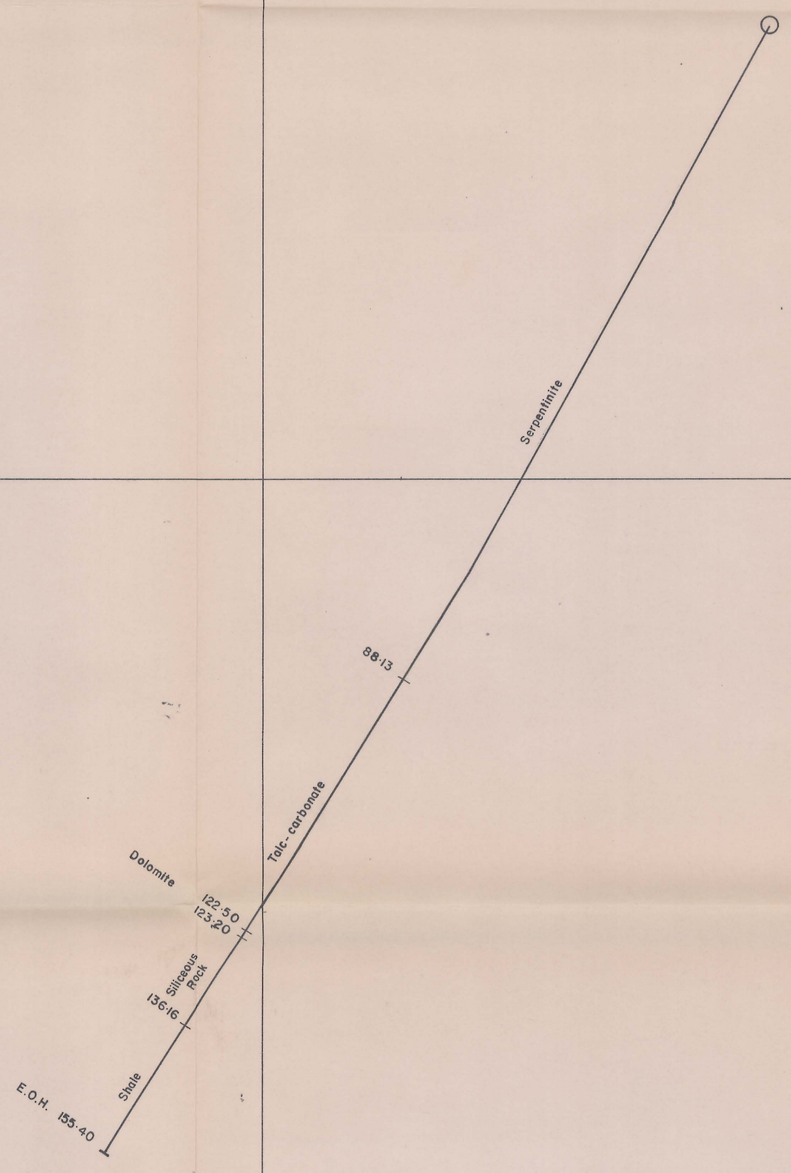
2900E.

R.L. 300.

R.L. 200.

R.L. 100.

4300 N.



DRILL HOLE SURVEYS:

Depth	Dip	Bearing
48	-61°	— (in casing)
99	-58°	243° mag 268° grid.
150'	-57°	242° mag 267° grid.

RZS-5.
Co-ordinates: 4354·54 N. 2860·22E.
Bearing: 270° Grid.
Dip: -62°
R.L. 253·7

MINOPS PTY. LTD. RAZORBACK MINE.

DIAMOND DRILL HOLE: RZS-5.

SCALE 1:500.

5 cm

2800E.

2900E.

R.L. 300.

R.L. 200.

R.L. 100.

R.L. 00.

4500N.

SECTION ALONG HOLE

E-W SECTION
4528·19N.

Serpentinite

115·80

Dolomite

Serpentinite 123·86
124·62

Dolomite

Pyrrhotite
173·87 - 177·24.

Pyrrhotite
182·99 - 184·22

207·34

Conglomerate

E.O.H. 287·00

ASSAYS:

NUMBER	FROM	TO	Sn % Total.	Sn as SnO_2	Cu %	Zn %.
RZS-24	173·87	174·87	0·27	0·05	0·11	0·16
RZS-25	174·87	175·87	0·17	0·01	0·18	0·01
RZS-26	175·87	176·87	0·61	0·05	0·58	1·30
RZS-27	176·87	177·24	0·13	0·01	0·17	0·04
RZS-28	182·99	183·60	0·28	0·18	0·10	0·01
RZS-29	183·60	184·27	0·28	0·05	0·23	0·01
RZS-40	180·17	180·55	0·05	0·04	0·01	0·01

DRILL HOLE SURVEYS:

Depth	Dip	Bearing
96	-69·5°	255° mag.
150	-69·5°	260° mag. (278l° grid)
179	-69°	298° mag.
233	-69°	252° mag. 270° grid.
286	-68·7°	255° mag. 273° grid.

RZS-6.
Co-ordinates: 4528·19 N. 2902·32 E.
Bearing: 293° 30' Grid.
Dip: -68°.
R.L. 257·6.

MINOPS PTY. LTD. RAZORBACK MINE.

DIAMOND DRILL HOLE: RZS-6.

SCALE 1:500.

5 cm

2800E.

2900E.

R.L. 300.

R.L. 200.

R.L. 100.

4500 N.

Serpentinite

121·80'

Dolomite

168·95

182·07

Conglomerate

Shale

E.O.H. 203·0

DRILL HOLE SURVEYS

Depth	Dip	Bearing
90	-44·5°	- (in casing)
150	-44°	239° mag. 260° grid.
201	-40°	239·5° mag. 260·5 grid.

5177

RZS-7.
Co-ordinates: 4528·19 N. 2902·32 E.
Bearing: 275°40' Grid.
Dip: - 46°.
R.L. 257·64.

MINOPS PTY. LTD. RAZORBACK MINE.

DIAMOND DRILL HOLE: RZS-7.

SCALE 1:500.

5 cm

4500 N
4600 N
4700 N
4800 N
4900 N
5000 N
2800 E
2900 E
3000 E
"OPEN CUT"
"Old Hodge Mill"
"Minops P/L Mill Site"
R3 Diamond Drilling : Placer Prospecting P/L 1965-66.
RZS-1 Diamond Drilling Minops Pty. Ltd 1978.
Department of Mines 1978 Report Appendix I.
MINOPS PTY. LTD.
RAZORBACK MINE
SURFACE SURVEY PLAN 4500 N - 5000 N . 2700 E - 3000 E.
DRAWN
TRACED
SCALE 1:500
10 5 0 10 20
METRES
DRG. No :
NOTE: Due to Plan distortion all positions are relative to 4700N 3000E.

Placer Feet RL	UTM RLS	
	Placer N°1	
	Placer-Dillon N°2	
	Rzb. (Mill) N°1	270.6
918.3	Upper Rzb.	315.5
932.4	Hodges	319.8 floor
935.5	Brocks	322.5 floor
	Rzb. N° 3	277? floor
806.8	4	281.5 floor
	5	
	6	
	7	
831	8	288.9 floor
826.6	9	287.6 291 back

Hole N°	Grid Bearing	Dip
R1	297°	-60°
R2	297°	-75°
R3	271°	-45°
R4	317°	-75°
R5	317°	-40°
R6	317°	-57°
R7	268°	-65°
R9	306°	-75°
R10	304°	-78.5°
R11	292°	-45°
R12	288°	-60° Unknown
R13	?	?
R16	325°	-70°
MD-1	305°	-50°
MD-2	242°	-50°
MD-3	269°	
RZS-1	288°	-70°

MINOPS PTY. LTD.

RAZORBACK.

SURFACE HOLE LOCATIONS.

Scale 1:500.